TASK 2 REPORT
NEW YORK STATE ELECTRIC & GAS CORPORATION
INVESTIGATION OF THE FORMER COAL
GASIFICATION SITE
GENEVA, NEW YORK

VOLUME I
TECHNICAL REPORT

TRC Environmental Consultants, Inc.

Prepared by:

Lynne France
John Palmer

Reviewed by:

James Gould, P.E.

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TRC Project No. 3292-N61

800 Connecticut Blvd.
East Hartford, CT 06108
(203) 289-8631

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1.0 INTRODUCTION

In December, 1985, TRC Environmental Consultants (TRC) received authorization to begin Task 2 of the investigation of the former Geneva (Border City) coke plant site, and field work began in mid-January, 1986.

The site is located two miles east of the City of Geneva, Seneca County, N.Y. (Figure 1-1). The original plant was built between 1901-1903 by the Empire Coke Company and consisted of 31 coke ovens and 2 gas holders. Expansions in 1909 allowed the facility to produce blue gas. In 1914 the plant was sold to Empire Gas and Electric Company, and in 1925, New York Central Electric Corporation gained control of the company. The coal gasification operation officially closed in August 1934, and the property is currently the site of the New York State Electric and Gas Corporation (NYSEG) Service Center. The location of the present site buildings and the configuration of former structures is depicted in Figure 1-2.

Previous investigations at the site, including TRC's Task 1 investigation and air sampling conducted during a sewer line excavation in Fall, 1985, and borings drilled by Woodward-Clyde Consultants in 1984, established that residues related to the coking/gasification process exist at the site. Compounds characteristic of coal tars were found in soil borings at the site and high electrical conductivity values were obtained during geophysical surveys in the vicinity of the Service Center. Visual inspection of the site revealed evidence of gasification byproducts and waste in the area near the former purifier building and in the sediments of a site stream.

1.1 Purpose and Scope of Task 2

The purpose of the Task 2 investigation is to determine:

- which coal gasification constituents are present at the site;

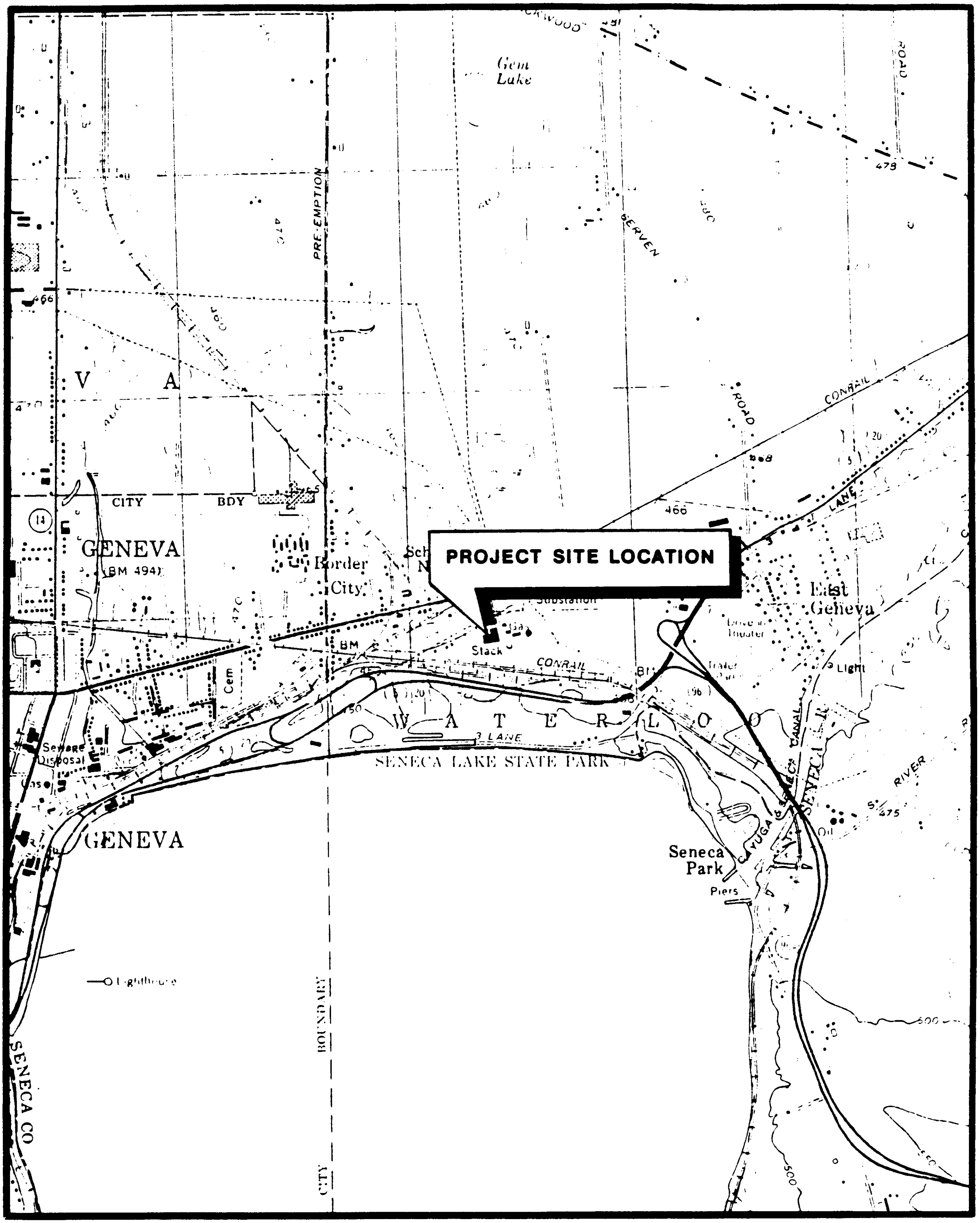
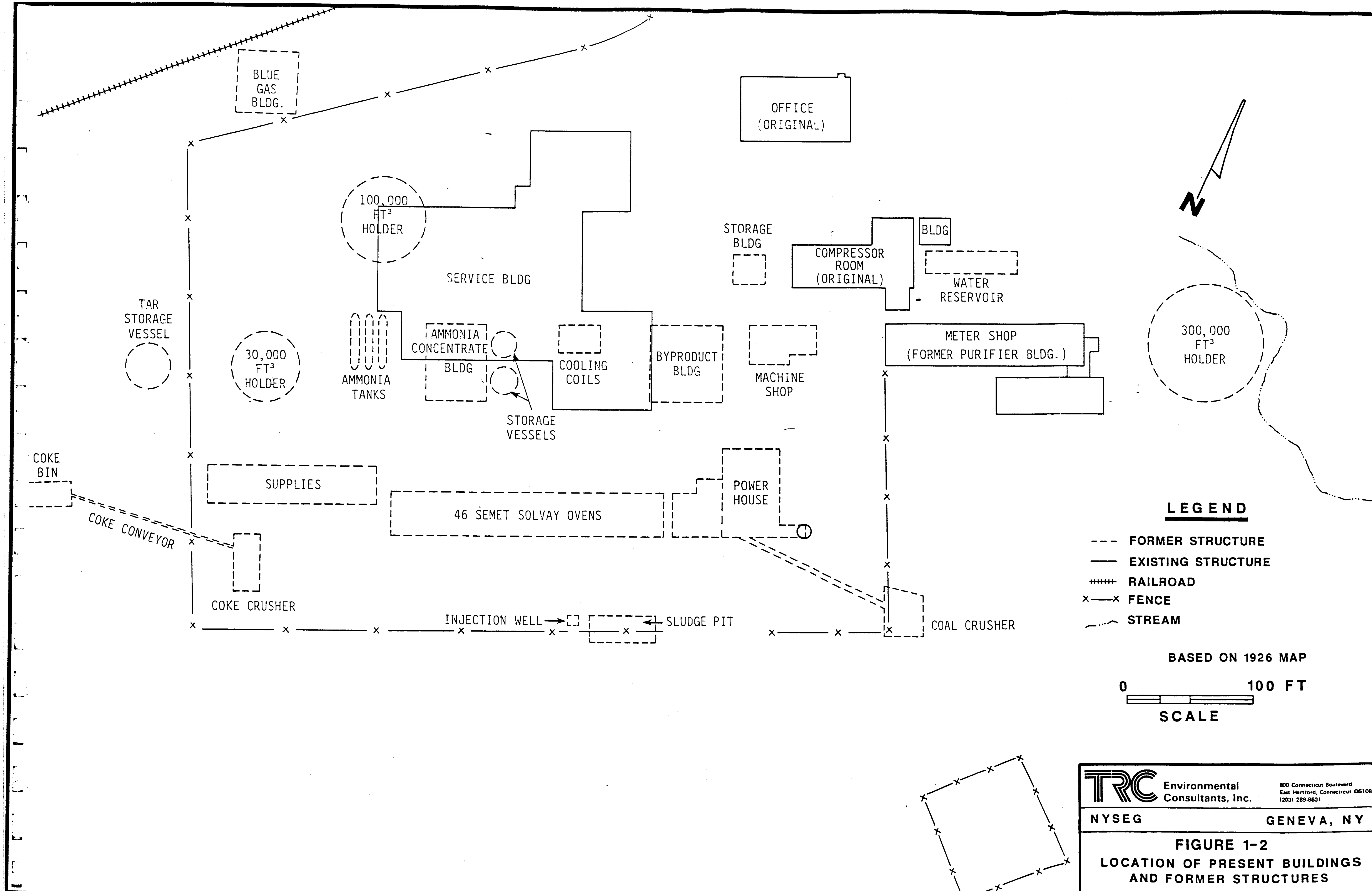


Figure 1-1. Location of the Former Geneva Coke Plant.



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800 Connecticut Boulevard
East Hartford, Connecticut 06108
(203) 289-8631

NYSEG GENEVA, NY

FIGURE 1-2
LOCATION OF PRESENT BUILDINGS AND FORMER STRUCTURES

- the approximate horizontal and vertical extent of these constituents;
- the potential routes of constituent migration;
- the impacts on ground water quality;
- the extent to which on-site and off-site receptors may be exposed to contamination; and
- the potential public health and environmental impacts.

The field work involved the excavation of forty-three test pits, drilling six borings, the installation of six monitoring wells in these borings, and air quality monitoring to determine background conditions as well as the effects of subsurface work on air quality. Sampling included soil sampling from test pits, sediment sampling from the site streams, and three rounds of ground water and surface water sampling.

In addition to the field investigation, Task 2 includes a qualitative assessment of the potential risk to human health posed by the contaminants at the site.

1.2 Previous Investigations

TRC completed Task 1 of its investigation of the former Geneva coal gasification site in December, 1985, and submitted the final Task 1 report to NYSEG on May 13, 1986. This initial phase of the site investigation included both background research and preliminary field work.

A historical review of the site ownership and operating procedures was performed. This involved the examination of written materials and interviews with former gas plant employees. Information on the regional and site geological and hydrological setting was also gathered.

Preliminary fieldwork included a two-phase geophysical survey conducted by Weston Geophysical and TRC, an air quality survey of the site buildings, and a visual inspection of the site and site stream.

In addition to site work performed by TRC, Woodward-Clyde Consultants performed a site study for NYSEG in 1984, which involved drilling 21 shallow boreholes and taking 11 soil samples and 1 water sample. These samples were analyzed for total phenols, aromatics and PAHs. A discussion of their findings is incorporated into the Task 1 report.

The results of the Task 1 investigations are summarized in the following sections. A detailed description of the work, including Weston Geophysical's report, is presented in the Task 1 report.

1.2.1 Historical Review

A historical review of the site and its operations, based largely upon interviews with former plant employees, revealed that both solid and liquid wastes were disposed of on-site.

The solid wastes included iron oxide-impregnated shavings from the purification process and tars. These materials were disposed of in an area in the eastern section of the site and covered once yearly with top soil. Also disposed of in this area were some waste water and wastes from drip boxes located under equipment or gas lines. Coke quench water was initially discharged to the site stream. In 1923, a concrete-lined sludge basin was built to accept the coke quench water prior to discharge, and in 1927, a 336 foot deep injection well was installed at the site to dispose of the coke quench water. Other liquid wastes appear to have been disposed of in the eastern area of the site.

1.2.2 Geophysical Survey

Geophysical surveys conducted by TRC and Weston Geophysical Corporation personnel included seismic refraction, electrical resistivity and electromagnetic methods.

The objective of the seismic work was to determine if a glacial till layer is present beneath the Geneva site, and the depth to, and nature of, the bedrock. Two seismic refraction profiles were completed; the first ran east-west along the southern property boundary, and the second ran north-south through the marsh east of the compressor building and old purifier house.

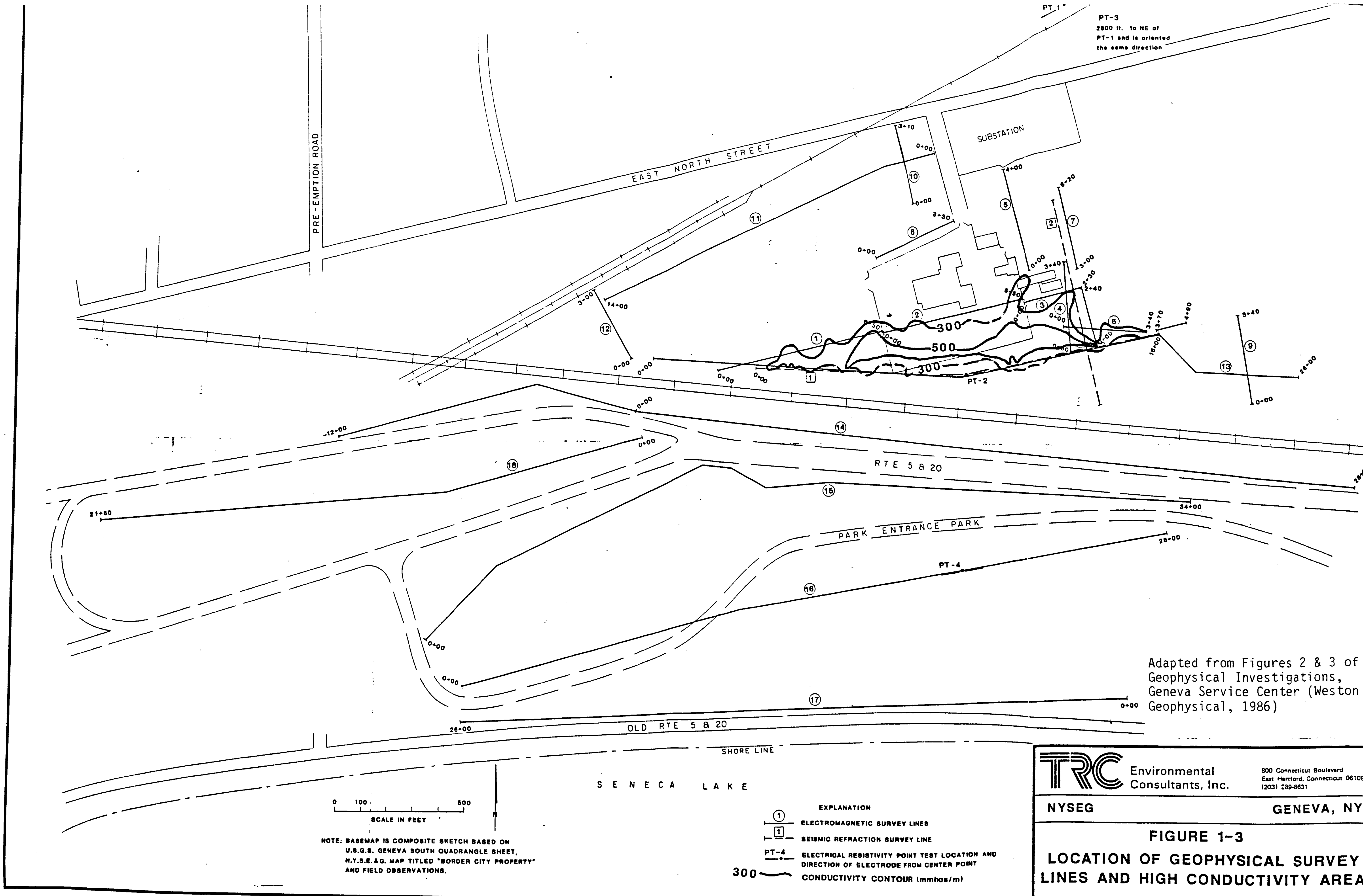
The results of the survey indicated that massive, relatively unweathered, unfractured bedrock is present at a depth of approximately 200 feet at the western edge of the property and 175 feet near the eastern edge. The bedrock is overlain by water-saturated alluvial or fluvial deposits. The seismic data did not detect any velocities indicative of dense glacial till deposits.

Four electrical resistivity point tests were performed at the site. Highly conductive materials were detected within 30 feet of the surface around the Service Center.

Electromagnetic measurements were taken along 18 survey lines using a Geonics EM-31 attached to a continuous chart recorder and on one survey line using an EM-34 (Figure 1-3). The most significant anomaly was detected in and around the Geneva Service Center. The anomaly is centered south of the present buildings and is elongated in an east-west direction. Other anomalies detected were determined to be unrelated to possible contamination at the Service Center because of the distance from the Service Center and the presence of background values between the Service Center anomaly and the others.

1.2.3 Air Quality Survey

Air quality surveys were conducted at the Geneva site as part of two separate investigations. TRC monitored the air quality during the excavation of a sewer line on the site between November 18-20, 1985, and an Organic Vapor Analyzer (OVA) survey of the site buildings was completed on November 21, 1985 as part of Task 1.



Adapted from Figures 2 & 3 of Geophysical Investigations, Geneva Service Center (Weston Geophysical, 1986)

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800 Connecticut Boulevard
East Hartford, Connecticut 06108
(203) 289-8631

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FIGURE 1-3

LOCATION OF GEOPHYSICAL SURVEY LINES AND HIGH CONDUCTIVITY AREA

The purpose of the sewer line excavation survey was to perform real time monitoring of volatile organic hydrocarbon emissions from the excavation to insure that the proper level of worker respiratory protection was used. The monitoring results were additionally used to evaluate potential occupational exposure to volatile organic hydrocarbons.

Two types of monitoring were performed during the subsurface investigation; a Century Model OVA-128 Portable Organic Vapor Analyzer provided instantaneous readings of the volatile organic hydrocarbons that may have been present during the excavation, and 3M organic vapor dosimeters measured airborne concentrations of benzene and naphthalene. Benzene and naphthalene were selected as indicators of aromatic hydrocarbons and coal tar products which are potential residuals of coal gasification.

The data from the OVA monitoring is presented in Table 1-1 and sampling locations are depicted on Figure 1-4. As discussed in Section 1.2.4, two areas of coal tars were found in the excavation. OVA readings near this material (locations 4 and 6 on Figure 1-4) were elevated initially, but decreased markedly with time, and by the next day had returned to ambient levels. The wind speed was very low during the period of high readings. Faster dispersion of organic vapors would have occurred if the speed had been higher. For most of the period during which the excavation was open, the OVA readings were at background (0-2 ppm) both in the excavation and in the respiratory zone.

The dosimeters were analyzed in TRC's analytical laboratory using gas chromatographic techniques. The data from the personal dosimeters in Table 1-2 shows that all values for benzene and naphthalene are below the detectable limit. The observed values of 0.5 to 1.6 mg/m^3 benzene and 0.44 to 1.8 mg/m^3 naphthalene, are well below the Threshold Limit Value (TLV) for benzene at 30 mg/m^3 (10 ppm) and naphthalene at 50 mg/m^3 (10 ppm)

TABLE 1-1

ORGANIC VAPOR CONCENTRATIONS
DURING SEWER LINE CONSTRUCTION

Date of Sample	Air Sampling Location [1]	Average OVA reading (ppm) In Excavation	Ambient
11/18/85	1	0-1	0
11/18/85	2	0-1	0
11/19/85	3	2-6	1-2
11/19/85	4	8-10	1-2
11/20/85	5	0-2	0
11/20/85	6	2-10	0-1
11/21/85	7	0-1	0
11/21/85	Ejector Pump	0	0

[1] See Figure 1-4 for locations

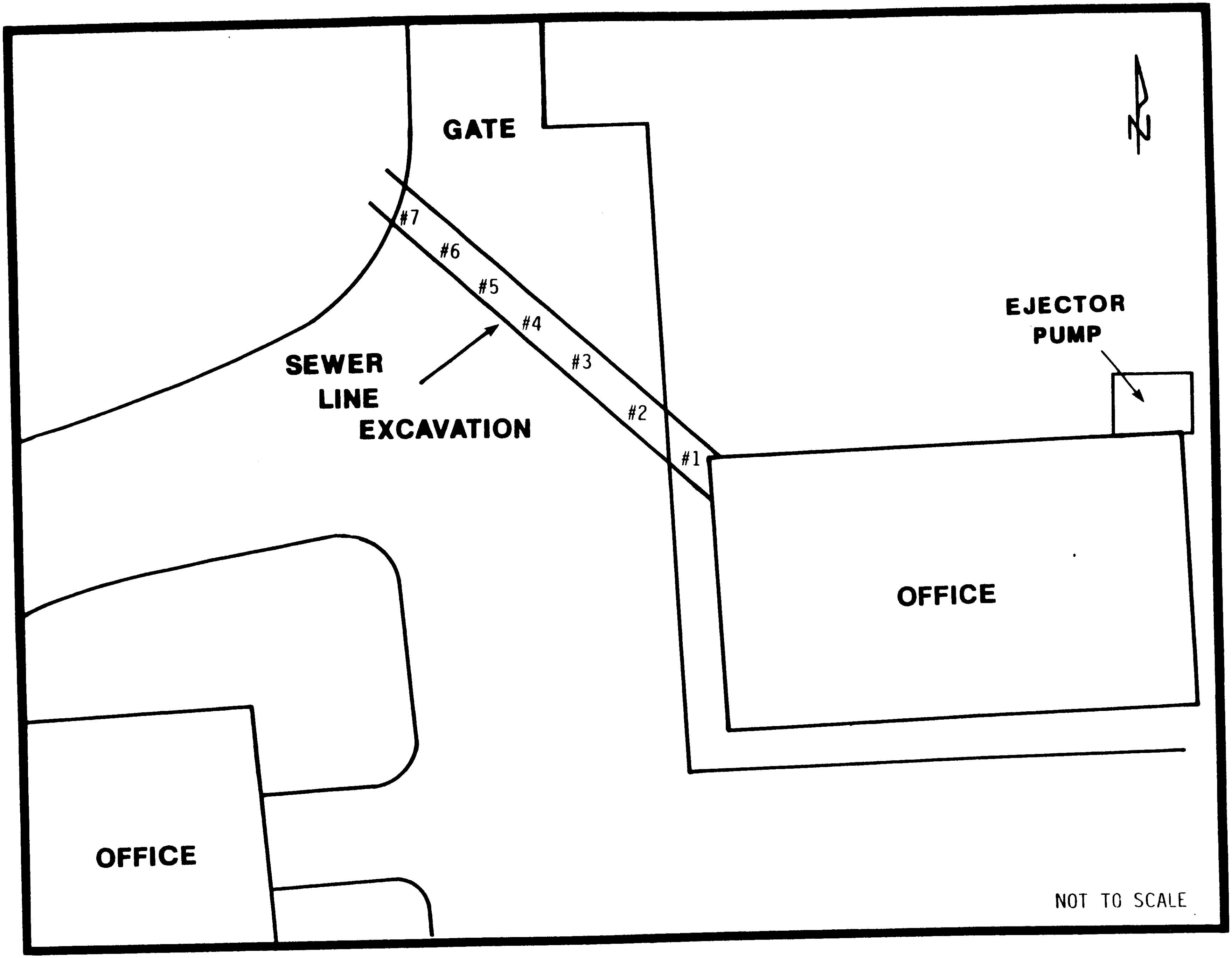


Figure 1-4. OVA Sampling Locations for Sewer Line Excavation

TABLE 1-2

DOSIMETER DATA FOR BENZENE AND NAPHTHALENE
SEWER LINE EXCAVATION

Sampling Date	Employee First Name	Sample Number	Exposure Time (min)	Air Volume (l)	BENZENE Detection Limit[1] mg	BENZENE Detection Limit[1] mg/m^3	BENZENE Concentration mg/m^3	NAPHTHALENE Detection Limit[1] mg	NAPHTHALENE Detection Limit[1] mg/m^3	NAPHTHALENE Concentration mg/m^3
11/18	Harry	3343	186	6.6	<0.009	<1.4	BDL*	<0.008	<1.8	BDL*
11/18	Dave	3404	185	6.6	<0.009	<1.4	BDL	<0.008	<1.8	BDL
11/18	Charlie	3435	185	6.6	<0.009	<1.4	BDL	<0.008	<1.8	BDL
11/19	Dave	3177	468	16.6	<0.009	<0.55	BDL	<0.008	<0.70	BDL
11/19	Charlie	3306	468	16.6	<0.009	<0.55	BDL	<0.008	<0.70	BDL
11/19	Harry	3388	488	16.6	<0.009	<0.55	BDL	<0.008	<0.70	BDL
11/20	Dave	2746	508	18.0	<0.009	<0.50	BDL	<0.008	<0.44	BDL
11/20	Harry	3233	508	18.0	<0.009	<0.50	BDL	<0.008	<0.44	BDL
11/20	Charlie	3268	508	18.0	<0.009	<0.50	BDL	<0.008	<0.44	BDL
11/21	Dave	2942	508	18.0	<0.009	<0.50	BDL	<0.008	<0.44	BDL
11/21	Harry	3078	158	5.6	<0.008	<1.60	BDL	<0.008	<1.43	BDL
11/21	Charlie	3097	508	18.0	<0.009	<0.50	BDL	<0.008	<0.44	BDL

[1] Detection Limit varies with exposure time.

* BDL: Below Detection Limit

established by the American Conference of Governmental Industrial Hygienists. In addition, the chromatograms completed for these samples indicated no other organic compounds present at the time of sampling.

As part of Task 1, a real-time air quality survey (using an OVA) was conducted in the site buildings. Outdoor ambient conditions were also recorded. The organic vapor levels listed in Table 1-3 are in all but a few instances below 10 ppm (30 mg/m^3), the threshold limit value for benzene.

Exceptions to the above-referenced findings are the meter storage room (10 ppm), new office control room in the compressor building (12 ppm), and the transmission room in the compressor building (150 ppm). What is now the meter building was originally the purifier building where coal tar pitch and other impurities were removed from the gas stream. This may be a source of the slightly elevated organic vapor concentrations. Alternatively, the higher readings may be due to slight leakage of natural gas from the compression process.

1.2.4 Soil and Water Quality

In 1984, 21 test borings were drilled at the Geneva site by Woodward-Clyde Consultants. Eleven soil samples and one ground water sample were taken and analyzed for total phenols, aromatics (602 series) and polynuclear aromatic hydrocarbons (PAHs) (610 series).

The results of the analyses indicate that compounds characteristic of coal tars are present in significant amounts in the soils taken from a few borings (shown in Figure 1-5). The water sample contained similar contaminants, although in lower concentrations.

As discussed in Section 1.2.3, an on-site sewer line was excavated in November, 1985. This line trends NW-SE from the Northwest corner of the old generator building (Figure 1-4). The soil materials were mapped during the

TABLE 1-3

AIR QUALITY SCREENING GENEVA SITE

Building	Location	Organic Vapor Levels (ppm)	Outdoor Ambient Organic Vapor Levels (ppm)
New Office Building	2nd floor office space	0-0.5	0.5
New Office Building	2nd floor storage area	0.5	0.5
New Office Building	1st floor stores UC&M	1.0-1.3	0.2
New Office Building	1st floor hallway	0.9	0.2
New Office Building	1st floor garage	2.8-3.2	0.2
Meter Building	1st floor loading dock	2.5-3.0	0.2
Meter Building	Meter Storage	10.0	0.5
Meter Building	Coffee Room	7.0-9.0	0.5
Compressor Building	Calibration Room	1.0	0.5
Compressor Building	New Office Control Room	12.0	0.5
Compressor Building	Transmission Room	150.0	0.5
Compressor Building	Welding Shop	0.7	0.5
Compressor Building	Storage area	2.2-2.4	
Old Office Building	2nd floor SP&C Dept.	3.7	0.5

TABLE 1-3 (Continued)

AIR QUALITY SCREENING GENEVA SITE

Building	Location	Organic Vapor Levels (ppm)	Outdoor Ambient Organic Vapor Levels (ppm)
Old Office Building	2nd floor Elect & Gas Disp.	1.6	0.5
Old Office Building	2nd floor offices	2.6-2.8	0.5
Old Office Building	2nd floor classroom	2.8	0.5
Old Office Building	Stairs 2nd floor	2.3	0.5
Old Office Building	1st floor conference room	1.5	0.5
Old Office Building	Janitor Room 1st floor	1.8	0.5
Old Office Building	Store Room	1.5	0.5
Old Office Building	Electric Meter Dept.	1.2-2.0	0.5
Old Office	Hall 1st floor	1.2	0.5

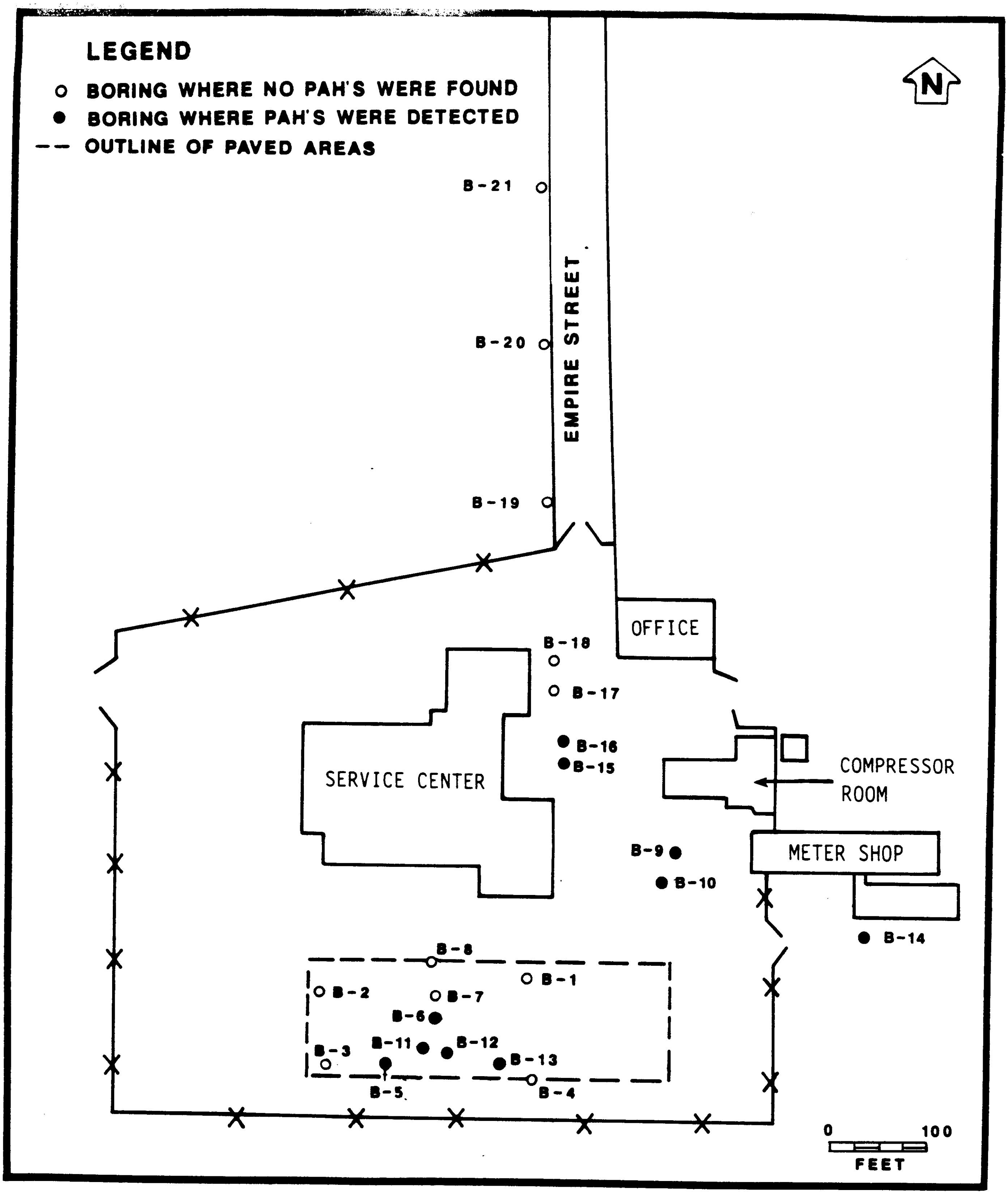


Figure 1-5. Location of previous soil borings
(Data from Woodward - Clyde, 1984 et seq)

excavation, and Figure 1-6 contains a generalized soil profile of the excavation. Coal tars were found in two locations, each having the consistency of hard pitch. In each location, the tars were in a layer 4-6 inches thick extending over an irregular area approximately 4 to 6 feet long. The general profile of the excavation from the surface downward consisted of the following: blacktop underlain by clean fill underlain by black debris (consisting of coal fines, clay, etc.) underlain by the previously noted coal tar in two locations, underlain by undisturbed brown silty clay.

During the Task 1 investigations, a visual inspection of the site revealed evidence of near-surface contamination south of the gas holder and purifier building (see Figure 1-7). Rocks coated with what appears to be ferric-ferrocyanide ("blue billy") were found throughout that area.

The site stream was walked from the railroad embankment to the parking lot and examined for signs of coal tar contamination (see Figure 1-8 for location). Hydrocarbons were found in the bottom sediments in two separate areas of the stream, as evidenced by small slicks which floated to the surface when the sediment was disturbed. The odor given off by these sediments is characteristic of coal tars. The first area of observed hydrocarbons is from the railroad embankment to just above the road leading to the sewage treatment plant, and the second area is from the parking lot down to about the compressor house (Figure 1-8). The portion of the stream between these areas showed no visible hydrocarbons. The stream in this area was dredged at some time after the closing of the coking operation.

1.3 Nature and Extent of the Problem

Previous investigations established the on-site presence of coal tar constituents. Known areas of soils and stream sediments containing PAHs exist on-site. Ferric-ferrocyanide and other cyanides are likely indicated by the

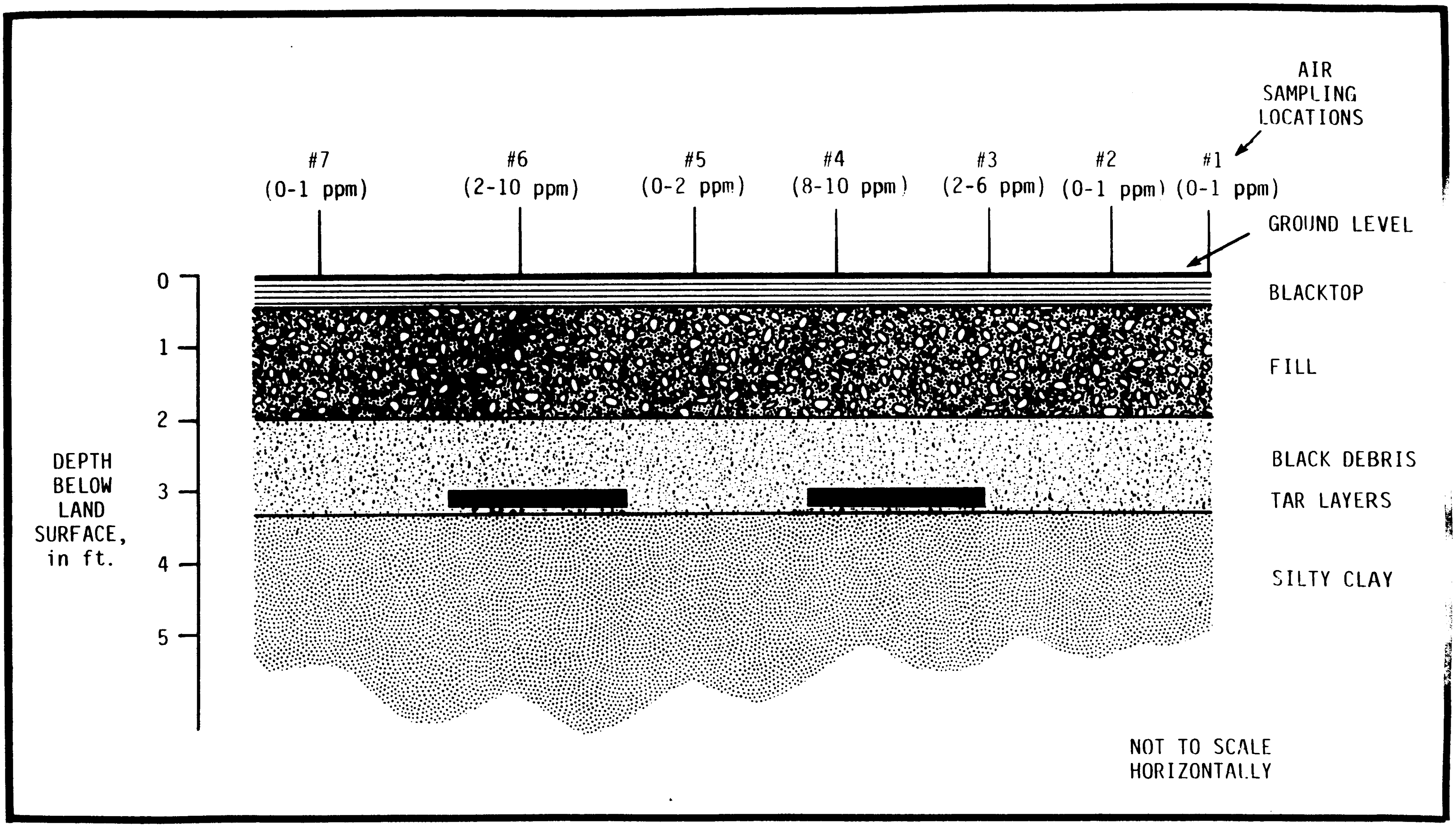


Figure 1-6. Generalized soil profile of sewer line excavation with average OVA readings within the pit.

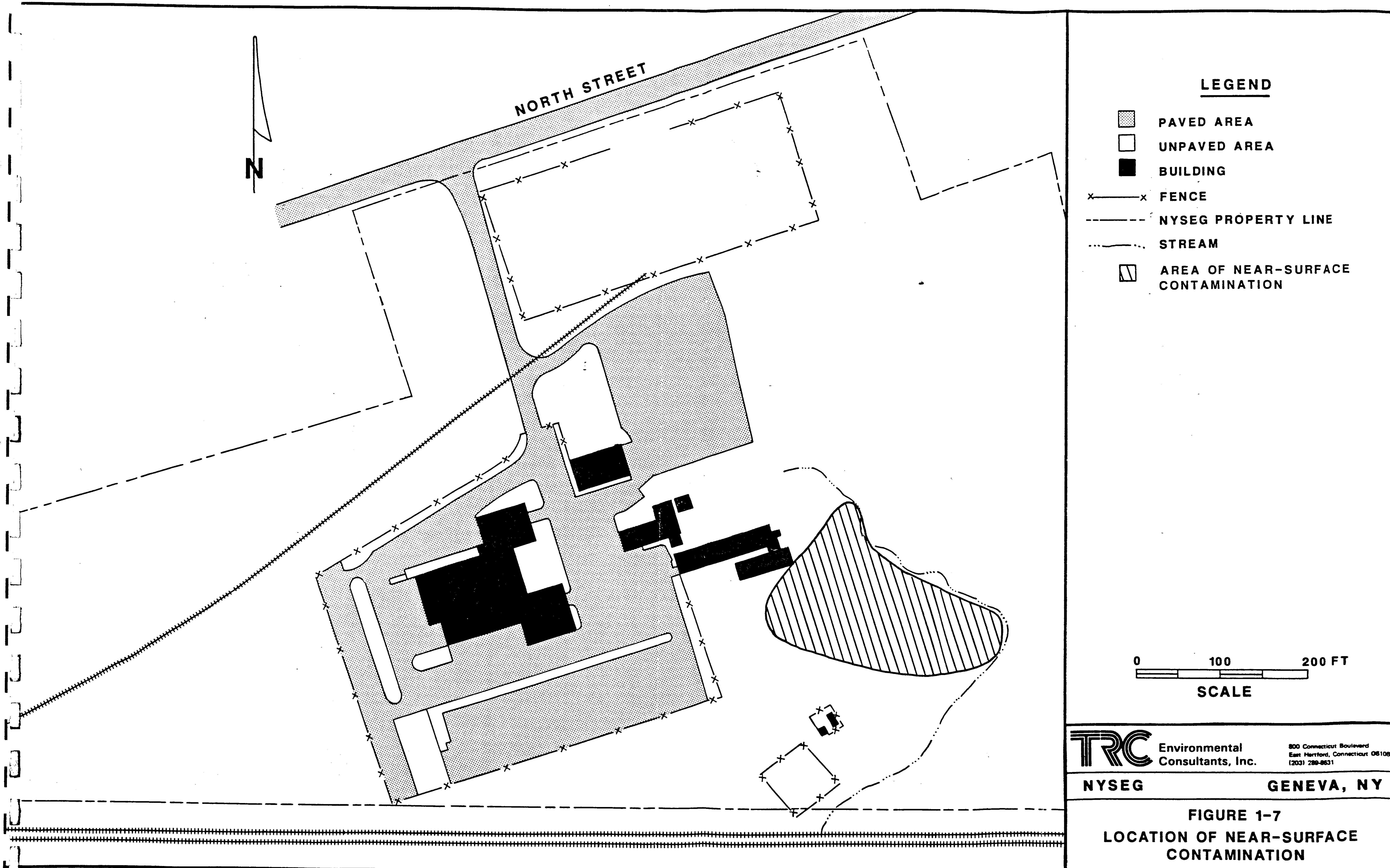


FIGURE 1-7
LOCATION OF NEAR-SURFACE CONTAMINATION

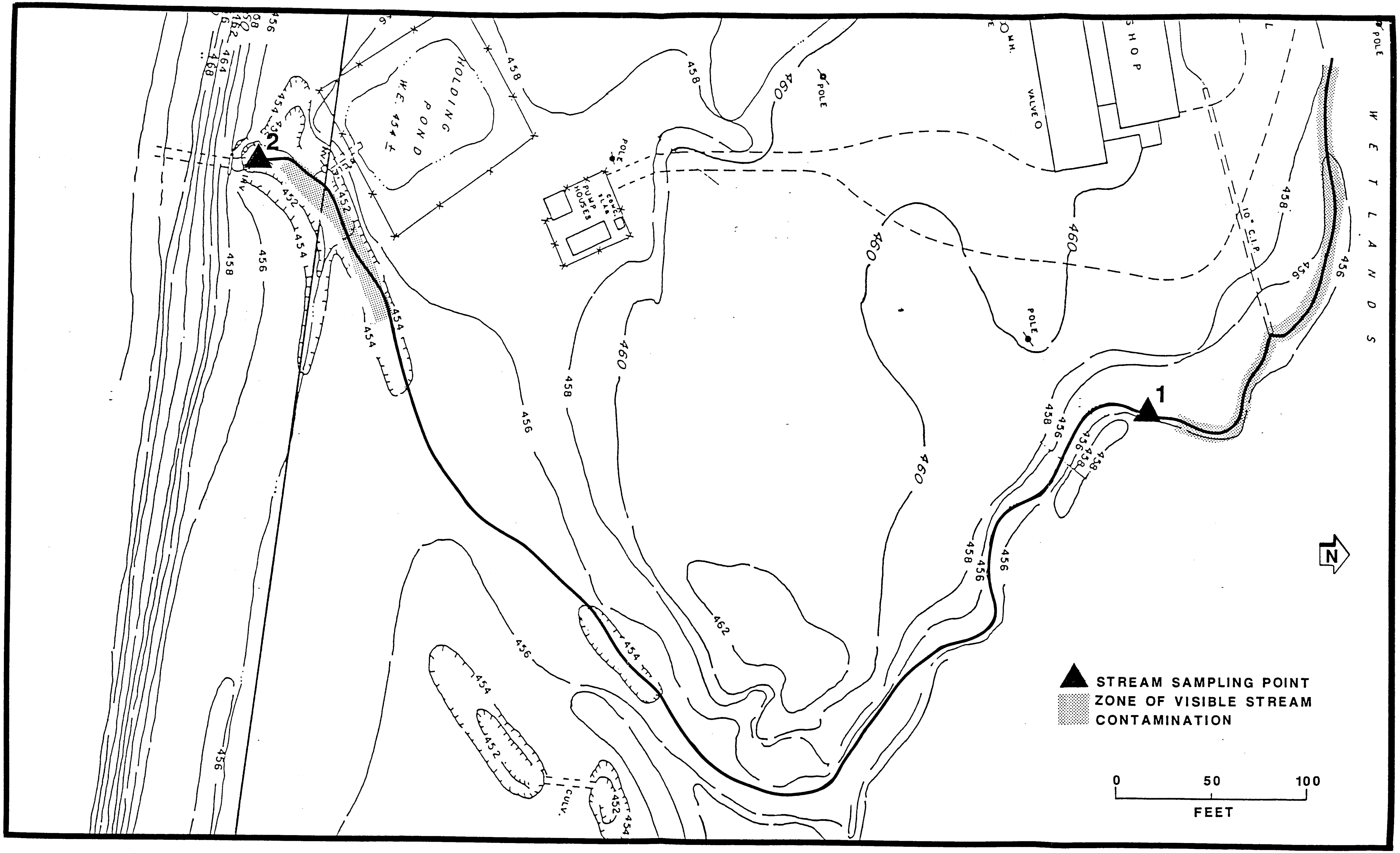


FIGURE 1-8

LOCATION OF POSSIBLE HYDROCARBONS IN STREAM SEDIMENTS

presence of "blue billy" found coating some rocks near the site of the gas holder and purifier building.

The use of a deep injection well to dispose of coke quench water suggests that there may be coal tar constituents at depths greater than 200 feet, i.e., in the bedrock. Within a one mile radius of the site, there are no potable water wells in the bedrock formation.

Air quality impacts from volatile organic compounds appear to be minor and present minimal risk to on-site workers. The measured levels are at or below the benzene threshold limit value (TLV) of 10 ppm (Time Weighted Average)(Lederer, 1985) established by the American Conference of Industrial Hygienists. One high reading was detected in the transmission room of the natural gas compressor building, an area not frequented by employees. It is suspected that this reading was caused by minor natural gas leakage. Natural gas is a simple asphyxiant, dangerous in very high concentrations; however, no TLV has been established for this substance.

These previous investigations identified direct contact, ground water, surface water, stream sediments, and possibly fugitive dust from the former disposal area, as primary potential contaminant pathways. Fugitive dust was later eliminated as a possible pathway due to the moist nature of the site.

At the conclusion of Task 1 the spatial extent of the constituents in both the near surface and deeper levels was not known. In addition, the data collected were insufficient to establish the type(s) and quantity of the material disposed of and the extent of any plume that may exist because of that disposal.

The method by which the suspected tars entered the stream sediments also has not been determined. This information is important because a direct disposal route suggests that the level of contamination is not increasing through time, whereas material seeping into the sediments from another source could cause such an increase.

The geophysical survey conducted as part of Task 1 established the presence of bedrock at 175 to 200 feet and the lack of a glacial till layer. Prior to Task 2 no investigations were done which could provide either more detailed stratigraphic information or data on the role that the unconsolidated materials and bedrock play in contaminant migration.

2.0 SITE HISTORY

A review of the Geneva site history was conducted as part of Task 1 and is briefly summarized in this section. This review of the site conditions and unit operations was conducted to determine locations of gas operation facilities, potential sources of waste, areas in which wastes were handled, and disposal practices.

The original plant was built during the period 1901-1903 by the Empire Coke Company. At that time the facility consisted of 31 coke ovens and two large gas receivers. Expansion in 1909 increased the number of coke ovens to 46 and later additions included a blue gas operation with a holder in the northern part of the site.

In February, 1925, New York Central Electric Corporation acquired controlling interest in the company. Coal gas production at the site terminated in August, 1934. The property is currently maintained by NYSEG as a gas and utility substation.

2.1 Plant Operations

A brief description of plant operations is presented here, and waste generation processes are summarized diagrammatically in Figure 2-1. Bituminous coal arrived at the site by rail, was stored in piles, crushed, and sent to Semet-Solvay ovens. The coke was pushed out the back of the ovens, quenched by water, graded, and stored in bins until it was shipped out by rail.

Gas produced from the heating of the coal was collected from the top of the ovens. The liquid and gas components were separated, and the gaseous portion sent through a series of screens and scrubbers. Tars separated from the gas stream were stored in tanks. Final gas purification occurred in the purifying building and the gas was stored in gas holders prior to distribution.

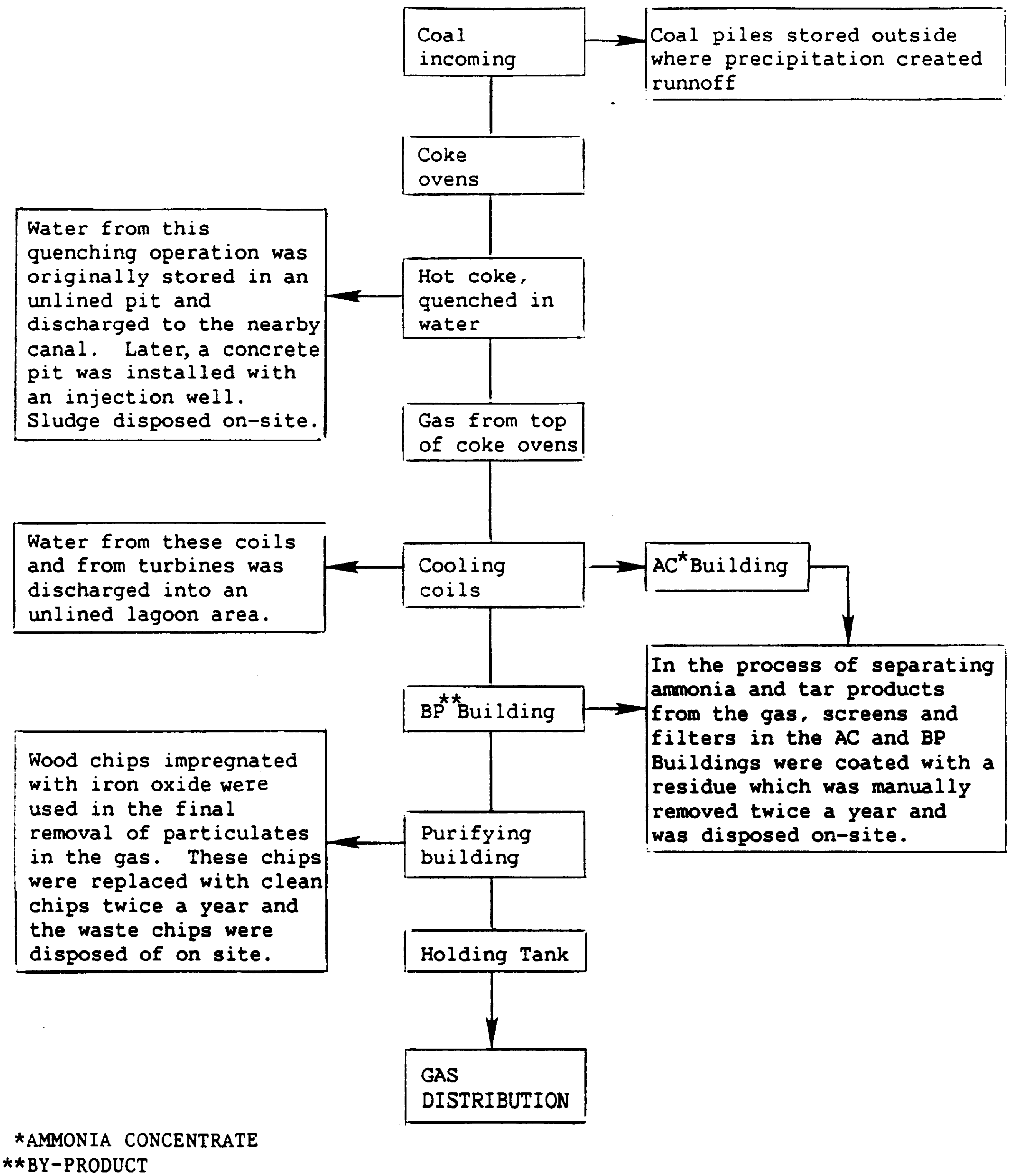


Figure 2-1. Waste Generation Flow Diagram
Geneva Coal Gasification Plant

The blue gas operation was used when the rest of the plant could not accommodate consumer gas demands. Blue gas was used only as a back-up fuel and no details were available concerning purification or scrubbing.

2.1.1 Waste Generation and Disposal

A small portion of both the solid and liquid wastes generated by the blue gas process were disposed of on-site. Most of these waste materials were collected and sold.

The major source of the solid wastes disposed of on-site was the iron oxide-impregnated shavings from the purifying building. Additional wastes included tars which accumulated on the wooden and metal screens in the by-product and ammonia concentrate buildings. The majority of these wastes were transported to a disposal area south and southeast of the gas holder in the eastern portion of the property.

The predominant liquid waste generated at the coke plant was waste water from the coke quenching operation. During the early years of plant operation, this water was discharged to the site stream. In 1923 a concrete-lined coke quench waste water sludge basin was constructed at the site. Coke quench water was pumped into this stream and allowed to separate. The coke quench water supernatant was discharged to the nearby stream, while the lower liquid layer was disposed via an 8 inch diameter, 336 foot deep injection well.

Other waste water, including discharges from the cooling coils and turbines, was either piped to a small evaporation area or discharged to the local stream.

Additional sources of liquid wastes were from random tar spillage around the site and from the drip boxes located under equipment or gas lines to collect condensed tar within the system. This latter waste was normally disposed of in the sludge pit, or in the previously described disposal area.

2.1.2 Chemical Characteristics of Wastes

To accurately assess the impact of the plant on nearby soil and water, chemical characteristics of the materials which were disposed of on-site must be understood. The materials of greatest concern are the coke quench water, tars, and purifier wastes.

It is believed that the Geneva coke plant used fresh water for quenching. Table 2-1 is a summary of analytical data for wastewaters from coke quenching processes.

Other liquid wastes from the coking process have been shown to contain ammonia, cyanides, phenolic compounds, sulfides, oil and greases, acids and alkalis, and many toxic organic constituents. Although it is believed that these wastes were discharged into the stream and flushed clear of the site, any wastes spilled on-site may have contributed to soil and water contamination. A chemical characterization typical of these wastes is provided in Table 2-2.

2.2 Present Conditions

The site is currently used by New York State Electric and Gas Corporation as a gas and utility substation and service center.

TABLE 2-1

SUMMARY OF ANALYTICAL DATA FROM SAMPLED PLANTS
ORIGINAL GUIDELINES STUDY
BY-PRODUCT COKEMAKING OPERATIONS
NET CONCENTRATION OF POLLUTANTS IN WASTEWATERS FROM QUENCHING[1]

	Discharged Water Quality Using	
	Fresh Water Make-up	Waste Water Make-up
Sample Point(s)	5-4	3-4
Flow (Gal/Ton)	498	448
Suspended Solids	703	(11)[2]
Oils & Greases	9.6	84
Ammonia (N)	1.94	92
Sulfide	< 0.02	135
Thiocyanate	< 3	10
pH (Units)	7.6	8.5
Beryllium	< 0.04	< 0.04
Cyanides	4.0	51
Phenolic	1.46	150

1 All values are in mg/l unless otherwise noted.
2 Non-representative sample for suspended solids, which were conveyed along the bottom of the sampling sluiceway.

Source: Modified from Environmental Protection Agency, 1982.

TABLE 2-2

CHEMICAL COMPOUNDS COMMONLY FOUND IN LIQUID WASTES FROM THE BY-PRODUCT COKEMAKING INDUSTRY

Acenaphthene	Benzo(a)anthracene
Acrylonitrile	Benzo(a)pyrene
Benzene	Benzo(k)fluoranthene
2-Chloronaphthalene	Chrysene
2,4,6-Trichlorophenol	Acenaphthylene
Parachlorometacresol	Anthracene
Chloroform	Benzo(ghi)perylene
2-Chlorophenol	Fluorene
2,4-Dimethylphenol	Phenanthrene
2,4-Dinitrotoluene	Dibenzo(a,h)anthracene
2,6-Dinitrotoluene	Indeno(1,2,3-cd)pyrene
Ethylbenzene	Pyrene
Fluoranthene	Toluene
Methylene Chloride	Antimony
Isophorone	Arsenic
Naphthalene	Cadmium
2-Nitrophenol	Chromium
4,6-Dinitro-o-cresol	Copper
Pentachlorophenol	Cyanide
Phenol	Lead
Bis-(2-ethylhexyl)phthalate	Nickel
Butyl Benzyl Phthalate	Selenium
Di-n-butyl Phthalate	Silver
Di-n-octyl Phthalate	Zinc
Diethyl Phthalate	Xylene
Dimethyl Phthalate	

Source: Environmental Protection Agency, 1982.

3.0 SITE SETTING

The physiographic, demographic and geologic setting of the site, as well as a land use analysis of the area within a one mile radius of the site, are discussed in the Task 1 report and are summarized in this section.

3.1 Physiography

The Geneva site is situated at the border of two regional physiographic provinces: the Central Lowland, a poorly-drained, fairly level plain to the north and the Appalachian Plateau, characterized by rolling hills and uplands separated by large and broad stream and lake valleys to the south (Crain, 1974). The City of Geneva is located on the northwest shore of one of the largest of the Finger Lakes, Seneca Lake.

3.2 Demography

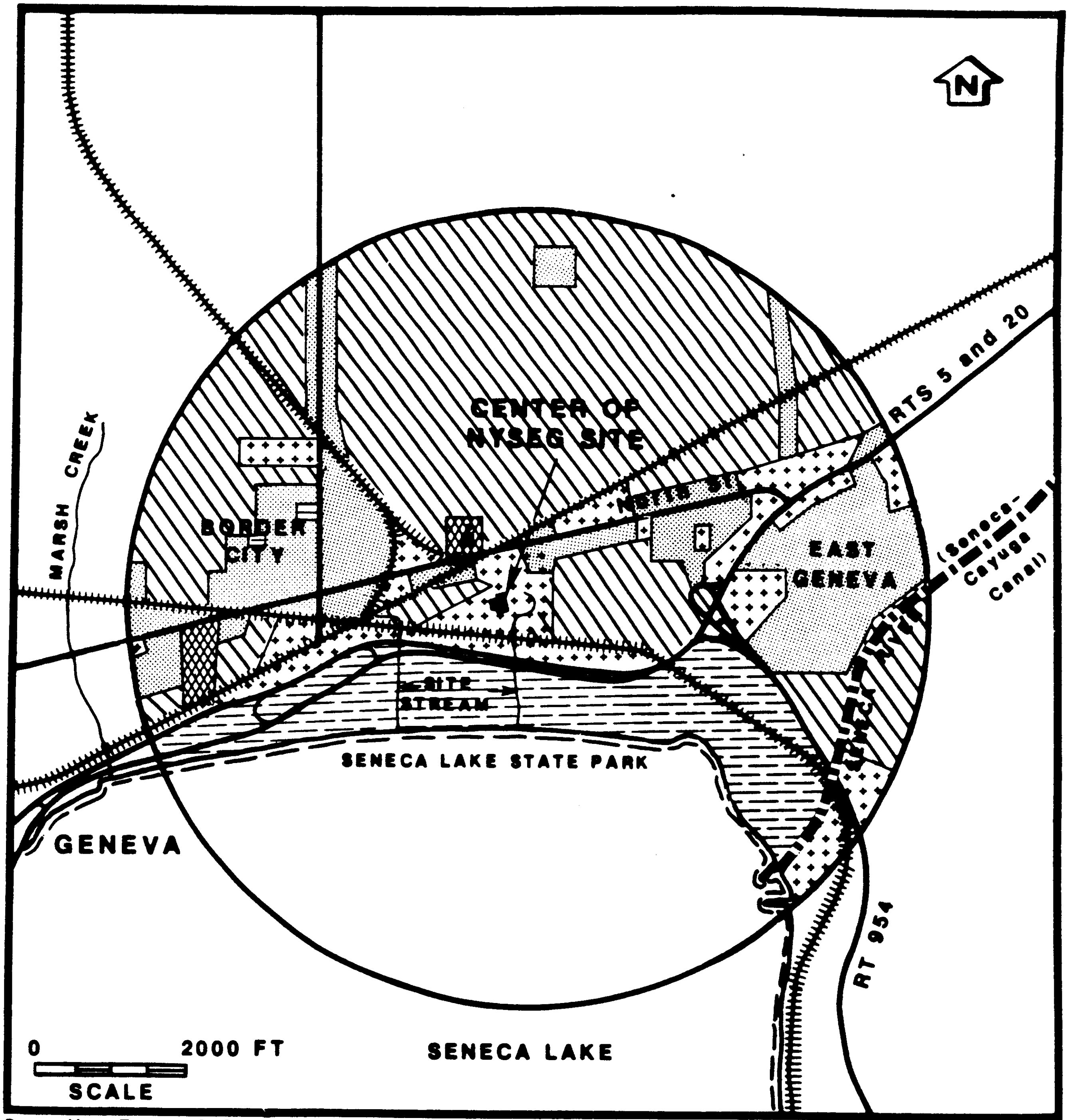
The City of Geneva, with a population of 15,133 (1980 census) is the center of population closest to the former coke plant. Other nearby centers include Waterloo, seven miles east of Geneva, and Seneca Falls, seven miles north.

3.3 Area Land Use

The land use map developed as part of Task 1 is presented here as Figure 3-1.

Approximately one third of the area within a one mile radius of the site is Seneca Lake State Park, or part of Seneca Lake itself. Prior to 1922 the land use along the lake was primarily industrial, including a large brewery and a barrel making factory.

The original barge canal, constructed about 1825, passed through the center of the area which is presently the state park. With the onset of



Base Map From USGS Topographic Map

LEGEND: OPEN AGRICULTURAL; COMMERCIAL; RESIDENTIAL; OPEN RECREATIONAL; PUBLIC BUILDINGS

Figure 3-1. Area Land Use Map

steam and gasoline engines, waterway traffic abandoned the barge canal and it became an unregulated trash disposal area.

Most of the remaining land in the area surrounding the Geneva facility is agricultural or open space.

Border City, 2000 ft to the west of the site and East Geneva, 3000 feet to the east, are combination industrial/residential communities. An elementary school with an enrollment of approximately 500 students is located on North Street about 1000 feet west of the site in Border City.

The Cayuga-Seneca (Seneca) River passes through East Geneva and is an inlet to Seneca Lake.

3.4 Regional Geology and Hydrology

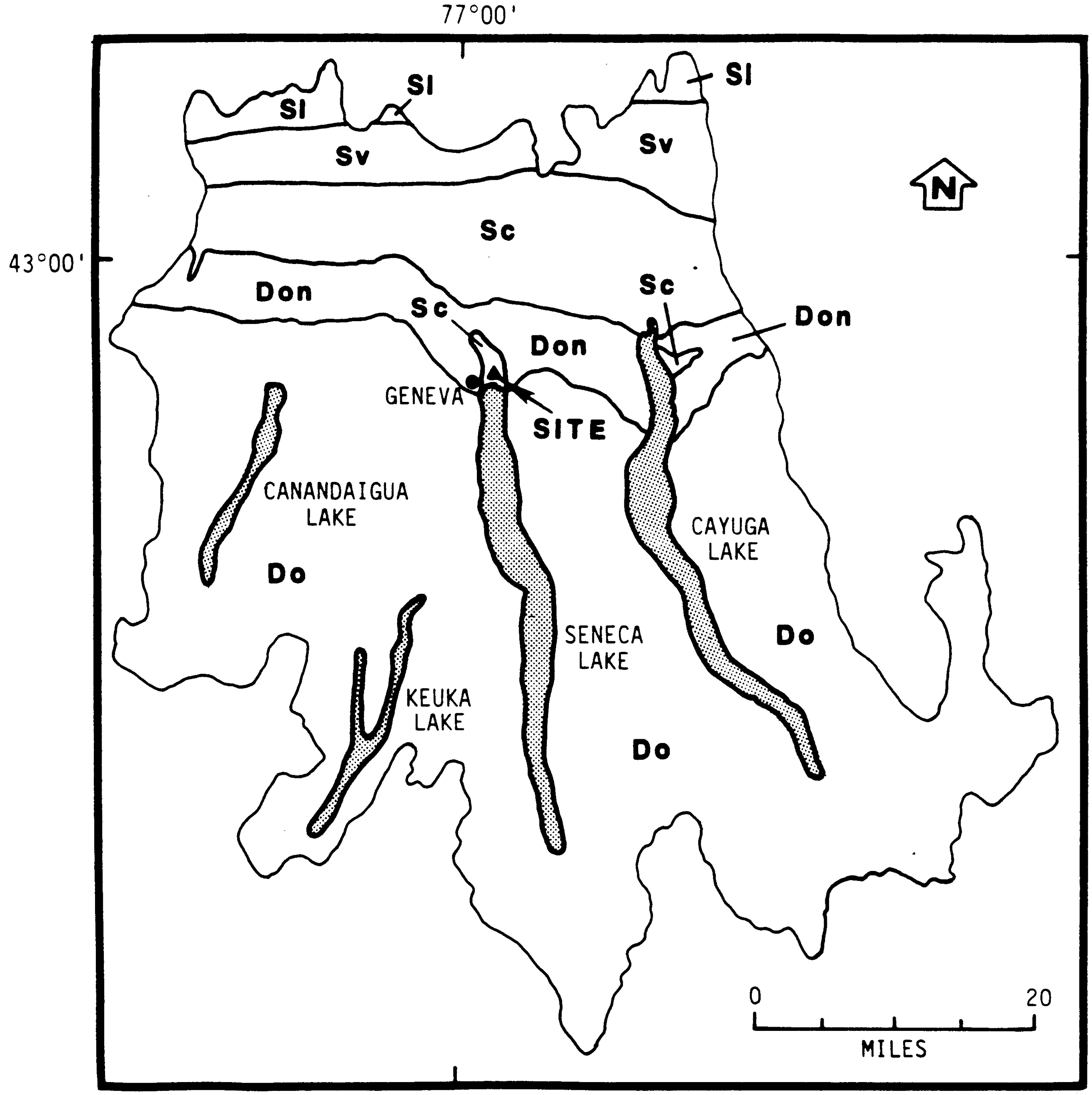
The regional geologic and hydrologic setting of the site is described in the following subsections.

3.4.1 Bedrock Geology

The bedrock in the northern Appalachian Plateau/Southern Central Lowlands (Figure 3-2) consists of Devonian and Silurian (350-440 million years old) marine sedimentary sequences which generally dip about 50 feet per mile to the south (Crain, 1974). A stratigraphic column of the regional bedrock with physical descriptions is given in Figure 3-3. Bedrock is exposed at the surface along some valley walls but is deeply buried by unconsolidated glacial sediments within the major valleys.

3.4.2 Surficial Geology

The surficial geology in the Geneva area is dominated by the sediment deposited by glacial ice and meltwaters during the last million years.



Map Modified From Crain, 1974

LEGEND

YOUNGER	**Do**	- Other Devonian Formations including Hamilton, Tully, Genessee, Sonyea, Java, and West Falls Formations
	Don	- Onondaga Limestone and Silurian Carbonates
	Sc	- Camillus Shale
	Sv	- Vernon Shale
OLDER	**Sl**	- Lockport Dolomite

Figure 3-2. Bedrock Geology of the Western Oswego River Basin.

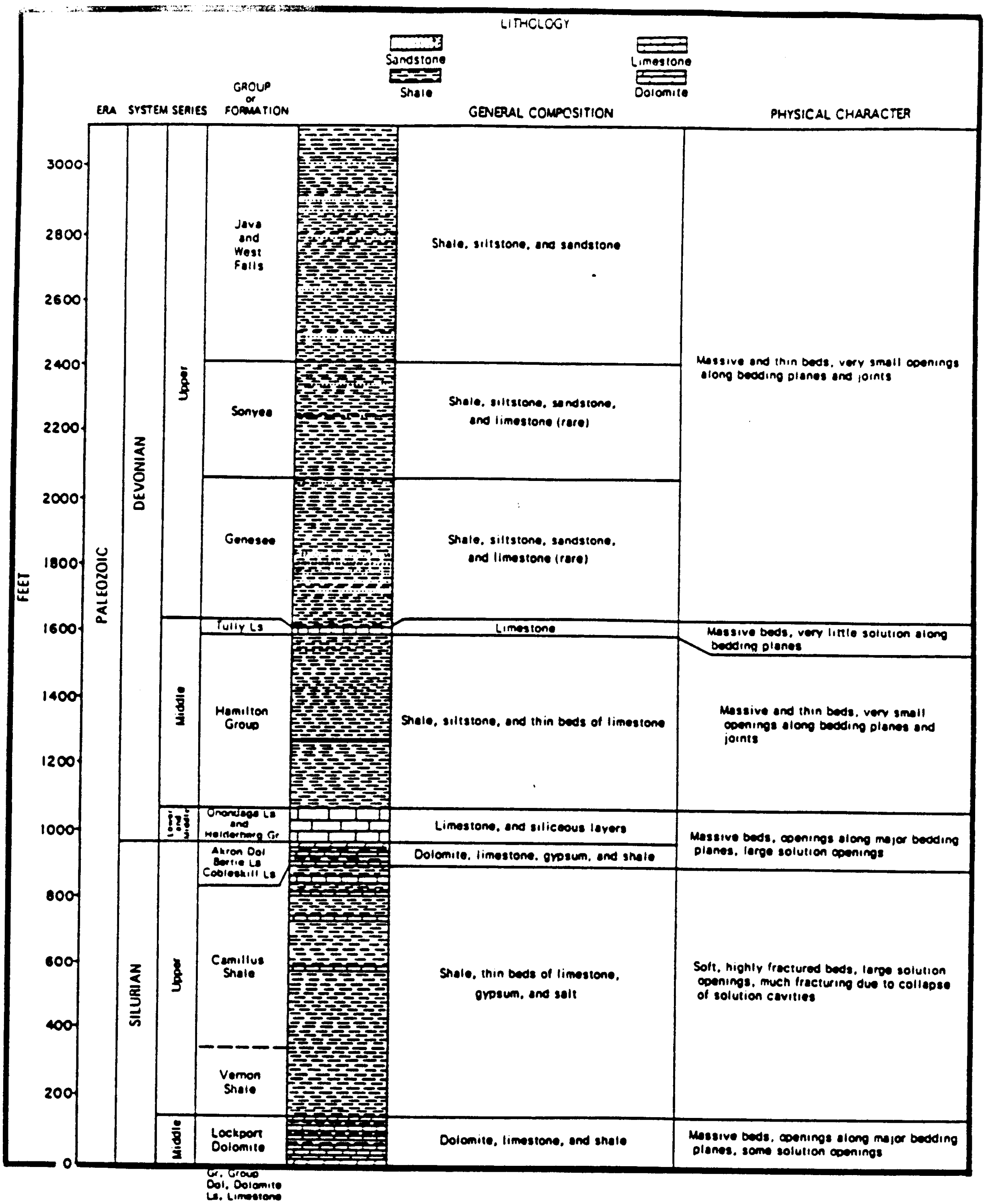


Figure 3-3. Generalized Stratigraphic Column of Bedrock in the Western Oswego River Basin. (from Crain, 1974).

Unsorted glacial till, up to 200 feet thick in some places, is common in the Geneva area but is often covered or absent in valley bottoms (Crain, 1974).

Post-glacial deposits in the area include alluvium (poorly-sorted coarse gravel and sand), muck, and peat deposits (Mozola, 1951).

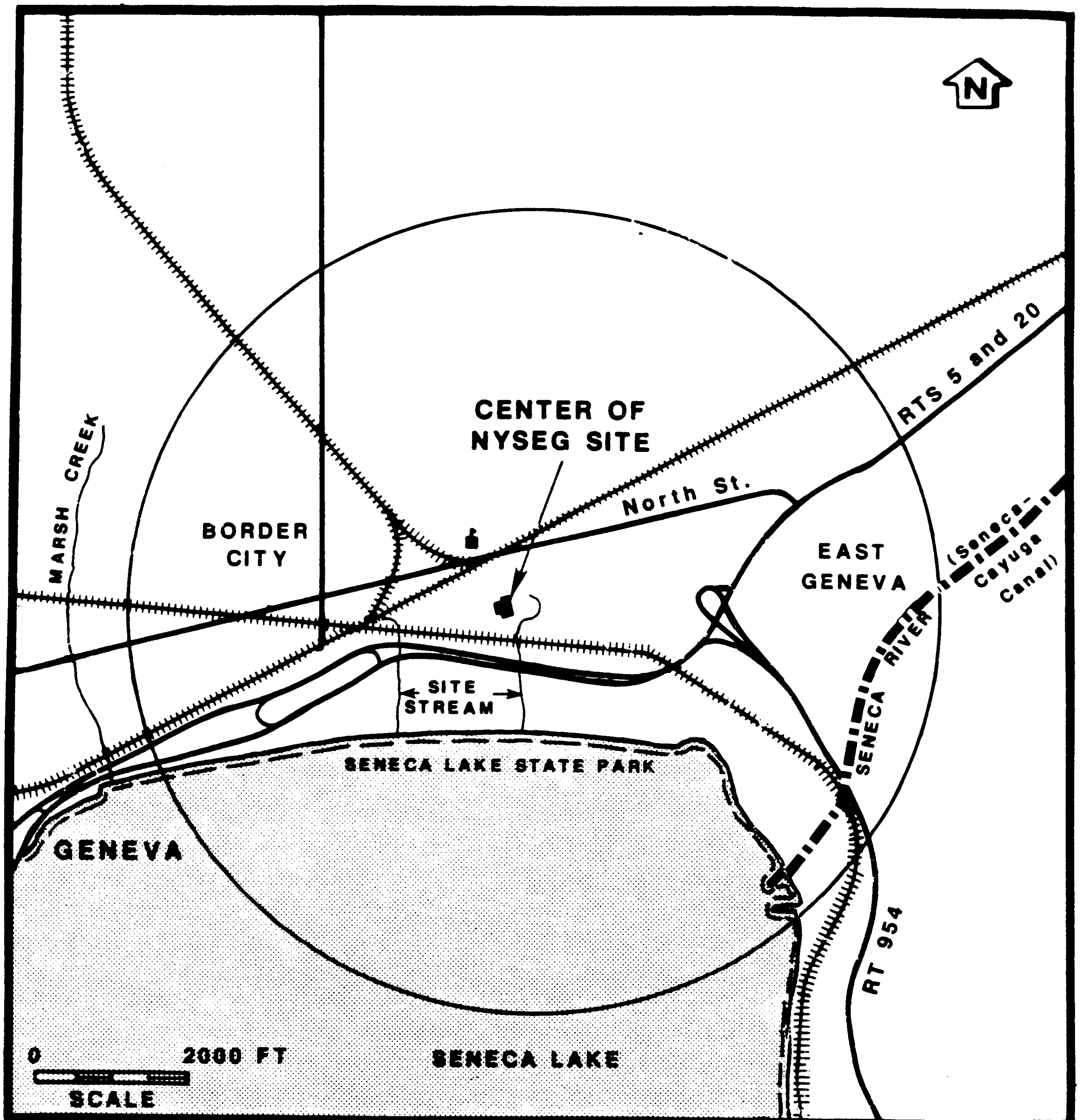
Soil types in the region are highly variable because of the diversity of surficial deposits. In the area immediately north of Seneca Lake, soils are classified in the Arkport-Claverack association (Hutton, 1972), developed primarily from fine sand and gravel or lacustrine silts and clays.

3.4.3 Hydrology

The surface water hydrology of the site area is dominated by Seneca Lake, situated approximately 1500 feet south of the site. Marsh Creek is about 5000 feet west of the site and the Seneca River about 4000 to 5000 feet east of the site. Small streams such as the unnamed stream in the eastern portion of the site are common. Figure 3-4 shows the location of the lake, stream, and river. Much of the area is poorly drained with numerous marshes and small ponds.

There are two important aquifers in the Geneva area. In the center of the valleys the unconsolidated materials serve as an aquifer and in inter-valley areas the bedrock is most commonly used as a water source. Two distinct bedrock formations, the Onondaga Limestone and the Camillus Shale, are used as aquifers in the Geneva area.

Figure 3-5 shows the location of wells in the site area. Logs for wells within one mile of the site are presented in Table 3-1. As shown on Table 3-1, the injection well (37-12) is the only well completed in the Camillus Shale. Two other wells (56-14 and SE-233) are bedrock wells completed in the Onondaga Limestone. All other reported wells within one mile of the site are completed in the glacial unconsolidated sediments.



Base Map From USGS Topographic Map

(circle indicates 1 mile radius from site center)

Figure 3-4. Location of Streams, Lakes and Rivers.

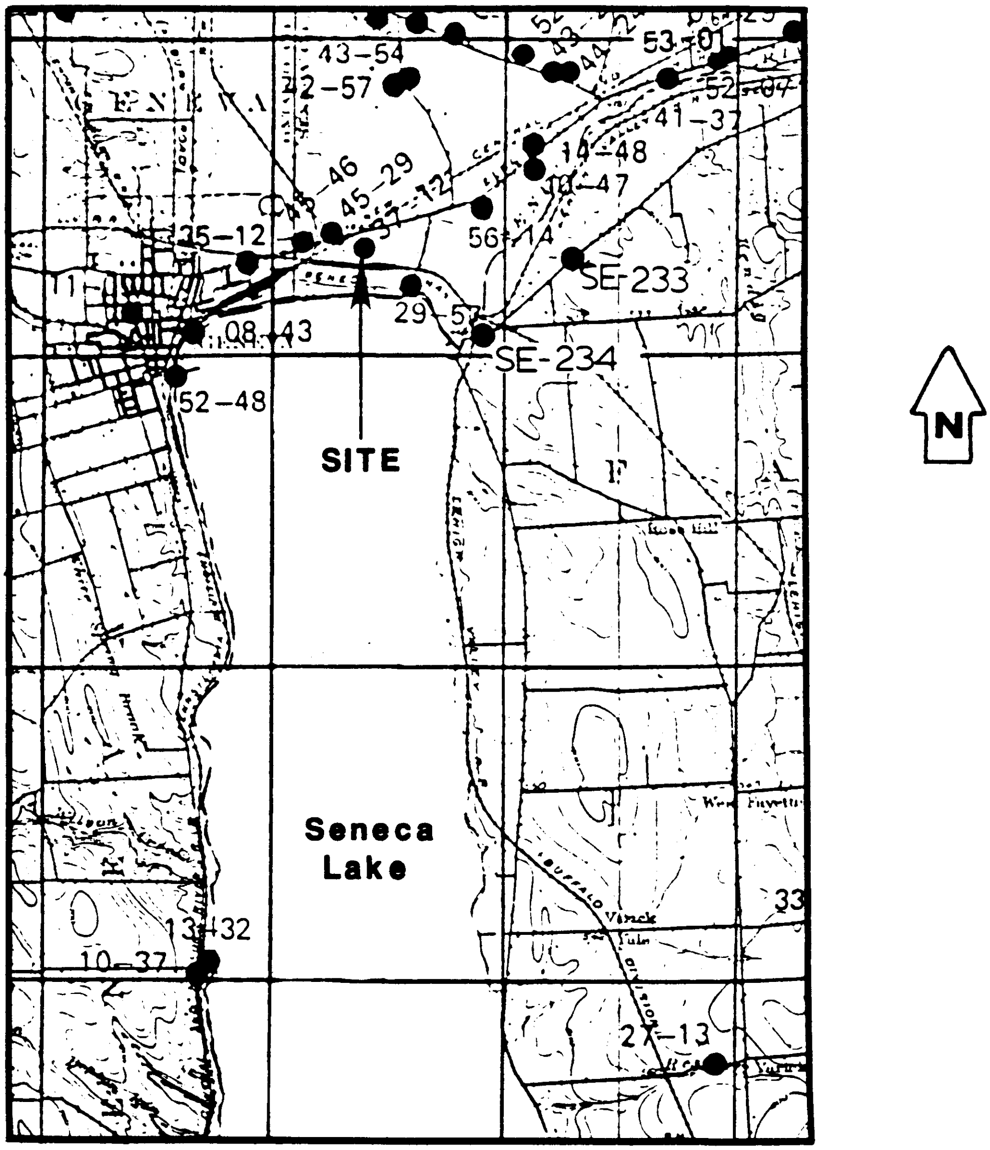


Figure 3-5. Locations for which well logs are available.
Logs are given in Table 3-1.

TABLE 3-1

AVAILABLE WELL-LOGS FOR AREA WITHIN ONE MILE OF SITE
WELL LOCATIONS ARE SHOWN IN FIGURE 3-5

Well Number	Date Drilled	Use	Well Depth (ft)	Depth to Rock (ft)	Casing Diam (in)	Water-Bearing Material	Depth to Water (ft)	Yield (gpm)
37-12	1927	Waste Injection	336	200	8	Camillus Shale	+1	11
45-29	1946	Commercial	135	--	6	Sand and Gravel	10	50
35-12	1933	Industrial	135	--	6	Sand and Gravel	10	7
56-14	1947	Domestic	113	110	6	Onondaga Limestone	9	30
42-57	--	Stock	268	--	6	Sand and Gravel	28	75
29-57	1946	Unused	135	--	8	Gravelly Clay	--	--
08-43	1950	Unused	91	--	3	Sand	--	--
11-09	--	Unused	30	--	6	Sand and Gravel	--	15
52-48	1950	Unused	102	--	3	Silty Sand and Gravel	--	--
10-47	1946	Domestic	87	--	6	Sand and Gravel	9	50
14-48	1946	Unused	76	--	6	Sand and Gravel	9	60
43-54	--	Unused	13	--	30	Sand	10	--
SE-234	--	Gas Exploration	1400+	5	6	Onondaga and Camillus	--	--
SE-233 20	--	Farm		108	8	6	Onondaga Limestone	20

Source: Crain, 1974
Mozola, 1951

The bedrock aquifers are commonly confined by the relatively impermeable silts and clays which overlay them. Wells which penetrate the confining layers commonly flow freely at the surface because of these artesian conditions. The regional flow of ground water within the bedrock can be assumed to be toward the regional ground water sink, Seneca Lake.

Regional groundwater flow in the unconsolidated aquifer can also be assumed to be toward Seneca Lake for the same reason.

4.0 FIELD INVESTIGATION PROGRAM

The Task 2 field investigation was designed to confirm the presence and nature of contamination in the soil, water and air at the site. Field work was conducted during January 1986, with water sampling rounds occurring in February, May, and August 1986, involving both subsurface and surface investigations.

The subsurface work included the excavation and sampling of test pits, the drilling of test borings, and the installation and sampling of monitoring wells. Surface water and stream sediment samples were also collected for analysis. An air quality survey was performed to monitor the effects of on-site subsurface investigations. The following sections discribe the scope and rationale of the field program. The results of the testing program are presented in Sections 5, 6, 7, and 8.

4.1 Field Investigation Plans and Procedures

The work which was conducted as part of Task 2 is described in detail in the "Work Plan for New York State Electric and Gas Corporation to Investigate Former Coal Gasification Sites: Geneva Site" (TRC, 1985). This plan, submitted to NYSEG on September 17, 1985, contains preliminary surface water sampling, test pit, and monitoring well locations as well as details of the test pit excavation, drilling and well installation, and sampling methods.

The Quality Assurance/Quality Control procedures followed by TRC personnel during the collection, field analysis and shipping of samples are presented in the TRC Technical Standards listed in the Work Plan.

4.2 Site Topographic Survey

TRC contracted with Weiler Mapping, Inc. of Horseheads, NY to perform a topographic survey, as well as to provide base maps for recording, evaluating, and presenting all site investigation data from the Geneva site. A topographic map of the site was prepared at a scale of one inch equals 50 feet with a two foot contour interval (mean sea level datum).

4.3 Test Pits

A total of forty-three test pits were excavated at the Geneva Site during the period January 13-21, 1986. The purpose of these excavations was to identify areas of soil contamination, define the near-surface geology, determine potential pathways for contaminant migration, and collect soil samples.

Test pits were excavated by Mr. Ed McDonald of Elmira, New York. Depths of the test pits ranged from 3 to 10 feet, with the final depth determined by ground water influx, refusal, or a decision by TRC personnel that the excavation had progressed beyond the deepest extent of visible contamination.

Paved areas of the site were underlain by up to 30 inches of frost which was impossible for the backhoe to penetrate. A jackhammer and operator from Finger Lakes Paving Company were hired for 3 days to break up the frost layer in these areas of the site.

Test pits were monitored continuously with an organic vapor analyzer during excavation to provide information on contaminant concentration and to assure worker safety.

Most of the test pits were located in areas where soil contamination was known or suspected. Two pits were located beyond the zone of suspected contamination to determine background conditions and assist in defining the boundary of the tar spillage/disposal area. Figure 4-1 shows the locations of the test pits. Table 4-1 lists the test pit depths and describes their locations. A TRC geologist logged the subsurface materials exposed by the excavations. These logs are presented in Appendix A.

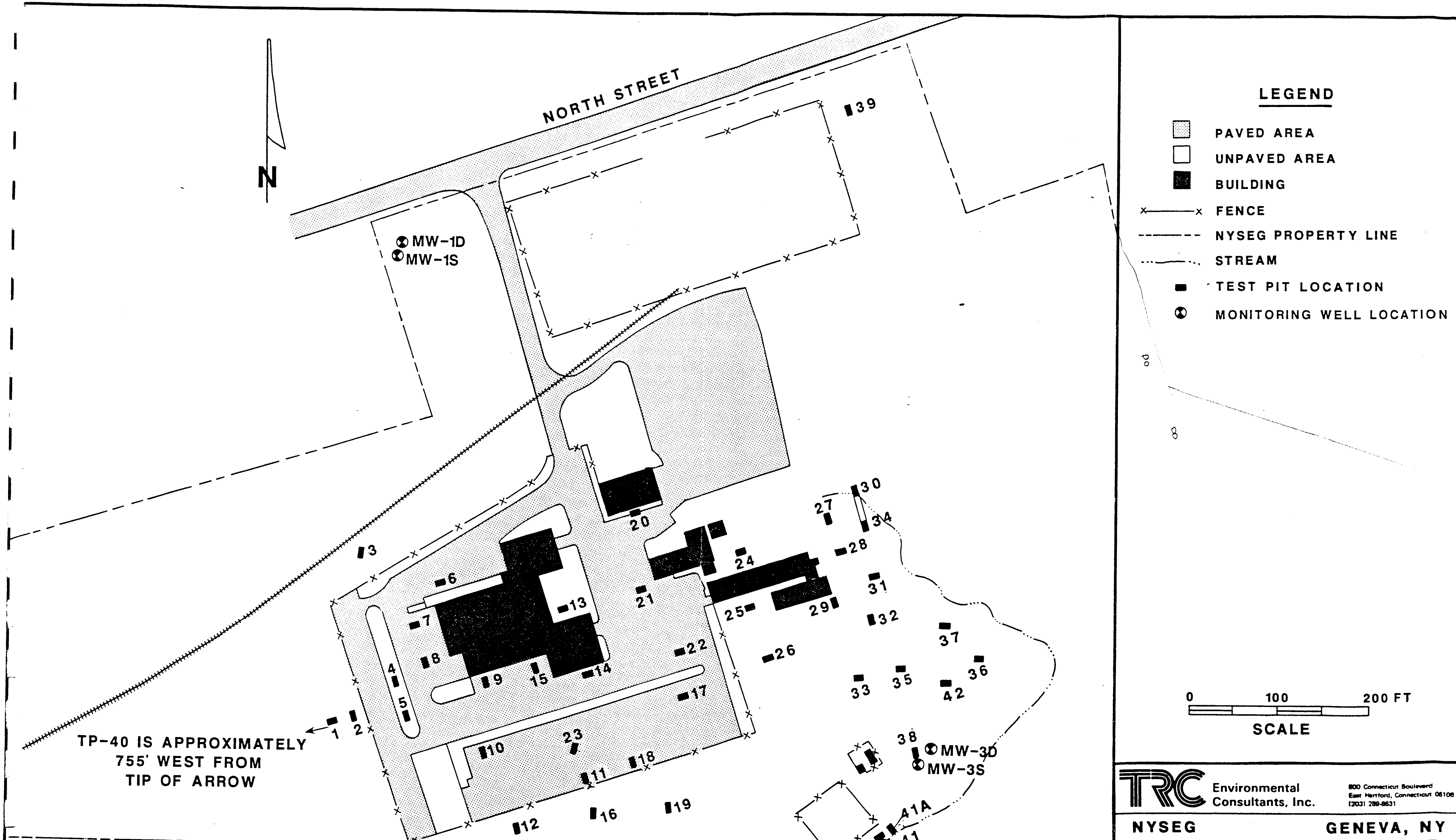


FIGURE 4-1
TASK 2 TEST PIT AND
MONITORING WELL LOCATIONS

TABLE 4-1

TEST PIT SUMMARY

Test Pit No.	Total Depth (ft)	Area to be Investigated*
1	3.0	Tar storage vessel
2	7.5	Tar storage vessel
3	10.0	Near blue gas holder
4	8.0	30,000 cubic ft holder
5	6.0	30,000 cubic ft holder
6	5.0	100,000 cubic ft holder
7	5.0	Near holders, ammonia tanks
8	8.0	Near holders, ammonia tanks
9	4.0	Near ammonia tanks
10	3.0	Semet-Solvay ovens
11	5.0	Sludge pit
12	4.0	South of suspected contamination
13	6.0	Near byproduct building
14	8.0	Near byproduct building
15	5.0	Near A.C. building
16	6.0	South of suspected contamination
17	7.0	Near power house/semet-solvay ovens
18	6.0	Sludge pit
19	7.5	South of suspected contamination
20	2.5	Adjacent to original office building
21	2.5	Adjacent to compressor room
22	3.0	Holder in existing central parking area
23	8.0	Semet-Solvay ovens
24	4.5	Adjacent to Compressor Room/Purifier House
25	4.0	Adjacent to Purifier House
26	3.5	South of purifier house
27	6.0	Edge of large relief holder
28	3.5	Waste disposal area
29	4.0	Waste disposal area
30	3.0	Edge of large relief holder
31	6.5	Waste disposal area
32	6.0	Waste disposal area
33	6.0	Waste disposal area
34	2.5	Within large relief holder
35	9.0	Waste disposal area
36	10.0	Waste disposal area
37	7.5	Waste disposal area
38	6.0	South of waste disposal area
39	9.0	Background by North St.
40	8.5	Southeast corner of property
41	4.0	Adjacent to creek - south property boundary
41A	1.5	Within creek - south property boundary
42	7.0	Waste disposal area

* Test pit locations are shown in Figure 4-1.

4.4 Air Quality Monitoring

Air monitoring was performed to qualify and quantity air contaminants which may have been released during the subsurface investigations. The air monitoring program was specifically designed to monitor gas-phase organic contaminants. Due to the generally moist nature of the site, fugitive dust was not considered to be a health concern and was not, therefore, sampled. The program allows an evaluation of potential air quality impacts associated with remedial action alternatives and aids in the design and implementation of measures to control any adverse air quality impacts.

Two air monitoring techniques were employed at the Geneva site; the first involved the use of instrumentation which yields real-time results, while the second involves longer duration sampling and subsequent laboratory analysis.

A Century Organic Vapor Analyzer (OVA) was used to monitor the ambient air quality at the test pit excavations, and to screen test pit and boring samples for organic vapors. The screening results are given in the Test Pit and Boring Logs presented in Appendices A and B, respectively. Ambient air quality measurements were all less than 1.2 ppm, with the exception of the air downwind of TP-4 where OVA readings of 50-200 ppm were recorded. Organic vapors measurements above the test pits ranged between zero and 4.0 ppm. A concentration of 100-700 ppm total organic vapors was obtained at TP-4 located at the site of a former storage vessel. A strong gasoline or solvent odor was also noted at this pit. Head space analysis of TP-4 samples yielded organic vapor concentrations of between 0.0 and +1000 ppm. Organic vapors measured from the boring samples ranged from 0.0 to 100 ppm (recorded at B-7). It should be noted that the test pits were excavated during cold weather periods when volatilzation may not have been as rapid as it would be in warm weather.

Both active and passive long-duration sampling devices were employed to characterize and quantify air quality impacts from the site investigation.

The active device was a low flow pump which drew ambient air through a solid sorbent (Tenax tube). This sorbent medium, selected to adsorb organic constituents, was analyzed by gas chromatography or gas chromatography/mass spectrometry. Four tubes, one of which was a quality control blank, were placed on the site during the early stages of subsurface work.

The 3M Organic Vapor Dosimeters (OVDs) are passive monitors, and are charcoal-based badge-like devices. At the Geneva site, OVDs were worn by all field geologists and drillers during the first three days of drilling, and by field geologists and backhoe operators during the first four days of test pit excavation. In addition, dosimeters were placed at downwind and upwind locations in order to allow differentiation between those emissions originating off-site and those originating on-site. Each badge was assigned a number, and the wearer or location of each badge was recorded. This allowed the sources which contribute to each OVD to be traced.

The locations of both the Tenax tube and dosimeter sampling are shown on Figure 4-2.

Results of the Tenax and OVD monitors are presented in Section 7.0.

4.5 Soil Borings and Monitoring Wells

Two soil boring programs were performed at the Geneva Site. In January, 1986, six monitoring wells were installed by Empire Soils, Inc. as part of the Task 2 investigation. In late April, 1986, nine shallow borings were drilled to test site conditions, and to assess possible environmental problems associated with a proposed building construction project.

4.5.1 Monitoring Wells

Six monitoring wells were installed at the Geneva Site between January 13th and 30th, 1986. These wells are located in three multi-depth clusters;

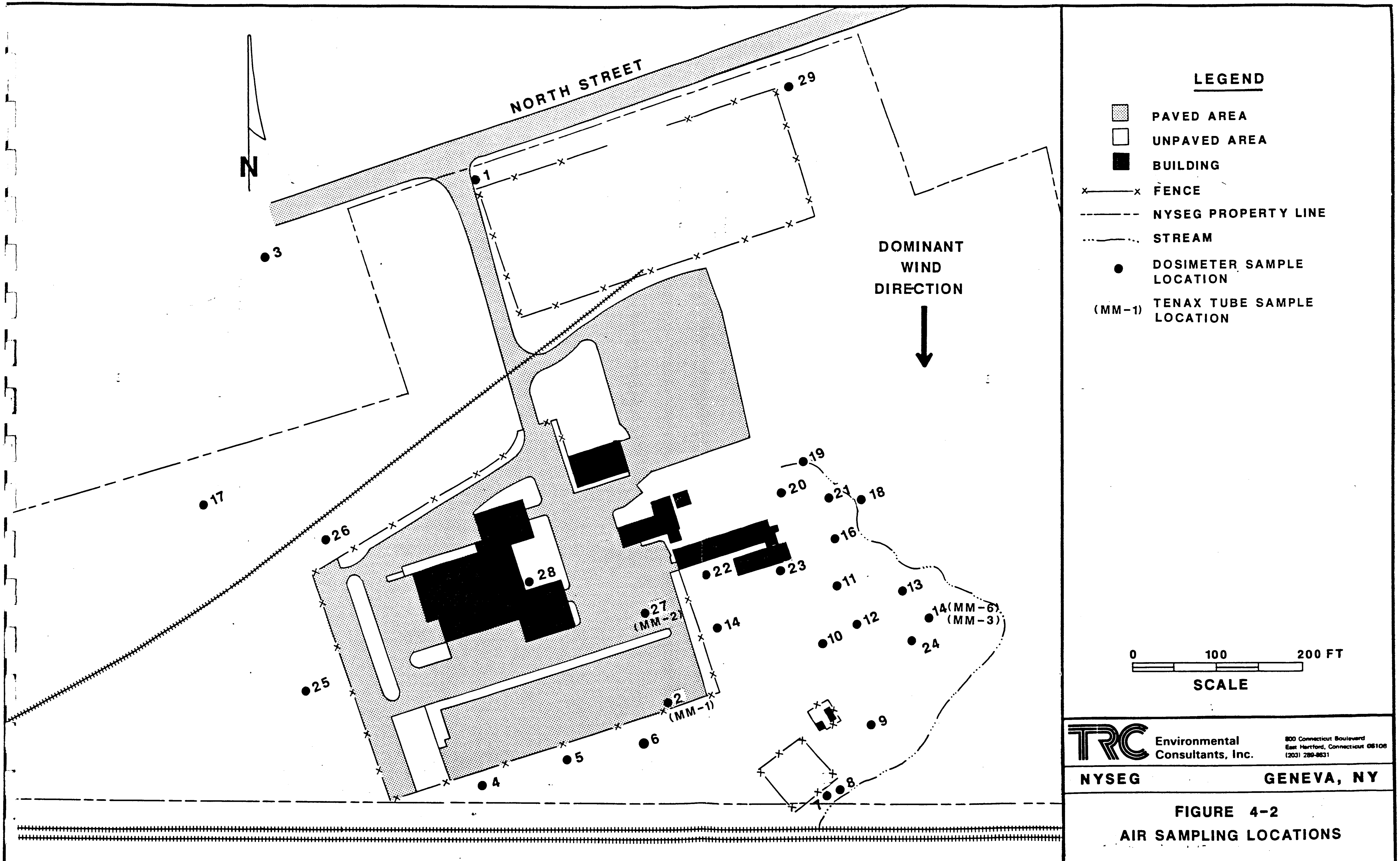


FIGURE 4-2
AIR SAMPLING LOCATIONS

one north of the plant and two between the gasification plant and Seneca Lake (Figure 4-1).

The wells were installed by TRC's drilling subcontractor, Empire Soils Investigations Inc., of Groton, NY. The three deep borings were drilled with 4 inch ID steel casing and the three shallow borings with 4 inch ID hollow stem augers.

Continuous spilt spoon sampling was performed on the deep borings and the boring logs are included as Appendix B to this report. A TRC geologist screened the samples with an OVA for volatile organic compounds using procedures noted in the Work Plan. At no time were organic vapor levels detected above background levels.

A summary of the locations and purpose of each monitoring well is presented in Table 4-2. Table 4-3 shows the depths of the wells, their screened intervals, and water depths encountered during the first sampling round. Well construction diagrams are included in Appendix B.

The wells are constructed of 2-inch flush-threaded stainless steel casing and 10 slot (0.010 inch) stainless steel screen. Protective casing with locking steel covers surrounding the stainless steel risers were set in concrete to provide well security. Well lithology and construction diagrams are included in Appendix B.

Empire Soils personnel developed the monitoring wells evacuating them with a pump and flexible PVC tubing until the discharge water was visually clean. After equilibrium was re-established, a TRC hydrologist performed a constant head test to measure horizontal permeability in the screened subsurface interval. This test was performed according to method E-18 of the Earth Manual (U.S. Department of Interior, 1974). The method involves rapidly raising the water level in the well and maintaining it at that level throughout the test. Data obtained from these tests were used in the equation for horizontal

TABLE 4-2

SUMMARY OF MONITORING WELL LOCATIONS

Well Number	Location	Purpose
1D	North end of site immediately south of Border City Rd.	Deep aquifer, upgradient water quality conditions
1S	North end of site immediately south of Border City Rd.	Shallow upgradient ground water quality conditions
2D	South of site at base of railroad bed	Deep aquifer water quality conditions, downgradient of gasification process area
2S	South of site at base of railroad bed	Shallow downgradient ground water quality conditions
3D	Southeast of site, east of pump house	Deep aquifer water quality conditions, downgradient of old disposal area
3S	Southeast of site, east of pump house	Shallow ground water quality conditions, downgradient of old disposal area

TABLE 4-3

WELL CONSTRUCTION DATA

Well Number	Casing Elevation*	Screened Lithology	Screen Interval (Depth from ground surface)	Screen Elevation Top	Screen Elevation Bottom	2/24/86 Water Level**	2/24/86 Water Elevation
MW-1S	459.05	Sand/Clay	3.0-13.0	456.7	446.7	1.98	457.07
MW-1D	458.99	Sand	75.0-90.0	384.29	369.29	4.60	454.39
MW-2S	463.09	Fill/Silt	3.0-13.0	460.69	450.69	7.73	455.96
MW-2D	462.49	Sand	91.5-106.5	368.69	353.69	8.40	454.09
MW-3S	458.88	Silt/Clay	3.0-13.0	453.89	443.89	5.17	453.71
MW-3D	458.54	Sand	86.7-101.7	370.84	355.84	4.64	448.90

* Top of stainless steel riser
** From top of stainless steel riser

NOTE: All elevations are relative to mean sea level
All measurements are in feet

hydraulic conductivity in the case for a well point in homogenous soil (Lambe and Whitman, 1969). Permeability calculations performed for this test are shown in Appendix C.

4.5.2 Shallow Soil Borings

On April 30, 1986, nine shallow borings were drilled in the area of a proposed storage building (Figure 4-3), off the southwest corner of the present service building. These borings were logged and monitored with an OVA by a TRC geologist. Boring logs are presented in Appendix B.

The borings were drilled to a depth of between five and seven feet. Boring depths were controlled either by regulating the penetration of the auger (of 7 feet maximum), or by limiting boring advancement to the extent of visible contamination.

Odor or visible contamination detected during the boring program was recorded on the logs. The open borings were monitored with an OVA to provide information on contamination concentration and to assure worker safety. Measureable concentrations of organic vapors are noted on the boring logs (Appendix B).

4.6 Soil, Water, and Sediment Sampling

Soil, ground water, surface water, and stream sediment samples were collected during the field investigation. The sample analytical results were used to: 1) characterize the tar constituents, 2) define potential pathways of migration, and 3) aid in defining the areas containing coal tar.

Soil samples were collected during the excavation of test pits, and water samples were taken during three sampling rounds: the first from February 24-26, 1986, the second from May 1-2, 1986, and the third from August 6-8, 1986. Stream sediment samples were collected during the first round of water

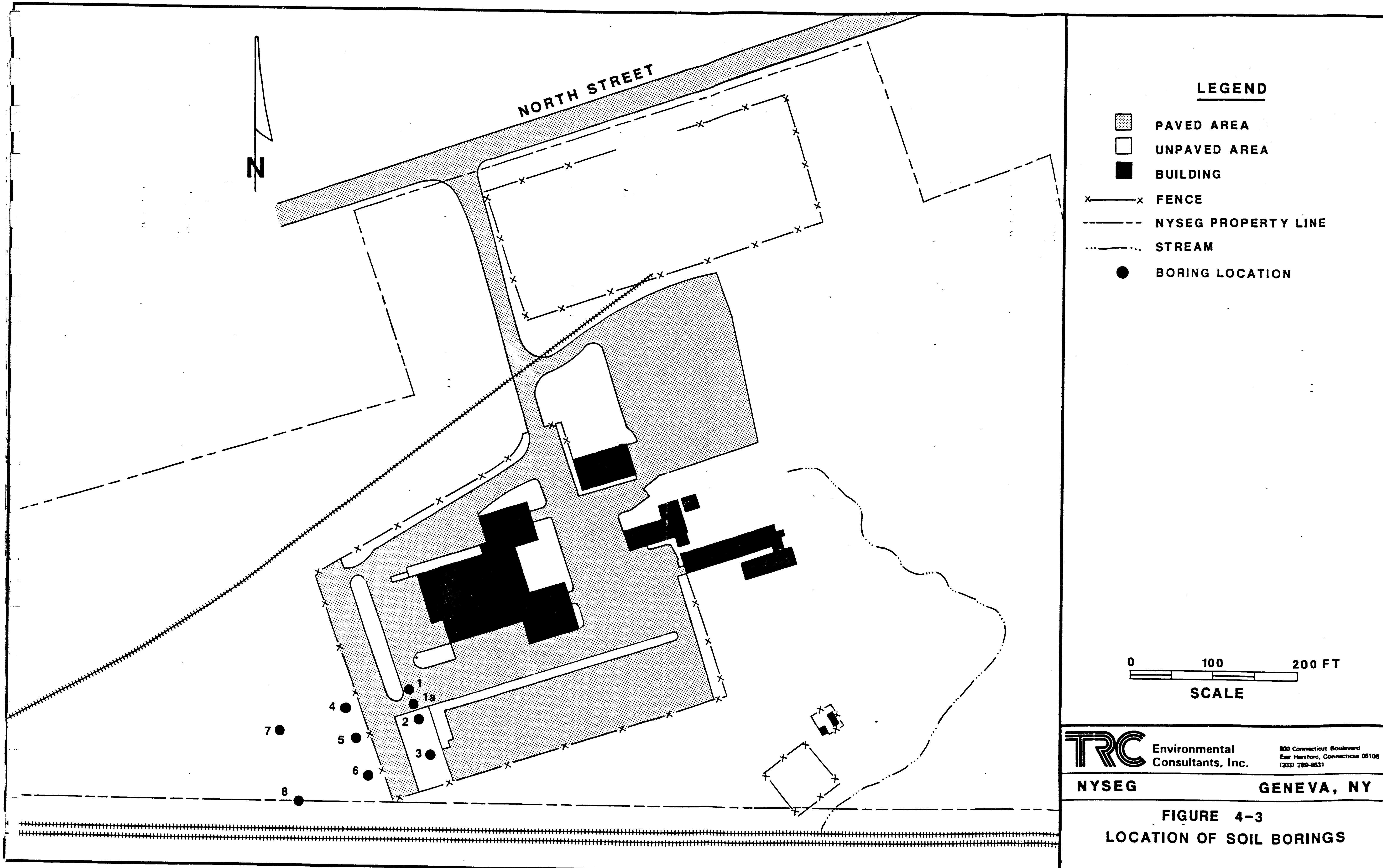


FIGURE 4-3
LOCATION OF SOIL BORINGS

sampling. During each sampling round, one field blank per matrix (ground water, surface water, sediment) was taken on each day of sampling of that matrix. In addition, one blind duplicate per 10 groundwater and surface water samples (minimum of one duplicate per matrix) was collected in the first two rounds. In the third round of sampling, one blind duplicate per five ground water and surface water samples was taken. During each round, ground water samples from two wells were sent to CompuChem Laboratories of Research Triangle Park, NC for priority pollutant analysis (excluding the PCB/Pesticides fraction).

4.6.1 Soil Sampling

Forty-one soil samples were collected during the test pit excavation program (January 13-21, 1986), following TRC Technical Standard 973, Procedures for Logging and Collecting Subsurface Soils in Test Pit Excavations. Samples were either grab samples collected at a specific depth, or composite samples from several depths. Grap samples were collected to determine the maximum concentrations of tar constituents wherever waste material or visibly contaminated soil was encountered. Some samples of apparently clean soil were collected from beneath visibly contaminated zones. Composite samples were taken from one pit where no waste materials or visibly contaminated soils were found. Two test pits, TP-39 and TP-40 were located upgradient, or away from, the suspected area of constituents. Soil samples from these pits provided data on background conditions.

4.6.2 Ground Water Sampling

Prior to ground water sampling, the water levels in the monitoring wells were recorded using an electronic water level indicator. Water level measurements were taken to the nearest 0.01 foot from a reference mark on top of the inner stainless steel casing and are presented in Table 5-1 and discussed in Section 5.2.2.

Before sampling, at least four well water volumes were evacuated from the wells using either an Instrumentation Specialties (ISCO) pump, a centrifugal pump, or a teflon bailer. Dedicated 1.5 inch diameter black flexible PVC tubing and 0.75 inch diameter clear flexible PVC hose was used for discharge from the centrifugal and ISCO pumps, respectively.

Samples were collected with teflon bailers following procedures in TRC Technical Standard 975, Field Procedures for Collection of Ground Water Samples, and preserved in the field in accordance with TRC Technical Standard 959, Recommendations for Water and Soil Sample Volumes, Preservatives and Holding Times. Dedicated teflon bailers were installed in August 1986, during the third sampling round. Measurements of pH, temperature and conductivity were performed in the field laboratory and are presented in Section 7.

4.6.3 Surface Water Sampling

Three surface water samples were collected during each sampling round; two from a small stream which runs south toward the lake along the east side of the site, and one from the stream in the southwestern part of the site (Figure 4-4). Sampling locations and rationale for the selection of these locations are presented in Table 4-4.

Collection proceeded in a downstream to upstream fashion in order to prevent downstream waters from becoming contaminated from upstream sampling.

The sampling method is described in TRC Technical Standard 972, Field Procedures for Collection of Surface Water and Sediment Samples.

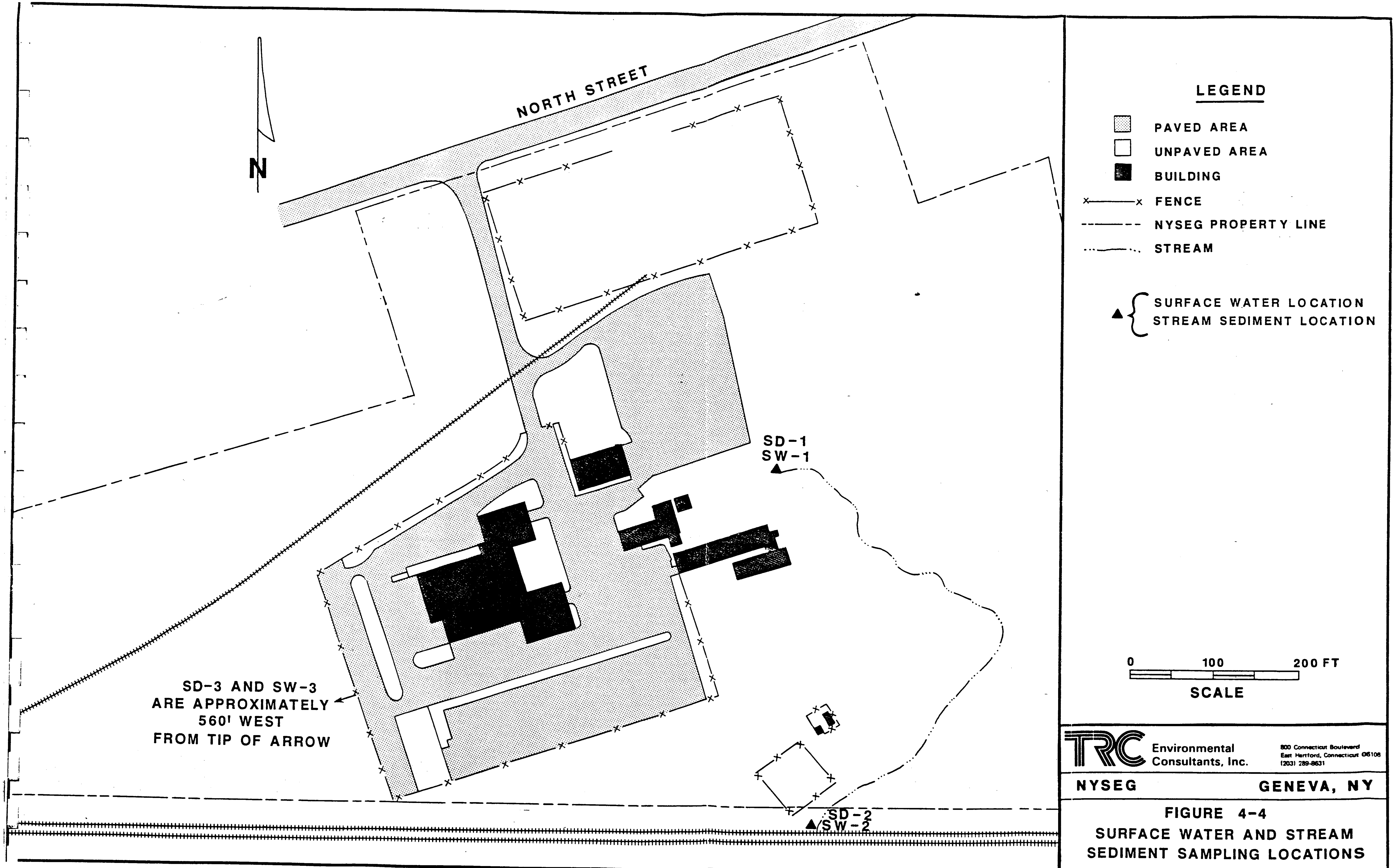


FIGURE 4-4
SURFACE WATER AND STREAM SEDIMENT SAMPLING LOCATIONS

TABLE 4-4

SUMMARY OF SURFACE WATER SAMPLING LOCATIONS

Sample No.	Location	Purpose
SW-1	Head of watercourse on east side of plant near compressor room	Water quality conditions at the head of the small stream
SW-2	Southeast end of site where watercourse flows under railroad	Water quality conditions downgradient of eastern portion of site and disposal area
SW-3	Southwest side of site where drainage pipe surfaces and drainage water flows under railroad	Water quality conditions downgradient of western portion of site and laydown yard

4.6.4 Stream Sediment Sampling

Three stream sediment samples were collected at the same locations and in the same order as the surface water samples during the first sampling round. Sediment sampling was performed subsequent to surface water sampling. The locations and rationale for those locations are presented in Table 4-5. The method of sampling is described in TRC Technical Standard 972 (above).

4.7 Summary of Task 2 Field Investigation

The Geneva Task 2 field investigation was conducted during January 1986, with subsequent sampling rounds in February, May, and August, 1986. The work included the excavation of forty-three test pits, air quality monitoring during subsurface work, and the installation of six monitoring wells (three shallow and three deep). Soil samples were collected from the test pits, and three rounds of ground and surface water sampling took place on February 24-26, May 1-2, and August 6-8, 1986. Three stream sediment samples were taken during the first round of water sampling.

TABLE 4-5

SUMMARY OF STREAM SEDIMENT SAMPLING LOCATIONS

Sample No.	Location	Purpose
SD-1	Head of watercourse on east side of plant near compressor room	Sediment conditions at head of on-site watercourse
SD-2	Southeast end of site where watercourse flows under railroad	Sediment conditions downgradient of eastern portion of site and disposal area
SD-3	Southwest side of site where drainage pipe surfaces and drainage water flows under railroad	Sediment conditions downgradient of western portion of site and laydown yard

5.0 SITE FEATURES

The Task 2 subsurface investigations, along with the geophysical survey conducted in Task 1, have provided information on the geological and hydrological setting of the site. In addition, several suspected plant-related features and others of unknown origin were. encountered during test pit excavations. These features are described here.

5.1 Geology

The site bedrock and surficial geology is discussed in the following subsections.

5.1.1 Bedrock Geology

Site bedrock investigations were not undertaken in Task 2 of the Geneva study. Information about the bedrock geology was available from the log of one deep well drilled at the site in 1927 and a seismic refraction survey performed for TRC by Weston Geophysical in the fall of 1985. The deep well, drilled at the present location of the parking lot south of the main NYSEG office building, intercepted the Camillus Shale at a depth of 200 feet (Crain, 1974). The seismic refraction survey confirmed bedrock at this depth and suggested that bedrock in the eastern part of the site may be slightly closer to the surface (175 feet) than in the western part of the site (200 feet). The Weston Geophysical Report is presented in Appendix A of the Task 1 Report.

5.1.2 Soils and Surficial Geology

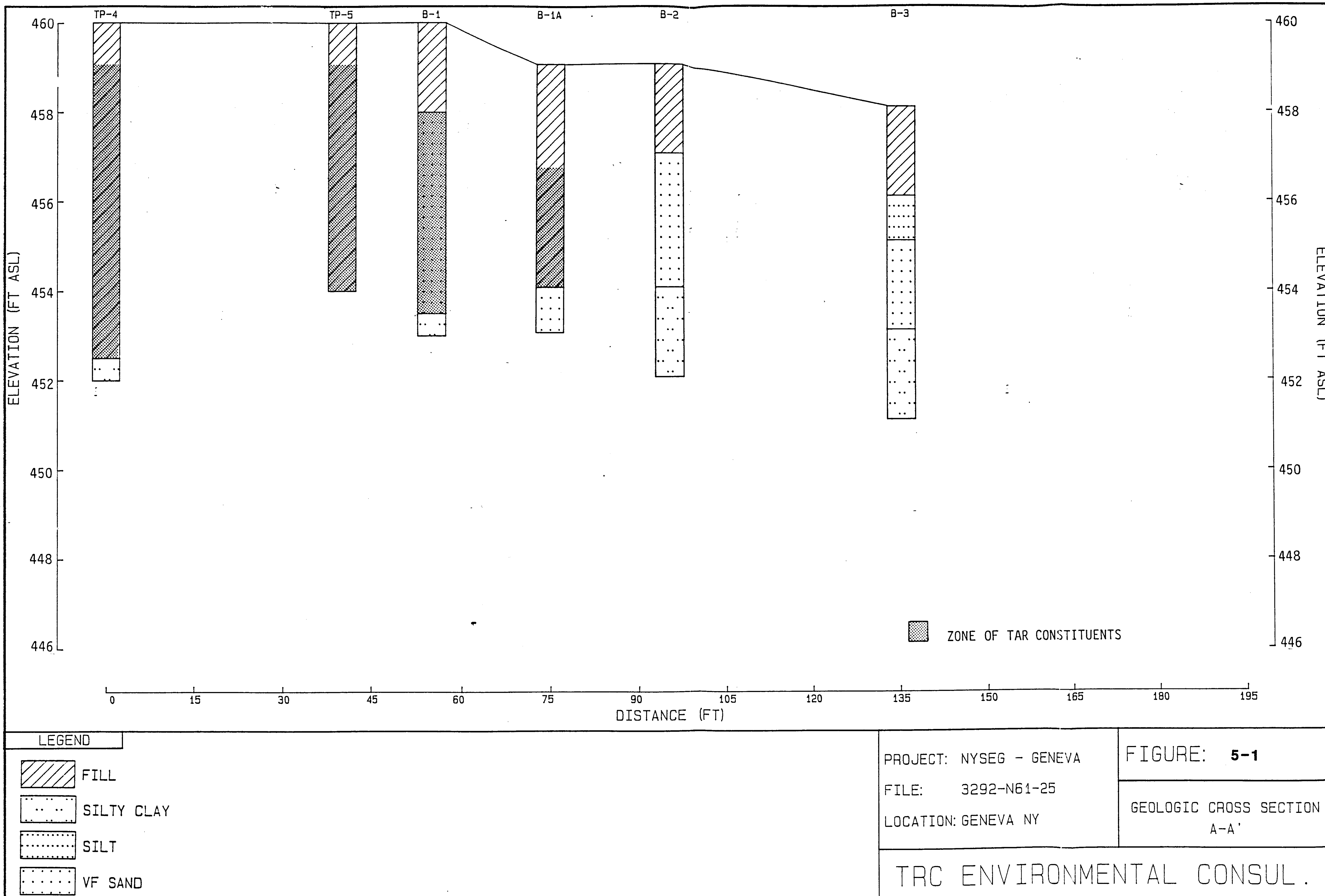
The stratigraphy of the surficial deposits at the site was determined through subsurface sampling using test pit excavations and split spoon sampling in boreholes. Continuous split spoon sampling was conducted to a depth of between 90 and 107 feet at three locations around the site.

Information was also obtained during the drilling of 9 shallow borings in April, 1986. These locations are shown in Figures 4-1 and 4-3, and logs for these borings and test pits are presented in Appendices A and B.

The unconsolidated sediments encountered can be subdivided into four distinct units: fill, interlayered very fine sand and clays, clay, and fine to medium sand. Geologic cross sections across the site are presented in Figures 5-1, 5-2, 5-3, 5-4, and 5-5, and the locations of these sections are shown on Figure 5-6. (Note that some test pits and borings in Section A-A' are slightly offset from the section line)

The nature of the fill varies considerably over the site area. Beneath the parking lot south of the main building, the fill consists almost entirely of loose bricks and miscellaneous demolition debris. Fill in the old dump area east of the meter shop consists predominantly of waste products of the coal gasification process including purifier wastes, thick black tar, coke, coal, coal slag, and demolition debris. In other areas, the fill consists of a mixture of coarse crushed stone, slag/cinders, brick, and wood chips in a sandy matrix.

The fill is underlain by 65-75 feet of alternating layers of very fine silty sand (up to 19 feet in thickness), silt (up to 8 feet in thickness), and very soft to stiff layered lacustrine clay containing lenses (1/8 - 1 inch thick) of very fine sand (up to 6 feet in thickness). The very fine silty sand layers often contained similar to the above mentioned lacustrine clay lenses of soft clay. Beneath these alternating layers of sand and clay is a 10-20 foot thick layer of very soft interbedded light-gray and dark-reddish-gray clay. This clay has a high plasticity (putty-like consistency). Underlying the clay is a fine to medium sand unit, with a minimum thickness of 19 feet. It is in this relatively permeable layer below the clay layer that all of the deep wells are screened.



PROJECT: NYSEG - GENEVA

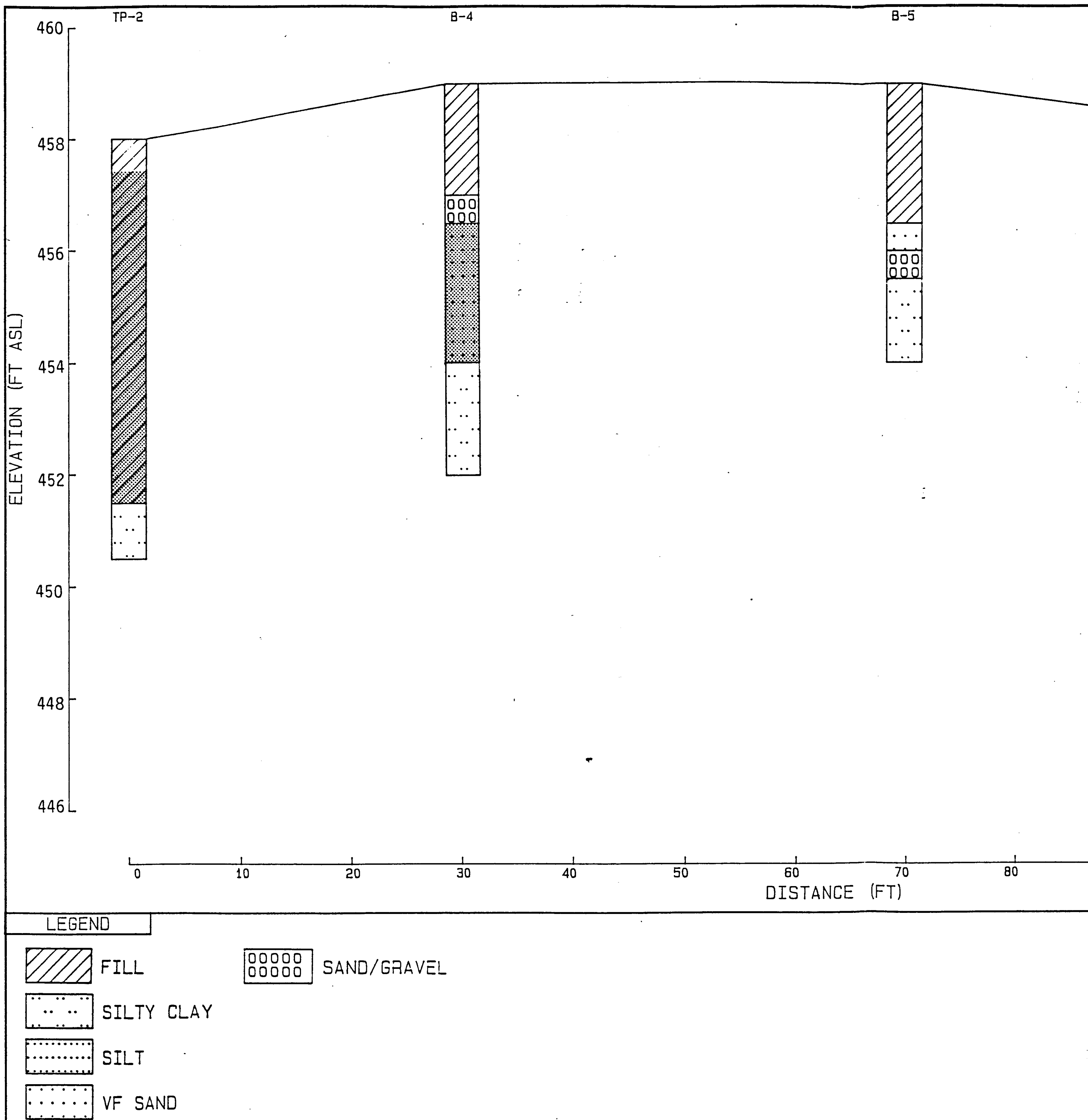
FILE: 3292-N61-25

LOCATION: GENEVA NY

FIGURE: **5-1**

GEOLOGIC CROSS SECTION A-A'

TRC ENVIRONMENTAL CONSUL.



PROJECT: NYSEG - GENEVA

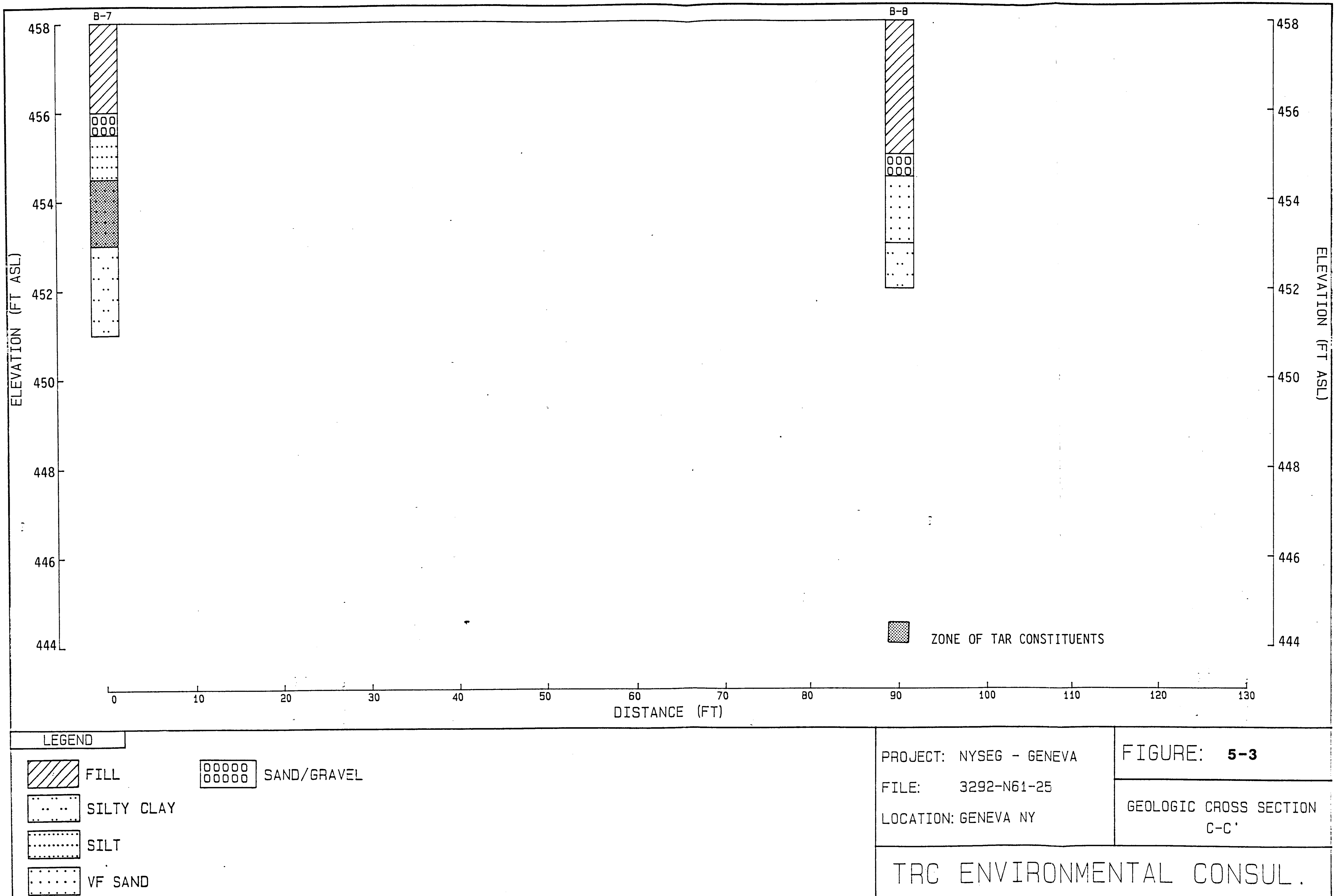
FILE: 3292-N61-25

LOCATION: GENEVA NY

FIGURE: **5-2**

GEOLOGIC CROSS SECTION B-B'

TRC ENVIRONMENTAL CONSUL.



PROJECT: NYSEG - GENEVA

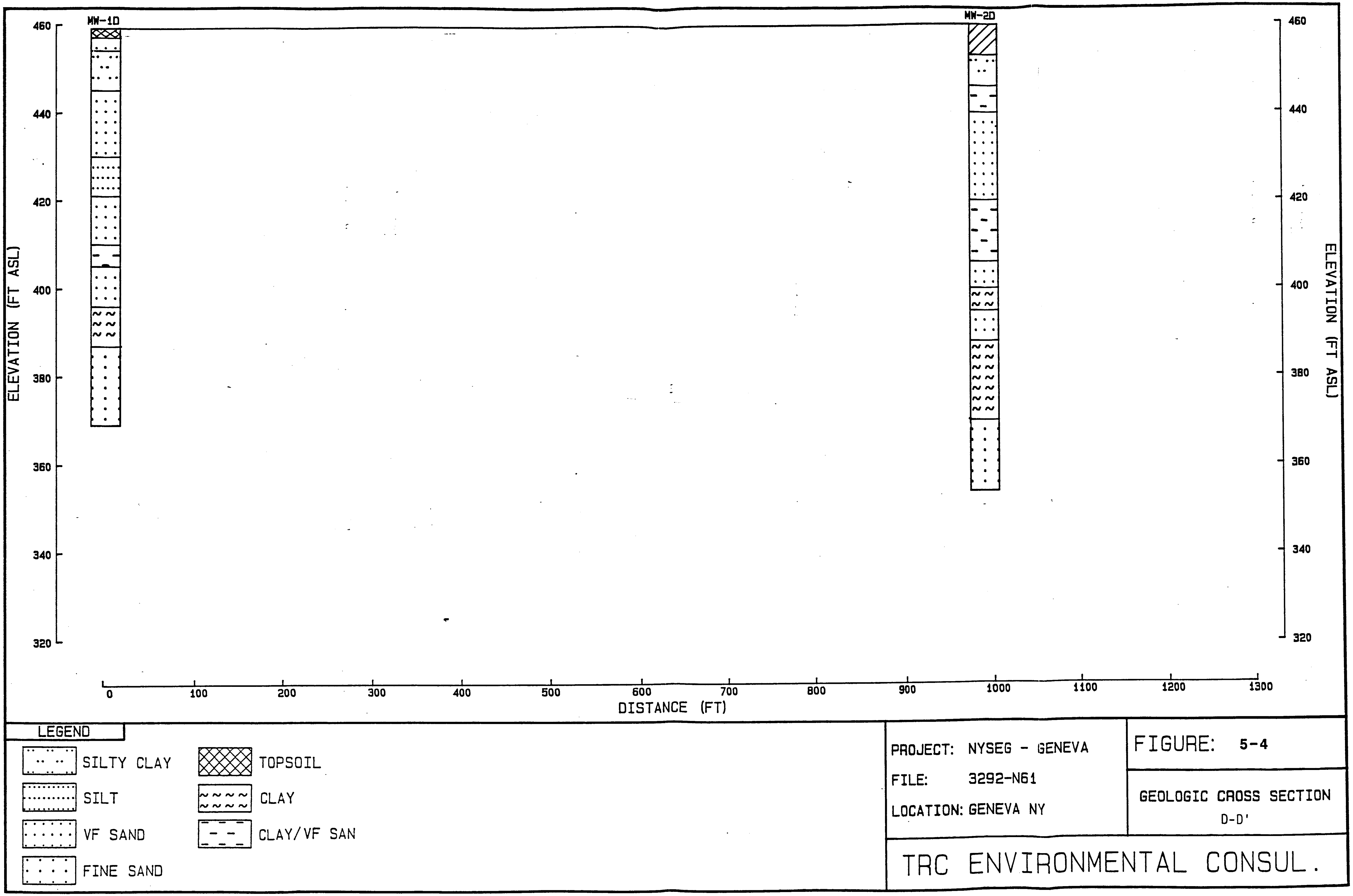
FILE: 3292-N61-25

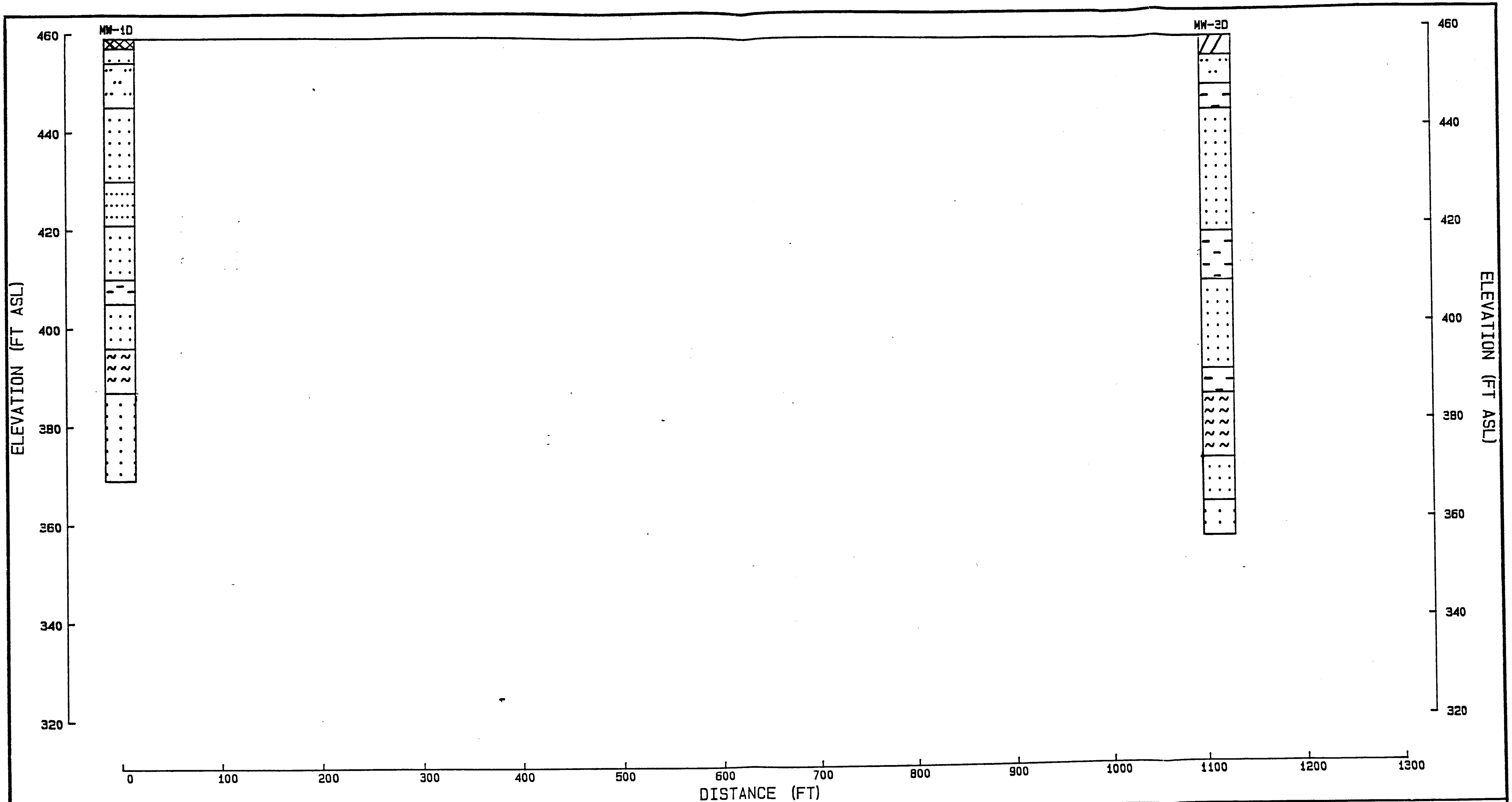
LOCATION: GENEVA NY

FIGURE: **5-3**

GEOLOGIC CROSS SECTION C-C'

TRC ENVIRONMENTAL CONSUL.


MW-1D
MW-2D
460
440
420
400
380
360
340
320
ELEVATION (FT ASL)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
DISTANCE (FT)
LEGEND
SILTY CLAY
SILT
VF SAND
FINE SAND
TOPSOIL
CLAY
CLAY/VF SAN
PROJECT: NYSEG - GENEVA
FILE: 3292-N61
LOCATION: GENEVA NY
FIGURE: 5-4
GEOLOGIC CROSS SECTION
D-D'
TRC ENVIRONMENTAL CONSUL.



LEGEND

FILL
TOPSOIL
CLAY
CLAY/VF SAN
SILTY CLAY
SILT
VF SAND
FINE SAND

PROJECT: NYSEG - GENEVA
FILE: 3292-N61
LOCATION: GENEVA NY

FIGURE: 5-5

GEOLOGIC CROSS SECTION
E-E'

TRC ENVIRONMENTAL CONSUL.

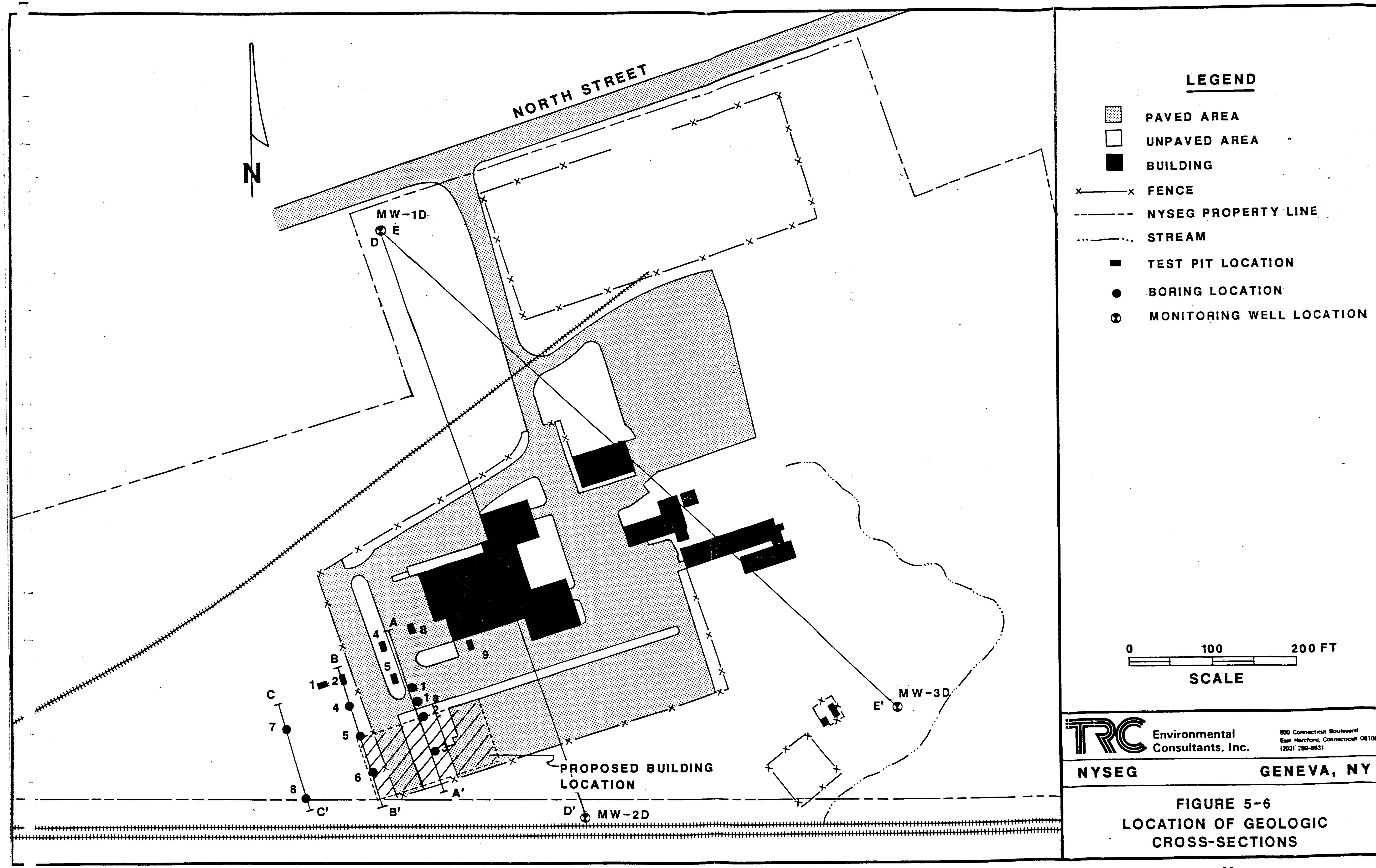


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FIGURE 5-6
LOCATION OF GEOLOGIC CROSS-SECTIONS

5.2 Hydrology

The site surface and ground water hydrogeology are described in this section.

5.2.1 Surface Water

The surface runoff in the immediate area of the NYSEG facilities flows to a small stream on the eastern edge of the site. This stream originates in the wetlands in the northern part of the site and flows south to the NYSEG property boundary and then enters a culvert. This culvert extends from the railroad embankment to the south side of State Routes 5 and 20. The flow exiting the culvert again becomes an open stream, flowing south passing the Seneca Lake State Park entrance road, where it enters an open, lined culvert. The stream flows through this culvert into Seneca Lake. The water depth in the stream ranges from 0-10 inches and averages about 6 inches. The stream bottom consists mostly of soft, tan clayey organic material.

Another small stream passes through the far southwestern portion of the site. A 4 inch diameter drainage pipe discharges into the stream from the north i.e., from the main facility area, upstream of where the creek enters a culvert. The culvert passes through the railroad embankment to the open stream, described above, on the south side of State Routes 5 and 20. The water depth in the stream interval between the culvert and drainage pipe is 18 inches at its deepest point.

5.2.2 Ground Water Hydrology

Measurements of depth to ground water and constant head hydraulic conductivity tests were performed to characterize the hydrogeologic conditions of the Geneva site. Actual ground water elevations were calculated from the topographic survey data and surveyed well riser elevations (Table 5-1).

TABLE 5-1

WATER LEVELS AND ELEVATIONS - GENEVA

Well Number	Casing Elevation (MSL)	2/24/86 Water Depth	Water Elevation	5/1/86 Water Depth	Water Elevation	8/6/86 Water Depth	Water Elevation
MW - 1S	459.05	1.98	457.07	1.75	457.30	1.50	457.55
MW - 1D	458.99	4.60	454.39	3.80	455.19	5.64	453.35
MW - 2S	463.09	7.73	455.56	7.99	455.10	8.96	454.13
MW - 2D	462.49	8.40	454.09	7.56	454.93	8.96	453.16
MW - 3S	458.88	5.17	453.71	5.42	453.46	9.41	449.47
MW - 3D	458.54	4.64	453.90	3.78	454.76	5.55	452.99
LAKE			446.2		446.2		446.6

NOTE: Elevations are relative to Mean Sea Level
All measurements are in feet
Water levels are measured from top of stainless steel riser

The February 24, 1986 ground water elevation data for shallow and deep wells was plotted and contoured to construct the ground water contour map shown in Figure 5-7. The elevation of Seneca Lake on that day was 446.2 feet above sea level. The ground water contour map for both the shallow and deep wells indicates ground water flow to the southeast. Data for the two later dates (May 1, 1986, and August 6, 1986) show similar flow patterns, although the gradients vary slightly, possibly due to seasonal variations in precipitation.

Vertical hydraulic gradients exist at all three well nests. At well nest 1, the upgradient nest, hydraulic head was 2.11 to 4.20 feet lower in the deep well for all three sampling rounds indicating a downward hydraulic gradient. At well nest 2, the western downgradient nest, vertical gradients are also consistently downward, but the magnitude of head difference is less (0.17 to 1.27 feet) At well nest 3, the opposite was true; the deeper well had a higher head indicating an upward hydraulic gradient. The magnitude of the head difference between MW-3S and MW-3D was 0.19 to 3.52. Because of the clay layers between the deep and shallow aquifers, vertical movement of ground water is estimated to be less than 1.0 foot/year. (This estimate is based on the formula $v = \frac{Kv}{\eta} \frac{\Delta h}{L}$ where v is the average linear velocity in the vertical direction, Kv is the vertical hydraulic conductivity, assumed to be 1×10^{-7} cm/sec, η is the porosity, assumed to be 0.3, Δh is the head difference between the deep and shallow wells, and L is the vertical distance between the mid-points of the screens for the deep and shallow wells.)

The horizontal hydraulic conductivity values measured for the 6 monitoring wells are within the range characteristic of silty sand (Table 5-2).

Analysis of the change in water levels between sampling rounds suggests that the deep aquifer is not hydraulically connected to the shallow aquifers.

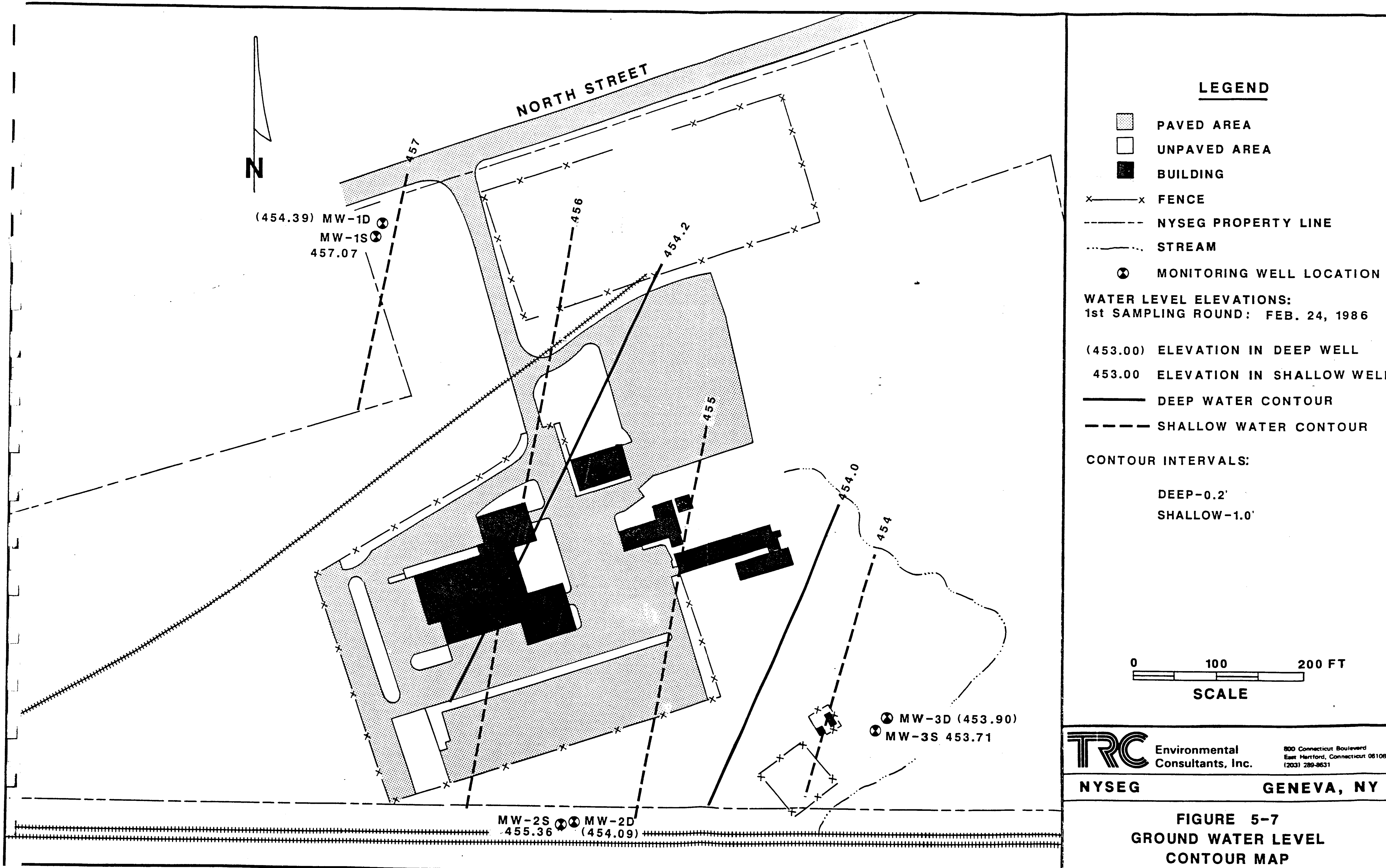

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FIGURE 5-7
GROUND WATER LEVEL CONTOUR MAP

TABLE 5-2

HORIZONTAL HYDRAULIC CONDUCTIVITIES

Well Number	Horizontal Ground Permeability* cm/sec
MW-1S	$2.19x10^{-3}$
MW-1D	$2.19x10^{-3}$
MW-2S	$3.66x10^{-3}$
MW-2D	$1.12x10^{-3}$
MW-3S	$3.64x10^{-4}$
MW-3D	$5.57x10^{-4}$

* Permeabilities were calculated using the equation for a well point in uniform soil as given in Lambe and Whitman, 1969. See Appendix C for calculations.

All the deep wells showed the same pattern of change (Figure 5-8); head increased from the first to the second round of sampling (0.80 to 0.86 ft) and decreased from the second to the third round (1.77 ft to 1.89 ft). The patterns of changes in head for the shallow wells were not similar to the deep wells or each other. Wells 2S and 3S showed a general decrease in head with successive sampling rounds while 1S increased in each successive round. If the deep wells were hydraulically connected with their corresponding shallow wells, they would exhibit the same pattern of changes.

5.3 Plant-Related Features

The test pits were instrumental in confirming the location of several plant-related features, including a tar storage vessel and gas holders, ovens, and waste disposal areas. The structures encountered are depicted in Figure 1-2, and Figure 5-9 shows in which of the test pits these structures, as well as other features, were found.

The floor of the tar storage vessel, located west of the present service building, was encountered at a depth of 3 feet at TP-1. The unconsolidated material above the tar storage vessel floor as well as that just to the east in TP-2, was found to be heavily coated by a very viscous creosote-like material. This material was encountered less than one foot below the surface and was covered by crushed stone. The presence of the creosote-like material in this area was most likely the result of pipe coating activity which was performed there in the 1950's (Schiefen, 1986).

The concrete floor of the 30,000 ft^3 gas holder, west of the main building, was found in TP-4 and TP-5. The wall of the 100,000 ft^3 holder was found in TP-7.

The floor of the large, 300,000 ft^3 gas holder located east of the site buildings was encountered at a depth of 2.5 feet in TP-34 and the trench that

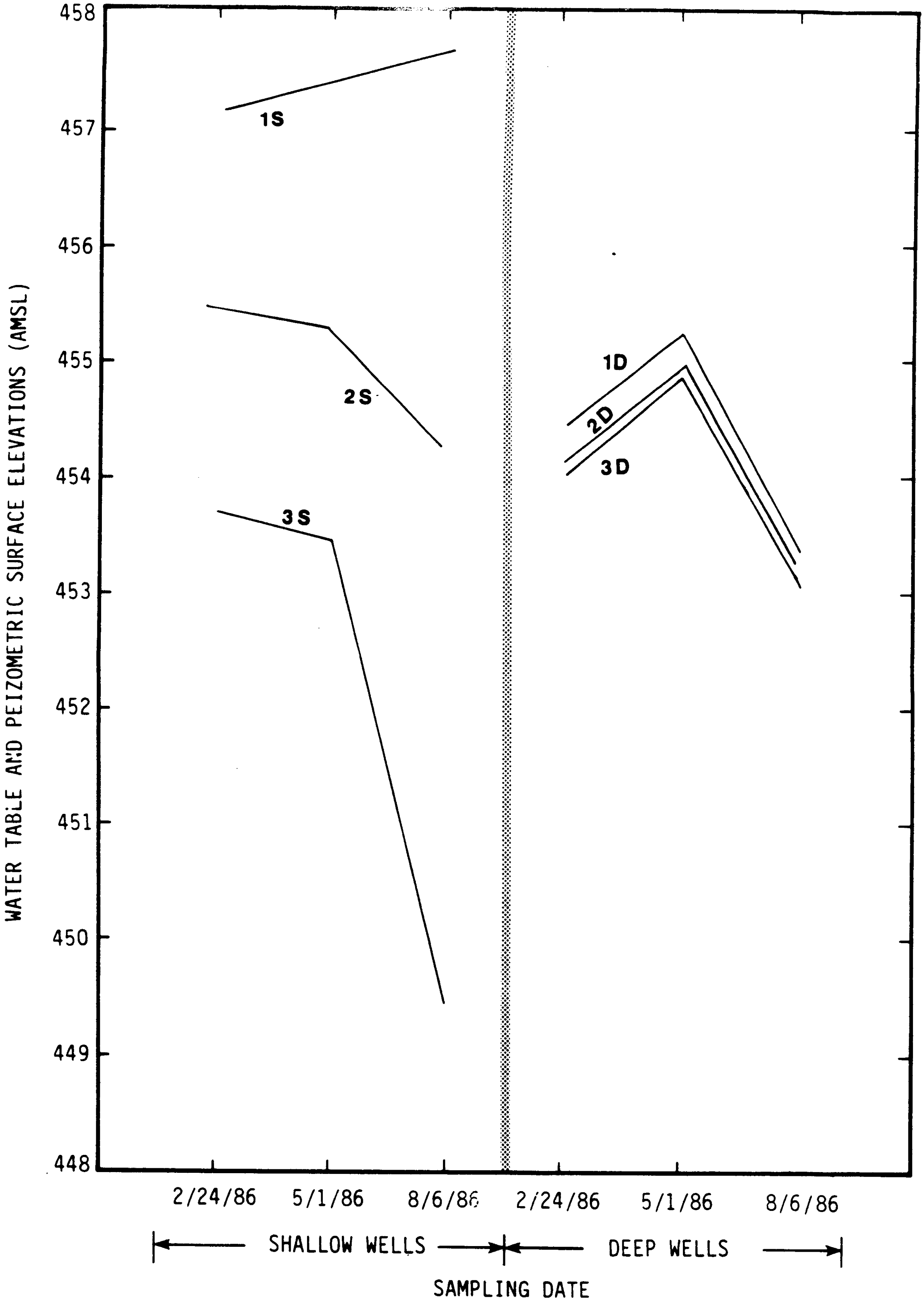

Figure 5-8. Comparison of ground water elevation through time.

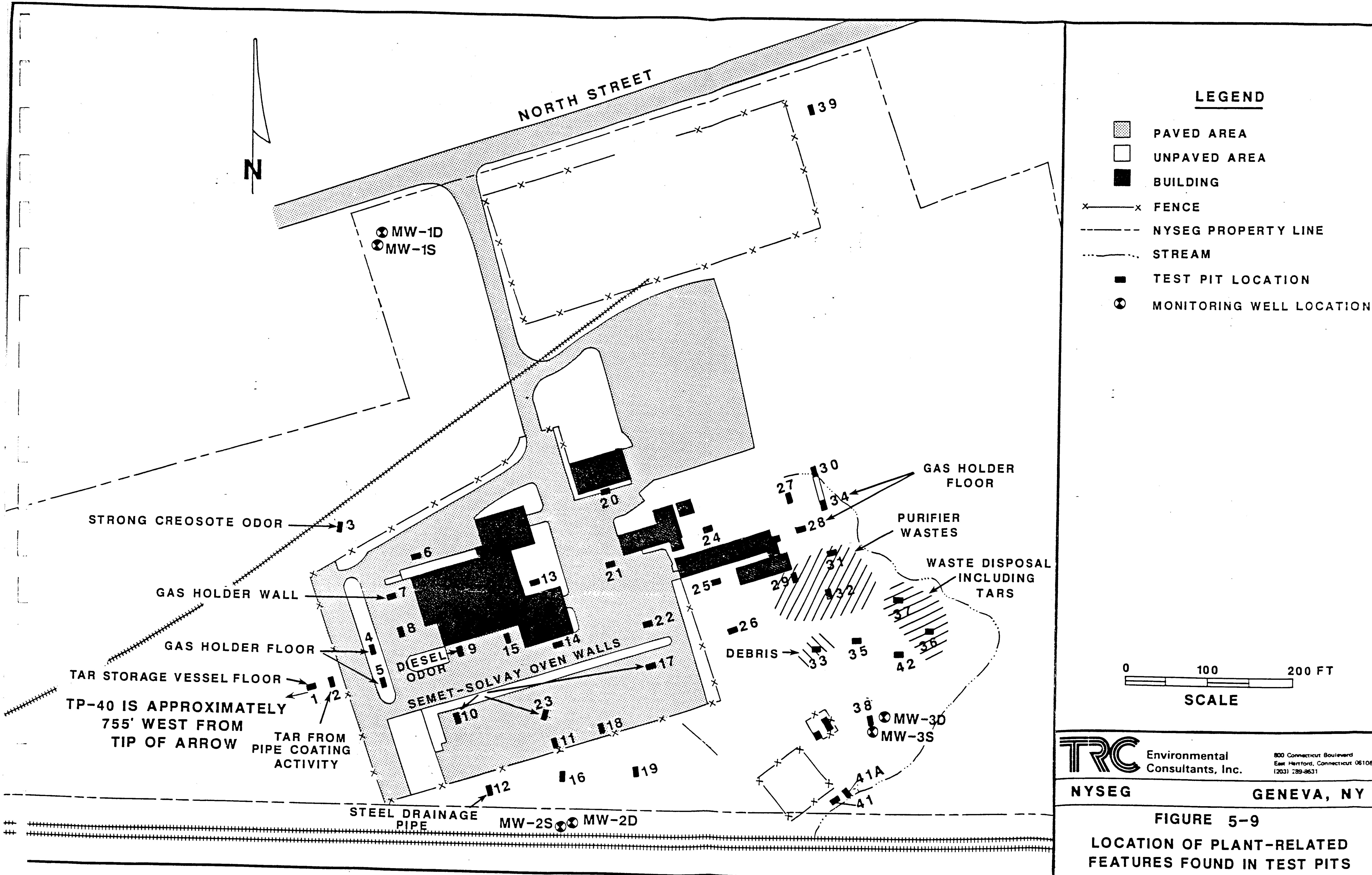

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FIGURE 5-9
LOCATION OF PLANT-RELATED FEATURES FOUND IN TEST PITS

extends to TP-30. An extension of this floor was also found in TP-28, west of TP-34. Black sand and gravel were situated both above and below the floor at TP-28, as well as at about that same depth in TP-27.

Walls of the former Semet Solvay ovens were located in TP-10, TP-23, and TP-17. No visible coal tar constituents or coal tar odors were encountered during the excavation of these structures, although PAHs were found by Woodward-Clyde (1984 et seq.) in soils just to the south of the ovens. Test pits 11 and 18 encountered no visible coal tar constituents, and contained only relatively minor amounts of PAHs. The test pits may not have been excavated deep enough to encounter PAHs in the concentrations found in the borings (This question will be futher addressed in Task 3).

A 1 foot diameter corrugated steel pipe, trending N30W, was found at a depth of 3.5 feet in TP-12. The pipe exhibited a coal tar-like odor, however, there were no elevated OVA readings from this source. The soil sample from this location consisted of sediment obtained from the pipe interior.

Purifer wastes (blue-green colored wood chips) were found in TP-29, TP-31, and TP-32 at depths as shallow as 1 foot (TP-29). These test pits are all located southeast of the former purifier building (Figure 1-2). Blue staining of bricks and rocks was encountered in test pits as far south as TP-33 and TP-37.

A debris disposal area was located at TP-33, where approximately 5.5 feet of loose brick and metal scrap was found.

Test pits TP-36 and TP-37 were excavated in the suspected tar waste disposal area. A layer of fine sand and silt, coated with thick tar was found in both of these pits. At TP-36 and TP-37, these layers were found to be 3 feet thick and 2 feet thick respectively.

Although no structures were found, a very strong creosote-like odor was encountered in TP-3, in the area of the former blue gas generator. A strong diesel fuel odor, possibly related to a leaky diesel fuel tank formerly located nearby (Schiefen, 1986), was encountered in TP-9.

5.4 Summary of Site Features

The subsurface investigations conducted during Task 2 determined the site stratigraphy to a depth of approximately 100 feet. The unconsolidated fill, silty sand and clay, clay, and sand units overlie bedrock estimated to be at 175-200 feet below surface.

Hydrological data indicates that there are at least two hydrologically separated aquifers (one shallow, one deep) at the site. Ground water flow in both aquifers is dominated at the site by the eastern site stream and flows to the east-southeast. Horizontal hydraulic conductivity measurements for all monitoring wells are within the range for silty sand, i.e., 10^{-1} to 10^{-10} cm/s (Freeze and Cherry, 1979).

The locations of the tar storage vessel, three gas holders, the Semet-Solvay ovens, and the purifier and tar waste disposal areas were confirmed by test pit excavation. An area of viscous creosote-like material was encountered in the area where pipe coating activities reportedly occurred during the 1950's (Schiefen, 1986).

6.0 ANALYTICAL METHODS

TRC and CompuChem Laboratories performed the laboratory analyses on soil, sediment, surface water and ground water samples taken at the Geneva site. Total organic compound analysis of ground and surface water was performed by Envirite and Environmental Science Corporation. Analysis of time-averaged air samples was performed by the Hartford and Travelers Laboratories.

TRC's laboratory is certified by the New York State Health Department to perform analysis on potable and non-potable water source and sediments. CompuChem is an EPA approved laboratory and performs analyses according to Contract Laboratory Protocol.

6.1 Soils, Sediment, and Water Sample Analyses

The organic and inorganic compounds analyzed by TRC Laboratories for soil, sediment and water samples are listed in Table 6-1. Organic priority pollutant constituents analyzed by CompuChem are presented in Table 6-2 and trace elements analyzed by that lab are listed in Table 6-3.

The methods used by the labs to analyze soil and water samples are summarized in Table 6-4.

6.2 Air Sample Analyses

Various air samples were collected on-site utilizing Multi Media Tenax tubes and Organic Vapor Dosimeters. The Multi Media Tenax tubes were analyzed by The Travelers Insurance Laboratory, using gas chromatography/mass spectrometry (GC/MS) techniques. The Organic Vapor Dosimeters were analyzed by The Hartford Insurance Group - Environmental Sciences Laboratory using gas chromatography (GC) techniques.

TABLE 6-1

Organic and Inorganic Chemical Compounds Analyzed by TRC Laboratories

Purgeable Aromatics:	Non-Chlorinated Phenols:
Benzene	2,4-Dimethylphenol
Chlorobenzene	2,4-Dinitrophenol
1,2-Dichlorobenzene	2-Methyl-4,6-Dinitrophenol
1,3-Dichlorobenzene	2-Nitrophenol
1,4-Dichlorobenzene	4-Nitrophenol
Ethylbenzene	Phenol
Polynuclear Aromatic Hydrocarbons:	**Inorganic Compounds:**
Acenaphthene	Iron, Total
Acenaphthylene	Zinc, Total
Anthracene	
Benzo(a)anthracene	Organic Ammonia
Benzo(a)pyrene	Cyanide, Total
Benzo(b)fluoranthene	Cyanide, Ferro/Ferric
Benzo(k)fluoranthene	Total Organic Carbon(1)
Benzo(g,h,i)perylene	
Chrysene	
Dibenzo(a,h)anthracene	
Fluoranthene	
Fluorene	
Indeno(1,2,3-cd)pyrene	
Naphthalene	
Phenanthrene	
Pyrene	

NOTE: (1) Analysis performed on ground water and surface water samples only.

TABLE 6-2
Organic Chemical Compounds Aanalyzed by CompuChem Laboratory

Acid Extractables:

Phenol
2-Chlorophenol
2-Nitrophenol
2,4-Dimethylphenol
2,4-Dichlorophenol
P-Chloro-m-cresol
2,4,6-Trichlorophenol
2,4-Dinitrophenol
4-Nitrophenol
4,6-Dinitro-o-cresol
Pentachlorophenol

Base/Neutral Extractables:

N-Nitrosodimethylamine
bis(2-chloroethyl)ether
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,2-Dichlorobenzene
bis(2-chloroisopropyl)ether
Hexachloroethane
N-Nitrosodi-n-propylamine
Nitrobenzene
Isophorone
bis(2-chloroethoxy)methane
1,2,4-Trichlorobenzene
Naphthalene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Dimethyl phthalate
Acenaphthylene
2,6-Dinitrotoluene
Acenaphthene
2,4-Dinitrotoluene
Diethyl phthalate
Fluorene
4-Chlorophenyl phenyl ether
Diphenylamine(n-nitroso)
1,2-Diphenylhydrazine (Azobenzene)
4-Bromophenyl phenyl ether
Hexachlorobenzene
Phenanthrene
Anthracene
Di-n-butyl phthalate
Fluoranthene
Benzidine
Pyrene
Butylbenzl phthalate
Benzo(a)anthracene
3,3'-Dichlorobenzidine
Chrysene
bis(2-ethlhexyl)phthalate
Di-n-octyl phthalate
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Indeno(1,2,3-cd)pyrene
Dibenzo(a,h)anthracene
Benzo(g,h,i)perylene

Volatiles:

Chloromethane
Vinyl chloride
Chloroethane
Bromomethane
Acrolein
Acryonitrile
Methylene chloride
Trichlorofluormethane
1,1-Dichloroethylene
1,1-Dichloroethane
Trans-1,2-dichloroethylene
Chloroform
1,2-Dichloroethane
1,1,1-Trichloroethane
Carbon tetrachloride
Bromodichloromethane
1,2-Dichloropropene
Trans-1,3-dichloropropene
Trichloroethylene
Benzene
cis-1,3-dichloropropene
1,1,2-Trichloroethane
Dibromochloromethane
Bromoform
1,1,2,2-Tetrachloroethylene
1,1,2,2-Tetrachloroethane
Toluene
Chlorobenzene
Ethylbenzene
2-Chloroethyl vinyl ether

TABLE 6-3

Inorganic Chemical
Compounds Analyzed by
CompuChem Laboratory

Trace Metals:

Antimony	Mercury
Arsenic	Nickel
Beryllium	Selenium
Cadmium	Silver
Chromium	Thallium
Copper	Zinc
Lead	Cyanide (total)

[1] Soil samples from the test pits and ground water samples from Rounds I and II were analyzed for total metals. Ground water from Round III was analyzed for both total and dissolved metals.

TABLE 6-4

SUMMARY OF ANALYTICAL METHODS USED FOR SOIL AND WATER SAMPLE ANALYSIS

Lab	Analysis Performed	Methods*
TRC	Purgeable Aromatics	602
	PAHs	610
	Nonchlorinated Phenols	604
	Inorganic Compounds:	
	Iron	236.1
	Zinc	289.1
	Ammonia (Organic Nitrogen)	351.3
	Sulfate	375.2
	Total Cyanide	9010 (soil) 335.2 (water)
	Ferric-Ferro cyanide	9010 (soil)
CompuChem	Priority Pollutant (excluding PCB/Pesticdes):	
	Purgeables	624
	Acid and Base/Neutral Extractables	625
	Trace Metals	200.7
	Total Phenols (water only)	420.1
	Total Cyanides	412B
Envirite	Total Organic Carbon	415.1
Environmental Science Corporation	Total Organic Carbon	415.2

* Numbers refer to U.S. EPA Methods found in: Methods for Chemical Analysis of Water and Wastes (U.S. EPA, 1983). Test Methods for Evaluating Solid Wastes - Physical Chemical Methods (U.S. EPA, 1984), Guidelines Establishing Test Procedures for the Analysis of Pollutants, CFR, part 136 (U.S. EPA, 1985), and Standard Methods for the Examination of Water and Wastewater (American Public Health Association, 1985).

6.2.1 Travelers Analytical Methodologies

Tenax tube samples were thermally desorbed at 225°C into a GC/MS. The compounds tentatively identified under the conditions of analysis were compared to a liquid standard which was injected under identical conditions. For comparative purposes, the concentrations were calculated on a time averaged basis.

6.2.2 Hartford Analytical Methodologies

The OVDS were analyzed for benzene and toluene by GC techniques. For comparative purposes, the concentrations were calculated on a time averaged basis.

7.0 ANALYTICAL RESULTS

The analytical results from soil, water, stream sediment and air samples collected during Task 2 are presented in this section, along with a brief discussion of the analytical aspects of the data. A full interpretation of the data is discussed in Section 8, Data Analysis.

The tables included in this section are summary tables which include only "hits", i.e., a value is only entered if it is greater than the detection limit. Some constituents which were analyzed for do not appear on these tables because they were not found in any samples. Complete analytical data tables for all parameters analyzed for, including data from CompuChem Laboratories and comparison tables of blind duplicates, are presented in Appendices D, E, F, and G.

A table of "hits" for the soil data is essentially identical to the table of complete analytical data. Because of the volume of soil data, these tables are presented only in Appendix D.

7.1 Soil Samples

Forty-one soil samples, collected from test pits (see Figure 4-1 for sampling locations), were analyzed for purgeable aromatics, polynuclear aromatic hydrocarbons, non-chlorinated phenols and inorganic compounds. Two additional samples were collected from TP-4 and TP-36 and analyzed by CompuChem for priority pollutants, excluding PCBs and pesticides. Two of the 41 samples, TP-39 and TP-40, were taken to establish background soil conditions. The following discussion refers to analyses presented in Appendix D.

The majority of samples contained at least minor concentrations of some PAHs. The concentration of total PAHs ranged from 0 ppm in TP-5, TP-20, TP-21, and TP-24, to nearly 139,000 ppm in TP-1, collected near the former tar tank and the area where pipe-coating activity occurred.

Most samples also contained minor amounts of purgeable aromatics with the greatest concentration (669.43 ppm) found in TP-1. Slightly more than half of the samples contained total purgeable aromatic concentrations of less than 1.0 ppm.

Nine samples contained detectable amounts of non-chlorinated phenols. The greatest concentration (total concentration: 70,430 ppm) was found in TP-37 located within the former disposal area. 57,000 ppm of this total is 2-methyl-4, 6-dinitrophenol.

Concentrations of organic nitrogen ranged from <90 ppm in TP-2 to 9,400 ppm in TP-37.

Sulfate concentrations ranged from 4.06 ppm in TP-11 to 1,500 in TP-28. Two thirds of the samples had concentrations less than 100 ppm.

Ferric-ferrocyanide was not detected in TP-3 and TP-8. Ferric-ferrocyanide concentrations ranged up to 32,000 ppm in TP-31. This and other samples with elevated values (TP-29 with 13,000 ppm and TP-31 with 10,000 ppm), were found in pits containing purifier wastes.

Differences between the CompuChem and TRC data for TP-4 and TP-36 can be explained by the fact that the two TP-4 samples were taken at different depths within the pit and by the general difficulty in obtaining homogenous soil samples.

The background samples, TP-39 and TP-40, contained no purgeable aromatics or non-chlorinated phenols. The only PAHs detected were benzo(a)anthracene (5 ppm and 9 ppm) and benzo(b)fluoranthene and benzo(k)fluoranthene (8 ppm co-eluted) in TP-39.

TP-39 and TP-40 contained detectable amounts of all the inorganic compounds examined.

7.2 Ground Water Samples

Each of the six monitoring wells was sampled during three sampling rounds (see Figure 4-1 for locations of wells). The samples were analyzed for purgeable aromatics, PAHs, non-chlorinated phenols and inorganics. A summary of the results of these analyses is presented in Table 7-1 and complete analytical data, including blind duplicate analyses (MW-4 and MW-5), are compiled in Appendix E. Measurements of pH, conductivity and temperature were taken in a field laboratory at the time of collection, and these data are shown in Table 7-2.

During each round, two samples were sent to CompuChem Laboratories for priority pollutant analyses, excluding the PCB/pesticides fraction. These data are presented in Tables E-29 and E-31 of Appendix E. A comparison of the TRC and CompuChem round one data for MW-1D and MW-2S, round 2 data for MW-3S and MW-3D, and round three data for MW-2S and MW-2D is difficult because the analytical detection limits are higher for the CompuChem data. This is due to the different instruments, and therefore methods, used by TRC (GC) and CompuChem (GC/MS). Therefore, many constituents detected by TRC were not identified by CompuChem. The detection limits of both TRC's and CompuChem's methods are below the New York State ground water quality standards and guidelines for volatile organic compounds (See section 8.2.2 for a discussion of these standards and guidelines).

The New York State standards for total phenol and Total Regulated Compounds (0.001 mg/l) are lower than CompuChem's detection limit for these constituents (0.050 or 0.010 mg/l) for acid extractables and base neutrals. TRC's detection limits are below these standards and are therefore more useful for evaluating water quality.

The State guidance values for benzo(b)fluorathene, benzo(k)fluoranthene, chrusene, and indeno(1,2,3-cd)pyrene (2.0×10^{-6} mg/l) are below the

TABLE 7-1

SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE (ROUND 1) DETECTION LIMIT	(ROUND 2) DETECTION LIMIT	(ROUND 3) DETECTION LIMIT	MW-1S 2/26/86 GRAB	MW-1S 5/2/86 GRAB	MW-1S 8/7/86 GRAB	MW-1D 2/26/86 GRAB	MW-1D 5/2/86 GRAB	MW-1D 8/7/86 GRAB	MW-2S 2/25/86 GRAB	MW-2S 5/2/86 GRAB	MW-2S 8/7/86 GRAB
PURGEABLE AROMATICS													
BENZENE	MG/L	0.001	0.002	0.001	0.002	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	MG/L	0.003	0.003	0.002	0.002	-	-	-	-	-	-	-	-
ETHYLBENZENE	MG/L	0.002	0.003	0.001	0.001	-	-	-	-	-	-	-	-
TOLUENE	MG/L	0.001	0.002	0.001	0.001	-	-	-	-	-	-	-	-
POLYNUCLEAR AROMATIC HYDROCARBONS													
ACENAPHTHENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	-	-	-	-
ACENAPHTHYLENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	0.0022	-	0.001	-
BENZO (A) ANTHRACENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	0.0003	-	-	0.0018	-
BENZO (A) PYRENE	MG/L	0.0004	0.0002	0.0002	-	0.0005	-	0.0004	0.0012	-	0.0004	0.0038	-
BENZO (B) FLUORANTHENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	-	0.0008	-	-
BENZO (K) FLUORANTHENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	-	0.0036	0.0024	-
BENZO (GHI) PERYLENE	MG/L	0.0004	0.0002	0.0002	-	-	0.0024	-	-	-	-	0.0016	-
CHRYSENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	-	-	-	-
DIBENZO(A,H)ANTHRACENE	MG/L	0.0004	0.0002	0.0002	-	0.0005	-	-	0.0002	-	-	0.0005	-
FLUORANTHENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	-	0.0004	0.0030	-
FLUORENE	MG/L	0.0004	0.0002	0.0002	-	0.0108	-	-	0.0139	-	-	0.0017	-
INDENO(1,2,3-CD)PYRENE	MG/L	0.0004	0.0010	0.0002	-	-	-	-	-	-	0.0030	0.0018	-
NAPHTHALENE	MG/L	0.0004	0.0002	0.0002	-	-	-	0.0006	-	-	-	0.0003	-
PHENANTHRENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	-	-	0.0005	-
PYRENE	MG/L	0.0004	0.0002	0.0010	-	-	-	-	-	-	0.0018	0.0013	-
TOTAL PAHs	MG/L				-	0.0118	0.0024	0.0010	0.0156	0.0022	0.0100	0.0197	-
NON-CHLORINATED PHENOLS													
2,4-DIMETHYLPHENOL		0.008	0.002	0.005	-	-	-	-	-	-	-	-	-
INORGANIC COMPOUNDS													
IRON, DISSOLVED	MG/L	0.1	0.13	0.15	-	0.14	0.15	-	-	0.24	2.30	1.61	2.58
ZINC, DISSOLVED	MG/L	0.02	0.02	0.02	0.02	-	0.031	0.02	0.02	-	-	-	0.021
SULFATE	MG/L	1.0	1.0	1.0	13.3	64.2	47.6	242	224	205	536	772	1180
ORGANIC NITROGEN	MG/L	0.159	0.136	0.036	0.590	-	0.153	0.221	-	0.070	0.260	0.951	1.49
CYANIDE, TOTAL	MG/L	0.008	0.008	0.005	0.016	-	-	0.009	-	-	5.70	3.2	3.53
ORGANIC CARBON, TOTAL	MG/L	1.0	1.0	1.0	1.2	81	8.0	1.7	27	6.0	13	179	21

Note: Full analytical data is presented in Appendix E.
- indicates that the analyte was not detected.

TABLE 7-1 (Cont.)

SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER

SAMPLE ID DATE SAMPLE TYPE	UNITS	(1) DETECTION LIMIT	(2) DETECTION LIMIT	(3) DETECTION LIMIT	MW-2D 2/25/86 GRAB	MW-2D 5/2/86 GRAB	MW-2D 8/7/86 GRAB	MW-3S 2/25/86 GRAB	MW-3S 5/1/86 GRAB	MW-3S 8/8/86 GRAB	MW-3D 2/25/86 GRAB	MW-3D 5/1/86 GRAB	MW-3D 8/8/86 GRAB
PURGEABLE AROMATICS													
BENZENE	UG/L	0.001	0.002	0.001	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	UG/L	0.003	0.003	0.002	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	UG/L	0.002	0.003	0.001	-	0.0041	-	-	0.0091	-	-	-	-
TOLUENE	UG/L	0.001	0.002	0.001	-	0.0048	-	-	0.0027	-	-	-	-
POLYNUCLEAR AROMATIC HYDROCARBONS													
ACENAPHTHENE	MG/L	0.0004	0.0002	0.0002	0.0004	-	-	-	0.0017	-	-	-	-
ACENAPHTHYLENE	MG/L	0.0004	0.0002	0.0002	-	-	0.0023	-	-	-	-	-	-
BENZO (A) ANTHRACENE	MG/L	0.0004	0.0002	0.0002	-	-	-	0.0044	0.0002	-	0.0044	-	-
BENZO (A) PYRENE	MG/L	0.0004	0.0002	0.0002	-	0.0004	-	-	-	-	-	-	-
BENZO (B) FLUORANTHENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	0.0011	0.0008	-	-	0.0013
BENZO (K) FLUORANTHENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	-	-	-	-
BENZO (GHI) PERYLENE	MG/L	0.0004	0.0002	0.0002	-	-	0.0004	-	-	-	ND<0.005	-	-
CHRYSENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	-	-	-	-
DIBENZO(A,H)ANTHRACENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	-	-	0.0003	-
FLUORANTHENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	-	-	-	-	-
FLUORENE	MG/L	0.0004	0.0002	0.0002	0.0056	0.0024	-	-	0.0080	-	-	0.0034	-
INDENO(1,2,3-CD)PYRENE	MG/L	0.0004	0.0002	0.0010	-	-	-	-	-	-	-	-	-
NAPHTHALENE	MG/L	0.0004	0.0002	0.0002	0.0244	0.0012	-	-	0.0098	-	-	-	-
PHENANTHRENE	MG/L	0.0004	0.0002	0.0002	0.0074	-	-	-	-	-	-	-	-
PYRENE	MG/L	0.0004	0.0002	0.0010	0.0130	0.0019	-	-	-	-	-	0.0062	-
TOTAL PAHs	MG/L				0.0508	0.0059	0.0027	0.0044	0.0208	0.0008	0.0044	0.0099	0.0013
NON-CHLORINATED PHENOLS													
2,4-DIMETHYLPHENOL		0.008	0.002	0.005	-	-	0.0052	-	-	-	-	-	-
INORGANIC COMPOUNDS													
IRON, DISSOLVED	MG/L	0.1	0.13	0.15	-	0.13	-	0.66	1.47	1.94	-	-	-
ZINC, DISSOLVED	MG/L	0.02	0.02	0.02	-	-	0.043	0.02	-	0.030	-	-	0.021
SULFATE	MG/L	1.0	1.0	1.0	244	274	247	1,310	1,340	1050	436	372	-
ORGANIC NITROGEN	MG/L	0.159	0.136	0.036	0.452	-	0.092	0.958	0.822	0.741	0.223	-	-
CYANIDE, TOTAL	MG/L	0.008	0.008	0.005	-	-	-	0.970	-	0.287	-	-	-
ORGANIC CARBON, TOTAL	MG/L	1.0	1.0	1.0	1.1	23	3.0	6.4	78	10.0	0.8	105	9.0

Note: Full analytical data is presented in Appendix E.
- indicates that the analyte was not detected.

TABLE 7-2

pH, CONDUCTIVITY AND TEMPERATURE OF GROUND WATER SAMPLES

	ROUND 1 (2/86)			ROUND 2 (5/86)			ROUND 3 (8/86)		
Sample	pH	Conductivity (μMhos)	Temperature °C	pH	Conductivity (μMhos)	Temperature °C	pH	Conductivity (μMhos)	Temperature °C
MW-1S	7.49	520	6°	7.15	580	9°	7.30	700	18.5°
MW-1D	7.60	900	8°	7.35	960	10.5°	7.70	950	14.5°
MW-2S	6.95	1,200	13°	7.15	1,500	13°	7.19	2,600	18°
MW-2D	6.65	1,090	15	7.50	1,090	13.5°	7.53	1,020	17°
MW-3S	6.82	1,700	8°	6.90	2,380	16.5°	6.86	1,950	17°
MW-3D	6.75	ND	7°	7.90	1,450	15°	7.99	1400	16°

ND - No data collected

detection limits of both TRC's (0.001 mg/l or 0.0002 mg/l for indeno(1,2,3-cd)-pyrene) and CompuChem's (0.010 mg/l) methods. Although above the guidelines, TRC's lower limits are more useful than CompuChem's.

CompuChem analyzed the samples for several inorganic compounds not analyzed for by TRC. Of these, the New York State standard for arsenic (0.025 mg/l) and lead (0.025) are below CompuChem's detection limits of 0.050 mg/l for both constituents.

The order of magnitude difference between rounds 1 and 3, and round 2 total organic carbon values is due to the fact that this work was subcontracted by TRC to two different labs. The lab used for rounds 1 and 3 decanted an aliquot from the sample bottle without disturbing bottom sediment. The lab used in the second round thoroughly mixed the sample before analysis. The data from the decanted aliquots are more representative of the water quality than the data from the mixed samples which includes undissolved constituents. Therefore, subsequent samples were decanted.

The total PAH values for round 1 samples range from "not detected" to 0.0508 ppm in MW-2D; in round 2, they ranged from 0.0059 ppm in MW-2D to 0.0197 ppm in MW-2S, and in round 3 from "not detected" to 0.0027 ppm in MW-2D. All total PAH values were found to increase from round 1 to round 2 and decrease in round 3, except those for MW-2D. In MW-2D, the total PAH concentration decreased from 0.0391 to 0.0027 ppm.

Dissolved iron concentrations ranged from "not detected" in MW-1D and MW-3D to 2.58 ppm (round 3) in MW-2S. Dissolved zinc was found only in levels close to the detection limit in all three wells. Sulfate values ranged from 13.3 ppm in MW-1S (round 1) to 1340 ppm in MW-2S (round 2). Organic nitrogen was found in at least one sample from each well. In general, the lowest values were found most consistently in MW-1D and MW-3D and the highest in MW-2D. The highest concentration of organic nitrogen (5.7 ppm) was found in MW-2S (round 1).

Rounds 1 and 3 total organic carbon concentrations were highest in MW-2S (13 ppm, round 1; 21 ppm, round 3).

The only non-chlorinated phenol detected in any well was 2,4-dimethylphenol, which was found in MW-2D at a concentration (0.0052 ppm) close to the detection limit.

7.3 Surface Water Samples

Three surface water samples were collected during each of the three sampling rounds (see Figure 4-1 for sampling locations) and analyzed for purgeable aromatics, PAHs, non-chlorinated phenols and inorganics. A summary of the analytical results for these samples is presented in Table 7-3 and complete analytical data, including blind duplicate analyses (SW-4) is compiled in Appendix F.

Measurements of pH, conductivity and temperature were taken in a field laboratory, and these data are shown in Table 7-4. The field analytical work during the second round was delayed by two hours and the temperature of the samples had therefore reached room temperature (20°C) by the time the measurements were taken. The actual temperature of the surface water during the month of May is likely to have been several degrees cooler.

Purgeable aromatics were only detected in SW-1, while PAHs, phenol, and inorganic compounds were found in all samples.

The blind duplicate analytical results are in good agreement in all sampling rounds (see Appendix F).

The concentrations of benzene, ethylbenzene, and toluene all show increased concentrations in round 2 samples but are absent in round 3. Benzene, found in a concentration of 0.533 ppm during round 2 at SW-1, was the constituent present in highest concentration for the three sampling rounds.

TABLE 7-3

GENEVA SURFACE WATER SAMPLES
SUMMARY OF RESULTS

	UNITS	SAMPLE ID DATE SAMPLE TYPE (ROUND 1) DETECTION LIMIT	(ROUND 2) DETECTION LIMIT	(ROUND 3) DETECTION LIMIT	SW-1 2/24/86 GRAB	SW-1 5/1/86 GRAB	SW-1 8/8/86 GRAB	SW-2 2/24/86 GRAB	SW-2 5/1/86 GRAB	SW-2 8/8/86 GRAB	SW-3 2/24/86 GRAB	SW-3 5/1/86 GRAB	SW-3 8/8/86 GRAB
PURGEABLE AROMATICS													
BENZENE	MG/L	0.001	0.002	0.001	0.062	0.0533	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	MG/L	0.003	0.003	0.002	0.007	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	MG/L	0.003	0.003	0.002	0.013	-	-	-	-	-	-	-	-
ETHYLBENZENE	MG/L	0.002	0.003	0.001	0.003	0.0045	-	-	-	-	-	-	-
TOLUENE	MG/L	0.001	0.002	0.001	0.059	0.0242	-	-	-	-	-	-	-
POLYNUCLEAR AROMATIC HYDROCARBONS													
ACENAPHTHENE	MG/L	0.0004	0.0002	0.0002	-	0.0016	-	-	-	-	-	-	-
ACENAPHTHYLENE	MG/L	0.0004	0.0002	0.0002	-	-	-	-	0.0002	-	-	-	-
BENZO (A) ANTHRACENE	MG/L	0.0004	0.0002	0.0002	0.001	0.0007	-	-	-	0.0020	-	0.0002	-
BENZO (A) PYRENE	MG/L	0.0004	0.0002	0.0002	-	0.0008	-	-	-	-	-	0.0002	-
BENZO(B)FLOURANTHENE	MG/L	0.0004	0.0002	-	-	-	0.0019	-	-	0.0026	-	-	0.0014
BENZO (K) FLUORANTHENE	MG/L	0.0004	0.0002	0.0002	-	0.0006	0.0003	-	-	-	-	-	-
CHRYSENE	MG/L	0.0004	0.0002	0.0002	-	0.0004	-	-	-	-	-	-	-
DIBENZO (A,H) ANTHRACENE	MG/L	0.0004	0.0002	0.0002	-	0.0005	0.0005	0.0040	-	-	-	-	-
FLUORANTHENE	MG/L	0.0004	0.0002	0.0002	-	0.0022	-	0.0008	-	-	0.0032	0.0003	-
FLUORENE	MG/L	0.0004	0.0002	0.0002	-	0.0021	-	0.0064	0.0031	-	-	0.0040	-
NAPHTHALENE	MG/L	0.0004	0.0002	0.0002	0.0006	-	-	0.0016	-	-	-	-	-
PHENANTHRENE	MG/L	0.0004	0.0002	0.0002	-	0.0006	-	-	-	-	-	-	-
PYRENE	MG/L	0.0004	0.0002	0.0010	-	0.0055	-	0.014	0.0040	-	-	0.0065	-
TOTAL PAHs	MG/L	-	-	-	0.0006	0.0150	0.0026	0.0268	0.0072	0.0040	0.0032	0.0112	0.0014
NON-CHLORINATED PHENOLS													
PHENOL	MG/L	0.004	0.002	0.005	0.012	-	-	-	0.015	-	-	0.0040	
INORGANIC COMPOUNDS													
IRON, TOTAL	MG/L	0.1	0.13	0.15	2.43	3.88	2.60	6.54	3.61	2.21	1.04	3.76	0.810
ZINC, TOTAL	MG/L	0.02	0.02	0.02	0.08	0.10	0.087	0.04	0.08	0.055	0.05	0.15	0.040
SULFATE	MG/L	1.0	1.0	1.0	81.8	66.0	38.5	160	283	222	86.7	80.7	57.500
ORGANIC NITROGEN	MG/L	0.159	0.136	0.036	0.560	1.47	1.133	0.775	1.15	0.629	0.608	0.822	0.485
CYANIDE, TOTAL	MG/L	0.008	0.008	0.005	0.071	-	0.342	0.089	-	0.211	-	-	0.007
ORGANIC CARBON, TOTAL	MG/L	1.0	1.0	1.0	4.6	58	21.0	5.3	36	10.0	58	8.0	-

Note: Full analytical data is presented in Appendix F
- indicates that the analyte was not detected

TABLE 7-4

pH, CONDUCTIVITY AND TEMPERATURE OF
SURFACE WATER SAMPLES

Sample	Round 1 (2/86) pH	Round 1 (2/86) Conductivity (μMhos)	Round 1 (2/86) Temperature °C	Round 2* (5/86) pH	Round 2* (5/86) Conductivity (μMhos)	Round 2* (5/86) Temperature °C	Round 3 (8/86) pH	Round 3 (8/86) Conductivity (μMhos)	Round 3 (8/86) Temperature °C
SS-1	7.10	1,100	5°	7.15	1,390	20°	7.31	950	21.0
SS-2	6.50	465	3°	6.95	1,080	20°	7.30	1,400	21.0
SS-3	7.00	600	6°	7.25	800	20°	7.37	850	19.5

* Analytical work was delayed 2 hours

The total PAH values range from 0.0006 ppm in SW-1 (round 1) to 0.0268 ppm in SW-2 (round 1). The highest total PAH concentration in round 2 was detected in SW-1 (0.0150 ppm), and in round 3 was found in SW-2 (0.0040 ppm). Pyrene was the constituent of highest concentration in at least one round of sampling at each location. However, it was not found at SW-1 for SW-2 in round 1.

Phenol was found in at least one sampling round at each sampling location. The highest concentration, 0.004 ppm, was detected in the second round sample of SW-3 collected from the western stream.

The iron concentration in round 1 samples ranges from 1.04 ppm (SW-3) to 6.54 ppm (SW-2). The values for round 2 samples are all between 3.61 ppm and 3.88 ppm, and in round 3, they range from 0.8 ppm to 2.60 ppm. The range of round 2 zinc concentrations, which were slightly higher then the first round, is 0.08 ppm (SW-2) to 0.15 ppm (SW-3). Round 3 values decreased from those in round 2.

For all sampling rounds, sulfate concentrations were highest in SW-2, round 2 (283 ppm). Organic nitrogen concentrations increased from round 1 to round 2, in all samples, and decreased from round 2 to round 3. Values ranged from 0.461 ppm (SW-1, round 1) to 1.21 ppm (SW-1, round 2).

Total cyanide concentrations ranged from not detected to 0.342 ppm (SW-1, round 3) and increased by an order of magnitude in the third round in SW-1 and SW-2. Total organic carbon (TOC) values in round 1 range from 4.6 ppm (SW-1) to 6.7 ppm (SW-3). In round 3, they ranged from 8.0 ppm (SW-3) to 21.0 ppm (SW-1).

7.4 Stream Sediment Samples

During the first sampling round, three stream sediment samples were collected at the same locations as the surface water samples. These sediments were analyzed for purgeable aromatics, PAHs, non-chlorinated phenols and inorganics. The analytical results for these samples are summarized in Table 7-5, and complete analytical data are presented in Appendix G.

No purgeable aromatics were found in the sediments.

Non-chlorinated phenols (110 ppm of 2,4-dimethylphenol and 28 ppm of 4-nitrophenol) were found only in SD-2 (the downstream sample of the eastern site stream).

PAHs were found in all the samples, with the total PAH concentrations ranging from 87.4 ppm in SD-1, to 703.0 ppm in SD-2.

All of the inorganic constituents examined for were found in each of the samples, with the exception of SD-3, which contained no detectable amounts of cyanide.

7.5 Air Samples

The analytical data for the OVDS worn by field personnel during the first 3 to 4 days of subsurface work, and the Tenax tube multi-media samplers placed around the site at that same time are presented in Tables 7-6 and 7-7, respectively. The location numbers noted on these tables correspond to points shown on Figure 4-2.

The majority of the OVD analyses were below the detection limits. Measurable concentrations of both benzene and toluene were detected on sample numbers 3117 and 2586, both of which were worn by workers at location 3 (MW-1D) on the second day of drilling. Sample 3117 had the highest concentration of both benzene, 0.5 mg/m^3, and toluene 0.8 mg/m^3.

Toluene was also detected at that same location (3) on the first day of drilling (Samples 3287 and 3516). In addition it was detected in sample 2432 at locations 4-11, and 2467 at locations 25-29.

TABLE 7-5

SUMMARY OF ANALYTICAL RESULTS - STREAM SEDIMENT SAMPLES

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMITS	SD-1 2/24/86 GRAB	SD-2 2/24/86 GRAB	SD-3 2/24/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS					
ACENAPHTHENE	UG/G DRY	0.9	ND	8	ND
ACENAPHTHYLENE	UG/G DRY	0.9	0.9	5	ND
ANTHRACENE	UG/G DRY	0.9	ND	20	3
BENZO (A) ANTHRACENE	UG/G DRY	0.9	9.6	48	23
BENZO (A) PYRENE	UG/G DRY	0.9	15	46	28
BENZO (B) FLUORANTHENE	UG/G DRY	0.9	3	22	32
BENZO (K) FLUORANTHENE	UG/G DRY	0.9	16	43	ND<4
BENZO (GHI) PERYLENE	UG/G DRY	0.9	5	46	21
CHRYSENE	UG/G DRY	0.9	ND	ND<4	3
DIBENZO (A,H) ANTHRACENE	UG/G DRY	0.9	7	116	ND
FLUORANTHENE	UG/G DRY	0.9	15	110	50
FLUORENE	UG/G DRY	0.9	ND	5	ND<4
INDENO (1,2,3-CD) PYRENE	UG/G DRY	0.9	4	53	26
NAPHTHALENE	UG/G DRY	0.9	0.9	ND<4	ND<4
PHENANTHRENE	UG/G DRY	0.9	ND	110	17
PYRENE	UG/G DRY	0.9	11	71	33
TOTAL PAHs	UG/G DRY		87.4	703	236
NON-CHLORINATED PHENOLS					
2,4-DIMETHYLPHENOL	UG/G DRY	20	ND	110	ND
4-NITROPHENOL	UG/G DRY	10	ND	28	ND
INORGANIC COMPOUNDS					
IRON, TOTAL	UG/G DRY	27	53,000	23,000	16,000
ZINC, TOTAL	UG/G DRY	3.4	550	270	170
SULFATE	UG/G DRY	1.0	158	63.9	68.3
ORGANIC NITROGEN AS AMMONIA	UG/G DRY	120	7,910	2,140	3,000
CYANIDE, TOTAL	UG/G DRY	0.32	120	72	ND
CYANIDE, FERRO-FERRIC	UG/G DRY	0.32	100	51	2.6
ORGANIC CARBON, TOTAL	-	-	-	-	-

Note: Full analytical data can be found in Appendix G.
ND < indicates that the detection limit for a particular analysis was increased to the value following <. This resulted from the need to dilute the sample because of sample matrix interferences.

TABLE 7-6

ANALYTICAL RESULTS OF ORGANIC VAPOR DOSIMETERS

Sample	Locations (Fig. 4-2)	Date	Exposure (min)	Benzene mg	Benzene mg/m3	Toluene mg	Toluene mg/m3
3170	3-11	1/13/86	445	<0.003	<0.2	<0.003	<0.2
2432	4-11	1/13/86	325	<0.003	<0.2	0.004	0.4
3384	4-11	1/13/86	445	<0.003	<0.2	<0.003	<0.2
3456*	2	1/13/86	390	<0.003	<0.2	<0.003	<0.2
3287	3	1/13/86	375	<0.003	<0.2	0.003	0.3
3516	3	1/13/86	375	<0.003	<0.2	0.003	0.3
3618	3	1/13/86	400	<0.003	<0.2	<0.003	<0.2
3405*	2	1/13/86	390	<0.003	<0.2	<0.003	<0.2
2915*	1	1/13/86	390	<0.003	<0.2	<0.003	<0.2
3563	12-16	1/14/86	465	<0.003	<0.2	<0.003	<0.2
3749	2	1/14/86	465	<0.003	<0.2	<0.003	<0.2
3117	3	1/14/86	465	0.008	0.5	0.012	0.8
2894	3	1/14/86	465	<0.003	<0.2	<0.003	<0.2
2586	3	1/14/86	465	0.004	0.2	<0.008	0.5
3356	12-16	1/14/86	465	<0.003	<0.2	<0.003	<0.2
2680*	1	1/14/86	465	<0.003	<0.2	<0.003	<0.2
2451	18	1/15/86	480	<0.003	<0.2	<0.003	<0.2
2550	3	1/15/86	480	<0.003	<0.2	<0.003	<0.2
2616	Blank	1/15/86	480	<0.003	<0.2	<0.003	<0.2
2652	3	1/15/86	480	<0.003	<0.2	<0.003	<0.2
2526	19-24	1/15/86	480	<0.003	<0.2	<0.003	<0.2
3061	19-24	1/15/86	480	<0.003	<0.2	<0.003	<0.2
3185	17	1/15/86	480	<0.003	<0.2	<0.003	<0.2
3205	3	1/15/86	480	<0.003	<0.2	<0.003	<0.2
2592	3	1/16/86	435	<0.003	<0.2	<0.003	<0.2
2467	25-29	1/16/86	435	<0.003	<0.2	0.003	0.2
2663	25-29	1/16/86	435	<0.003	<0.2	<0.003	<0.2
2486	3	1/16/86	435	<0.003	<0.2	<0.003	<0.2
2470	3	1/16/86	435	<0.003	<0.2	<0.003	<0.2

< Indicates that the number following is the detection limit and the concentration of the constituent in that sample is less than that limit.

* Indicates a fixed location dosimeter.

Note: Where more than one sample location is noted, the person wearing the dosimeter moved from location to location.

TABLE 7-7

ANALYTICAL RESULTS OF TENAX TUBES
(mg/m^3)

Sample	Date	Hexane	Toluene	Dichloro- methane	Trichloro fluoromethane	Xylene	Aliphatic Hydro.
MM-1	1/16/86	0.025	0.0606	ND	ND	0.0120	ND
MM-2	1/16/86	0.0088	0.0481	ND	ND	ND	ND
MM-3	1/16/86	0.0213	0.0148	0.00694	0.0194	ND	0.0227
MM-6	1/16/86	0.0218	0.0194	ND	ND	ND	ND

Exposure 120 min.
Pump rate 18.0 cc/min.

ND - Not detected

8.0 DATA ANALYSIS

The data presented in this report are evaluated here with respect to the distribution of constituents in the environment, measured concentrations of the constituents, potential risks to human health due to the presence of these constituents, and remedial alternatives which may need to be considered.

8.1 Synopsis of Degree and Extent of Contamination

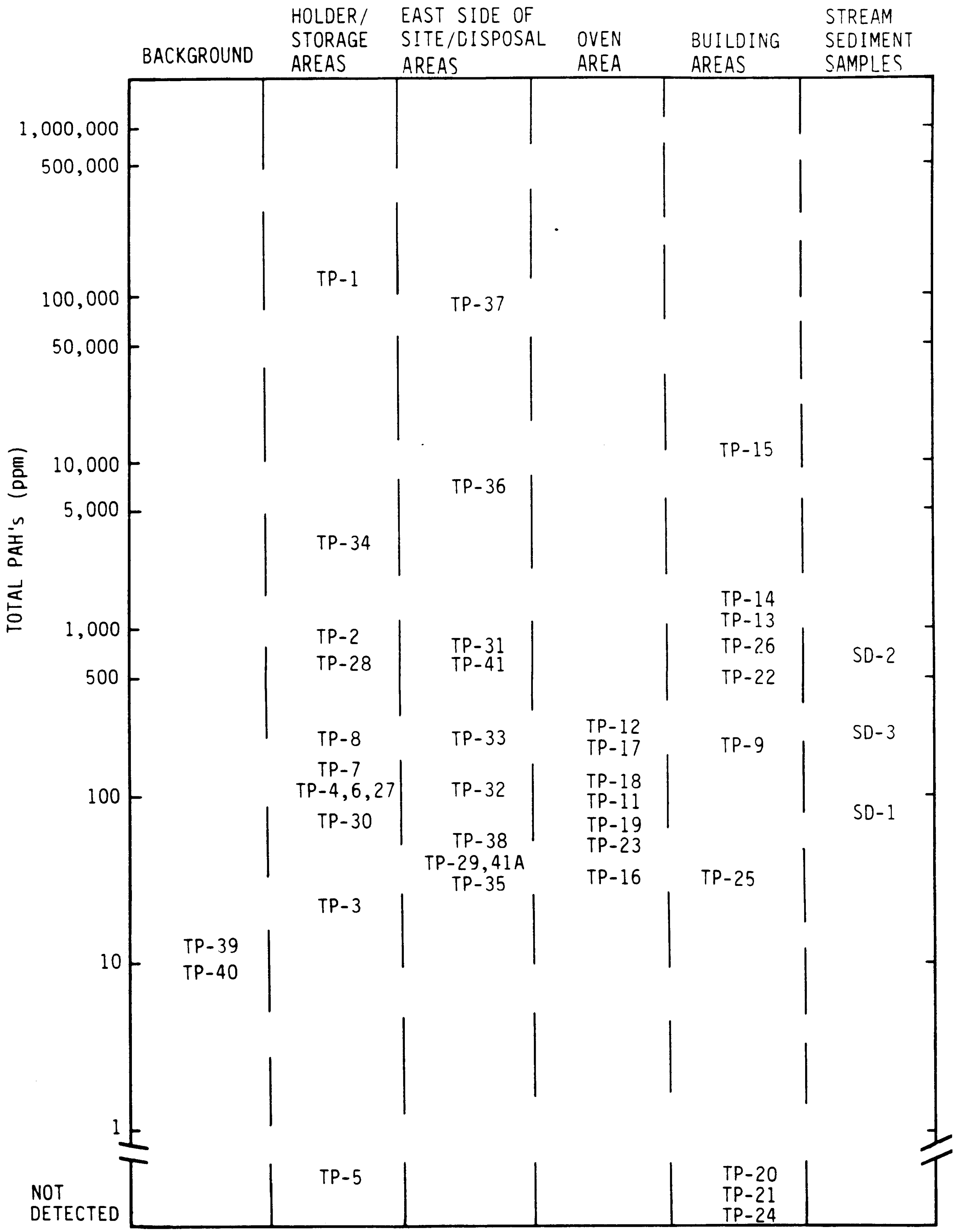
The degree and extent of contamination at the site is evaluated here in terms of its probable sources and distribution within each media.

8.1.1 Soil and Stream Sediments

Most of the test pits and all of the stream sediments sampled contained PAHs. Figure 8-1 shows the concentration of total PAHs for each soil or sediment sample. Those with the highest concentrations are TP-1, TP-15, TP-34, TP-36, and TP-37.

The high PAH levels detected in TP-1 can be attributed to the pipe-coating activities that once occurred in that area, and residuals from a tar storage vessel located there. The probable source for the PAHs detected in TP-15 is a former storage vessel located in that area. Tars which collected in the 300,000 ft^3 gas holder are the probable source of the constituents found in TP-34. The high concentrations of constituents in both TP-36 and TP-37 can be attributed to coal gas manufacturing wastes which were disposed of in that area. As would be expected, most of these test pit samples also contained concentrations of the other chemical groups (purgeable aromatics, phenols, and organic compounds) which are high relative to the other samples.

Those samples containing the highest levels of ferro-ferric cyanides, TP-29, TP-31, and TP-32, were collected from test pits located south east of



(No sample taken at TP-10)

Figure 8-1. Concentration of PAH's in Soil and Stream Sediment Samples.

the former purifier building. This area was used for the disposal of purifier wastes, and is the probable cause of the ferro-ferric cyanide concentrations.

PAHs in the stream sediment samples were found in highest concentration in the sample collected downstream of the waste disposal area (SD-2). PAHs were also found in SD-3, collected from the western site stream. The exact source of these constituents is unclear. However, a small drainage pipe which appears to originate from the western portion of the site may be transporting constituents to this stream.

8.1.2 Ground Water and Surface Water

The total concentration of New York State regulated organic compounds in each of the groundwater samples is shown in Figure 8-2 (see section 8.2 for a discussion of the regulated organic compounds). Data from the samples analyzed by CompuChem are also shown.

A general pattern of lower concentrations for all wells in the third sampling round may be due to a lower water table and less recharge at that time as compared with sampling rounds 1 and 2.

Generally, the background wells (MW-1S and MW-1D) contain a lower concentration of regulated constituents than the downgradient wells. In round 1, however, MW-1S and MW-1D show higher concentrations than MW-3S and MW-3D. In the second round, MW-1D is slightly higher than MW-3D.

The total concentration of all organic compounds analyzed for each surface water sample is shown in Figure 8-3. Those samples collected from the western site stream (SW-3) have consistently lower concentrations than those from the eastern stream. This is probably due to the close proximity of the eastern stream to the former disposal areas.

In the eastern stream, constituent levels were highest in the late February sampling round and lowest in the August sampling round when the

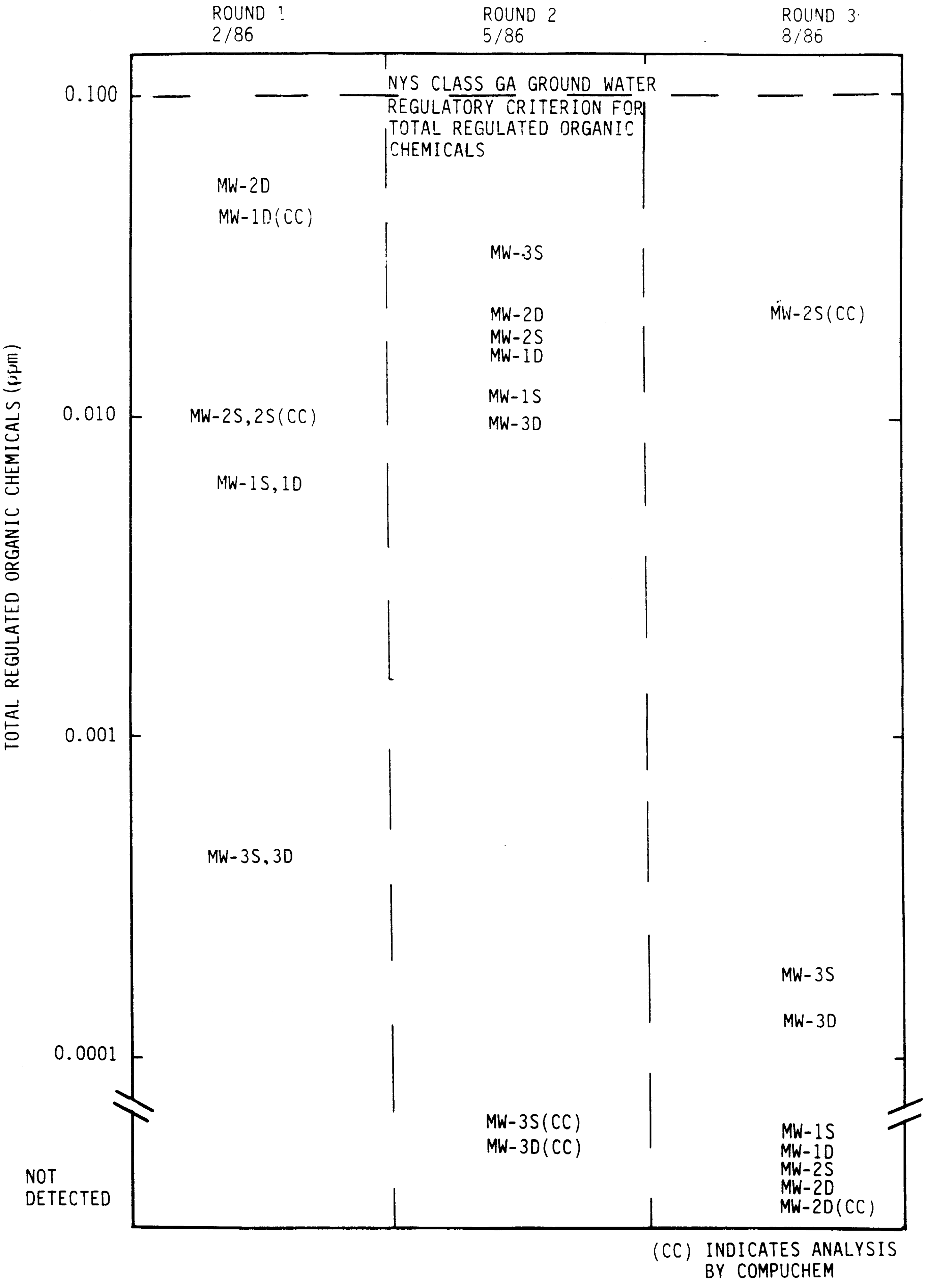


Figure 8-2. Total Regulated Organic Chemicals (ppm) in Ground Water

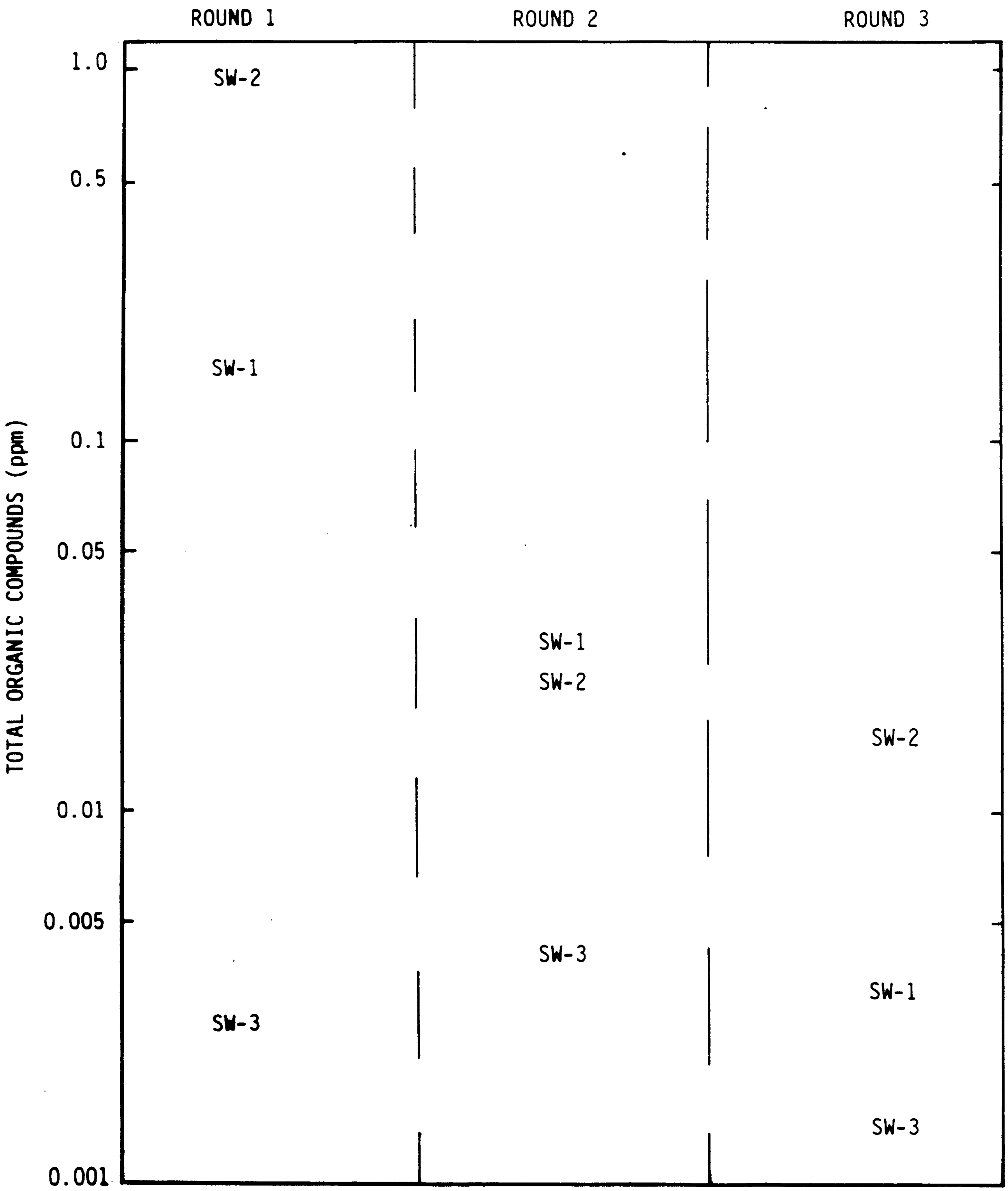


Figure 8-3. Total Organic Compounds (ppm) in Surface Water

stream was at low flow. As with constituents in the stream sediments, those in the stream waters may be entering the stream via groundwater transport and, to a lesser extent, direct runoff.

8.1.3 Air

Air quality monitoring results for both Tenax tubes and dosimeters generally were one to four orders of magnitude less than guidance and regulatory criteria for eight-hour time-weighted average (TWA) concentrations While OVA levels of up to 1000 ppm were detected for disturbed test pit samples (TP-22), the dosimeters worn by field crew members during test pit excavation indicated specific constituent and total organic compound levels far below recommended TWA levels in the general test pit areas. OVA readings also suggested that unless areas containing coal tar constituents are disturbed, organic vapor levels are generally below 1.2 ppm.

8.2 Comparison to Guidelines and Regulatory Standards

There are no published guidelines or regulatory action levels for soil quality in New York State. Generally, evaluations are performed on a case by case basis taking into consideration local background values, land usage, and location of nearby water bodies.

The source of ground and surface water quality criteria used for evaluating measured constituent concentrations was a NYSDEC Division of Water Technical and Operational Guidance Series (84-38) for Ambient Water Quality Standards and Guidance Values, dated July, 1985. These criteria were developed to protect New York State waters for their best classified usage. Ground water criteria listed in this document are from NYCRR Part 703.

For comparison, both standards and guidance values were used. Standards are enforcable by law, whereas guidance values are not. Guidance values are legally enforcable when used to establish discharge limits in various permits. New York State standards and guidance values are equivalent to or more conservative than corresponding Federal standards.

Toxicity values for freshwater aquatic life have been published by the USEPA Office of Water Regulations and Standards (EPA, 44015-86-001). These values are not regulatory, but serve as guidance values which can be used to determine regulatory requirements. These values were used here to evaluate the water quality of the site streams.

Occupational exposure criteria were chosen from the more conservative of the regulatory levels established by either the Occupational Safety and Health Act of 1970 (OSHA) or guidance levels set by the American Conference of Governmental Industrial Hygienists (ACGIH). Eight-hour TWA threshold limit values (TLV) were used to evaluate air quality monitoring results. TLVs are established at concentrations below which it is believed that workers can be exposed daily without adverse effect for an entire working career.

8.2.1 Soils and Stream Sediments

As mentioned above, New York State has promulgated no quantitative criteria for evaluating soil and sediment quality. One factor that can be used in assessing the degree of contamination is a comparison with background samples. Two background samples (TP-39 and TP-40) were analyzed for the Geneva Site and are used here to aid in evaluating the soil and sediments.

As can be seen on Figure 8-1, the majority of samples had total PAH concentrations greater than background, although 4 samples (TP-5, TP-20, TP-21, and TP-24) had less than the background concentrations. Those test pits discussed in Section 8.1 had concentrations at least two orders of magnitude greater than background. All of the sediment samples contained higher PAH concentrations than background.

No purgeable aromatics were found in the background samples. Twenty-seven of the remaining soil samples did contain purgeable aromatics. As with the PAHs, the highest concentrations were found in the samples discussed in Section 8.1. No purgeable aromatics were found in the stream sediments.

The background samples also did not contain any non-chlorinated phenols. Nine samples (TP-1, TP-2, TP-8, TP-15, TP-33, TP-39, TP 36, TP 37, TP-41A) contained these phenols, with total concentrations ranging from 10 ppm (TP-8) to 67,660 ppm in TP-37. Non-chlorinated phenols were found in one stream sediment Sample, SD-2.

Only 12 soil samples and one sediment sample (SD-1) contained more iron than the background samples (25,100 to 26,000 ppm). These include TP-4, TP-6, TP-7, TP-12, TP-18, TP-23, TP-27, TP-28, TP-29, TP-30, TP-33 and TP-34. Of these, TP-23 contained the highest iron concentration: 123,000 ppm.

Half of the soil samples and all of the sediment samples contained greater zinc concentrations than the highest background sample (84.6 ppm in TP-40). The highest concentration detected in soils was 402 ppm in TP-6. Sample SD-1 contained 550 ppm zinc.

Twelve soils samples (TP-23, TP-25, TP-27, TP-28, TP-29, TP-31, TP-32, TP-33, TP-34, TP-35, TP-36 and TP-37) and one sediment sample (SD-1) contained higher than background sulfate concentrations. Samples TP-25 and TP-28 had particularly high sulfate concentrations of 1,470 ppm and 1,510 ppm, respectively.

All soil samples (except TP-2, TP-19, and TP-20), and all stream sediment samples contained higher than background organic nitrogen concentrations. The highest organic nitrogen concentration was found in TP-37, which contained 11,000 ppm.

Total cyanide and ferro-ferric cyanide concentrations were higher than background values in all soil and sediment samples except TP-3, TP-8, TP-11, TP-16, TP-20, and Sd-3. As mentioned in Section 8.1, the highest values were in TP-31 (132,000 ppm).

8.2.2 Ground Water

The ground water quality in this study was compared to New York State standards and guidance values for class GA ground water. Class GA waters are those which can be used for a potable water supply. Although the ground water downgradient of the site is not being used as a drinking water supply, new NYDEC policy is to evaluate all ground waters as though they are class GA.

Table 8-1 is a summary of the standards and guidance values for constituents that were found in the Geneva ground water samples. Included in this list is total NYS regulated organic compounds. Organic chemicals with regulatory standards and guidance values are included in this total. The value of 0.1 ppm total regulated organic compounds is used for developing ground water discharge permits.

As can be seen in Table 8-2, no samples exceeded the total regulated organic value. A summary of those samples which exceeded limits for individual constituents is presented in Table 8-2.

Groundwater standards or guidance values were exceeded for all six monitoring wells during at least one sampling round. Exceedences were most common for the two shallow downgradient wells (MW-2S and MW-3S).

8.2.3 Surface Water

The standards and guidance values used to evaluate the site streams were those for Class C (secondary contact recreation and fishing) waters. This was because New York State was in the process of upgrading all streams within the State to Class C.

TABLE 8-1

NY STATE GROUND WATER STANDARDS* AND GUIDANCE VALUES FOR CONSTITUENTS FOUND AT THE GENEVA SITE

Constituent	Standard	Guidance Value
Volatile Organics (mg/l)		
Benzene	ND	NL
Ethylbenzene	NL	0.050
Toluene	NL	0.050
Methylene Chloride	NL	0.050
Trichloroethylene	0.010	NL
Semi-Volatile Organics (mg/l)		
Acenaphthene	NL	0.02
Benzo(a)anthracene	NL	0.02
Benzo(a)pyrene	ND	NL
Benzo(b)fluoranthene	NL	2×10^{-6}
Benzo(k)fluoranthene	NL	2×10^{-6}
Chrysene	NL	2×10^{-6}
Fluoranthene	NL	0.050
Fluorene	NL	0.050
Indeno (1,2,3-cd)pyrene	NL	2.0×10^{-6}
Napthalene	NL	0.010
Phenanthrene	NL	0.050
Pyrene	NL	0.050
Phenols, Total	0.001	NL
Total NYS Regulated Organics	0.001	0.100
Inorganics (mg/l)		
Arsenic, Total	0.025	NL
Cadmium, Total	0.010	NL
Iron, Total	0.30	NL
Lead, Total	0.025	NL
Mercury, Total	0.002	NL
Zinc, Total	5.0	NL
Sulfate, Total	250	NL
Total Cyanide, Total	0.200	NL

ND = Not Detectable
NL = Standard or guidance value is not listed
* = New York State Ambient Water Quality Standards and Guidance Values, July 24, 1985

TABLE 8-2

GENEVA SAMPLES EXCEEDING
NEW YORK STATE GROUND WATER STANDARDS/GUIDANCE VALUES, JULY 1985

Constituent	Standard or Guidance Value[1] (mg/l)	Sample (round)[2]	Concentration (mg/l)
Benzene	ND[3](S)	MW-1S(1)	0.002
Benzo(a)pyrene	ND(S)	MW-1S(2)	0.0005
		MW-1D(1)	0.0004
		MW-1D(2)	0.0012
		MW-2S(1)	0.0004
		MW-2S(2)	0.0038
		MW-2D(2)	0.0004
Benzo(b)fluoranthene	0.000002(G)	MW-2S(1)	0.0008
		MW-3S(2)	0.0011
		MW-3S(3)	0.0008
		MW-3D(3)	0.0013
Benzo(k)fluoranthene	0.000002(G)	MW-2S(1)	0.0036
		MW-2S(2)	0.0024
Indeno (1,2,3-CD) pyrene	0.000002(G)	MW-2S(1)	0.003
		MW-2S(2)	0.0018
Naphthalene	0.010(G)	MW-2D(1)	0.0244
Phenol	0.001(G)*	MW-1D(1cc)	0.036
Trichloroethylene	0.010(S)	MW-2S(3cc)	0.021
Arsenic	0.025(S)	MW-3S(2cc)	0.075
		MW-2S(3cc)	0.052
Cadmium	0.010(S)	MW-2S(3cc)	0.027
		MW-2D(3cc)	0.013
Iron	0.30	MW-2S(1)	2.30
		MW-2S(2)	1.61
		MW-2S(3)	2.58
		MW-3S(1)	0.66
		MW-3S(2)	1.47
		MW-3S(3)	1.94
Lead	0.025(S)	MW-3S(2)	0.16
Mercury	0.002(S)	MW-2S(1cc)	0.007

* Standard is for total phenols.

TABLE 8-2 (Cont.)

GENEVA SAMPLES EXCEEDING
NEW YORK STATE GROUND WATER STANDARDS/GUIDANCE VALUES, JULY 1985

Constituent	Standard or Guidance Value[1] (mg/l)	Sample (round)[2]	Concentration (mg/l)
Sulfate	250(S)	MW-2S(1)	536
		MW-2S(2)	772
		MW-2S(3)	1180
		MW-2D(2)	270
		MW-3S(1)	1310
		MW-3S(2)	1340
		MW-3S(3)	1050
		MW-3D(1)	436
		MW-3D(2)	372
Total Cyanide	0.200(S)	MW-2S(1)	5.7
		MW-2S(2)	3.2
		MW-2S(3)	3.52
		MW-3S(1)	0.97
		MW-3S(3)	0.287

[1]S = Standard, G = Guidance Values
[2](cc) indicate analysis by CompuChem
ND = the constituent should not appear in detectable quantities

Table 8-3 contains a list of Class C water criteria for constituents found in water samples from the Geneva site streams as well as a summary of those samples containing concentrations in excess of these standards. The standard for each constituent listed on Table 8-3 was exceeded in at least one sample. The iron standard was exceeded in every sample.

The U.S. EPA has developed quality criteria for surface waters and have published freshwater aquatic life toxicity values for several compounds (EPA, 1986). As noted earlier, these are not regulatory values, but can be used as an aid in developing regulatory criteria. These values, for some of the constituents detected in the Geneva site surface waters, are listed in Table 8-4. All samples contained concentrations below the toxicity values. As in the case with the New York State standard for iron, nearly all samples exceeded the EPA iron criteria value of 1.0 ppm.

8.2.4 Air Quality Standards

The American Conference of Governmental and Industrial Hygienists (ACGIH) has developed threshold limit values (TLVs) for many volatile and semi-volatile compounds. The ACGIH criteria listed in Table 8-5 are for normal work day exposure - 8 hours/day, 5 days/week. The Occupational Safety and Health Administration (OSHA) also has a regulation for benzene. None of the air samples collected (Table 7-6 an 7-7) exceeded either OSHA standards or ACGIH TLVs for constituents of concern.

In order to regulate the more general situation of 24 hour annual air quality, NYSDEC has developed acceptable ambient levels (AAL - presented in Table 8-5) for compounds classified as high and moderate toxicity air contaminants. AAL's are calculated by dividing a given compound's TLV by 300. Two of the OVD samples exceeded the AAL for benzene (0.1 mg/m^3). However, the subsurface work which was being conducted while these OVDs were

TABLE 8-3

SURFACE WATER SAMPLES WITH CONCENTRATIONS
IN EXCESS OF NEW YORK STATE STANDARDS

Constituent	Standard*	Sample (round)	Sample Concentration (mg/l)
1,2 Dichlorobenzene	0.005	SW-1(1)	0.007
Phenol	0.005	SW-1(1)	0.012
		SW-2(2)	0.015
Iron, Total	0.300	SW-1(1)	2.43
		SW-1(2)	3.88
		SW-1(3)	2.60
		SW-2(1)	6.54
		SW-2(2)	3.61
		SW-2(3)	2.21
		SW-3(1)	1.04
		SW-3(2)	3.76
		SW-3(3)	0.810
Zinc, Total	0.030	SW-1(1)	0.08
		SW-1(2)	0.10
		SW-1(3)	0.087
		SW-2(1)	0.04
		SW-2(2)	0.08
		SW-2(3)	0.055
		SW-3(1)	0.05
		SW-3(2)	0.15
		SW-3(3)	0.040
Total Cyanide	0.0052	SW-1(1)	0.071
		SW-1(3)	0.342
		SW-2(1)	0.089
		SW-2(3)	0.211
		SW-3(3)	0.007

* New York State Class C Surface Water Criteria in mg/l.

TABLE 8-4

EPA FRESHWATER AQUATIC LIFE TOXICITY VALUES VERSUS
THE CONCENTRATION OF THESE
CONSTITUENTS FOUND IN THE GENEVA SITE STREAMS

	Toxicity Value (mg/l) Chronic	Acute	Sample Round	Concentration (mg/l)
Purgeable Aromatics				
Benzene		5.300	SW-1(1)	0.062
			SW-1(2)	
Dichlorobenzene	0.763	1.120	SW-1(2)	0.0533
Ethylbenzene		32.0	SW-1(1)	0.020
				0.003
Toluene		17.5	SW-1(1)	0.059
			SW-1(2)	0.0242
Polynuclear Aromatic Hydrocarbons				
Acenaphthene		1.7(0.520)[1]	SW-1(2)	0.0016
Fluoranthene		3.980	SW-2(1)	0.0008
			SW-3(1)	0.0032
			SW-1(2)	0.0022
			SW-3(2)	0.0003
Napthalene	0.620	2.300	SW-1(1)	0.0006
			SW-1(2)	0.0016
Non-Chlorinated Phenols				
Phenol[3]	2.650	10.200	SW-1(1)	0.012
			SW-2(2)	0.015
			SW-3(2)	0.0040
Inorganic Compounds				
Iron	1.0[2]		SW-1(1)	2.43
			SW-2(1)	6.54
			SW-3(1)	1.04
			SW-1(2)	3.88
			SW-2(2)	3.61
			SW-3(2)	3.76
			SW-1(3)	2.60
			SW-2(3)	2.21
			SW-3(3)	0.81

[1] Value for freshwater algae
[2] Value is criteria, not a toxicity value
[3] Type of phenol not specified for toxicity value. For samples, the concentration is total non-chlorinated phenols.

TABLE 8-5

THRESHOLD LIMIT VALUES (ACGIH, 1986-1987)
AND ACCEPTABLE AMBIENT LEVELS FOR AIR SAMPLES

Compound	Threshold Limit Values TWA (mg/m^3)	STEL(mg/m^3)	Acceptable Ambient Levels (mg/m^3)	Samples Exceeding The AAL
Benzene	30, A2	(75, A2)	0.1	3117, 2586
Toluene	375	560	7.50*	None
Hexane	180	--	--	--
Methylene Chloride	(350)	(1740)	1.17	None
Trichlorofluoromethane	5,600 C	--	--	--
Xylene(s)	435	655	1.45	None

A2 = Suspected carcinogen based on either limited epidemiological evidence, exclusive of clinical reports of single cases, or demonstration of carcinogenesis in one or more animal species.

( ) = Values listed in parenthesis in the "Adopted" list are to be used during the period in which a proposed change for that value is listed in the Notice of Intended Changes.

C = Ceiling Limit, i.e. the concentration that should not be exceeded during any part of the working exposure.

* = Toluene is considered to be of low toxicity (NYSDEC, 12/15/83). The AAL is obtained by dividing the TLV by 50.

TWA = Time Weighted Average (8 hour workday, 40 hour workweek)

STEL = Short Term Exposure Limit (exposure below the STEL will not produce the following symptoms: irritation, chronic or irrevisible tissue damage, narcosis)

-- = No standard listed

worn would be expected to have only short term impacts on the air quality and not significntly affect the long term ambient conditions.

8.3 Preliminary Risk Assesment

The objective of this preliminary risk assessment was to evaluate, qualitatively, the potential risks at the site based on the field investigations. The health and environmental concerns at the Geneva Site are a function of contamination concentrations, exposure routes, and potential receptors. In the previous section, constituent concentrations were compared to existing criteria. In this section, exposure pathways are examined, and potential receptors identified. This material is summarized for the various media in Tables 8-6 (Soil and Stream Sediment), 8-7 (Ground Water), 8-8 (Surface Water) and 8-9 (Air). This preliminary risk assessment only considers present site conditions and not future land use scenarios.

8.3.1 Transport and Exposure Pathways

The pathway of exposure involves both the transport of the constituents through the various media and route(s) of exposure into the human body. It should be noted that the relative importance of the contribution of a particular transport route to the risk is dependent on the toxicity of the compound being transported.

Transport phenomena are largely governed by the physical and chemical characteristics of the constituents and media involved. Thus, the transport and fate of PAHs are generally linked to the transport of soil (windborne dust) because PAHs have a low solubility and a high tendency to adsorb to soil particles. Metals also tend to be transported by windborne dusts. Phenols are highly soluble and tend to be transported with ground water. Phenol transport is somewhat limited, however, by subsurface bacteria which readily

Table 8-6

SOIL AND STREAM SEDIMENTS - PRELIMINARY EVALUATION OF RISKS

Constituents of Concern and Measured Concentration Ranges (ppm)	Physical and Chemical Form	Environmental Distribution and Transport Mechanisms	Potential Receptors	Effects on Human Health	Effects on Biota
41 soil and 3 stream sediment samples have been collected at the site. Measured concentration ranges for selected constituents are presented below:		Depending on the specific characteristics of the various constituents, volatilization, solids adsorption, biodegradation and leaching can be important in environmental transport.	Because coal tar constituents have been identified in near-surface soils, exposure risks due to direct contact exist. Currently, asphalt and grass soil covers limit ingestion and dermal exposure to affected soils. Therefore; the possibility of exposure is not as great for general site visitors as it would be for site workers who might excavate into the soils.	Effects on human health associated with soils and stream sediments containing coal tar constituents would occur via direct contact or ingestion. Inhalation risks are discussed in Table 8-4.	Effects on biota associated with soils and stream sediments containing coal tar constituents would occur via direct contact or ingestion/uptake by animals and plants.
• Polynuclear aromatic hydrocarbons (PAHs) ND-139,000[1] Benzo(a)pyrene, ND-5,500 Fluoranthene, ND-13,400 Napthalene, ND-47,400 Phenanthrene, ND-23,400	PAHs are found on-site adsorbed by purifier wastes (iron oxide-impregnated wood shavings) and adsorbed by soils, possibly from such waste streams as coke quenching wastewaters, coal pile runoff, pitch, tar spills and disposal areas.	PAHs were detected in background samples at concentrations of 5.9 ppm; therefore, the elevated PAH levels in site soil samples seem to be related to site activities. PAHs are very stable, with low volatility and aqueous solubility. They tend to adsorb on soils and sediments and be immobile. PAHs are moderately biodegradable.	Potential receptors of stream sediment constituents include people or animals who may ingest or be dermally exposed to the sediments, or plants which may grow in the sediments.	The major health effect of concern with respect to PAHs is the development of cancer due to long-term, low-level exposure. Carcinogenic effects have been demonstrated regardless of the route of exposure. The carcinogenic risk associated with PAHs varies with the specific compounds.	PAHs can cause carcinomas in animals as a result of chronic exposure. Soil contamination can inhibit plant growth to some extent. With respect to aquatic organisms, chronic exposure to PAHs can produce sublethal responses. PAHs can accumulate in tissues, although most aquatic organisms can metabolically degrade PAHs.
• Purgeable aromatics ND-669.43[1] Benzene, ND-328 1,3-Dichlorobenzene, ND-143 Toluene, ND-251	Purgeable aromatics may have been introduced to soils from such waste streams as coke quenching wastewaters, coal pile runoff, tar spills and disposal areas. Gas plant oils and tars are sources of purgeable aromatics.	Purgeable aromatics were not detected in background soil samples or in any of the stream sediment samples. Purgeable aromatics are moderately soluble and volatile, with only a slight tendency for adsorption. These compounds are biodegradable.		Purgeable aromatics can result in health effects due to inhalation and, secondarily, due to dermal absorption. Depending on the compound, blood, blood-forming tissues or the central nervous system can be affected.	Little information is available on the effects of purgeable aromatics. Their high volatilities make airborne exposure the greatest concern. Purgeable aromatics appear to be moderately toxic to fish relative to other pollutants.
• Non-chlorinated phenols Phenol, ND-70,430[1] 2,4 Dimethyl Phenol ND-110	Phenols are associated with coal tars, and also can be naturally occurring due to decomposition.	Phenols were not detected in background soil samples and were found in only one sediment sample. Phenols are highly soluble but have little tendency for volatilization or adsorption. They are also biodegradable.		Phenol generally is not considered to be carcinogenic although it is related to acute poisoning. Dermal adsorption and and ingestion are major concerns. Low levels can cause taste and odor problems.	Phenol is moderately toxic to animals by acute exposures. No plant growth effects have been identified. Phenol can be acutely toxic to fish but is not though to be a chronic toxicant of concern or a concern with respect to bioaccumulation.
• Inorganic compounds Iron, 8,900-123,000	Iron is associated with gasifier ash and purifier wastes and can be naturally occurring in soils.	Iron was detected at elevated levels in all soil and sediment samples. Iron is typically retained within the soil.		High ingestion rates are required for iron to be considered toxic.	Iron is considered to be slightly toxic to microorganisms and animals and slightly to moderately toxic to plants.
Zinc, 4.4-550	Zinc is associated with purifier wastes, catalysts and corrosion inhibitors, and can be naturally occurring in soils.	Zinc was detected in all soil and sediment samples. Zinc is typically retained within the soil.		High ingestion rates are required for zinc to be considered toxic.	Zinc is moderately toxic to plants and slightly toxic to non-aquatic animals. Its toxicity varies from slightly to very toxic for microorganisms and fish.
Sulfate, 2.28-1,510	Sulfate is associated with spent oxide wastes.	Sulfate was detected in all soil and sediment samples. Sulfate is relatively stable although it can leach into ground water. It is biogradable under anaerobic conditions.		Sulfate can have a laxative effect when ingested at high concentrations.	Sulfates may be toxic to plants, depending on a plant's ability to accumulate the sulfate ion. Sulfate is naturally occurring in water systems at high concentrations and toxicity is usually not a concern.
Organic Nitrogen, ND - 11,000	Organic nitrogen is a parameter which measures several reduced forms of nitrogen commonly found in oxide wastes, and waste water.	Organic nitrogen was detected in nearly all soil and sediment samples at levels above background. Leaching may occur. Nitrates (which can form from organic nitrogen in oxidizing environments in the soil) are also biodegradable.		Consumption of large amounts of nitrate (which can form from organic nitrogen in oxidizing environments) produces methemoglobin in the bloodstream, a particular concern for infants.	
Cyanide, Total <0.32-34,000 Cyanide, Ferro-Ferric ND-32,000	Cyanides are associated with spent oxide wastes. Complex cyanides are typically stable and persistent.	Cyanides were detected in all soil and sediment samples; background soil samples showed lower concentrations. Cyanides are relatively stable although they can be leached or biodegraded.		Cyanide is a non-cumulative poison and chronic toxicity is not a concern. Complex cyanides exhibit low toxicity. Free cyanide, however, is highly toxic by acute exposure.	Plants can synthesize cyanide-containing pounds. Free cyanide is toxic to aquatic life, although the effects of metal cyanide complexes in aquatic environments are not well-defined.

(1) Values given are total concentrations for all compounds detected within the given chemical group.

Table 8-7

GROUND WATER - PRELIMINARY EVALUATION OF RISKS

Constituents of Concern and Measured Concentration Ranges	Guidelines and Standards[1] (mg/l)	Physical and Chemical Form	Environmental Distribution and Transport Mechanisms	Potential Receptors	Effects on Human Health	Effects on Biota
Three rounds of ground water samples have been collected from the six monitoring wells. Measured concentration ranges for selected constituents are presented below.			Depending on the specific characteristics of the various constituents, dispersion and solids adsorption can be important in environmental transport.	Within a one mile radius of the site, two homes have been identified which depend on wells for domestic water supply. City water is available to all houses in that area. These wells are not downgradient from the site. Impacts on lake water quality due to any ground water discharge would be expected to be negligible.	Effects on human health associated with ground water containing tar constituents would be due mainly to ingestion of the ground water.	Because biota, (except for microorganisms or plant root structures), are generally not affected by ground water, little information exists or is applicable in evaluating ground water effects on biota.
• Polynuclear aromatic hydrocarbons (PAHs) ND-0.0391 mg/l[2] Benzo(a)pyrene, ND-0.0038 mg/l Pyrene, ND-0.0067 mg/l Naphthalene, ND-0.0244 mg/l Fluorene, ND-0.0139 mg/l	 not detected (R) 0.050(G) 0.010(G) 0.050(G)	PAHs in the ground water could be associated with waste streams such as coke quenching wastewaters, coal pile runoff, pitch and free tars.	PAHs were detected in all well samples except for the first round sample from the shallow background well. During second round sampling, both the shallow and deep background wells detected elevated levels of fluorene. PAHs generally exhibit low solibility and tend to adsorb on soils. PAHs detected in the ground water could be associated with sinking or floating fractions of free tars.		The major health effect of concern with respect to PAHs is the development of carcinomas due to long-term, low-level exposure. Carcinogenic effects have been demonstrated regardless of the route of exposure. The carcinogenic risk associated with PAHs varies with the specific compounds.	PAHs may be adsorbed on plant roots and may cause a slight inhibition in plant growth.
• Purgeable aromatics ND-0.0118 mg/l[2] Ethylbenzene ND-0.0091 mg/l Toluene ND-0.0048 mg/l	 0.050(G) 0.050(G)	Purgeable aromatics are moderately soluble and could have been introduced to the ground water from gas plant oils and tars, coke quenching wastewaters or coal pile runoff.	Purgeable aromatics were detected at low levels in the shallow background well and in one shallow and one deep downgradient well, but all detected levels were below guidance levels. Purgeable aromatics are moderately soluble and will travel in ground water with little attenuation by adsorption or reaction.		Exposure to purgeable aromatics occurs primarily by vapor inhalation and secondarily by absorption through the skin. Chronic exposure to benzene is linked to increased leukemia risks and is the basis for development of some water quality criteria.	Little information available.
• Non-chlorinated phenols 2, 4-Dimethyl phenol ND-0.0052 mg/l	 0.001(R)	Phenols may have entered the ground water from areas of coal tar disposal.	Phenols were only detected in one (downgradient) well during the third sampling round. Phenols are highly soluble in water with little tendency for adsorbtion or volatilization. Under aerobic conditions, phenols are readily biodegraded.		The primary health concern associated with phenols is acute poisoning due to ingestion or absorbtion through the skin. In addition, low levels can introduce taste and odor problems.	Phenols exhibit moderately toxic effects on aquatic organisms. Bioaccumulation is not a concern. Because of their high solubility, there is little information on the ingestion or absorbtion through the skin.
• Inorganic compounds Iron, ND-2.58 mg/l	 0.300(R)	Iron could have leached into the ground water from gasifier ash or purifier wastes, or could be naturally occurring.	Iron was detected at elevated levels in one shallow downgradient well. Iron may move more slowly than ground water due to adsorption and precipitation reactions.		High ingestion rates are required for iron to be considered toxic.	Iron is slightly toxic to microorganisms and moderately to slightly toxic to plants.
Zinc, ND-0.043 mg/l	 5.00(R)	Zinc could have leached into the ground water from purifier wastes, catalysts or corrosion inhibitors.	Zinc levels were below guidance levels in all wells. Zinc may move more slowly than ground water due to adsorption and precipitation reactions.		High ingestion rates are required for zinc to be considered toxic.	Zinc varies in its toxicity to microorganisms and is moderately toxic to plants.
Sulfate, 13.3-1,340 mg/l	 250.00(R)	Sulfate could have leached from spent oxide wastes into the groundwater or can occur naturally.	Sulfate was detected in all wells with lower concentrations detected in upgradient wells. Ground water flow would provide the transport mechanism.		Sulfate can have a laxative effect when ingested at high concentrations.	Sulfate may be toxic to plants, depending on a plant's ability to accumulate the sulphate ion.
Organic Nitrogen ND-1.49 mg/l		Organic nitrogen is a parameter which measures several reduced forms of nitrogen	Organic nitrogen was detected at higher levels in downgradient wells than in upgradient wells. Ground water flow would provide the transport mechanism. Nitrate (which can form from organic nitrogen in an oxidizing environment) is very mobile in ground water.		Consumption of large amounts of nitrate can produce methemoglobin in the blood stream.	
Cyanide, Total ND-0.8-21 mg/l	 0.200 (R)	Cyanide compounds could have leached from spent oxide wastes into the ground water.	Cyanide was detected above guidance levels in the shallow downgradient wells. Ground water flow would provide the transport mechanism.		Lethal effects only occur when high cyanide concentrations in water overwhelm the body's detoxification mechanisms. Cyanide is a non-cumulative poison and chronic toxicity is not a concern.	Many plants can synthesize cyanide containing compounds.
TOC[3] 0.8-21			TOC is an indicator of gross hydrocarbon contamination when comparing upgradient and downgradient samples. Downgradient TOC levels are comparable to or slightly higher than upgradient levels.			

(1) Ambient water quality criteria as presented in Division of Water Technical and Operational Guidance Series, (84-W-38), Ambient Water Quality Standards and Guidance Values, dated July 24, 1985, New York State Department of Environmental Conservation; (G) indicates guidance criteria; (R) indicates regulatory standards.

Table 8-8

SURFACE WATER - PRELIMINARY EVALUATION OF RISKS

Constituents of Concern and Measured Concentration Ranges (mg/l)	Guidelines and Standards[1] (mg/l)	Physical and Chemical Form	Environmental Distribution and Transport Mechanisms	Potential Receptors	Effects on Human Health	Effects on Biota
Three rounds of surface water samples were collected from three sampling locations. Measured concentration ranges for selected constituents are presented below.			Depending on the specific characteristics of the various constituents, dispersion, volatilization or solids adsorption can be important in environmental transport in surface waters.	Surface water flow is into streams which discharge into Seneca Lake. Potential receptors include people using the streams or lake for recreational purposes or the biota associated with the streams or lake.	Effects on human health associated with surface waters containing coal tar constituents would occur via direct contact or ingestion.	Effects on biota associated with surface waters containing coal tar constituents would occur via direct contact or ingestion/uptake by animals and plants.
• Polynuclear aromatic hydrocarbons (PAHs) 0.0016 - 0.0268[2] Benzo(a)pyrene, ND - 0.0008 Fluoranthene, ND - 0.0022 Fluorene, ND - 0.0064 Pyrene, ND - 0.065		PAHs in surface waters could be associated with runoff from areas of coal tar or purifier waste disposal or with areas of stream sediments containing coal tar constituents.	PAHs were detected in all surface water samples with the highest levels detected in the downstream sample at the south-east end of the site. PAHs generally exhibit low solubility and tend to adsorb on soils. PAHs detected in surface waters are often associated with suspended solids on which the PAHs have adsorbed.		The major health effect of concern with respect to PAHs is the development of cancer due to long-term, low-level exposure. Carcinogenic effects have been demonstrated regardless of the route of exposure. The carcinogenic risk associated with PAHs varies with the specific compounds.	PAHs accumulate in tissues of aquatic organisms due to exposure from water and food, although most organisms can metabolically degrade PAHs, making accumulation in food chains unlikely. Chronic exposure to PAHs can result in cancer. Plants uptake PAHs by adsorption. Translocation to other plant parts can occur where the uptake rate exceeds metabolism and degradation.
• Purgeable aromatics ND - 0.144[2] Benzene ND - 0.062 Toluene, ND - 0.059 Ethylbenzene, ND - 0.0045		Purgeable aromatics are moderately soluble and could have been introduced to surface waters via runoff from areas of coal tar disposal or from areas of stream sediments containing coal tar constituents.	Purgeable aromatics were detected in the upstream sample of the stream along the eastern side of the site only. This stream starts in the wetlands in the northern part of the site. Purgeable aromatics are primarily removed from aquatic environments by volatilization,		Exposure to purgeable aromatics within surface waters would be of concern due to skin absorption.	Purgeable aromatics are moderately toxic to fish and other aquatic life. Little information is available on their terrestrial effects.
• Non-chlorinated phenols Phenol, ND - 0.015 1,2 Dichlorophenol	 0.005 (R) 0.005(R)	Phenols could have been introduced to surface waters via runoff from areas of coal tar disposal or stream sediments containing coal tar constituents.	Phenols were detected at each surface water sampling location during at least one round of sampling. Phenols are highly soluble in water with little tendency for adsorption or volatilization. Under aerobic conditions, phenols are readily biodegraded.		The primary health concern associated with phenols is acute poisoning due to ingestion or absorption through the skin.	Phenols exhibit moderately toxic effects on aquatic organisms. Bioaccumulation is not a concern.
Iron, 1.04 - 6.54	0.300 (R)	Iron could be leaching to surface waters from ash or spent oxide wastes.	Trace metals such as iron are generally nonvolatile with their fate depending largely on soil/water interactions.		High ingestion rates are required for iron to be considered toxic.	Iron is slightly toxic to microorganisms and animals, and moderately to slightly toxic to plants.
Zinc, 0.04 - 0.15	0.030 (R) aquatic	Zinc could be leaching to surface waters from spent oxide wastes or from soils or sediments containing catalysts or corrosion inhibitors.	Detected levels of zinc were below NYS water quality standards.[1] Trace metals, such as zinc, are generally non-volatile with their fate depending largely on soil/water interactions.		High ingestion rates are required for zinc to be considered toxic.	Zinc varies from being very to slightly toxic to microorganisms and fish; it is moderately toxic to plants.
Sulfate, 66.0-283		Sulfate could be leaching to surface waters from spent oxide wastes, or could be naturally occurring.	Sulfate was detected in all surface water samples, with only one sample exceeding NYS water quality standards.[1] Sulfate can be naturally occurring in surface water.		Sulfate can have a laxative effect when ingested at high concentrations.	Because sulfates are naturally occurring in aquatic systems, their toxicity is not usually a concern. Sulfate can reduce plant growth.
Organic nitrogen, 0.560-1.47		Organic nitrogen is a parameter which measures several reduced forms of nitrogen	Organic nitrogen was detected in all surface water samples. Nitrate (which can form from organic nitrogen in an oxidizing environment) is very mobile in water.		Nitrates (which can form from orgnic nitrogen in an oxidizing environment) can impact the bloodstream.	
Cyanide, Total, ND-0.342	0.0052 (R)	Cyanides could be leaching to surface waters from spent oxide wastes.	Cyanide was detected in only first and third round samples, and at levels exceeding water quality standards in only the third round. Cyanide compounds are relatively stable under normal environmental conditions.		Cyanide is a noncumulative poison and chronic toxicity is not an important concern. Free cyanide is highly toxic by acute exposure.	Cyanide is toxic to aquatic life, especially free cyanide existing as HCN.
TOC,[3] 4.6-21	---		TOC is an indicator of gross hydrocarbon contamination when comparing upgradient and downgradient samples. Downgradient TOC levels are comparable to upgradient levels.			

(1) Ambient water quality criteria as presented in Division of Water Technical and Operational Guidance Series, (84-W-38), Ambient Water Quality standards, dated July 24, 1985, New York State Department of Environmental Conservations; (G) indicates guidance criteria; (R) indicates regulatory standards.

(2) Values given are total concentrations for all compounds detected within the given chemical group.

(3) Range represents rounds 1 and 3 data only.

Table 8-9

AIR - PRELIMINARY EVALUATION OF RISKS

Constituents of Concern and Measured Concentration Ranges	Guidelines and Standards (mg/l)	Physical and Chemical Form	Environmental Distribution and Transport Mechanisms	Potential Receptors	Effects on Human Health	Effects on Biota
Air quality was monitored using Tenax tubes and dosimeters. An OVA was used during field investigations to provide real-time results. This monitoring gave information on the presence of volatile organics. Volatilization is not considered to be an important transport and removal process for PAHs, phenols or the inorganic compounds discussed in Tables 8-1 through 8-3. Therefore, only volatile organics are addressed here.	Occupational exposure criteria have been developed for compounds not identified during air monitoring. Eight-hour time weighted averages have been set for the following by the Occupational Safety and Health Act of 1970 (OSHA) or the American Conference of Governmental Industrial Hygienists (ACGIH): 0.2 mg/m^3 for the benzene soluble fraction of coal tar pitch volatiles (OSHA) 19 mg/m^3 for phenols (OSHA, ACGIH) 18 mg/m^3 for ammonia (ACGIH) 5 mg/m^3 for cyanides (OSHA, ACGIH)	Windborne soil particulates could result from disturbing site soils. No sampling of windborne particulates was conducted. Some constituents volatilize and are found in air as a gas phase.	Windborne particulates and volatile components are transported and dispersed by air movement.	Potential receptors of air quality impacts due to volatilization of wastes include on-site workers or visitors to the site, especially during times when soils are being disturbed due to construction or other activities. Windborne soil particulates could potentially migrate off-site.	The risk associated with contaminated dust is a function of the degree to which it can be mobilized, the toxicity of the contaminant, the degree to which it is respirable, and the degree to which it is absorbed in the lungs. Dust from solidified coal tar pitch poses some risks since pitch is a known carcinogen.	
Dosimeter Results Benzene, <0.2-0.5 mg/m^3 Toluene, <0.2-0.8 mg/m^3 Tenax Results Hexane, 0.0088-0.025 mg/m^3 Toluene, 0.0148-0.0606 mg/m^3	 30 mg/m^3 (OSHA, ACGIH) 375 mg/m^3(ACGIH) 180.0 mg/m^3(ACGIH) 375 mg/m^3(ACGIH)	Waste constituents in the air could have their source in solid or liquid coal tar waste residues, including contaminated soils, or vapor releases from pipes or tanks.	The Tenax and dosimeter results give information on the presence of specific volatile constituents while the OVA gives a realtime analysis of total hydrocarbons. Volatile organics were detected at the site although results were below threshold level guidelines. Waste constituents enter the air due to volatilization from liquids or solids/soils. Once in the air, they are transported and dispersed by the air's movement. They are also subject to physical removal mechanisms or reactions.		Exposure to volatile organics occurs primarily by inhalation of vapors. Associated risks are to the blood and blood-forming tissues or to the central nervous system, depending on the specific compound involved.	Little information is available on the impacts of airborne exposure to volatile organics on plants or animals.
OVA Results Ambient, <1.2 ppm above test pits, 0-4.0 ppm test pit samples, 0.0-1000 ppm boring samples, 0.0-110 ppm within buildings, to 150 ppm		Organic Vapors	Constituents enter air due to volatilization from liquids or solids. Once in the air they are transported by the air's movement.		Exposure to volatile organics occurs primarily by inhalation of vapors. Associated risks are to the blood-forming tissues or to the central nervous system, depending on the specific compound involved.	Little information is available on the impacts of volatile organics on plants or animals.

consume this compound. Purgeable aromatics tend to volatilize or dissolve in ground water, and therefore are generally not detected in the near-surface region at former gasification sites. Thus, exposure pathways for purgeable aromatics tend to be limited to ground water movement and episodic short term volatilization when deep sources are disturbed during excavation.

Variations from these generalizations do occur. Naphthalene, the lowest molecular weight PAH species, is both volatile and moderately soluble in water. Napthalene is generally the most abundant PAH found at coal gasification sites.

Exposure routes to the human body include inhalation, ingestion, and dermal absorption. Inhalation as a route of entry is of particular concern because of the rapidity with which toxic materials can be absorbed through the lungs and into the bloodstream . Ingestion as a route of entry involves the inadvertant consumption of toxins with food or drink and absorption of soluble toxins through the gastrointestinal tract. Toxins may also enter the bloodstream through swallowing of inhaled dust, or casually touching the mounth with hands or fingers. Dermal exposure can occur directly by physically contacting contaminted soil or water, or indirectly by the dermal absorption of toxins that settle on the skin in the form of dust, mist, etc.

At the Geneva site, the constituents which may currently pose a health risk to potential receptors were orignally disposed of or deposited in the soil. The transport mechanisms which might bring these constituents into contact with receptors include adsorbtion, direct runoff, infiltration of precipitation, ground water transport and volatilzation. The fate of wastes disposed of via the injection well cannot be determined.

Direct runoff may be carrying constituents and particles with constituents adsorbed to them into the stream sediment and water. Both the shallow and deep ground water flow is toward the eastern site stream. Consitiuents can be leached from the source areas by infiltrating precipitation and ground water and transported to the stream.

As mentioned in Section 8.1, the drainage pipe which enters the western stream may be acting as a pathway for dissolved constituents and those adsorbed on soil particles entering that stream.

Off-site migration of constituents via the two site streams may be occuring. Both streams leave the site through culverts which pass beneath routes 5 and 20, and enter Seneca Park. The streams flow above ground, first on a natural stream bed and then in an open, lined culvert, for a short distance before entering closed culverts which enter the lake.

The constituents entering the ground water are most likely being leached from source areas by infiltrating precipitation. As was noted earlier, concentrations decreased when recharge rates were slowest and the ground water table lowest (which tends to support this conclusion).

Volatilization may transport constituents at the site if subsurface soils are disturbed. However, under normal conditions this mechanism does not appear to contribute significantly to the dispersion of volatile organic compounds at the site.

Transport of constituents via adsorption on dust particles is also a potential mechanism, but is not considered to be a problem under the normally moist conditions at the site.

8.3.2 Potential Receptors

Potential receptors of coal tar constituents originating at the Geneva Site include on-site workers (and to a lesser extent, site visitors) and persons using the Seneca Park facilities. Workers may be exposed through inhalation of volatile components or dust, or through direct skin contact with some constituents. This exposure risk is greatest when excavation work is being performed.

The site streams may be providing a pathway for constituents to move off-site, into Seneca Lake Park. Of particular concern would be those constituents in the stream and lake bed sediments. If this is the case, there is a potential direct contact risk to persons using the park facilities.

Since there are no known domestic wells downgradient of the site, exposure through ingestion of ground water is not thought to be a concern. However, as noted in Section 8.2, it is New York State's policy to treat all aquifers (except brine waters) as potential sources of potable water.

8.4 Preliminary Remedial Alternatives

Table 8-10 presents a list of potential remedial activities that could be applied at the Geneva Site. Further refinement of the list may be made at the end of Task 3, and final alternatives, if needed, selected as part of Task 5.

TABLE 8-10

PRELIMINARY IDENTIFICATION OF REMEDIAL ALTERNATIVES
FOR THE GENEVA SITE

Medium	Conceptual Action	Remedial Measure	Remarks
Soils	Removal	Excavation and Disposal • contaminated soils • waste deposits	Off-site disposal will involve excavation and removal of contaminated soils and waste deposits with subsequent transportation to another location. Potential impact on air quality during excavation.
	Containment	Capping, Grading, Revegetation • wastes • contaminated soils	Commonly implemented together, they will prevent the movement of wastes and contaminated soils into the environment from erosion. The cap will also reduce infiltration and, therefore, the rate of leaching of chemicals from the soils into the ground water.
		Slurry Wall	Generally used in conjunction with extraction and treatment of ground water.
	Treatment		
		Extraction (soil flushing)	Not applicable for large quantities of material with diverse compositions. A variety of treatment technologies are potentially applicable to extracted wastes. Extracted soils may still contain much contamination.
		In-situ	Biological and chemical treatment of soils.
	No Action	Posting, Fencing, Land Restrictions	May not be applicable for a complete remedial action plan, but may be used as an element of a comprehensive plan. Will be considered in conjunction with other technologies.
Ground Water	Removal/Treatment	Extraction of Ground Water via Pumping	If large volumes of water are to be extracted, on-site treatment may be appropriate. May include recharge or discharge to surface drainage. Extent of contamination and required operating period is not known. May require years of operation.
		Carbon Adsorption	Contaminated carbon filters require appropriate disposal or regeneration.
	In-situ Treatment	Biostimulation	Analysis/culture of the contaminated water to determine the present activity and nutrient levels needed to stimulate hydrocarbon-utilizing bacteria.
		Aquifer Flushing	May include the use of chemical additives. Often used in conjunction with ground water removal.
		Other Technologies	Cost-effectiveness is dependent on concentration and types of contamination. Physical or physical/chemical technologies such as oxidation, precipitation, etc. may be applicable to highly contaminated waters.

TABLE 8-10
(Continued)

PRELIMINARY IDENTIFICATION OF REMEDIAL ALTERNATIVES
FOR THE GENEVA SITE

Medium	Conceptual Action	Remedial Measure	Remarks
Ground Water (Continued)	Containment	Slurry Wall	Generally used in conjunction with extraction and treatment of ground water.
		Capping	See Soils.
	Diversion	Low Permeability Barriers	Prevent chemical migration within shallow aquifer.
		Injection Wells/Interceptor Trenches	Control ground water flow direction. Generally used in conjunction with ground water extraction.
	No Action		To be considered in conjunction with other technologies.
Surface Water and Stream Sediments	Elimination of Source	Slurry Wall	See Ground Water.
		Dredge Contaminated Soils	May be necessary if coal tars have penetrated stream sediments. To be considered in conjunction with other technologies.
	Treatment	Stripping or Carbon Adsorption	Stripping may cause air contamination without proper and expensive controls applicable to organic constituents; contaminated carbon filters require appropriate disposal or regeneration. Large quantities of water make treatment expensive

9.0 CONCLUSIONS AND RECOMMENDATIONS

Analysis and interpretation of data collected during Task 2 and during earlier investigations, allow some conclusions to be drawn about potential concerns and recommendations for future studies.

9.1 Summary of Findings

The field investigation yielded site-specific geological and hydrological information, confirmed the presence of plant-related features, and generated chemical data used to identify the nature and extent of on-site contamination.

Test pits, continuous split spoon sampling during the drilling of monitoring wells, and shallow soil borings established the nature of the site stratigraphy. The deepest borings, to a depth of approximately 100 ft., encountered only unconsolidated sediments, confirming the findings of the Task 1 geophysical survey. Fill, the nature and thickness of which varies considerably over the site, constitutes the uppermost material. The fill is underlain by a considerable thickness (65-75 ft) of silty sands and clays. A distinctive clay layer (10-20 ft thick) lies beneath these silty sands, and is in turn underlain by a fine to medium relatively permeable sand unit.

Water elevation data from the monitoring wells indicates that both the shallow and deep ground water flow is in a southeasterly direction.

The test pits were useful in locating several former structures including the base of the tar storage vessel, gas holders, ovens, and the waste disposal areas in the eastern part of the site. Total PAH, total cyanide, and ferric-ferrocyanide concentrations were particularly high in samples from the latter area.

Coal tar constituents were found in samples taken during at least one round of sampling in each well. Cyanide was found in all of the shallow wells and in the deep background well. Both water and sediment samples from the site streams contained PAHs. Of the water samples, SW-1, taken in the marsh area at the head of the eastern stream, contained the highest concentrations of PAHs. PAHs in the stream sediments were highest in sample SD-2 collected near the point where the stream leaves the site and enters Seneca Lake Park.

There are two possible sources of the constituents found within the ground water. One possible source is the contamination found within the soils, and the other is the coke quench water injection well. The effects of the injection of coke quench water on the aquifers can not be readily evaluated.

The most likely source of coal tar constituents found in the stream sediments and water may be the contaminated soil and waste materials found in the former disposal area. Alternatively, the coal tar constituents in the sediments may have been directly deposited by runoff. Shallow ground water flow, which is toward the stream, may be the route of migration for these constituents to the surface water.

The results of the air monitoring program indicated that volatile organic vapors do not present a major concern, except when contaminated soils are disturbed. In such a case, exposure would be short-term and episodic.

9.2 Potential Health and Environmental Concerns

The interpretation of data collected during Task 2 (see Section 8) has identified the following potential health and environmental concerns:

- A potential direct contact (and possibly inhalation) risk exists for workers doing subsurface excavations. To a much lesser degree, these risks also exist for site visitors.
- Inhalation exposure to workers in crawl spaces and basements of on-site buildings.
- Direct contact risk to those people using Seneca Lake Park facilities.
- Possible contamination of the ground water aquifers

- Possible detrimental effects on biota from constituents in the soil and stream water and sediments.

9.3 Recommendations for Future Study

The findings and concerns indicated in Section 9.1 and 9.2 indicate the need for further study at the site. Of particular concern is the need to more clearly define the extent of near surface contamination, and the extent and pathways of constituent migration off-site.

This section outlines recommendations for future work to be undertaken in Task 3 of TRC's Geneva Site investigation. Appendix H presents the proposed Task 3 Work Plan.

9.3.1 Data Needs and Data Quality Objectives

The further definition of the vertical and horizontal extent of contamination at the Geneva site will require the collection of additional soil and water samples. These will be analyzed for the following parameters: volatile organics, polynuclear aromatic hydrocarbons, total cyanide, ferric-ferrocyanide, total organic carbon (water samples only), non-chlorinated phenols, iron, zinc, organic nitrogen, and sulfate.

The methods used for analysis will be comparable to those used in Task 2 to allow comparison between the data. In addition, analytical methods for soil and water samples will generate data that are comparable so that relationships between contaminants in different media can be examined. The data will also be of a quality which will allow comparison with regulatory standards and guidelines. Where sources of contamination not related to the past use of the former coal gasification site are present, the analytical methods must provide sufficient information to allow contaminant source identification.

This data will be used to aid in Task 4, Risk Assessment, and Task 5, Conceptual Design of Remedial Alternatives. The potential health and environmental concerns which will have to be addressed have been described in Tables 8-1 through 8-4, and in Section 9.2. Preliminary remedial alternatives for the potential problems identified in this report are listed in Table 8-9.

The data requirements for risk assessment and remediation of the identified concerns include the following:

- Characterization of contamination sources;
- Determination of transport routes; and
- Identification of potential receptors.

Table 9-1 lists specific data requirements in each of these categories for the Geneva site. The activities referred to in Table 9-1 are summarized in the following section (9.3.2).

9.3.2 Task 3 Recommendations

The recommended Task 3 activities listed here are described in detail in the attached Task 3 Work Plan. These recommendations include:

- Sample surface soil in the areas where relatively higher concentrations of PAHs were found TP-1 and 2, TP-28 and 34, TP-36 and 37, TP-31 and 32).

- Sample near-surface (5-20 ft) soils in the coke oven area to complete identification of locations containing coal tar constituents.

- Probe (and possibly sample) stream sediments and Seneca Lake shore to confirm/refute presence of coal tar constituents.

- Survey the air quality in crawl spaces beneath the former purifier building and compressor buildings.

TABLE 9-1

TASK 3 DATA REQUIREMENTS
GENEVA SITE

General Data Requirement	Specific Data Requirement	Related Task 3 Activity
A. Characterization of Contaminant Sources		
1) Location	Confirmation of the presence and depth of constituents in the soil near the the location of the coke ovens.	Four shallow (5-20') test borings in the area.
	Soil conditions in the area near TP-1 where pipes were covered with coal tars.	Surface soil sampling.
	Air quality in crawl spaces beneath some buildings.	Air quality survey in crawl spaces.
2) Chemical Nature	Analytical data from soil, sediment, ground water, and air (from Task 2 monitoring wells).	Analysis of samples collected.
B. Determination of Potential Transport Routes		
1) Stream Sediment	Extent of migration off site.	Probing of stream sediments in Seneca Lake Park.
C. Identification of Potential Receptors	Evaluation of stream sediment quality	Stream sediment analysis
	Evaluation of potential for direct human contact.	Surface soil collection and analysis.
	Evaluation of air quality in crawl spaces.	Air quality survey in crawl spaces.

10.0 REFERENCES

American Public Health Association, American Water Works Association, and Water Pollution Control Federation, 1985, Standard Methods for the Examination of Water and Wastewater, 16th Edition, Washington, D.C., 1268 p.

Crain, L.J., 1974, Groundwater Resources of the Western Oswego River Basin, New York, State of New York Department of Environmental Conservation Basin Planning Report, ORB-5, 137 p.

Freeze, R.A., and Cherry, J.A., 1979, Ground Water, Prentice Hall Inc., Englewood Cliffs, NJ, 604p.

Hutton, F.Z., Jr., 1982, Soil Survey, Seneca County, New York: U.S. Government Printing Office, Washington, D.C., 143 p.

Johns, A., 1985, Personal Communications with August Johns, retired maintenance worker from Empire Coke Company, November, 1985.

Kierst, H., 1985, Personal Communications with Henry Kierst, retired relief man from Empire Coke Company, November, 1985.

Lambe, T.W., and Whitman, R.V., 1969, Soil Mechanics, John Wiley and Sons, Inc., New York, 553 p.

Lederer, W.H., 1985, Regulatory Chemicals of Health and Environmental Concern, Van Nostrand Reinhold Company, New York, 304 p.

Mack, F.K., and Digman, R.E., 1962, The Groundwater Resources of Ontario County, New York: State of New York Water Resources Commission, Bulletin GW-48, 99 p.

Mozola, A.J. 1951, The Groundwater Resources of Seneca County, New York: New York Water Power and Control Commission Bulletin GW-26, 99 p.

Schiefen, J. 1986, Personal Communication with John Schiefen, present operations supervisor of Geneva NYSEG Service Center, September, 1986.

TRC Environmental Consultants, Inc., 1985, Site Safety Plan for Coal Gasification Sites, 22 p.

TRC Environmental Consultants, Inc., 1985, Work Plan for New York State Electric and Gas Corporation to Investigate Former Coal Gasification Sites: Geneva Site, 56 p.

TRC Environmental Consultants, Inc., 1986, Investigation of the Former Coal Gasification Site, Geneva, New York, Task 1 Report, Preliminary Site Evaluation, for New York State Electric and Gas Corporation, 57 p.

U.S. Department of Interior, 1974, Earth Manual, United States Government Printing Office, Washington, D.C., 810 p.

U.S. Environmental Protection Agency, 1982, Development Document for Effluent Limitation Guidelines, New Source Performance Standards and Pretreatment Standards for the Iron and Steel Manufacturing Point Source Category, Washington, D.C.

U.S. Environmental Protection Agency, 1983, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020.

U.S. Environmental Protection Agency, 1984, Test Methods for Evaluating Solid Wastes - Physical/Chemical Methods, SW-846.

U.S. Environmental Protection Agency, 1985, Guidelines Establishing Test Procedures for the Analysis of Pollutants, CFR 40, part 136.

U.S. Environmental Protection Agency, 1986, Quality Criteria for Water, 1986, EPA 440/5-86-001.

Weston Geophysical Corporation, 1986, Geophysical Investigations Geneva Service Center Geneva, New York, for TRC Environmental Consultants, Inc., 8 p.

Wilson, D.C., and Stevens, C, 1981. Problems Arising from the Redevelopment of Gas Works, and Similiar Sites, AERE Harwell, 175p.

Woodward-Clyde Consultants, 1984, Report of Investigations of NYSEG Geneva Service Center, May.

Woodward-Clyde Consultants, 1984. Report of Investigations of NYSEG Geneva Service Center, August.

Woodward-Clyde Consultants, 1984, Report of Investigations of NYSEG Geneva Service Center, November.

TASK 2 REPORT
NEW YORK STATE ELECTRIC & GAS CORPORATION
INVESTIGATION OF THE FORMER COAL
GASIFICATION SITE
GENEVA, NEW YORK

GEM 372 CGWW

VOLUME II
APPENDICES A-G

TRC Environmental Consultants, Inc.

Prepared by:

Lynne France
John Palmer

Reviewed by:

James Gould, P.E.

October 1, 1987

TRC Project No. 3292-N61

800 Connecticut Blvd.
East Hartford, CT 06108
(203) 289-8631

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APPENDIX A

TEST PIT LOGS

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-1
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/16/86 DATE COMPLETED: 1/16/86
PIT DIMENSIONS (W X L X H): 3' x 25' x 3'

Depth (ft)	Description
0.0 - 0.8	Coarse crushed stone
0.8 - 2.0	Sand, fine to medium. Heavy creosote odor. Slightly cemented by creosote, black.
2.0 - 3.0	Sand, fine and silt. Heavily coated by extremely viscous creosote.
3.0	Flat concrete floor -- extends for entire length of pit

OVA Response --		
	Ambient	1.0 ppm
	Above pit	1.0 ppm
	Disturbed sample	10.0 ppm

Sample taken at 2.0 ft

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-2
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/20/86 DATE COMPLETED: 1/20/86
PIT DIMENSIONS (W X L X H): 4' x 6' x 7'

Depth (ft)	Description
0.0 - 0.5	Coarse crushed stone
0.5 - 1.5	Fill, black, heavily coated with creosote pitch
1.5 - 6.5	Fill, silt and fine sand, light brown. Slight creosote odor.
6.5 - 7.5+	Clay and silt, red. No noticeable odor.
	Sample taken at 1.0 ft
	No OVA readings above ambient levels.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/16/86
PIT DIMENSIONS (W X L X H): 3' x 8' x 7'

TEST PIT NO. TP-3

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/16/86

Depth (ft)	Description
0.0 - 0.7	Topsoil, fine sand and silt, some medium sand, some gravel
0.7 - 1.5	Fill, coarse to very coarse sand, primarily black coal slag with brick fragments. Slight tar odor.
1.5 - 7.0	Fill, clay and silt, light brown. Occasional slag and coal fragments. Odor different than above layer -- more like creosote. Slight hydrocarbon sheen on some clumps.
7.0 - 10.0+	Clay and silt, red-brown. Laminations 2-5 mm wide. Noticeable creosote odor.
	Slight seepage at 7.0 ft.
	Soil samples taken at 1.0 ft and 6.0 ft. No OVA readings above ambient levels.

TEST PIT LOG

PROJECT NO.: 3292-N61	TEST PIT NO. TP-4
PROJECT: Geneva Gas Plant	
CLIENT: NYSEG	LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald	TRC INSPECTOR: J. Hankins
DATE STARTED: 1/20/86	DATE COMPLETED: 1/20/86
PIT DIMENSIONS (W X L X H): 3' x 12' x 8'	

Depth (ft)	Description
0.0 - 1.0	Fill, medium to coarse sand and gravel, brown.
1.0 - 3.0	Fill, medium to coarse sand and gravel, black, tar odor.
3.0 - 7.5	Fill, silt and clay, brown, strong gasoline or solvent smell below 3.0.
7.5 - 8.0+	Silt and clay, red.

Water with hydrocarbon sheen seen seeping into pit at 3.5 ft.

Concrete holder floor encountered in south end of pit at 3.0 ft.

OVA response --		
	Upwind ambient	1.0 ppm
	Downwind ambient	50-200 ppm
	Next to excavation	100-700 ppm

Samples taken from 3.0 ft and 4.0 ft.

Additional sample taken at 4-5 ft for full priority pollutant analysis except PCB/Pesticides.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/21/86
PIT DIMENSIONS (W X L X H): 3' x 25' x 6'

TEST PIT NO. TP-5

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/21/86

Depth (ft)	Description
0.0 - 0.5	Fill, medium to coarse sand and gravel, yellow-brown.
0.5 - 1.5	Fill, medium to coarse sand and gravel, black, slight tar odor.
1.5 - 6.0+	Fill, silt with some clay, dark yellowish brown. Strong tar odor.

South end of concrete floor of 75' holder encountered.

Water seeping rapidly into pit at 5.0 ft.

OVA response --	Ambient	1.0 ppm
	Above Pit	3.0 ppm
	Sample	100-500 ppm

Sample taken at 5.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 — TEST PIT NO. TP-6
PROJECT: Geneva Gas Plant
CLIENT: NYSEG — LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald — TRC INSPECTOR: J. Hankins
DATE STARTED: 1/17/86 — DATE COMPLETED: 1/17/86
PIT DIMENSIONS (W X L X H): 3' x 5' x 5'

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 1.5	Fill, fine to coarse sand and gravel to 6" diameter, medium brown.
1.5 - 4.0	Fill, fine sand and silt, some gravel, dark brown, Includes fragments of glass, brick, and wood. Slight tar odor.
4.0 - 5.0+	Clay and silt, reddish brown.

Water in pit at 4.0 ft.

OVA response --		
	Ambient	0.0 ppm
	Above pit	0.0 ppm
	Sample	1.0 ppm

Sample taken at 4.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-7
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/17/86 DATE COMPLETED: 1/17/86
PIT DIMENSIONS (W X L X H): 3' x 5' x 5'

Depth (ft)	Description
0.0 - 0.2	Ashphalt
0.2 - 1.0	Fill, fine to coarse sand and fine gravel, reddish-brown.
1.0 - 2.0	Fill, coarse sand and gravel, black, includes brick and wood fragments. Tar odor.
2.0 - 2.5	Fill, gravel and coarse sand, red.
2.5 - 5.0	Fill, clay and silt with random pockets of coarser fill material. Definite tar odor, possible gas or diesel fuel odor.
	Water in pit at 3.5 ft.
	Intersected vertical E-W concrete wall at 2.0 ft.
	Sample taken at 4.0 ft. No OVA response above ambient levels noted.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/17/86
PIT DIMENSIONS (W X L X H): 3' x 6' x 8'

TEST PIT NO. TP-8

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/17/86

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 1.0	Fill, fine to coarse sand and fine gravel, reddish-brown. No visible contamination.
2.0 - 2.5	Fill, fine sand and silt, dark brown
2.5 - 4.5	Fill, fine to coarse sand and gravel with entire railroad ties. May be old railroad bed. Definite creosote odor but no OVA response.
4.5 - 8.0+	Silt, some clay, light brown. Strong creosote odor.
	No water in pit (lowest layer is very tight)
	No OVA response from excavated materials.
	Sample taken at 3.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/21/86
PIT DIMENSIONS (W X L X H): 3' x 6' x 4'

TEST PIT NO. TP-9
LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/21/86

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 2.0	Fill, medium to coarse sand and gravel, brown. No construction debris. No apparent contamination.
2.0 - 2.5	Same as 0.2 - 2.0 but with occasional bricks.
2.5 - 4.0+	Fill, medium to coarse sand and gravel, black. Definite diesel fuel odor.

No water in pit. Excavation halted because a thin pipe was intercepted.

OVA response --		
	Ambient	0.6 ppm
	Above Pit	1 - 3 ppm
	Sample	5 -10 ppm

Sample taken at 4.0 ft.

(Note: Pit was dug 6 ft NE of large underground diesel fuel tank.)

TEST PIT LOG

PROJECT NO.: 3292-N61
TEST PIT NO. TP-10
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald
TRC INSPECTOR: J. Hankins
DATE STARTED: 1/20/86
DATE COMPLETED: 1/20/86
PIT DIMENSIONS (W X L X H): 3' x 12' x 3'

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 3.0+	Fill, cemented brick floors and walls, probably part of Semet-Solvay ovens. Some walls are curved, others are square with parking lot. Too difficult to dig past 3.0 ft.
	No tar odor or OVA response.
	No samples taken.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/20/86
PIT DIMENSIONS (W X L X H): 3' x 6' x 5'

TEST PIT NO. TP-11

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/20/86

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 1.0	Fill, medium to coarse sand and gravel, light brown.
1.0 - 4.0	Fill, medium to coarse sand and gravel, coarse brick fragments common (40% of total). No tar evidence.
4.0 - 5.0+	Fill, medium to coarse sand and gravel.
	No evidence of contamination.
	Water at 4.5 ft.
	Sample taken at 5.0 feet. No OVA readings above ambient levels.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/13/85
PIT DIMENSIONS (W X L X H): 3' x 6' x 4'

TEST PIT NO. TP-12

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/13/85

Depth (ft)	Description
0.0 - 0.5	Topsoil, fine sand with some coarse rubble including bricks, concrete and other building materials.
0.5 - 2.0	Fill, loose rubble including bricks and concrete in coal and coal slag matrix. Coal and coal slag mainly fine to coarse grained sand size.
2.0 - 2.7	Fill, medium to coarse sand, some gravel -- composed of packed coal and coal slag, black.
2.7 - 3.5	Fill, medium to coarse sand and gravel, light brown. Almost no coal fines present.
3.5 - 4.0+	Silt and clay, light brown.
	1 ft diameter corrugated steel pipe intercepted at 3.5 ft. Pipe trends N30W. Tar smell from pipe but no OVA elevation. Water drained into pit from pipe.
	Sample taken from within pipe at 3.5 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/16/86
PIT DIMENSIONS (W X L X H): 3' x 6' x 6'

TEST PIT NO. TP-13

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/16/86

Depth (ft)	Description
0.0 - 0.5	Topsoil, grassed, brown.
0.5 - 1.0	Fill, silt, some clay, reddish brown.
1.0 - 2.0	Fill, fine to medium sand, some silt, some gravel, black.
2.0 - 3.5	Fill, gravel and medium to coarse sand. Gravel is up to 5" in diameter. Little or no building debris.
3.5 - 5.0	Fill, medium to coarse sand, some gravel, black, common fragments of glass.
5.0 - 6.0+	Fine to medium sand, some silt, stratified.

OVA response --		
	Ambient	0.0 ppm
	Above Pit	0.0 ppm
	Sample	3.0 ppm

Sample taken at 5.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-14
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/20/86 DATE COMPLETED: 1/20/86
PIT DIMENSIONS (W X L X H): 3' x 6' x 8'

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 3.0	Fill, gravel and medium to coarse sand, reddish brown, no visible contamination.
3.0 - 5.0	Fill, building rubble including bricks and concrete debris. Also sand and gravel between rubble. Strong tar odor. OVA on sample 5 - 400 ppm.
5.0 - 8.0+	Silt and clay, brown, slight tar odor.
	Intercepted (did not break) 1" pipe at 8.0 ft.

OVA response --	Ambient	1.2 ppm
	Above pit	4.0 ppm
	Sample	5 - 400 ppm

Sample taken at 5.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/21/86
PIT DIMENSIONS (W X L X H): 3' x 5' x 5'

TEST PIT NO. TP-15

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/21/86

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 2.5	Fill, medium to coarse sand and gravel, brown, no visible construction debris.
2.5 - 4.0	Fill, medium to coarse sand and gravel, black, trace brick construction debris. Light tar odor but no OVA response.
4.0 - 5.0+	Fill, medium to coarse sand and gravel. Heavily coated with non-viscous iridescent hydrocarbon (tar).
	Water at 4.5 ft. with definite hydrocarbon sheen.
	OVA response -- Ambient 1.0 ppm; Above pit 1.5 ppm; Sample 10 - 50 ppm
	Sample taken at 5.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/13/86
PIT DIMENSIONS (W X L X H): 3' x 8' x 6'

TEST PIT NO. TP-16

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/13/86

Depth (ft)	Description
0.0 - 1.0	Fill, fine to coarse sand, some gravel, black. Largely composed of coal and coal slag with some brick. Roots common.
1.0 - 1.3	Fill, coarse sand and gravel, light brown. Appears saturated.
1.3 - 4.0	Fill, silt and clay, reddish brown.
4.0 - 6.0+	Fill, fine to medium sand, some coarse sand, trace gravel. Primarily black coal and coal slag.
	No water in pit even though base of pit was 2 - 3 ft below standing water in the swamp. This due to the extremely low permeability of the clays.
	Slight tar odor from top 2 ft. of pit.
	No OVA response. Sample taken at 1.3 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-17
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/20/86 DATE COMPLETED: 1/20/86
PIT DIMENSIONS (W X L X H): 3' x 6' x 7'

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 3.0	Fill, 50% brick and brick fragments, 50% medium to to coarse sand, dark brown.
3.0 - 4.5	Fill, medium to coarse sand, some gravel, black. No odor or OVA response.
4.5 - 7.0+	Fill, medium to coarse sand and gravel, reddish brown.

No OVA response or odor from pit.

Vertical E-W concrete wall along N side of pit. Wall extends from 3 - 7+ ft. depth.

Water seepage into pit at 6.0 ft.

Sample taken at 4.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/20/86
PIT DIMENSIONS (W X L X H): 3' x 6' x 6'

TEST PIT NO. TP-18

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/20/86

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 1.0	Fill, medium to coarse sand and gravel, light brown.
1.0 - 5.0	Fill, 70% loose bricks, 30% medium to coarse sand and gravel.
5.0 - 6.0	Fill, gravel and railroad ties trending N-S, black. This appears to be old railroad bed.
	No tar odor or OVA response from pit.
	Rapid seepage into pit at 5.0 ft.
	Sample taken at 5.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-19
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/13/86 DATE COMPLETED: 1/13/86
PIT DIMENSIONS (W X L X H): 3' x 8' x 7.5'

Depth (ft)	Description
0.0 - 0.5	Topsoil, fine to medium sand, some silt, dark brown. Common roots, some loose bricks and broken brick.
0.5 - 3.5	Fill, fine sand and silt, dark brown, with large (0 - 6") clumps of red silty clay. Common roots.
3.5 - 7.5+	Fill, fine to coarse sand, black. Primarily coal and coal slag. Few roots.
	Water at 7.5 ft.
	Composite soil sample taken from entire depth of pit. No OVA response above ambient levels.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-20
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/21/86 DATE COMPLETED: 1/21/86
PIT DIMENSIONS (W X L X H): 3' x 4' x 2.5'

Depth (ft)	Description
0.0 - 1.0	Topsoil, medium to coarse sand, some gravel, dark brown. Grassed at surface.
1.0 - 2.5+	Medium to coarse sand and gravel, yellow-brown.
	Water in pit below 2.0 ft.
	No tar evidence or OVA response.
	Sample taken at 2.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/21/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 2.5'

TEST PIT NO. TP-21

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/21/86

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 0.5	Fill, medium to coarse sand and gravel, yellow brown.
0.5 - 2.5+	Fill, medium to coarse sand and gravel, black. No odor or OVA response.
	Water below 2.3 ft.
	Sample taken at 2.5 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/16/86
PIT DIMENSIONS (W X L X H): 3' x 6' x 3'

TEST PIT NO. TP-22

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/16/86

Depth (ft)	Description
0.0 - 0.3	Asphalt
0.3 - 3.0	Fill, medium to coarse sand and gravel to 3" including common brick fragments. Black with moderate tar odor.
	Water below 3.0 ft.
	OVA response -- Ambient 0.0 ppm Above pit 1.0 ppm Disturbed sample 100 - 1000+ ppm
	Sample and duplicate sample taken at 3 ft.
	Hole left open for several hours while upwind and downwind Tenax air samples taken.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/20/86
PIT DIMENSIONS (W X L X H): 3' x 8' x 8'

TEST PIT NO. TP-23
LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/20/86

Depth (ft)	Description
0.0 - 0.2	Asphalt
0.2 - 6.0	Fill, 90% loose brick with other miscellaneous construction debris.
6.0 - 7.0	Fill, medium to coarse sand and gravel with broken brick fragments and railroad tie fragments, black.
7.0 - 8.0+	Silt and clay, olive brown.
	No water in pit.
	No odor or OVA response.
	Vertical brick wall runs E-W parallel to parking lot trend in N end of pit. Wall is 16' N of light pole in center of upper parking lot. This is probably wall of Semet-Solvay Oven Building.
	Sample taken at 6.5 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-24
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/21/86 DATE COMPLETED: 1/21/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 4.5'

Depth (ft)	Description
0.0 - 1.5	Fill, medium to coarse sand and gravel, medium-brown.
1.5 - 1.8	Fill, medium to coarse sand, black.
1.8 - 4.5+	Fill, silt with some clay, some gravel, medium brown.

Excavation halted when large diameter pipe was intercepted at 4.5 ft. (Pipe left intact)

Water in pit below 4.0 ft.

Slight possible tar odor from pit but could not find any samples which had odor. No OVA response from pit.

Sample taken at 4.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61

PROJECT: Geneva Gas Plant

CLIENT: NYSEG

CONTRACTOR: Ed McDonald

DATE STARTED: 1/15/86

PIT DIMENSIONS (W X L X H): 3' x 6' x 4'

TEST PIT NO. TP-25

LOCATION: Geneva, NY

TRC INSPECTOR: J. Hankins

DATE COMPLETED: 1/15/86

Depth (ft)	Description
0.0 - 1.0	Fill, loose brick rubble with coal, coal slag and wood.
1.0 - 4.0+	Fill, fine to coarse sand and coarse gravel to brick size, dark brown. Material includes fragments of wood, brick, and concrete.

Water in pit below 4.0 ft.

Slight tar odor 3.5 - 4.0 ft.

OVA response --		
	Ambient	0.0 ppm
	Above pit	0.7 ppm
	Disturbed sample	4.0 ppm

Sample taken at 4.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-26
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/14/86 DATE COMPLETED: 1/14/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 3.5'

Depth (ft)	Description
0.0 - 0.5	Topsoil, fine to medium sand, dark brown. Some brick fragments.
0.5 - 3.5	Fill, 70% broken brick with pockets of coarse black coal and coal slag.
	Water in pit below 3.5 ft. Water has a slight tar sheen and odor.
	No noticeable tars or odor in the soil itself.
	Sample taken at 3.0 ft. No OVA readings taken (no hydrogen).

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-27
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/15/86 DATE COMPLETED: 1/15/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 6'

Depth (ft)	Description
0.0 - 2.5	Fill, fine to medium sand and gravel, some silt. Common building debris including bricks, concrete, etc.
2.5 - 4.0	Fill, fine to medium sand, black. Coated with heavy tars but only slight odor and no OVA response.
4.0 - 6.0+	Silt and clay, yellow brown.
	No OVA response. No water in pit.
	Sample taken at 3.5 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/17/86
PIT DIMENSIONS (W X L X H): 3' x 5' x 3.5'

TEST PIT NO. TP-28
LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/17/86

Depth (ft)	Description
0.0 - 1.0	Concrete
1.0 - 2.5	Fill, fine to coarse sand, some gravel, black. Moderate tar odor but no OVA response.
2.5	Flat concrete pad in east half of pit (holder floor).
2.5 - 3.5+	Fill, fine to coarse sand, some gravel, black. Moderate tar odor but no OVA response.
	Water with slight oil sheen in pit at 3.5 ft.
	Sample taken at 2.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-29
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/15/86 DATE COMPLETED: 1/15/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 4'

Depth (ft)	Description
0.0 - 1.0	Fill, mainly coarse construction debris including bricks, concrete and boards.
1.0 - 4.0+	Purifier wastes, soft, easily worked blue-green wood chips.
	No OVA response above amibent levels. Sample taken at 3.5 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
TEST PIT NO. TP-30
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald
TRC INSPECTOR: J. Hankins
DATE STARTED: 1/15/86
DATE COMPLETED: 1/15/86
PIT DIMENSIONS (W X L X H): 3' x 72' x 3'

(PIT TRENCHED FOR 72 FT FROM TP-30 TO TP-34 -- NORTH END OF THE PIT IS DESCRIBED HERE AS TP-30, SOUTH END OF PIT DESCRIBED LATER AS TP-34)

Depth (ft)	Description
0.0 - 1.0	Fill, fine to medium sand and silt, dark brown.
1.0 - 3.0	Clay and silt, reddish brown
	No contamination evident at described location. Pocket of tars exists 20-25 ft south of described location at depth of 1.5 - 3.0 ft.
	Relief holder wall encountered in trench 32 ft south of TP-30 location. Concrete base of holder is at depth of 2.5 ft.
	Sample taken at 2.5 ft. No OVA response.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-31
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/14/86 DATE COMPLETED: 1/14/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 6.5'

Depth (ft)	Description
0.0 - 3.5	Fill, fine to coarse sand and gravel to 1 ft cobbles. Common brick fragments. No visible contamination.
3.5 - 4.5	Purifier wastes. Dark blue to black wood chips with some fine sand and silt and large wood rubble. Tar odor present but no OVA response.
4.5 - 6.5+	Silty clay, reddish brown with light brown mottles. No visible contamination.
	No odor or OVA response.
	Sample taken at 4.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
TEST PIT NO. TP-32
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald
TRC INSPECTOR: J. Hankins
DATE STARTED: 1/13/86
DATE COMPLETED: 1/13/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 6'

Depth (ft)	Description
0.0 - 1.5	Fill, fine to medium sand, some silt, dark brown. Some wood and brick fragments.
1.5 - 6.0+	Purifier waste. Blue-green soft wood chips with common fragments of harder wood.
	Water in pit below 6.0 ft. Water is stained blue-green, appears to have slight amount of tar scum.
	Slight tar odor above pit.
	No OVA readings taken (no hydrogen). Sample taken at 6.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-33
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/13/86 DATE COMPLETED: 1/13/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 6'

Depth (ft)	Description
0.0 - 0.5	Topsoil, dark brown.
0.5 - 6.0	Fill, 80% loose brick rubble, also other miscellaneous debris including one battered rusty drum, metal strapping, and one large concrete slab. Some of the bricks are stained blue-green. Small amount of fine to coarse sand, medium brown.
	Water in pit below 6.0 ft. Water has scum but no evidence of tar.
	No OVA response above ambient levels. Sample taken at 6.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/15/86
PIT DIMENSIONS (W X L X H): 3' x 72' x 3'

TEST PIT NO. TP-34

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/15/86

(NOTE: TP-34 DESCRIPTION IS OF THE SOUTH END OF A 72 FT TRENCH WHICH WAS DUG FROM TP-31 TO TP-34. SEE TP-31 FOR DESCRIPTION OF NORTH END. TP-34 LOCATED APPROXIMATELY AT CENTER OF 75' DIAMETER RELIEF HOLDER.)

Depth (ft)	Description
0.0 - 2.5	Silt and clay, some coarse sand and gravel. Coarse material is coal slag, with occasional bricks and concrete blocks. Also some purifier wastes. Black with clumps of dark brown clay.
2.5	Flat concrete pad (Base of relief holder)
	No OVA response from pit.
	Sample taken at 2.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/14/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 9'

TEST PIT NO. TP-35

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/14/86

Depth (ft)	Description
0.0 - 1.0	Topsoil, fine to medium sand, some gravel (brick), dark brown. Lower boundary very irregular, varies from 1.0 to 5.0 ft.
1.0 - 2.5	Fill, medium to coarse sand, some gravel, black. Primarily coal and coal slag to 4" across.
2.5 - 9.0+	Clay and silt, red-brown.
	Water seepage into pit at 5.5 ft.
	No evidence of tar in any layer, no OVA response.
	No OVA response. Sample taken at 7.5 - 8.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/14/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 10'

TEST PIT NO. TP-36

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/14/86

Depth (ft)	Description
0.0 - 5.0	Fill, fine to coarse sand, some gravel, dark brown, includes fragments of wood and brick.
5.0 - 8.0	Fill, fine sand and silt, some coarse sand and gravel. Coated with extremely thick tar (consistency of warm asphalt) which hardens when cooled. Definite tar odor.
8.0 - 10.0	Clay and silt, reddish brown.

Water in pit below 9.0 ft.

Sample taken at 6.0 ft.

OVA - Ambient 1.0 (ppm).
Over pit 1.0.
Next to Spoil Pile 3.0.
Disturbed Tar 8.0.

Additional sample taken at 6.0 ft for full priority pollutant analysis except PCB/Pesticides.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-37
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/14/86 DATE COMPLETED: 1/14/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 7.5'

Depth (ft)	Description
0.0 - 4.0	Topsoil, fine to medium sand, some gravel, dark brown. Fragments of brick, coal, coal slag and wood. Minor blue staining on some rock fragments.
4.0 - 6.0	Fill, fine sand and silt, some medium to coarse sand. All heavily coated with thick black tar, consistency of warm asphalt. Definite tar odor but no OVA response.
6.0 - 7.5+	Clay and silt, brown. No evidence of tars.
	No OVA response. Sample taken at 5.5 - 6.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-38
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/13/86 DATE COMPLETED: 1/13/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 6'

Depth (ft)	Description
0.0 - 0.5	Topsoil, fine to medium sand, dark brown. Some brick and coal fragments.
0.5 - 0.9	Fill, silt, light brown.
0.9 - 2.0	Fill, medium to coarse sand, black. Primarily coal and coal slag.
2.0 - 6.0+	Clay and silt, reddish brown with large orange-brown pockets.
	No tar odor or tar evidence.
	No OVA response. Sample taken at 1.5 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/16/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 9'

TEST PIT NO. TP-39

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/16/86

BACKGROUND PIT

Depth (ft)	Description
0.0 - 0.7	Topsoil, fine sand and silt, dark brown.
0.7 - 3.5	Fill, silt and clay, brown.
3.5 - 9.0+	Clay, some silt, reddish brown. Laminated into 1-5 mm layers.
	No water in pit but water seeping in slowly at 3.5 ft.
	No odor or OVA response.
	Sample taken at 8.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61 TEST PIT NO. TP-40
PROJECT: Geneva Gas Plant
CLIENT: NYSEG LOCATION: Geneva, NY
CONTRACTOR: Ed McDonald TRC INSPECTOR: J. Hankins
DATE STARTED: 1/15/86 DATE COMPLETED: 1/15/86
PIT DIMENSIONS (W X L X H): 3' x 7' x 8.5'

Depth (ft)	Description
0.0 - 1.0	Topsoil, fine to medium sand, dark brown. Includes coal slag, bricks, and concrete rubble to 3" across.
1.0 - 4.5	Fill, fine sand and silt, dark brown with 4"-5" clumps of light brown.
4.5 - 8.5	Clay and silt, reddish brown.

No water in pit (presumably due to tightness of clay).

No odor or tar evidence in pit. No OVA response.

Sample taken at 8.0 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61

TEST PIT NO. TP-41

PROJECT: Geneva Gas Plant

CLIENT: NYSEG

LOCATION: Geneva, NY

CONTRACTOR: Ed McDonald

TRC INSPECTOR: J. Hankins

DATE STARTED: 1/13/86

DATE COMPLETED: 1/13/86

PIT DIMENSIONS (W X L X H): 3' x 7' x 4'

Depth (ft)	Description
0.0 - 1.0	Topsoil, fine to medium sand and silt, dark brown. Contains red silty clay lumps to 3" across; trace coal slag, common roots.
1.0 - 2.0	Fill, fine to medium sand, black. Mainly coal slag.
2.0 - 2.6	Fill, silt, some clay, dark brown.
2.6 - 3.0	Fill, coarse sand, black, loose. Mainly coal and coal slag.
3.0 - 4.0+	Clay and silt, reddish brown.
	No elevated OVA readings. Composite sample taken from 0 - 3 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61

TEST PIT NO. TP-41A

PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/13/86
PIT DIMENSIONS (W X L X H): 3' x 6' x 1.5'

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/13/86

Depth (ft)	Description
0.0 - 1.0	Alluvium, fine to medium sand, black. Organic-rich with definite tar odor.
1.0 - 1.5+	Clay and silt, reddish brown.

Pit was dug into stream channel.
OVA temporarily out of hydrogen fuel - No readings taken.
Sample taken at 0.7 ft.

TEST PIT LOG

PROJECT NO.: 3292-N61
PROJECT: Geneva Gas Plant
CLIENT: NYSEG
CONTRACTOR: Ed McDonald
DATE STARTED: 1/15/86
PIT DIMENSIONS (W X L X H): 3' x 6' x 7'

TEST PIT NO. TP-42

LOCATION: Geneva, NY
TRC INSPECTOR: J. Hankins
DATE COMPLETED: 1/15/86

Depth (ft)	Description
0.0 - 1.0	Topsoil, fine to medium sand, dark brown. Common roots.
1.0 - 3.5	Fill, silt and clay, reddish brown.
3.5 - 4.5	Fill, medium to very coarse sand and gravel. Mainly coarse coal slag.
4.5 - 7.0	Silt and clay, light brown.
	No visible contamination or OVA response
	No water in pit (probably because of tight materials at base).
	Sample taken at 4.0 ft.

APPENDIX B

BORING LOGS AND WELL CONSTRUCTION DIAGRAMS

BORING LOG

PROJECT NO. 3292-N61-21 PAGE __ OF __ BORING NO. MW-1D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.99

WELL DEPTH: 90.0'

CASING STICK UP: -.3'

WATER LEVEL: 4.6

DATE STARTED: 01/13/86

COMPLETED: 01/18/86

TOP OF SCREEN: 75.0

BOTTOM OF SCREEN: 90.0

DRILLING METHOD: 4.5" ID Steel Casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2'	1-2-2-3	67			Dk. brown silty topsoil, moist.	
2-4'	7-8-8-7	42			1" same as above. 4" lt. brown, v. fine sand, tr. silt, moist.	
4-6'	2-6-4-8	83			14" lt. reddish brown, v. fine SAND, tr. silt. 6" gray-red clay, some silt.	
6-8'	8-10-8-18	42			Gray-red SILT, some clay.	

BORING LOG

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW-1D

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 458.99

DATE STARTED: 01/13/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 90.0'

COMPLETED: 01/18/86

LOCATION: Geneva, NY

CASING STICK UP: -.3'

TOP OF SCREEN: 75.0

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 4.6

BOTTOM OF SCREEN: 90.0

DRILLER: Scott Breed

DRILLING METHOD: 4.5" ID Steel Casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
8-10'	4-5-5-4	100			Dk red-gray CLAY, some silt. Contains some 2-2/16" layers of v. fine sand.	
10-12'	4-5-2-2	100			Dk. red-gray CLAY, little silt, some approximately 1/16" layers of v. fine sand.	
12-14'	2-2-2-2	100			Same as above.	
14-16'	5-6-8-6	50			2" same as above. 10" v. fine sand, tr. silt, moist.	

BORING LOG

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW-1D

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 458.99

DATE STARTED: 01/13/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 90.0'

COMPLETED: 01/18/86

LOCATION: Geneva, NY

CASING STICK UP: -.3'

TOP OF SCREEN: 75.0

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 4.6

BOTTOM OF SCREEN: 90.0

DRILLER: Scott Breed

DRILLING METHOD: 4.5" ID Steel Casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
16-18'	10-13 13 12	67			Lt. brown v. fine SAND, little silt, moist.	
18-20'	7-5-6-9	50			Same as above.	
20-22'	9-8 2-8	58			Same as above.	
22-24'	4-5-5-4	17			Same as above.	

BORING LOG

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW 1D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.99

WELL DEPTH: 90.0'

CASING STICK UP: -.3'

WATER LEVEL: 4.6

DATE STARTED: 01/13/86

COMPLETED: 01/18/86

TOP OF SCREEN: 75.0

BOTTOM OF SCREEN: 90.0

DRILLING METHOD: 4.5" ID Steel Casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
24-26'	3-4-3-3	58			10" same as above. 4" same, some silt, wet.	
26-28'	2-3-3-2	0			No recovery.	
28-30'	5-6-8-6	54			10" br. med-coarse SAND, wet. 4" br. silt, some fine sand. Tr. clay, wet.	
30-32'	5-3-7-5	63			3" br. SILT, some fine sand, little clay. 12" dk. reddish gray, clay, some silt.	

BORING LOG

PROJECT NO. 3292 N61-21 PAGE ___ OF ___ BORING NO. MW 1D

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 458.99

DATE STARTED: 01/13/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 90.0'

COMPLETED: 01/18/86

LOCATION: Geneva, NY

CASING STICK UP: -.3'

TOP OF SCREEN: 75.0

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 4.6

BOTTOM OF SCREEN: 90.0

DRILLER: Scott Breed

DRILLING METHOD: 4.5" ID Steel Casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
32-34'	2-2-6-8	75			3" same as above. 12" gray silt some clay. 3" gray silt, some v. fine sand, tr. clay.	
34-36'	3-3-4-3	63			Brown-gray SILT, some clay moist.	
36-38'	2-5-5-6	100			12" same as above. 4" gray brown silt, some fine sand, tr. clay. 7" gray brown, silt, some clay, moist.	
38-40'	6-6-6-5	58			Brown-gray v. fine SAND, some silt tr. clay, wet.	

BORING LOG

PROJECT NO. 3292-N61-21 PAGE __ OF __ BORING NO. MW-1D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.99

WELL DEPTH: 90.0'

CASING STICK UP: -.3'

WATER LEVEL: 4.6

DATE STARTED: 01/13/86

COMPLETED: 01/18/86

TOP OF SCREEN: 75.0

BOTTOM OF SCREEN: 90.0

DRILLING METHOD: 4.5" ID Steel Casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
40-42'	4-4-3-3	25			Gray-brown SILT, some clay, moist.	
42-44	10-6-13-6	38			3" gray-brown v. fine SAND, some silt, tr. clay. 3" gray-brown silt, some clay. 3" brown v. fine sand, some silt, tr. clay.	
44-46'	13-9-9-8	46			Brown - v. fine SAND, little silt, wet.	
46-48'	7-4-5-3	63			Same, moist.	

BORING LOG

PROJECT NO. 3292-N61-21 PAGE ___ OF ___ BORING NO. MW-10

PROJECT: NYSEG Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.99

WELL DEPTH: 90.0'

CASING STICK UP: -.3'

WATER LEVEL: 4.6

DATE STARTED: 01/13/86

COMPLETED: 01/18/86

TOP OF SCREEN: 75.0

BOTTOM OF SCREEN: 90.0

DRILLING METHOD: 4.5" ID Steel Casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
48-50'	3-8-5-4	67			16" same as above, wet. 6" brown, clay, trace silt.	
50-52'	WH-1-1	46			2" same as above. 4" brown, v. fine sand, some silt, little clay. 5" brown silt, some v. fine sand, little clay.	
54-56'	5-4-3-11	63			Brown v. fine-fine SAND, some silt, little clay, wet.	
56-58'	6-8-8-7	38			Same as above.	

BORING LOG

PROJECT NO. 3292 N61-21 PAGE ___ OF ___ BORING NO. MW-1D

PROJECT: NYSEG-Geneva
TOP OF CASING ELEVATION: 458.99
DATE STARTED: 01/13/86

CLIENT: New York State Electric & Gas
WELL DEPTH: 90.0'
COMPLETED: 01/18/86

LOCATION: Geneva, NY
CASING STICK UP: -.3'
TOP OF SCREEN: 75.0

DRILLING CONTRACTOR: Empire Soils
WATER LEVEL: 4.6
BOTTOM OF SCREEN: 90.0

DRILLER: Scott Breed
DRILLING METHOD: 4.5" ID Steel Casing

TRC INSPECTOR: Joe Bauer
COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
58-60'	5-7-6-7	46			Same as above.	
60-62'	1-2-2-1	83			10" same. 10" brown, CLAY, some silt, trace fine sand, wet.	
62-64'	3-6-3-3	83			14" brown v. fine SAND, some silt, tr. clay, wet. 6" brown, CLAY, little silt, trace v. fine sand, moist.	
64-66'	4-4-4-5	63			CLAY, little silt, some 1/16-1/8 silty clay layers, alternating band of lt. gray, dk gray & reddish gray clay. Silly putty consistency.	

BORING LOG

PROJECT NO. 3292-N61-21 PAGE ___ OF ___ BORING NO. MW-1D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.99

WELL DEPTH: 90.0'

CASING STICK UP: -.3'

WATER LEVEL: 4.6

DATE STARTED: 01/13/86

COMPLETED: 01/18/86

TOP OF SCREEN: 75.0

BOTTOM OF SCREEN: 90.0

DRILLING METHOD: 4.5" ID Steel Casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
66-68'	3-4-4-5	100			Same as above.	
68-70'	WR-3-5-6	100			Same as above.	
70-72'	2-6-33-25	100			20" same as above. 4" fine SAND.	
72-74'	13-27-23-12	100			Br. fine SAND, little silt.	

BORING LOG

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW-10

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.99

WELL DEPTH: 90.0'

CASING STICK UP: -.3'

WATER LEVEL: 4.6

DATE STARTED: 01/13/86

COMPLETED: 01/18/86

TOP OF SCREEN: 75.0

BOTTOM OF SCREEN: 90.0

DRILLING METHOD: 4.5" ID Steel Casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
74-76'	9-11-12-16	100			Same as above.	
76-78'	33-22-16-22	100			Same as above.	
78-80'	9-6 16-19	63			11" same. 4" fine SAND, some clay, little silt, wet.	
80-82'	11-11-13-13	58			4" fine SAND, some silt, tr. clay, wet. 11" fine-med. sand, tr. silt.	

BORING LOG

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW 1D

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 458.99

DATE STARTED: 01/13/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 90.0'

COMPLETED: 01/18/86

LOCATION: Geneva, NY

CASING STICK UP: -.3'

TOP OF SCREEN: 75.0

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 4.6

BOTTOM OF SCREEN: 90.0

DRILLER: Scott Breed

DRILLING METHOD: 4.5" ID Steel Casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
82-84'	11-14 33-33	83			12" same as above. 8" fine sand, some silt, tr. clay wet.	
84-86'	6 11 13 10	63			Same as above.	
86-88'	15 24 16 18	67			Same as above. Bottom 6" saturated.	
88-90'		0			No recovery.	
					END OF BORING	

BOR___OG

PROJECT NO. 3292 N61 21 PAGE __ OF __ BORING NO. MW 1S

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 459.05

DATE STARTED: 01/18/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 1.3

COMPLETED: 01/18/86

LOCATION: Geneva, NY

CASING STICK UP: -.25

TOP OF SCREEN: 3.0'

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 1.98

BOTTOM OF SCREEN: 13.0'

DRILLER: Scott Breed

DRILLING METHOD: 4.5" Hollow stem auger

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS

BORING LOG

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW 2D

PROJECT: NYSEG Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 462.49

WELL DEPTH: 106.5

CASING STICK UP: 1.5'

WATER LEVEL: 8.4

DATE STARTED: 01/21/86

COMPLETED: 01/24/86

TOP OF SCREEN: 91.5

BOTTOM OF SCREEN: 106.5

DRILLING METHOD: 4.75" steel casing

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0 2'	2-1-1-1	54			2" organics, grass & roots etc. 9" Brown, sand & gravel, some cinders & silt. Tr. clay, moist. 2" gray, used-course cinders & coal bits. Saturated.	
2 4'	1 1 1 1	50			Gr.-br. sand & gravel, cinders, med-coarse coal bits, saturated.	
4 6'	1-1 1 1	17			2" black, cinders & coal pieces. Some fine & silt. 2" sand & gravel, some silt. Little cinders & coal, tr. clay.	
6 8'	1-1-6-2	67			2" black cinders & coal bits. 1" v. fine material, clayey, very wet, airy, has consistancy of wet pizza dough, 1/4" black coal bits. 6" rusty br. v. fine sand, some roots. 7" gray brown v. fine sand, tr. silt.	

ORIN G

PROJECT NO. 3292 N61 21 PAGE __ OF __ BORING NO. MW-20

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 462.49

WELL DEPTH: 106.5

CASING STICK UP: 1.5'

WATER LEVEL: 8.4

DATE STARTED: 01/21/86

COMPLETED: 01/24/86

TOP OF SCREEN: 91.5

BOTTOM OF SCREEN: 106.5

DRILLING METHOD: 4.75" steel casing

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
8-10'	11-11-9-10	46			Reddish gray, silt, some clay.	
10-12'	14-16-18 19	50			Reddish gray, alternating layers of silt, some clay; clay, some silt, contains lenses (1/8"-1" thick) of v. fine sand.	
12-14'	20 25-28 30	83			Same as above.	
14-16'	8-8-7-5	75			4" same as above. 3" v. fine sand, saturated. 9" same as top 4". 2" reddish gray clay, silty putty like consistancy.	

BORING LOG

PROJECT NO. 3292-N61 21 PAGE ___ OF ___ BORING NO. MW-2D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 462.49

WELL DEPTH: 106.5

CASING STICK UP: 1.5'

WATER LEVEL: 8.4

DATE STARTED: 01/21/86

COMPLETED: 01/24/86

TOP OF SCREEN: 91.5

BOTTOM OF SCREEN: 106.5

DRILLING METHOD: 4.75" steel casing

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
16 18'	3-2-3 3	83			7" same as above. 13" brown v. fine SAND, tr. silt.	
18-20'	4-11-18-22	71			13" reddish-gray CLAY. 1" brown, v. fine sand. 3" same as top 13".	
20-22'	8-8-9-10	63			Gray, fine-v. fine SAND, wet.	
22-24'	8-9-12-11	75			Same as above.	

BORING LOG

CT NO. 3292-N61-21 PAGE __ OF __ BORING NO. MW-20

PROJECT: NYSEG Geneva

TOP OF CASING ELEVATION: 462.49

DATE STARTED: 01/21/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 106.5

COMPLETED: 01/24/86

LOCATION: Geneva, NY

CASING STICK UP: 1.5'

TOP OF SCREEN: 91.5

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 8.4

BOTTOM OF SCREEN: 106.5

DRILLER: Scott Breed

DRILLING METHOD: 4.75" steel casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
24-26'	4-2-3-4	67			Same as above.	
26-28'	5-4-9-9	58			Same as above.	
28-30'	3-7-11-10	63			Same as above.	
30-32'	9-10-11-13	71			Same as above.	

BORING LOG

.T NO. 3292-N61-21 PAGE ___ OF ___ BORING NO. MW-20

PROJECT: NYSEG Geneva

TOP OF CASING ELEVATION: 462.49

DATE STARTED: 01/21/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 106.5

COMPLETED: 01/24/86

LOCATION: Geneva, NY

CASING STICK UP: 1.5'

TOP OF SCREEN: 91.5

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 8.4

BOTTOM OF SCREEN: 106.5

DRILLER: Scott Breed

DRILLING METHOD: 4.75" steel casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
32-34'	10-23-26-19	83			Same as above.	
34-36'	5-6-8-8	0			No recovery.	
36-38'	5-6-9-12	92			Same as 32-34'.	
38-40'	16-23-27-24	100			20" same as above. 4" same, some silt.	

BORING LOG

PROJECT NO. 3292-N61-21

PAGE ___ OF ___

BORING NO. MW 2D

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 462.49

DATE STARTED: 01/21/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 106.5

COMPLETED: 01/24/86

LOCATION: Geneva, NY

CASING STICK UP: 1.5'

TOP OF SCREEN: 91.5

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 8.4

BOTTOM OF SCREEN: 106.5

DRILLING METHOD: 4.75" steel casing

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
40-42'	3-4-4-3	83			8" Br. CLAY, little silt. 1" Br. very fine SAND, some silt, little clay. 11" lt. reddish brown CLAY.	
42-44'	4-5-6-6	83			14" Br. very fine SAND, some silt. 3" Lt. brown clay, tr. silt. 3" alternating layers of above units.	
44-46'	4-5-4-4	0			No recovery.	
46-48'	WH-1-1-WH	67			4" alternating layers of very fine silty SAND & CLAY. Under silt than clay layers. 3 clay, tr. silt; 4" alternating layers of silt & clay, under silt layers; 5" same but wider clay layers.	

BORING LOG

T NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW-20

SUBJECT: NYSEG-Geneva TOP OF CASING ELEVATION: 462.49 DATE STARTED: 01/21/86

CLIENT: New York State Electric & Gas WELL DEPTH: 106.5 COMPLETED: 01/24/86

LOCATION: Geneva, NY CASING STICK UP: 1.5' TOP OF SCREEN: 91.5

DRILLING CONTRACTOR: Empire Soils WATER LEVEL: 8.4 BOTTOM OF SCREEN: 106.5

DRILLER: Scott Breed DRILLING METHOD: 4.75" steel casing

TRC INSPECTOR: Joe Bauer COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
48-50'	2-1-4-4	83			12" lt. reddish-gray CLAY, tr. silt, silty putty the consistancy. 8" alternating clay and v. fine silty sand.	
50-52'	WR-W R-WH-W-H	75			Reddish brown CLAY, tr. silt, silty putty consistancy.	
52-54'	WR-4-2-17	100			9" same as above. 4" lt. brown SILT, some v. fine sand, little clay, saturated. 9" same as top 9"; 2" v. fine sand, some silt, tr. clay, wet.	
54-56'	6-8-9-8	38			Lt. brown v. fine SAND, little silt.	

PROJECT NO. 3292 N61-21 PAGE __ OF __ BORING NO. MW-20

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 462.49

WELL DEPTH: 106.5

CASING STICK UP: 1.5'

WATER LEVEL: 8.4

DATE STARTED: 01/21/86

COMPLETED: 01/24/86

TOP OF SCREEN: 91.5

BOTTOM OF SCREEN: 106.5

DRILLING METHOD: 4.75" steel casing

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
56-58'	9-9-5-4	50			Same as above.	
58-60'	1-2-1-2	58			12" same as above. 2" reddish brown clay, tr. silt, with alternating layers & bands of silt & v. fine sand.	
60-62'	WH-WH-2-1	0			No recovery.	
62-64'	6-8-8-12	50			Reddish brown CLAY, tr. silt, with alternating layers and bands of silt and v. fine sand.	

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW 2D

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 462.49

DATE STARTED: 01/21/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 106.5

COMPLETED: 01/24/86

LOCATION: Geneva, NY

CASING STICK UP: 1.5'

TOP OF SCREEN: 91.5

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 8.4

BOTTOM OF SCREEN: 106.5

DRILLER: Scott Breed

DRILLING METHOD: 4.75" steel casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
64 66'	6-8-8-12	67			8" reddish-brown CLAY, tr. silt. 7" v. fine SAND, little silt, tr. clay.	
66-68'	7-8-8-6	33			Same as last 8" above.	
68-70'	7-7-7-10	63			Same as above.	
70-72'	WR-WH-1-1	0			No recovery.	

BORING

PROJECT NO. 3292 NG1 21 PAGE ___ OF ___ BORING NO. MW-20

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 462.49

WELL DEPTH: 106.5

CASING STICK UP: 1.5'

WATER LEVEL: 8.4

DATE STARTED: 01/21/86

COMPLETED: 01/24/86

TOP OF SCREEN: 91.5

BOTTOM OF SCREEN: 106.5

DRILLING METHOD: 4.75" steel casing

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
72-74'	5-4-3-7	100			5" reddish-gray CLAY, tr. silt. 5" v. fine SAND, little silt, tr. clay. 14" same as top 5".	
74-76'	WH	100			CLAY, alternating reddish gray, lt. gray and dk. gray layers, silty putty like consistency.	
76-78'	WR WH 4 4	100			Same as above.	
78-80'	4-4-4-4	100			Same as above.	

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW 2D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 462.49

WELL DEPTH: 106.5

CASING STICK UP: 1.5'

WATER LEVEL: 8.4

DATE STARTED: 01/21/86

COMPLETED: 01/24/86

TOP OF SCREEN: 91.5

BOTTOM OF SCREEN: 106.5

DRILLING METHOD: 4.75" steel casing

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
80-82'	2-2-2-2	100			Same as above.	
82-84'	3-3-5-5	100			Same as above.	
84-86'	4-3-4-4	100			Same as above.	
86 88	3-4-4-5	100			Same as above.	

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW 20

PROJECT: NYSEG-Geneva	TOP OF CASING ELEVATION: 462.49
CLIENT: New York State Electric & Gas	WELL DEPTH: 106.5
LOCATION: Geneva, NY	CASING STICK UP: 1.5'
DRILLING CONTRACTOR: Empire Soils	WATER LEVEL: 8.4
DRILLER: Scott Breed	DRILLING METHOD: 4.75" steel casing
TRC INSPECTOR: Joe Bauer	COMPLETION AND DEVELOPMENT: Pumped until clean

DATE STARTED: 01/21/86
COMPLETED: 01/24/86
TOP OF SCREEN: 91.5
BOTTOM OF SCREEN: 106.5

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
88 90'	6 12 12 28	100			12" same as above. 1" br. fine sand wet. 1" br. clay, 8" br. v. fine sand, some silt, tr. clay, wet 1/2" clay. 2" fine sand, tr. silt, wet.	
90 92'	6 10 9 8	0			No recovery.	
92 94'	12-8-8-7	72			Br. fine SAND, tr. silt, wet.	
94-96'	13-12-10-13	29			Same as above.	

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW 2D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 462.49

WELL DEPTH: 106.5

CASING STICK UP: 1.5'

WATER LEVEL: 8.4

DATE STARTED: 01/21/86

COMPLETED: 01/24/86

TOP OF SCREEN: 91.5

BOTTOM OF SCREEN: 106.5

DRILLING METHOD: 4.75" steel casing

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
96 98'	8 6 6 8	33			Brown, v. fine fine SAND, little silt, tr. clay, wet.	
98 100'	5 7 9 9	8			Same as above.	
100 102'	9-12-20-19	75			12" brown, v. fine-fine SAND, little silt, tr. clay, 6" fine sand, tr. silt.	
102-104'	17-18-18-17	33			Brown, v. fine-fine SAND, little silt tr. clay.	

RING

PROJECT NO. 3292 NG1 21 PAGE ___ OF ___ BORING NO. MW 20

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 462.49

WELL DEPTH: 106.5'

CASING STICK UP: 1.5'

WATER LEVEL: 8.4

DATE STARTED: 01/21/86

COMPLETED: 01/24/86

TOP OF SCREEN: 91.5

BOTTOM OF SCREEN: 106.5

DRILLING METHOD: 4.75" steel casing

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
104-106'	14-13-15-15	38			Brown, fine SAND, little silt. END OF BORING	

PROJECT NO. 3292 NG1 21 PAGE _ OF __ BORING NO. MW 2S

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 463.09

WELL DEPTH: 13'

CASING STICK UP: 1.6'

WATER LEVEL: 7.73

DATE STARTED: 01/27/86

COMPLETED: 01/27/86

TOP OF SCREEN: 3

BOTTOM OF SCREEN: 13

DRILLING METHOD: 6" ID Hollow steam auger

COMPLETION AND DEVELOPMENT: Pumped until clean

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS

PROJECT NO. 3292_N61_21 PAGE ___ OF ___ BORING NO. MW-30

PROJECT: NYSEG Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.54

WELL DEPTH: 101.7'

CASING STICK UP: 2.1'

WATER LEVEL: 4.64

DATE STARTED: 01/28/86

COMPLETED: 02/03/86

TOP OF SCREEN: 86.7

BOTTOM OF SCREEN: 101.7

DRILLING METHOD: 4.5" ID steel casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2'	12-13-13-10	25			Brown, silt, coal cinders and organics.	
2-4'	8-11-10-6	33			Black, cinders, small chunks of coal, wet.	
4-6'	6-8-15-20	58			Rusty brown, SILT, little clay, some gray mottling, dry.	
6-8'	13-14-18-30	75			Same as above, some clay.	

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW 3D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.54

WELL DEPTH: 101.7'

CASING STICK UP: 2.1'

WATER LEVEL: 4.64

DATE STARTED: 01/28/86

COMPLETED: 02/03/86

TOP OF SCREEN: 86.7

BOTTOM OF SCREEN: 101.7

DRILLING METHOD: 4.5" ID steel casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
8 10'	10-14 21-22	67			Same as above. Some v. thin layers of v. fine sand, these layers have turquoise mottling.	
10 12'	12 8 5 5	54			11" brown, fine SAND. 2" reddish-gray clay, little silt.	
12 14'	3 6 11 13	58			6" gray, v. fine SAND & CLAY. 3" reddish gray CLAY. 5" gray, v. fine SAND, little clay & silt, moist.	
14 16'	6-6-10-16	75			9" same as last 5" above. 9" gray fine SAND, tr. silt, wet.	

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW-3D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.54

WELL DEPTH: 101.7'

CASING STICK UP: 2.1'

WATER LEVEL: 4.64

DATE STARTED: 01/28/86

COMPLETED: 02/03/86

TOP OF SCREEN: 86.7

BOTTOM OF SCREEN: 101.7

DRILLING METHOD: 4.5" ID steel casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
16-18'	5-5-5-5	63			Same as last 9" above.	
18-20'	1-1-1-1	21			Same as above.	
20-22'	2-2-1-1	29			Gray, v. fine SAND, same silt, tr. clay.	
22-24'	2-2-4-7	38			Gray, fine SAND, tr. silt, wet.	

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW-3D

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 458.54

DATE STARTED: 01/28/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 101.7'

COMPLETED: 02/03/86

LOCATION: Geneva, NY

CASING STICK UP: 2.1'

TOP OF SCREEN: 86.7

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 4.64

BOTTOM OF SCREEN: 101.7

DRILLER: Scott Breed

DRILLING METHOD: 4.5" ID steel casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
24 26'	7 7 6 6	75			Same as above.	
26 28'	12-12-19-12	100			20" same as above. 4" v. fine-fine SAND, little silt, tr. clay, wet.	
28 30'	19-19 13 12	100			18" gray fine SAND, tr. silt. 6" v. fine-fine SAND, little silt, tr. clay, wet.	
30 32'	5 5-4 5	88			Gray-brown fine SAND, tr. silt moist.	

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW 3D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.54

WELL DEPTH: 101.7'

CASING STICK UP: 2.1'

WATER LEVEL: 4.64

DATE STARTED: 01/28/86

COMPLETED: 02/03/86

TOP OF SCREEN: 86.7

BOTTOM OF SCREEN: 101.7

DRILLING METHOD: 4.5" ID steel casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
32 34'	4 5 7 8	75			Same as above.	
34 36'	5 6 5 7	79			16" same as above. 3" v. fine SAND, little silt, tr clay.	
36 38'	7 8 7 8	42			Same as bottom 3" above.	
38 40'	3-4-3-3	79			17" brown v. fine SAND, little silt, tr. clay. 2" brown CLAY, little v. fine sand, and silt.	

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW-3D

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.54

WELL DEPTH: 101.7'

CASING STICK UP: 2.1'

WATER LEVEL: 4.64

DATE STARTED: 01/[illegible]

COMPLETED: 02/03/86

TOP OF SCREEN: 86.7

BOTTOM OF SCREEN: 101.7

DRILLING METHOD: 4.5" ID steel casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
40 42'	3-4-4-4	83			Alternating layers of above units, layers of v. fine sand are thickest.	
42 44'	3-4-4 6	83			Gray brown CLAY, little silt and v. fine sand.	
44 46'	2-2-1 2	88			Same as above.	
46 48'	1 1 1 1	67			V. fine-fine SAND, little silt, tr. clay.	

BORING LOG

PROJECT NO. 3292 N61-21

PAGE ___ OF ___

BORING NO. MW 3D

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 458.54

DATE STARTED: 01/28/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 101.7'

COMPLETED: 02/03/86

LOCATION: Geneva, NY

CASING STICK UP: 2.1'

TOP OF SCREEN: 86.7

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 4.64

BOTTOM OF SCREEN: 101.7

DRILLER: Scott Breed

DRILLING METHOD: 4.5" ID steel casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
48-50'	8-3 2-3	100			Lt. reddish-gray CLAY interlayed with gray-brown sands.	
50-52'	1-1-1-1	21			Br. v. fine SAND, little silt, tr. clay.	
52-54	4-3-2-2	46			Same as above.	
54-56'	3-4 6-3	42			Same as above.	

PROJECT NO. 3292_N61-21 PAGE ___ OF ___ BORING NO. MW 3D

PROJECT: NYSEG Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.54

WELL DEPTH: 101.7'

CASING STICK UP: 2.1'

WATER LEVEL: 4.64

DATE STARTED: 01/28/86

COMPLETED: 02/03/86

TOP OF SCREEN: 86.7

BOTTOM OF SCREEN: 101.7

DRILLING METHOD: 4.5" ID steel casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
56-58'	4-2-4-2	33			Same as above.	
58-60'	1-1-1-1	25			Same as above.	
60-62'	2-3-2-3	83			Same as above.	
62-64'	3-4-10-17	58			4" gray, CLAY, 10" v. fine SAND, little silt, tr. clay.	

BORING LOG

PROJECT NO. 3292-N61-21

PAGE ___ OF ___

BORING NO. MW-3D

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 458.54

DATE STARTED: 01/28/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 101.7'

COMPLETED: 02/03/86

LOCATION: Geneva, NY

CASING STICK UP: 2.1'

TOP OF SCREEN: 86.7

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 4.64

BOTTOM OF SCREEN: 101.7

DRILLER: Scott Breed

DRILLING METHOD: 4.5" ID steel casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
64-66'	12-6-5-6	33			Br. V. fine SAND, little silt, tr. clay.	
66-68'	6-3-5-4	42			Same as above.	
68-70'	1-1-1-2	83			5" same as above. 10" above, interlayered with clay. 5" reddish gray CLAY, silty putty consistency.	
70-72'	2-3-4-5	79			Same interlayered units.	

BORING LOG

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW-3D

PROJECT: NYSEG-Geneva
TOP OF CASING ELEVATION: 458.54
DATE STARTED: 01/28/86

CLIENT: New York State Electric & Gas
WELL DEPTH: 101.7'
COMPLETED: 02/03/86

LOCATION: Geneva, NY
CASING STICK UP: 2.1'
TOP OF SCREEN: 86.7

DRILLING CONTRACTOR: Empire Soils
WATER LEVEL: 4.64
BOTTOM OF SCREEN: 101.7

DRILLER: Scott Breed
DRILLING METHOD: 4.5" ID steel casing

TRC INSPECTOR: Joe Bauer
COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
72-74'	2-2-2-1	75			10" same as above. 8" CLAY, interlayered lt gray, dk gray and reddish gray clays. Silly putty consistency.	
74-76'	2-3-4-3	100			Same as bottom 8" above.	
76-78'	5-4-5-4	83			Same as above.	
78-80'	1-3-4-4	100			Same as above.	

ORIGINAL

PROJECT NO. 3292 N61 21 PAGE __ OF __ BORING NO. MW 3D

PROJECT: NYSEG Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.54

WELL DEPTH: 101.7'

CASING STICK UP: 2.1'

WATER LEVEL: 4.64

DATE STARTED: 01/28/86

COMPLETED: 02/03/86

TOP OF SCREEN: 86.7

BOTTOM OF SCREEN: 101.7

DRILLING METHOD: 4.5" ID steel casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
80 82'	2-3-4-6	100			Same as above.	
82 84'	4-4-5-6	100			Same as above.	
84 86'	5 6 8 9	100			Same as above. Last 1/4" v. fine sand.	
86-88'	8-14-13-19	42			Brown, v. fine SAND, some silt, tr. clay.	

BORING

PROJECT NO. 3292-N61-21 PAGE ___ OF ___ BORING NO. MW-30

PROJECT: NYSEG Geneva

TOP OF CASING ELEVATION: 458.54

DATE STARTED: 01/28/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 101.7'

COMPLETED: 02/03/86

LOCATION: Geneva, NY

CASING STICK UP: 2.1'

TOP OF SCREEN: 86.7

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 4.64

BOTTOM OF SCREEN: 101.7

DRILLER: Scott Breed

DRILLING METHOD: 4.5" ID steel casing

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
88-90'	6-9-7-4	0			No recovery.	
90-92'	2-3-4-3	42			Same as 86-88'.	
92-94'	7-4-5-4	42			Same as above, but has little silt.	
94-96'	4-9-9-10	75			10" same as above, wet. 3" brown, clay, little silt. 5" brown, fine sand, saturated.	

BORING LOG

PROJECT NO. 3292 N61 21

PAGE ___ OF ___

BORING NO. MW 3D

PROJECT: NYSEG Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: Empire Soils

DRILLER: Scott Breed

TRC INSPECTOR: Joe Bauer

TOP OF CASING ELEVATION: 458.54

WELL DEPTH: 101.7'

CASING STICK UP: 2.1'

WATER LEVEL: 4.64

DATE STARTED: 01/28/86

COMPLETED: 02/03/86

TOP OF SCREEN: 86.7

BOTTOM OF SCREEN: 101.7

DRILLING METHOD: 4.5" ID steel casing

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
96 98'	7 6 6 11	58			Brown, v. fine-fine sand, little silt. Saturated.	
98 100'	7 7 16 14	58			9" same as above. 5" fine med sand. Qtx. homeblend. feldspar sand.	
100 102'	16 13 13 13	0			No recovery.	
					END OF BORING	

BORING LOG

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. MW-3S

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: 458.88

DATE STARTED: 02/03/86

CLIENT: New York State Electric & Gas

WELL DEPTH: 13.0'

COMPLETED: 02/03/86

LOCATION: Geneva, NY

CASING STICK UP: 2.0'

TOP OF SCREEN: 3

DRILLING CONTRACTOR: Empire Soils

WATER LEVEL: 5.17'

BOTTOM OF SCREEN: 13

DRILLER: Scott Breed

DRILLING METHOD: 6" ID HSA

TRC INSPECTOR: Joe Bauer

COMPLETION AND DEVELOPMENT: Pumped until clear

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS

BORING LOG

PROJECT NO. 3292 N61-21 PAGE ___ OF ___ BORING NO. B-1

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: NYSEG

DRILLER: R.F. Balcerzak

TRC INSPECTOR: J. Bauer

TOP OF CASING ELEVATION: ______

WELL DEPTH: ______

CASING STICK UP: ______

WATER LEVEL: ______

DATE STARTED: 04/30/86

COMPLETED: 04/30/86

TOP OF SCREEN: ______

BOTTOM OF SCREEN: ______

DRILLING METHOD: Hollow Stem Auger

COMPLETION AND DEVELOPMENT: ______

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2'			30		Dark gray FILL, strong coal tar odor, black sludge at 2'.	OVA reading from composite sample.
2-4'					Same as above. Coal tar product.	
4-6'					Same as above. Coal tar product.	
6-7'			30		Red gray silty CLAY. Coal tar product. Saturated at 6.5'. END OF BORING.	

PROJECT NO. 3292-N61-21 PAGE ___ OF ___ BORING NO. B-1A

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: NYSEG

DRILLER: R.F. Balcerzak

TRC INSPECTOR: J. Bauer

TOP OF CASING ELEVATION: ___

WELL DEPTH: ___

CASING STICK UP: ___

WATER LEVEL: ___

DATE STARTED: 04/30/86

COMPLETED: 04/30/86

TOP OF SCREEN: ___

BOTTOM OF SCREEN: ___

DRILLING METHOD: Hollow Stem Auger

COMPLETION AND DEVELOPMENT: ___

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2'					Medium gray silt, clay, sand, FILL. Strong coal tar odor.	
2-5'					Same as above.	
5-6'					Light brown very fine SAND. END OF BORING.	

BORING LOG

PROJECT NO. 3292-N61-21 PAGE __ OF __ BORING NO. B-2

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: NYSEG

DRILLER: R.F. Balcerzak

TRC INSPECTOR: J. Bauer

TOP OF CASING ELEVATION:

WELL DEPTH:

CASING STICK UP:

WATER LEVEL:

DATE STARTED: 04/30/86

COMPLETED: 04/30/86

TOP OF SCREEN:

BOTTOM OF SCREEN:

DRILLING METHOD: Hollow Stem Auger

COMPLETION AND DEVELOPMENT:

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2'			3		Dark gray FILL, oily slight petroleum order.	
2-5'					Medium brown very fine silty SAND, trace clay, saturated at 5'.	
5-7'			3		Reddish gray silty CLAY. END OF BORING.	

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. B 3

PROJECT: NYSEG-Geneva

CLIENT: New York State Electric & Gas

LOCATION: Geneva, NY

DRILLING CONTRACTOR: NYSEG

DRILLER: R.F. Balcerzak

TRC INSPECTOR: J. Bauer

TOP OF CASING ELEVATION:

WELL DEPTH:

CASING STICK UP:

WATER LEVEL:

DATE STARTED: 04/30/86

COMPLETED: 04/30/86

TOP OF SCREEN:

BOTTOM OF SCREEN:

DRILLING METHOD: Hollow Stem Auger

COMPLETION AND DEVELOPMENT:

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0 1'			3.8		Gray cinders, FILL, coarse gravel.	OVA reading is from composite sample.
1-5'					Medium brown, moist, very fine sandy SILT, trace clay, water table at 5.0'.	
5-7'					Med. gray, silty CLAY, dry. END OF BORING.	

BORING LOG

PROJECT NO. 3292-N61-21

PAGE ___ OF ___

BORING NO. B-4

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: ___

DATE STARTED: 04/30/86

CLIENT: New York State Electric & Gas

WELL DEPTH: ___

COMPLETED: 04/30/86

LOCATION: Geneva, NY

CASING STICK UP: ___

TOP OF SCREEN: ___

DRILLING CONTRACTOR: NYSEG

WATER LEVEL: ___

BOTTOM OF SCREEN: ___

DRILLER: R.F. Balcerzak

DRILLING METHOD: Hollow Stem Auger

TRC INSPECTOR: J. Bauer

COMPLETION AND DEVELOPMENT: ___

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2'			40		Black, fine to coarse coal cinders, FILL.	OVA reading is from composite sample.
2-2.5'					SAND & GRAVEL, saturated.	
2.5-6'			15		Gray, very fine SAND, trace silt. Coal tar odor.	
6-7'					Reddish gray silty CLAY, dry.	
					END OF BORING.	

BORING LOG

PROJECT NO. 3292-N61-21 PAGE ___ OF ___ BORING NO. B-5

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: ______ DATE STARTED: 04/30/86

CLIENT: New York State Electric & Gas

WELL DEPTH: ______ COMPLETED: 04/30/86

LOCATION: Geneva, NY

CASING STICK UP: ______ TOP OF SCREEN: ______

DRILLING CONTRACTOR: NYSEG

WATER LEVEL: ______ BOTTOM OF SCREEN: ______

DRILLER: R.F. Balcerzak

DRILLING METHOD: Hollow Stem Auger

TRC INSPECTOR: J. Bauer

COMPLETION AND DEVELOPMENT: ______

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2.5'			3		Black, fine-coarse, coal cinders, FILL.	OVA reading from composite sample.
2.5-3'					Brown, very fine sandy SILT.	
3-3.5'					Fine-coarse SAND & GRAVEL, water table.	
3.5-5'					Light brown silty CLAY, trace, very fine sand.	
					END OF BORING.	

BORING LOG

PROJECT NO. 3292-N61-21 PAGE ___ OF ___ BORING NO. B-6

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: ______ DATE STARTED: 04/30/86

CLIENT: New York State Electric & Gas

WELL DEPTH: ______ COMPLETED: 04/30/86

LOCATION: Geneva, NY

CASING STICK UP: ______ TOP OF SCREEN: ______

DRILLING CONTRACTOR: NYSEG

WATER LEVEL: ______ BOTTOM OF SCREEN: ______

DRILLER: R.F. Balcerzak

DRILLING METHOD: Hollow Stem Auger

TRC INSPECTOR: J. Bauer

COMPLETION AND DEVELOPMENT: ______

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2'			8		Coal cinders, black, fine-coarse, FILL.	OVA reading from composite sample.
2-5'					Light brown, very fine sandy SILT, trace clay, moist, perched water table at 3.0'. At 3.0', 4" layer of fine-coarse SAND and GRAVEL, wet.	
5-7'					Brown, very fine SAND.	
7-8'					Reddish-gray silty CLAY, dry.	

END OF BORING.

PROJECT NO. 3292-N61-21 PAGE ___ OF ___ BORING NO. B-7

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: ______

DATE STARTED: 04/30/86

CLIENT: New York State Electric & Gas

WELL DEPTH: ______

COMPLETED: 04/30/86

LOCATION: Geneva, NY

CASING STICK UP: ______

TOP OF SCREEN: ______

DRILLING CONTRACTOR: NYSEG

WATER LEVEL: ______

BOTTOM OF SCREEN: ______

DRILLER: R.F. Balcerzak

DRILLING METHOD: Hollow Stem Auger

TRC INSPECTOR: J. Bauer

COMPLETION AND DEVELOPMENT: ______

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2'			110		Black, fine to coarse coal cinders, FILL.	OVA reading from composite sample.
2-4'					Brown-gray silty CLAY, trace very fine sand.	
4-5'			25		Very fine to fine SAND, moderate coal tar odor, saturated.	
5-7'					Reddish-gray silty CLAY.	
					END OF BORING.	

BORING LOG

PROJECT NO. 3292 N61 21 PAGE ___ OF ___ BORING NO. B-8

PROJECT: NYSEG-Geneva

TOP OF CASING ELEVATION: ______

DATE STARTED: 04/30/86

CLIENT: New York State Electric & Gas

WELL DEPTH: ______

COMPLETED: 04/30/86

LOCATION: Geneva, NY

CASING STICK UP: ______

TOP OF SCREEN: ______

DRILLING CONTRACTOR: NYSEG

WATER LEVEL: ______

BOTTOM OF SCREEN: ______

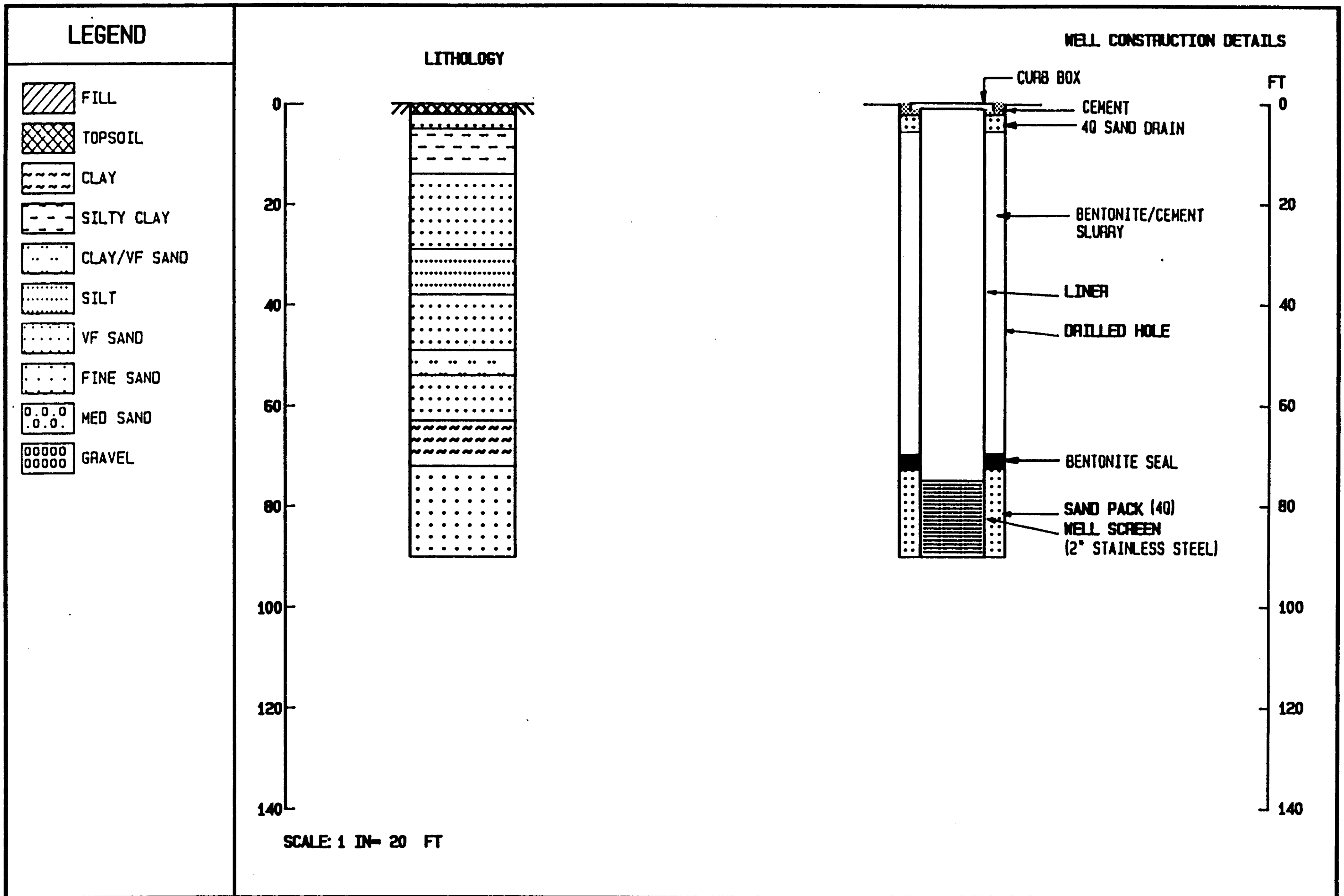
DRILLER: R.F. Balcerzak

DRILLING METHOD: Hollow Stem Auger

TRC INSPECTOR: ______

COMPLETION AND DEVELOPMENT: ______

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-3'			4		Black, fine to coarse coal cinders, FILL.	OVA reading from composite sample.
3-3.5'					Large sandy GRAVEL, saturated.	
3.5-5'					Light brown, fine to very fine SAND, wet. No odors.	
5-6'					Red-gray CLAY.	
					END OF BORING.	

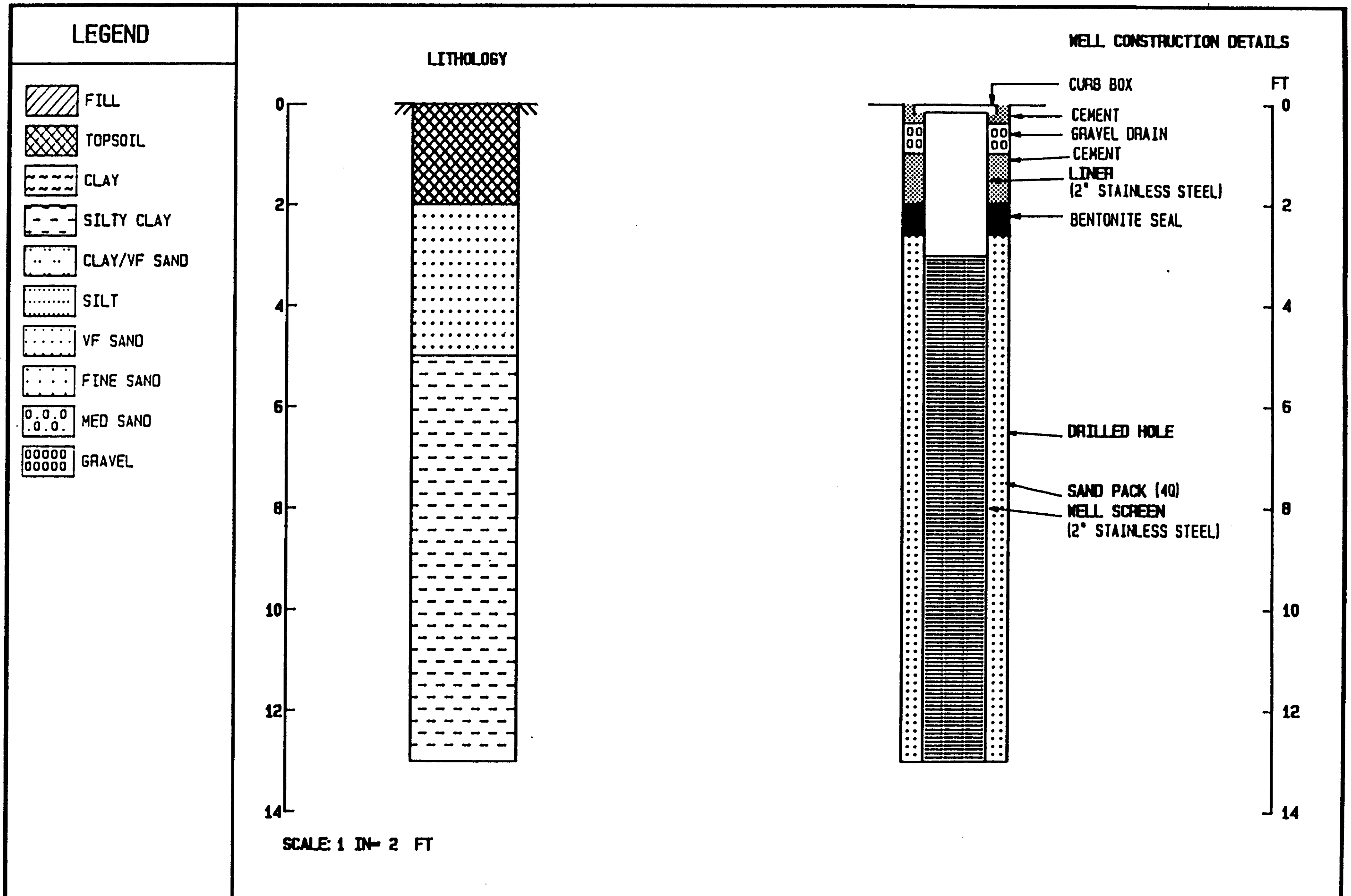


PROJECT: NYSEG - GENEVA
FILE: 3292-N61
LOCATION: GENEVA NY

MONITORING WELL MW-1D

TRC ENVIRONMENTAL CONSUL.

FIGURE: 8

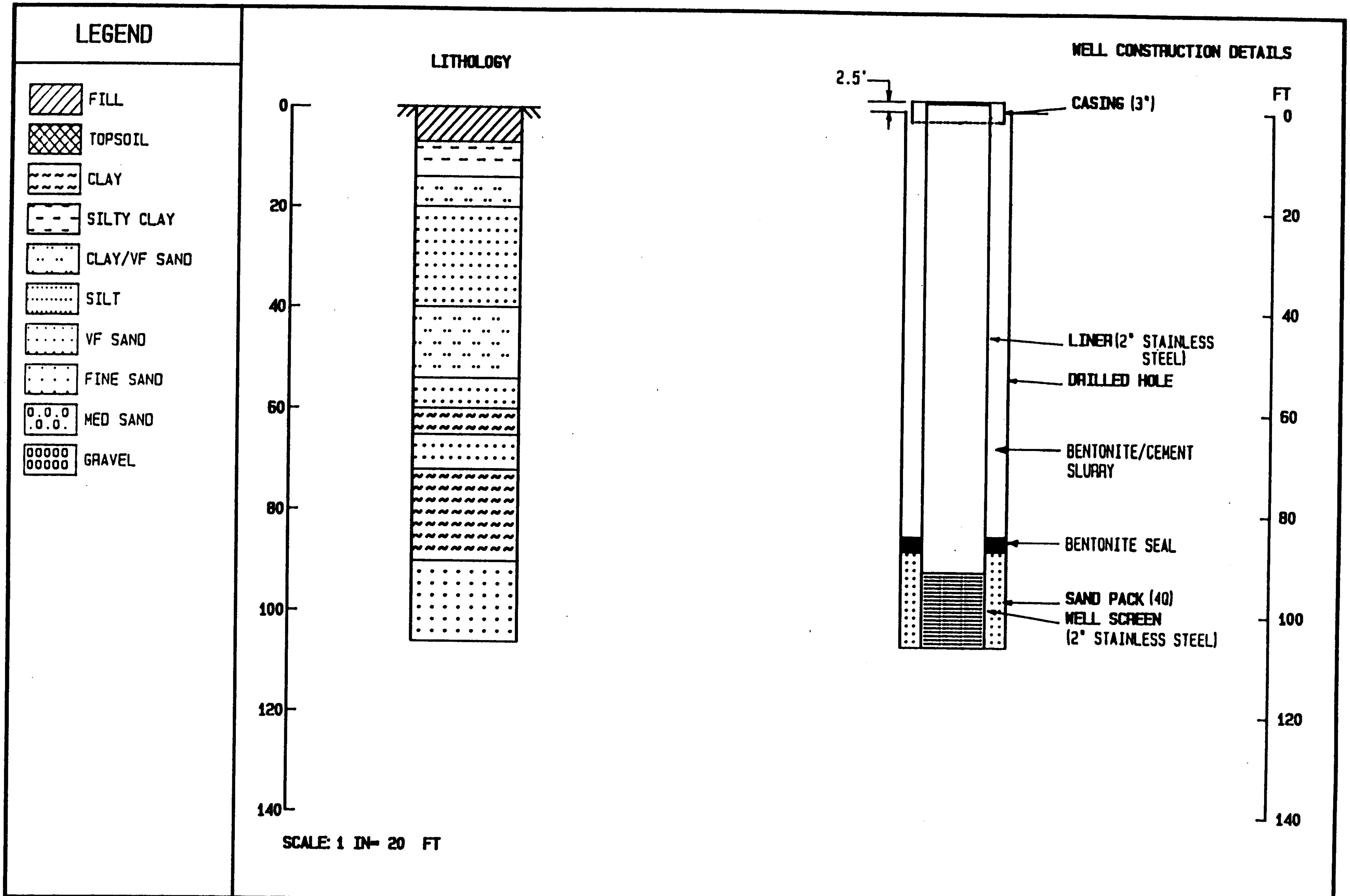


PROJECT: NYSEG - GENEVA
FILE: 3292-N61
LOCATION: GENEVA NY

MONITORING WELL MW-1S

TRC ENVIRONMENTAL CONSUL.

FIGURE: 9

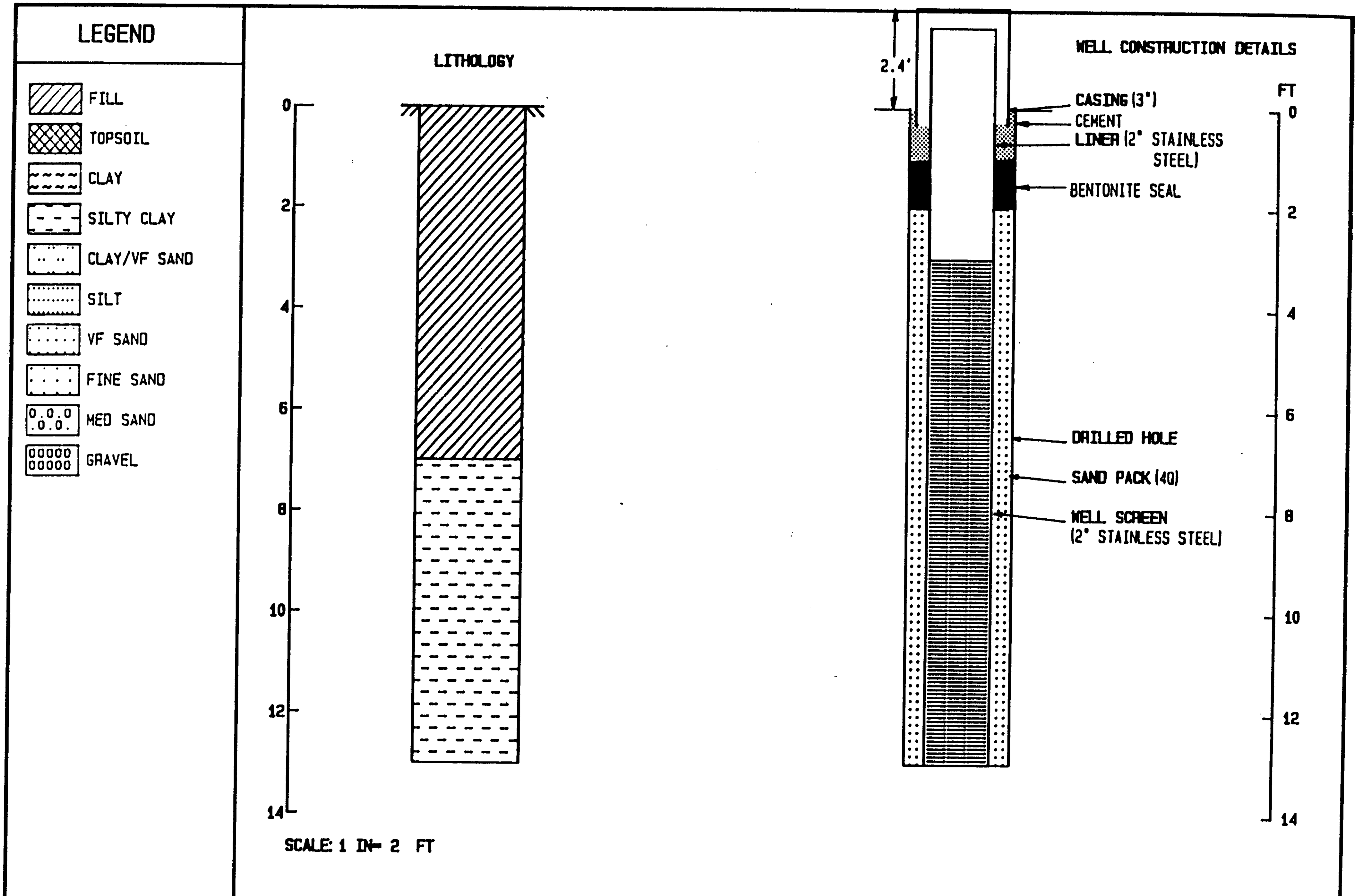


PROJECT: NYSEG - GENEVA
FILE: 3292-N61
LOCATION: GENEVA NY

MONITORING WELL MW-2D

TRC ENVIRONMENTAL CONSUL.

FIGURE: 10

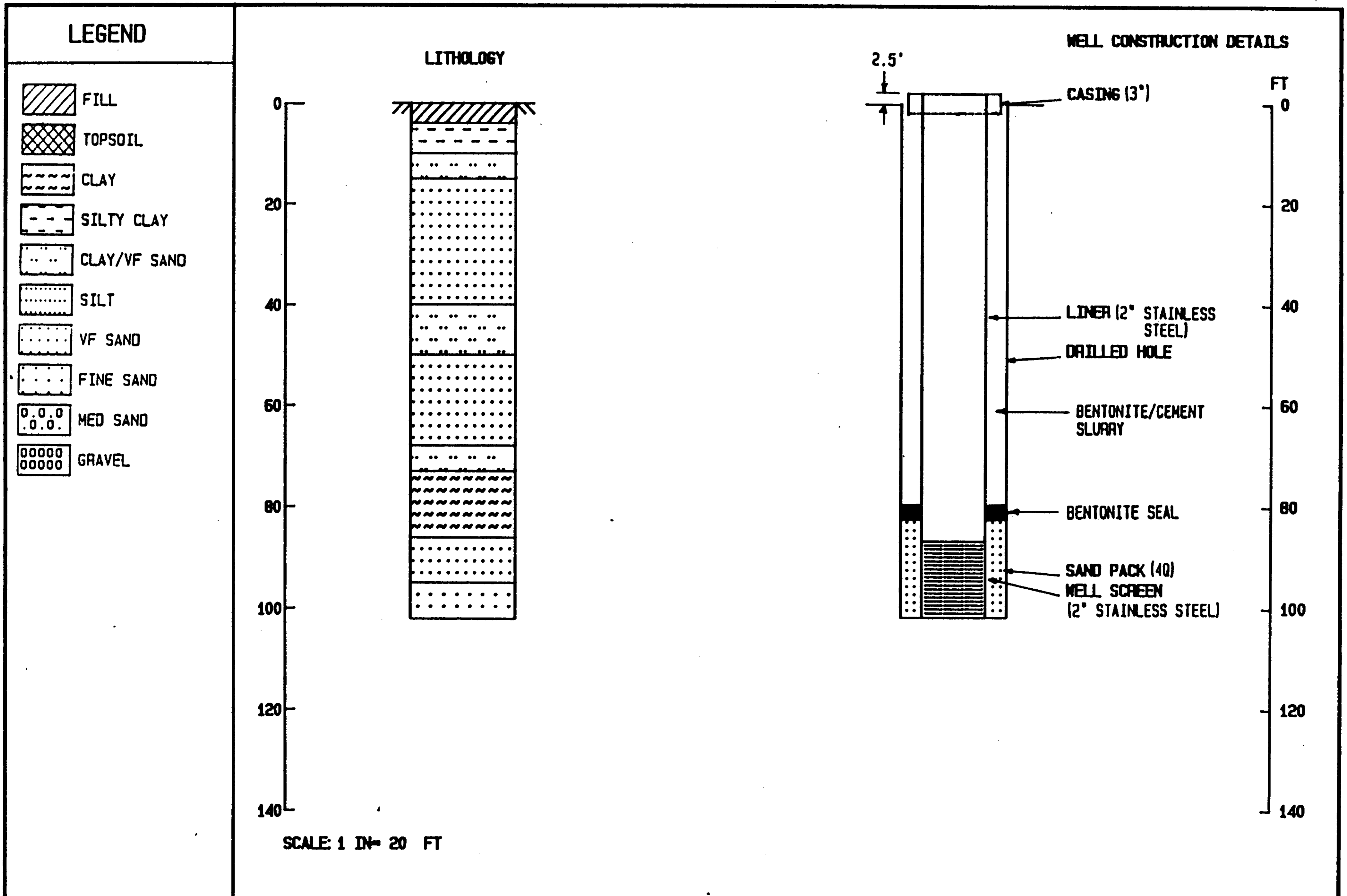


PROJECT: NYSEG - GENEVA
FILE: 3292-N61
LOCATION: GENEVA NY

MONITORING WELL MW-2S

TRC ENVIRONMENTAL CONSUL.

FIGURE: 11

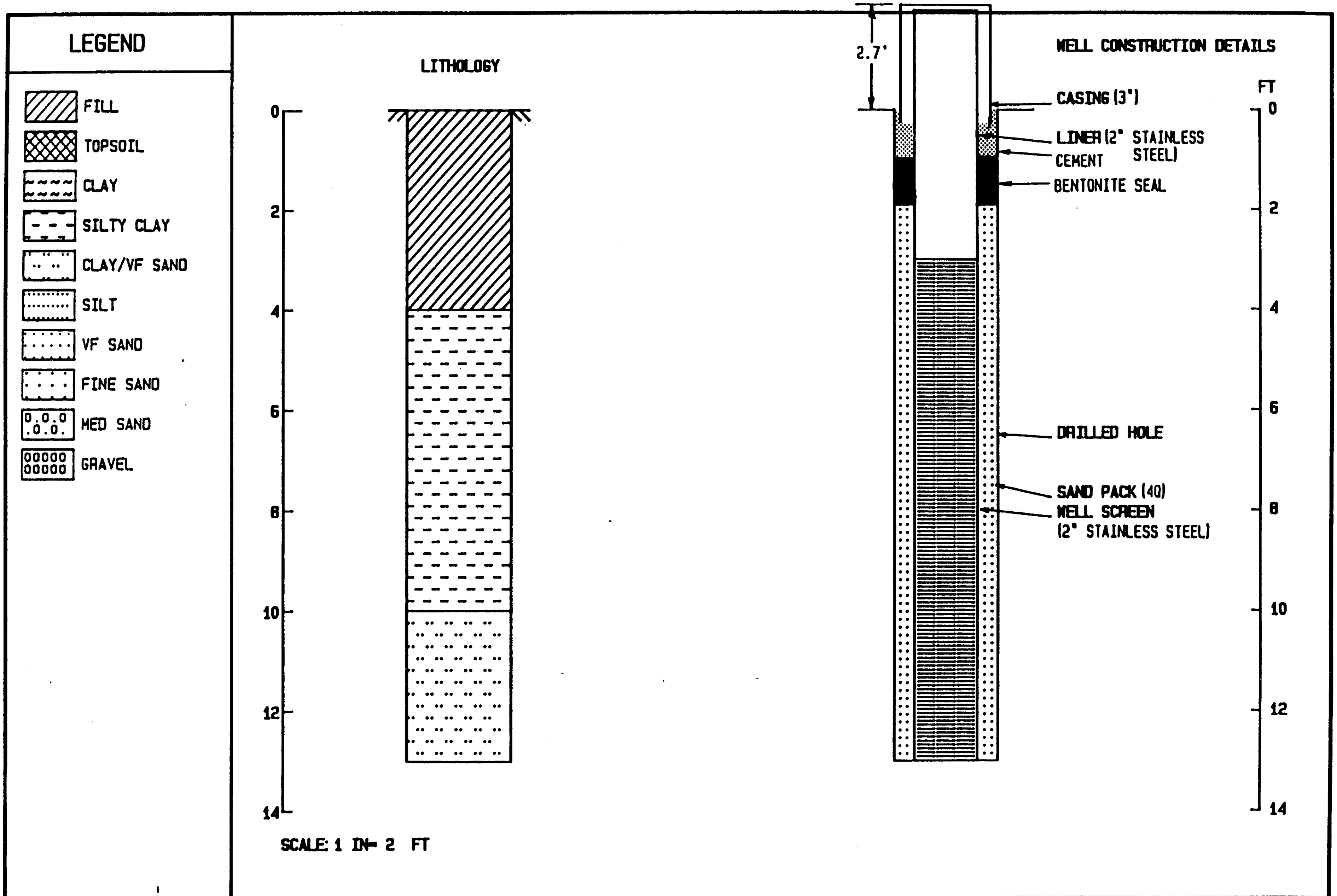


PROJECT: NYSEG - GENEVA
FILE: 3292-N61
LOCATION: GENEVA NY

MONITORING WELL MW-3D

TRC ENVIRONMENTAL CONSUL.

FIGURE: 12



PROJECT: NYSEG - GENEVA
FILE: 3292-N61
LOCATION: GENEVA NY

MONITORING WELL MW-3S

TRC ENVIRONMENTAL CONSUL.

FIGURE: 13

APPENDIX C

PERMEABILITY DATA AND CALCULATIONS

The equation used to calculate the permeabilities from a constant head test is that for a well point in uniform soil as given in Lambe and Whitman, 1969.

In this equation the horizontal ground permeability is calculated as follows:

$$K_h = \frac{q \bullet \ln\left[\frac{mL}{D} + \sqrt{1 + \left(\frac{mL}{D}\right)^2}\right]}{2 \bullet \pi \bullet L \bullet H_c}$$

Where:

D = Diameter of intake (screen)
L = Length of screened interval
H_c = Constant Head
q = Flow of Water
m = Transformation ratio

For all of the monitoring wells at the site, D, the diameter of the screen, is 5.08 cm (2 inches), and the transformation ratio, m, is 3.16. The constant head, H_c, and flow of water, q, of each well were determined during the constant head tests. These data, as well as the length of screen at each well, L, are presented in Table C-1.

Based on these data, the calculation of horizontal ground permeability at each monitoring well is as follows:

1. MW-1S:

$$K_h = \frac{q \bullet \ln\left[\frac{mL}{D} + \sqrt{1 + \left(\frac{mL}{D}\right)^2}\right]}{2 \bullet \pi \bullet L \bullet H_c}$$

$$K_h = \frac{164.1\ (\mathrm{cm^3/sec}) \bullet \ln\left[\frac{(3.16)(304.8\ \mathrm{cm})}{5.08\ \mathrm{cm}} + \sqrt{1 + \left(\frac{(3.16)(304.8\ \mathrm{cm})}{5.08\ \mathrm{cm}}\right)^2}\right]}{(2)(3.14)(304.8\ \mathrm{cm})(48.8\ \mathrm{cm})}$$

TABLE C-1

Monitoring Well	L(cm)	Hc(cm)	Injection Rate (cm^3/sec)
MW-1S	304.8	48.8	164.1
MW-1D	457.2	154.8	154.0
MW-2S	304.8	262.1	309.2
MW-2D	457.2	272.8	138.2
MW-3S	304.8	172.2	20.2
MW-3D	457.2	265.2	66.9

$$K_h = \frac{164.1\ cm^3/sec \bullet \ln 379.2}{93410.2\ cm^2}$$

$K_h = 1.04 \times 10^{-2}$ cm/sec

2. MW-1D:

$$K_h = \frac{153.95\ cm^3/sec \bullet \ln \left[\frac{(3.16)(457.2\ cm)}{5.08\ cm} + \sqrt{1 + \left(\frac{(3.16)(457.2\ cm)}{5.08\ cm} \right)^2} \right]}{(2)(3.14)(457.2\ cm)(154.8\ cm)}$$

$K_h = 2.19 \times 10^{-3}$ cm/sec

3. MW-2S:

$$K_h = \frac{309.2\ cm^2/sec \bullet \ln \left[\frac{(3.16)(304.8\ cm)}{5.08\ cm} + \sqrt{1 + \left(\frac{(3.16)(304.8\ cm)}{5.08\ cm} \right)^2} \right]}{(2)(3.14)(304.8\ cm)(262.1\ cm)}$$

$K_h = 3.66 \times 10^{-3}$ cm/sec

4. MW-2D:

$$K_h = \frac{138.2\ cm/sec \bullet \ln \left[\frac{(3.16)(457.2\ cm)}{5.08\ cm} + \sqrt{1 + \left(\frac{(3.16)(457.2\ cm)}{5.08\ cm} \right)^2} \right]}{(2)(3.14)(457.2\ cm)(272.8\ cm)}$$

$K_h = 1.12 \times 10^{-3}$ cm/sec

5. MW-3S:

$$K_h = \frac{20.2\ cm^3/sec \bullet \ln \left[\frac{(3.16)(304.8\ cm)}{5.08\ cm} + \sqrt{1 + \left(\frac{(3.16)(304.8\ cm)}{5.08\ cm} \right)^2} \right]}{(2)(3.14)(304.8\ cm)(172.2\ cm)}$$

$K_h = 3.64 \times 10^{-4}$ cm/sec

5. MW-3D:

$$K_h = \frac{66.9\ cm^3/sec \bullet \ln\left[\dfrac{(3.16)(457.2\ cm)}{5.08\ cm} + \sqrt{1 + \left(\dfrac{(3.16)(457.2\ cm)}{5.08\ cm}\right)^2}\right]}{(2)(3.14)(457.2\ cm)(265.2\ cm)}$$

$$K_h = 5.57 \times 10^{-4}\ cm/sec$$

APPENDIX D

LABORATORY RESULTS - SOIL SAMPLES

TABLE D-1

GENEVA SOIL SAMPLES
RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID / DATE / DEPTH IN FT / SAMPLE TYPE / DETECTION LIMIT	TP-1 1/16/86 2.0 GRAB	TP-2 1/20/86 1.0 GRAB	TP-3 1/16/86 1.0 GRAB	TP 4 1/20/86 3.0 GRAB	TP 5 1/21/86 5.0 GRAB	TP 6 1/17/86 4.0 GRAB	TP-7 1/17/86 4.0 GRAB	TP 8 1/17/86 3.0 GRAB	TP 9 1/21/86 4.0 GRAB	TP 11 1/20/86 5.0 GRAB	TP 12 1/13/86 3.5 GRAB
PURGEABLE AROMATICS													
BENZENE	UG/G DRY	0.06	328	6.25	ND	0.91	2.8	ND	0.1	11.5	1.6	ND	1.8
CHLOROBENZENE	UG/G DRY	0.1	0.74	ND	ND	ND	ND	ND	ND	ND	3.0	ND	ND
1,2 DICHLOROBENZENE	UG/G DRY	0.3	6.64	1.0	ND	ND	ND	ND	ND	22.1	2.8	ND	0.97
1,3 DICHLOROBENZENE	UG/G DRY	0.3	76.6	1.0	ND	ND	0.65	ND	ND	8.00	1.0	ND	ND
1,4 DICHLOROBENZENE	UG/G DRY	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	UG/G DRY	0.1	6.45	0.2	ND	ND	ND	ND	ND	1.6	3.1	ND	ND
TOLUENE	UG/G DRY	0.06	251	0.36	ND	0.2	ND	ND	0.08	1.9	2.3	ND	0.3
TOTAL	UG/G Dry		669.43	8.81	--	1.11	3.45	--	0.18	45.1	13.8	--	3.07

ND Not Detected

TABLE D-1 (CONT'D)

GENEVA SOIL SAMPLES
RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID DATE DEPTH IN FT SAMPLE TYPE DETECTION LIMIT	TP-13 1/16/86 5.0 GRAB	TP-14 1/20/86 5.0 GRAB	TP-15 1/21/86 5.0 GRAB	TP 16 1/13/86 1.3 GRAB	TP 17 1/20/86 4.0 GRAB	TP 18 1/20/86 5.0 GRAB	TP 19 1/13/86 0-3 COMP	TP-20 1/21/86 2.0 GRAB	TP 21 1/21/86 2.5 GRAB	TP 22 1/16/86 3.0 GRAB	TP 23 1/20/86 6.5 GRAB
PURGEABLE AROMATICS													
BENZENE	UG/G DRY	0.06	0.1	0.43	7.81	ND	0.2	0.3	ND	ND	0.4	0.2	0.50
CHLOROBENZENE	UG/G DRY	0.1	ND	ND	0.76	ND	ND	ND	ND	ND	ND	ND	ND
1,2 DICHLOROBENZENE	UG/G DRY	0.3	ND	ND	19.6	ND	ND	ND	ND	ND	ND	ND	ND
1,3 DICHLOROBENZENE	UG/G DRY	0.3	ND	ND	143	ND	ND	ND	ND	ND	ND	ND	ND
1,4 DICHLOROBENZENE	UG/G DRY	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	UG/G DRY	0.1	ND	0.4	23.1	ND	ND	ND	ND	ND	ND	ND	ND
TOLUENE	UG/G DRY	0.06	0.08	0.43	14.2	ND	0.08	ND	ND	ND	0.9	ND	0.2
TOTAL	UG/G Dry		0.18	1.26	208.47	--	0.28	0.3	--	--	1.3	0.2	0.70

ND - Not Detected

TABLE D-1 (CONT'D)

GENEVA SOIL SAMPLES
RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID DATE DEPTH IN FT SAMPLE TYPE DETECTION LIMIT	TP-24 1/21/86 4.0 GRAB	TP-25 1/15/86 4.0 GRAB	TP-26 1/14/86 3.0 GRAB	TP-27 1/15/86 3.5 GRAB	TP-28 1/17/86 2.0 GRAB	TP-29 1/15/86 3.5 GRAB	TP-30 1/15/86 2.5 GRAB	TP-31 1/14/86 4.0 GRAB	TP-32 1/13/86 6.0 GRAB	TP-33 1/13/86 6.0 GRAB	TP-34 1/15/86 2.0 GRAB
PURGEABLE AROMATICS													
BENZENE	UG/G DRY	0.07	0.39	0.92	ND	0.4	1.5	0.82	ND	0.8	0.4	ND	1.2
CHLOROBENZENE	UG/G DRY	0.2	ND	ND	ND	ND	0.2	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	UG/G DRY	0.5	ND	ND	ND	3.1	6.15	ND	ND	ND	ND	ND	1.8
1,3-DICHLOROBENZENE	UG/G DRY	0.5	ND	ND	ND	3.6	8.85	ND	ND	12.3	ND	ND	7.93
1,4-DICHLOROBENZENE	UG/G DRY	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	UG/G DRY	0.2	ND	ND	ND	0.78	1.4	ND	ND	0.7	ND	ND	0.44
TOLUENE	UG/G DRY	0.07	0.1	0.4	ND	0.4	1.7	0.7	ND	3.1	0.3	ND	1.5
TOTAL	UG/G Dry		0.49	1.32	--	8.28	19.8	1.52	--	16.9	0.7	--	12.87

ND = Not Detected

TABLE D-1 (CONT'D)

GENEVA SOIL SAMPLES
RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID DATE DEPTH IN FT SAMPLE TYPE DETECTION LIMIT	TP 35 1/14/86 7.5 8.0 GRAB	TP-36 1/14/86 6.0 GRAB	TP 37 1/14/86 5.5 6.0 GRAB	TP 38 1/13/86 1.5 GRAB	TP 39 1/16/86 8.0 GRAB	TP 40 1/15/86 8.0 GRAB	TP-41A 1/13/86 0.5 GRAB	TP 42 1/15/86 4.0 GRAB
PURGEABLE AROMATICS										
BENZENE	UG/G DRY	0.06	ND	64.2	57.0	ND	ND	ND	0.04	ND
CHLOROBENZENE	UG/G DRY	0.1	ND	ND	0.66	ND	ND	ND	ND	ND
1,2 DICHLOROBENZENE	UG/G DRY	0.3	ND	5.82	14.2	ND	ND	ND	2.2	ND
1,3-DICHLOROBENZENE	UG/G DRY	0.3	ND	35.6	75.4	ND	ND	ND	ND	ND
1,4 DICHLOROBENZENE	UG/G DRY	0.3	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	UG/G DRY	0.09	ND	2.5	5.93	ND	ND	ND	ND	ND
TOLUENE	UG/G DRY	0.06	ND	56.3	68.3	ND	ND	ND	0.1	ND
TOTAL	UG/G DRY		--	164.42	221.49		--	--	2.34	--

ND - Not Detected

TABLE D 2

GENEVA SOIL SAMPLES
RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE DEPTH IN FT SAMPLE TYPE DETECTION LIMIT	TP-1 1/16/86 2.0 GRAB	TP-2 1/20/86 1.0 GRAB	TP-3 1/16/86 1.0 GRAB	TP-4 1/20/86 3.0 GRAB	TP 5 1/21/86 5.0 GRAB	TP 6 1/17/86 4.0 GRAB	TP-7 1/17/86 4.0 GRAB	TP-8 1/17/86 3.0 GRAB	TP-9 1/21/86 4.0 GRAB	TP-11 1/20/86 5.0 GRAB	TP-12 1/13/86 3.5 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS													
ACENAPHTHENE	UG/G DRY	3	730	7	ND	ND	ND	ND	ND	2	ND<90	ND	ND
ACENAPHTHYLENE	UG/G DRY	3	7,930	30	ND	ND	ND	ND	ND	8	ND<90	ND	ND
ANTHRACENE	UG/G DRY	3	6,010	54	ND	ND	ND	ND	ND	ND	ND<90	ND	ND
BENZO (A) ANTHRACENE	UG/G DRY	2	4,600	67	4	10	ND	12	19	7	ND<90	9	21
BENZO (A) PYRENE	UG/G DRY	3	5,550	66	ND	15	ND	13	12	8	ND<90	9	28
BENZO (B) FLUORANTHENE BENZO (K) FLUORANTHENE*	UG/G DRY	2	6,480	91	8	18	ND	32	28	28	ND<90	21	37
BENZO (GHI) PERYLENE	UG/G DRY	3	2,100	34	ND	10	ND	9	9	ND	ND<90	7	21
CHRYSENE	UG/G DRY	3	1,900	28	ND	ND	ND	ND	ND	ND	ND<90	ND	ND
DIBENZO (A,H) ANTHRACENE	UG/G DRY	3	570	14	ND	ND	ND	ND	ND	ND	ND<90	ND	ND
FLUORANTHENE	UG/G DRY	2	13,400	152	8	22	ND	21	19	12	ND<90	21	61
FLUORENE	UG/G DRY	3	7,570	45	ND	ND	ND	ND	5	19	ND<90	ND	15
INDENO (1,2,3 CD) PYRENE	UG/G DRY	3	2,100	34	ND	7	ND	5	7	ND	ND<90	4	16
NAPHTHALENE	UG/G DRY	3	47,400	37	ND	ND	ND	ND	ND	84	ND<90	ND	ND
PHENANTHRENE	UG/G DRY	3	23,400	167	ND	15	ND	15	40	36	ND<90	12	46
PYRENE	UG/G DRY	2	9,230	120	5	16	ND	15	15	8	ND<90	12	40

*BENZO (B) FLUORANTHENE AND BENZO (K) FLUORANTHENE CO-ELUTED.

ND = Not Detected

ND< indicates that the detection limit was higher than that listed in the first column. Sample matrix interferences necessitated diluting the sample to perform the analysis, resulting in a higher detection limit.

TABLE D-2 (CONT'D)

GENEVA SOIL SAMPLES

RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID / DATE / DEPTH IN FT / SAMPLE TYPE DETECTION LIMIT	TP-13 1/16/86 5.0 GRAB	TP-14 1/20/86 5.0 GRAB	TP-15 1/21/86 5.0 GRAB	TP-16 1/13/86 1.3 GRAB	TP-17 1/20/86 4.0 GRAB	TP-18 1/20/86 5.0 GRAB	TP-19 1/13/86 0-3 COMP	TP-20 1/21/86 2.0 GRAB	TP-21 1/21/86 2.5 GRAB	TP-22 1/16/86 3.0 GRAB	TP-23 1/20/86 6.5 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS													
ACENAPHTHENE	UG/G DRY	3	235	39	ND<100	ND	ND	ND	ND	ND	ND	3	ND
ACENAPHTHYLENE	UG/G DRY	3	412	19	530	ND	ND	ND	ND	ND	ND	6	ND
ANTHRACENE	UG/G DRY	3	23	73	530	ND	ND	ND	ND	ND	ND	26	ND
BENZO (A) ANTHRACENE	UG/G DRY	3	21	96	790	10	25	24	7	ND	ND	44	ND
BENZO (A) PYRENE	UG/G DRY	3	23	110	300	8	32	10	9	ND	ND	53	ND
BENZO (B) FLUORANTHENE BENZO (K) FLUORANTHENE*	UG/G DRY	3	70	156	400	8	57	22	15	ND	ND	71	28
BENZO (GHI) PERYLENE	UG/G DRY	3	50	65	ND<100	ND	14	10	7	ND	ND	32	ND
CHRYSENE	UG/G DRY	3	ND	34	ND<100	7	ND	ND	ND	ND	ND	6	ND
DIBENZO (A,H) ANTHRACENE	UG/G DRY	3	52	22	ND<100	ND	ND	ND	3	ND	ND	ND	ND
FLUORANTHENE	UG/G DRY	3	50	252	690	ND	47	29	12	ND	ND	96	5
FLUORENE	UG/G DRY	3	44	52	1,500	ND	16	ND	ND	ND	ND	17	ND
INDENO (1,2,3-CD) PYRENE	UG/G DRY	3	25	63	300	3	13	7	7	ND	ND	32	28
NAPHTHALENE	UG/G DRY	3	231	ND	5,540	ND	ND	ND	ND	ND	ND	9	ND
PHENANTHRENE	UG/G DRY	3	25	192	1,200	ND	31	13	6	ND	ND	96	4
PYRENE	UG/G DRY	3	23	181	470	ND	32	18	10	ND	ND	68	4

*BENZO (B) FLUORANTHENE AND BENZO (K) FLUORANTHENE CO-ELUTED.

TABLE D-2 (CONT'D)

GENEVA SOIL SAMPLES

RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE DEPTH IN FT SAMPLE TYPE DETECTION LIMIT	TP-24 1/21/86 4.0 GRAB	TP-25 1/15/86 4.0 GRAB	TP-26 1/14/86 3.0 GRAB	TP-27 1/15/86 3.5 GRAB	TP-28 1/17/86 2.0 GRAB	TP-29 1/15/86 3.5 GRAB	TP-30 1/15/86 2.5 GRAB	TP-31 1/14/86 4.0 GRAB	TP-32 1/13/86 6.0 GRAB	TP-33 1/13/86 6.0 GRAB	TP-34 1/15/86 2.0 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS													
ACENAPHTHENE	UG/G DRY	6	ND	ND	ND	ND<20	30	ND	ND	ND	ND	ND	20
ACENAPHTHYLENE	UG/G DRY	6	ND	ND	11	ND<20	22	ND	ND	20	ND	10	98
ANTHRACENE	UG/G DRY	6	ND	ND	46	ND<20	44	ND	27	59	ND	17	220
BENZO (A) ANTHRACENE	UG/G DRY	2	ND	22	78	30	47	20	6	43	20	14	220
BENZO (A) PYRENE	UG/G DRY	5	ND	12	88	30	51	ND	5	38	30	18	220
BENZO (B) FLUORANTHENE BENZO (K) FLUORANTHENE*	UG/G DRY	2	ND	12	130	30	75	20	35	51	20	27	340
BENZO (GHI) PERYLENE	UG/G DRY	6	ND	ND	56	ND<20	22	ND	ND	20	ND	20	98
CHRYSENE	UG/G DRY	6	ND	ND	36	ND<20	10	ND	ND	20	ND	ND	91
DIBENZO (A,H) ANTHRACENE	UG/G DRY	6	ND	ND	28	ND<20	ND	ND	ND	20	ND	ND	ND<10
FLUORANTHENE	UG/G DRY	5	ND	ND	150	ND<20	84	ND	ND	120	30	46	520
FLUORENE	UG/G DRY	6	ND	ND	8	ND<20	35	ND	ND	46	ND	9	210
INDENO (1,2,3-CD) PYRENE	UG/G DRY	6	ND	ND	61	ND<20	21	ND	ND	27	ND	12	84
NAPHTHALENE	UG/G DRY	5	ND	ND	ND	30	32	ND	ND	94	6	5	320
PHENANTHRENE	UG/G DRY	6	ND	ND	12	ND<20	120	ND	ND	200	ND	68	722
PYRENE	UG/G DRY	6	ND	ND	100	ND<20	65	ND	ND	75	ND	34	340

*BENZO (B) FLUORANTHENE AND BENZO (K) FLUORANTHENE CO-ELUTED.

TABLE D-2 (CONT'D)

GENEVA SOIL SAMPLES

RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE DEPTH IN FT SAMPLE TYPE DETECTION LIMIT	TP-35 1/14/86 7.5-8.0 GRAB	TP-36 1/14/86 6.0 GRAB	TP-37 1/14/86 5.5-6.0 GRAB	TP-38 1/13/86 1.5 GRAB	TP-39 1/16/86 8.0 GRAB	TP-40 1/15/86 8.0 GRAB	TP-41A 1/13/86 0.5 GRAB	TP-42 1/15/86 4.0 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS										
ACENAPHTHENE	UG/G DRY	3	ND	36	590	ND	ND	ND	ND	ND
ACENAPHTHYLENE	UG/G DRY	3	ND	292	6,820	ND	ND	ND	20	ND
ANTHRACENE	UG/G DRY	3	ND	386	4,400	ND	ND	ND	44	ND
BENZO (A) ANTHRACENE	UG/G DRY	3	4	387	3,600	10	5	9	66	6
BENZO (A) PYRENE	UG/G DRY	3	3	390	3,600	9	ND	ND	78	27
BENZO (B) FLUORANTHENE BENZO (K) FLUORANTHENE*	UG/G DRY	2	20	530	4,300	8	8	ND	100	5
BENZO (GHI) PERYLENE	UG/G DRY	3	ND	207	1,200	ND	ND	ND	29	ND
CHRYSENE	UG/G DRY	3	ND	140	1,300	ND	ND	ND	ND	ND
DIBENZO (A,H) ANTHRACENE	UG/G DRY	3	ND	65	200	ND	ND	ND	3	ND
FLUORANTHENE	UG/G DRY	3	ND	923	10,900	8	ND	ND	150	ND
FLUORENE	UG/G DRY	3	ND	348	5,700	ND	ND	ND	22	ND
INDENO (1,2,3-CD) PYRENE	UG/G DRY	3	ND	211	1,200	ND	ND	ND	26	ND
NAPHTHALENE	UG/G DRY	3	ND	1,770	26,500	ND	ND	ND	4	ND
PHENANTHRENE	UG/G DRY	3	ND	1,310	16,000	ND	ND	ND	130	ND
PYRENE	UG/G DRY	3	ND	659	6,070	6	ND	ND	100	ND

*BENZO (B) FLUORANTHENE AND BENZO (K) FLUORANTHENE CO-ELUTED.

TABLE D-3

GENEVA SOIL SAMPLES

RESULTS FOR NON-CHLORINATED PHENOLS

	UNITS	SAMPLE ID DATE DEPTH IN FT SAMPLE TYPE DETECTION LIMIT	TP-1 1/16/86 2.0 GRAB	TP-2 1/20/86 1.0 GRAB	TP-3 1/16/86 1.0 GRAB	TP-4 1/20/86 3.0 GRAB	TP-5 1/21/86 5.0 GRAB	TP-6 1/17/86 4.0 GRAB	TP-7 1/17/86 4.0 GRAB	TP-8 1/17/86 3.0 GRAB	TP-9 1/21/86 4.0 GRAB	TP-11 1/20/86 5.0 GRAB	TP-12 1/13/86 3.5 GRAB
NON-CHLORINATED PHENOLS													
2,4-DIMETHYPHENOL	UG/G DRY	~~1~~ 0.8	~~700~~ 570	~~ND<8~~ ND<6	ND	ND	ND	~~ND<9~~ ND<7	~~ND<8~~ ND<6	~~3~~ 2	~~ND<80~~ ND<50	ND	ND
2,4-DINITROPHENOL	UG/G DRY	120	4,200	ND<520	ND	ND	ND	ND<550	ND<520	ND	ND<3,800	ND	ND
2-METHYL-4,6-DINITROPHENOL	UG/G DRY	44	2,400	ND<190	ND	ND	ND	ND<210	ND<520 ND<200	ND	ND<1,400	ND	ND
2-NITROPHENOL	UG/G DRY	~~3~~ 1	~~300~~ 100	~~ND<20~~ ND<6	ND	ND	ND	~~ND<20~~ ND<7	~~ND<20~~ ND<6	~~6~~ ND<2	~~ND<140~~ ND<50	ND	ND
4-NITROPHENOL	UG/G DRY	~~2~~ 1	~~980~~ 500	~~ND<10~~ ND<20	ND	ND	ND	~~ND<10~~ ND<7	~~ND<10~~ ND<6	~~10~~ 5	~~ND<100~~ ND<50	ND	ND
PHENOL PHENOL	UG/G DRY UG/G DRY	~~1~~ 0.8	~~ND<70~~ ND<50	~~ND<8~~ ND<6	ND	ND	ND	~~ND<9~~ ND<7	~~ND<8~~ ND<6	~~4~~ 3	~~ND<80~~ ND<50	ND	ND

ND = Not Detected

ND< Indicates that the detection limit was higher than that listed in the first column. Sample matrix interferences necessitated diluting the sample in order to perform the analysis. This resulted in a higher dection limit.

TABLE D-3 (CONT'D)

GENEVA SOIL SAMPLES

RESULTS FOR NON-CHLORINATED PHENOLS

	UNITS	SAMPLE ID DATE DEPTH IN FT SAMPLE TYPE DETECTION LIMIT	TP-13 1/16/86 5.0 GRAB	TP 14 1/20/86 5.0 GRAB	TP-15 1/21/86 5.0 GRAB	TP 16 1/13/86 1.3 GRAB	TP 17 1/20/86 4.0 GRAB	TP 18 1/20/86 5.0 GRAB	TP 19 1/13/86 0-3 COMP	TP-20 1/21/86 2.0 GRAB	TP 21 1/21/86 2.5 GRAB	TP 22 1/16/86 3.0 GRAB	TP-23 1/20/86 6.5 GRAB
NON CHLORINATED PHENOLS													
2,4 DIMETHYPHENOL	UG/G DRY	~~1~~ 0.8	ND	~~ND<9~~ ND<7	~~840~~ 400	ND	~~ND<8~~ ND<6	ND	ND	ND	ND	~~ND<9~~ ND<7	ND
2,4-DINITROPHENOL	UG/G DRY	120	ND	ND<570	ND<4,100	ND	ND<520	ND	ND	ND	ND	ND<600	ND
2-METHYL-4,6-DINITROPHENOL	UG/G DRY	44	ND	460	ND<1,520	ND	ND<200	ND	ND	ND	ND	ND<220	ND
2 NITROPHENOL	UG/G DRY	~~3~~ 1	ND	~~ND<21~~ ND<7	~~700~~ 250	ND	~~ND<18~~ ND<6	ND	ND	ND	ND	~~ND<21~~ ND<7	ND
4 NITROPHENOL	UG/G DRY	2 1	ND	~~ND<10~~ ND<7	210 100	ND	ND<10 ND<6	ND	ND	ND	ND	~~ND<10~~ ND<7	ND
PHENOL	UG/G DRY	~~1~~ 0.8	ND	~~ND<9~~ ND<7	~~330~~ 250	ND	~~ND<6~~ ND<8	ND	ND	ND	ND	~~ND<7~~ ND<9	ND

ND = Not Detected

TABLE D-3 (CONT'D)

GENEVA SOIL SAMPLES

RESULTS FOR NON-CHLORINATED PHENOLS

	UNITS	SAMPLE ID / DATE / DEPTH IN FT / SAMPLE TYPE / DETECTION LIMIT	TP-24 1/21/86 4.0 GRAB	TP-25 1/15/86 4.0 GRAB	TP-26 1/14/86 3.0 GRAB	TP-27 1/15/86 3.5 GRAB	TP-28 1/17/86 2.0 GRAB	TP-29 1/15/86 3.5 GRAB	TP-30 1/15/86 2.5 GRAB	TP-31 1/14/86 4.0 GRAB	TP-32 1/13/86 6.0 GRAB	TP-33 1/13/86 6.0 GRAB	TP-34 1/15/86 2.0 GRAB
NON-CHLORINATED PHENOLS													
2,4-DIMETHYPHENOL	UG/G DRY	~~12~~ 9	ND	ND	ND	ND	ND	~~ND<20~~ ND<13	ND	ND	~~ND<20~~ ND<15	ND	ND
2,4-DINITROPHENOL	UG/G DRY	130	ND	ND<740	ND	ND<650	ND<580	ND<1,070	ND	ND<230	ND<1,200	ND	ND<560
2-METHYL-4,6-DINITROPHENOL	UG/G DRY	86	ND	ND<280	ND	ND<240	ND<220	ND<400	ND	ND	ND<450	95	720
2-NITROPHENOL	UG/G DRY	~~20~~ 7	ND	ND<30	ND	ND	ND	ND<40	ND	ND	ND<50	ND	ND
4-NITROPHENOL	UG/G DRY	~~20~~ 10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	~~30~~ ND
PHENOL	UG/G DRY	~~12~~ 9	ND	ND	ND	ND	ND	~~ND<20~~ ND<13	ND	ND	~~ND<20~~ ND<15	ND	ND

TABLE D-3 (CONT'D)

GENEVA SOIL SAMPLES

RESULTS FOR NON-CHLORINATED PHENOLS

	UNITS	SAMPLE ID / DATE / DEPTH IN FT / SAMPLE TYPE / DETECTION LIMIT	TP-35 1/14/86 7.5-8.0 GRAB	TP-36 1/14/86 6.0 GRAB	TP-37 1/14/86 5.5-6.0 GRAB	TP-38 1/13/86 1.5 GRAB	TP-39 1/16/86 8.0 GRAB	TP-40 1/15/86 8.0 GRAB	TP-41A 1/13/86 0.5 GRAB	TP-42 1/15/86 4.0 GRAB
NON CHLORINATED PHENOLS										
2,4 DIMETHYPHENOL	UG/G DRY	~~1~~ 0.8	ND	~~4~~ 3	~~3,040~~ 2,280	ND	ND	ND	ND	ND
2,4 DINITROPHENOL	UG/G DRY	130	ND	ND	4,460	ND	ND	ND	185	ND
2 METHYL 4,6 DINITROPHENOL	UG/G DRY	41	ND	~~210~~ 309	57,000	ND	ND	ND	300	ND
2 NITROPHENOL	UG/G DRY	~~3~~ 1	ND	~~ND<6~~ ND	~~ND<150~~ ND<50	ND	ND	ND	ND	ND
4 NITROPHENOL	UG/G DRY	~~2~~ 1	ND	~~10~~ 5	~~1,900~~ 900	ND	ND	ND	~~10~~ 5	ND
PHENOL	UG/G DRY	~~1~~ 0.8	ND	~~4~~ 3	~~4,030~~ 3,020	ND	ND	ND	ND	ND

TABLE D-4

GENEVA SOIL SAMPLES

RESULTS FOR INORGANIC COMPOUNDS

	UNITS	SAMPLE ID / DATE / DEPTH IN FT / SAMPLE TYPE / DETECTION LIMIT	TP-1 1/16/86 2.0 GRAB	TP-2 1/20/86 1.0 GRAB	TP-3 1/16/86 1.0 GRAB	TP-4 1/20/86 3.0 GRAB	TP-5 1/21/86 5.0 GRAB	TP-6 1/17/86 4.0 GRAB	TP-7 1/17/86 4.0 GRAB	TP-8 1/17/86 3.0 GRAB	TP-9 1/21/86 4.0 GRAB	TP-11 1/20/86 5.0 GRAB	TP-12 1/13/86 3.5 GRAB
INORGANIC COMPOUNDS													
IRON, TOTAL	UG/G DRY	20	13,900	18,400	18,300	96,300	17,700	52,000	35,900	19,600	14,400	17,000	111,000
ZINC, TOTAL	UG/G DRY	3	339	64.9	142	173	49.1	402	145	68.9	195	75.6	48.1
SULFATE (LEACHATE)	MG/L	1.0	16.5	15.4	4.51	32.2	6.76	50.8	91.0	5.21	14.5	4.06	27.9
ORGANIC NITROGEN	UG/G DRY	100	3,600	ND	3,000	2,100	920	3,400	1,700	2,100	4,200	930	6,900
CYANIDE, TOTAL	UG/G DRY	0.1	190	160	1.4	490	69	450	120	0.7	140	5.4	490
CYANIDE, FERRO-FERRIC AS CN	UG/G DRY	0.1	69	140	ND	480	54	410	120	ND	130	3.6	480

ND = Not Detected

TABLE D-4 (CON'T)

GENEVA SOIL SAMPLES

RESULTS FOR INORGANIC COMPOUNDS

	UNITS	SAMPLE ID / DATE / DEPTH IN FT / SAMPLE TYPE / DETECTION LIMIT	TP-13 1/16/86 5.0 GRAB	TP-14 1/20/86 5.0 GRAB	TP-15 1/21/86 5.0 GRAB	TP-16 1/13/86 1.3 GRAB	TP-17 1/20/86 4.0 GRAB	TP-18 1/20/86 5.0 GRAB	TP-19 1/13/86 0-3 COMP	TP-20 1/21/86 2.0 GRAB	TP-21 1/21/86 2.5 GRAB	TP-22 1/16/86 3.0 GRAB	TP-23 1/20/86 6.5 GRAB
INORGANIC COMPOUNDS													
IRON, TOTAL	UG/G DRY	20	21,400	14,900	12,200	16,100	20,000	51,100	16,300	11,500	8,900	22,700	37,500
ZINC, TOTAL	UG/G DRY	3	167	289	73.6	63.5	284	207	28.3	157	58.4	155	48.3
SULFATE (LEACHATE)	MG/L	1.0	21.2	22.6	2.28	9.78	12.6	4.12	14.6	3.03	10.5	11.5	172
ORGANIC NITROGEN	UG/G DRY	100	3,400	3,400	3,600	4,000	1,800	6,100	300	320	1,000	4,000	2,200
CYANIDE, TOTAL	UG/G DRY	0.1	44	160	700	1.6	12	48.6	8.9	4.1	26	30	72
CYANIDE, FERRO-FERRIC AS CN	UG/G DRY	0.1	39	150	680	0.8	11	40	7.0	2.9	25	27	63

TABLE D-4 (CON'T)

GENEVA SOIL SAMPLES

RESULTS FOR INORGANIC COMPOUNDS

	UNITS	SAMPLE ID / DATE / DEPTH IN FT / SAMPLE TYPE / DETECTION LIMIT	TP-24 1/21/86 4.0 GRAB	TP-25 1/15/86 4.0 GRAB	TP-26 1/14/86 3.0 GRAB	TP-27 1/15/86 3.5 GRAB	TP-28 1/17/86 2.0 GRAB	TP-29 1/15/86 3.5 GRAB	TP-30 1/15/86 2.5 GRAB	TP-31 1/14/86 4.0 GRAB	TP-32 1/13/86 6.0 GRAB	TP-33 1/13/86 6.0 GRAB	TP 34 1/15/86 2.0 GRAB
INORGANIC COMPOUNDS													
IRON, TOTAL	UG/G DRY	20	24,000	15,300	25,200	119,000	41,700	26,300	40,000	11,000	19,900	123,000	77,000
ZINC, TOTAL	UG/G DRY	3	89.0	40.5	266	32.6	298	4.4	24.3	133	63.5	359	14.2
SULFATE (LEACHATE)	MG/L	1.0	6.70	1,470	18.5	205	1,510	255	38.6	206	398	1,020	224
ORGANIC NITROGEN	UG/G DRY	100	1,800	7,200	5,800	5,700	5,900	9,300	550	7,500	780	2,800	5,000
CYANIDE, TOTAL	UG/G DRY	0.1	36	10,000	130	8,100	2,300	13,000	19	34,000	13,000	220	2,800
CYANIDE, FERRO-FERRIC AS CN	UG/G DRY	0.1	36	8,900	110	7,600	1,700	13,000	18	32,000	10,000	210	2,600

TABLE D-4 (CONT'D)

GENEVA SOIL SAMPLES

RESULTS FOR INORGANIC COMPOUNDS

	UNITS	SAMPLE ID DATE DEPTH IN FT SAMPLE TYPE DETECTION LIMITS	TP-35 1/14/86 7.5-8.0 GRAB	TP-36 1/14/86 6.0 GRAB	TP-37 1/14/86 5.5-6.0 GRAB	TP-38 1/13/86 1.5 GRAB	TP-39 1/16/86 8.0 GRAB	TP-40 1/15/86 8.0 GRAB	TP-41A 1/13/86 0.5 GRAB	TP-42 1/15/86 4.0 GRAB
INORGANIC COMPOUNDS										
IRON, TOTAL	UG/G DRY	20	21,200	9,600	15,300	22,000	26,000	25,100	20,900	20,900
ZINC, TOTAL	UG/G DRY	3	61.2	140	476	24.2	84.6	37.6	168	10.8
SULFATE (LEACHATE)	MG/L	1.0	182	281	614	3.17	4.99	118	63.4	8.77
ORGANIC NITROGEN	UG/G DRY	100	1,000	6,900	11,000	4,200	320	460	2,300	2,800
CYANIDE, TOTAL	UG/G DRY	0.1	7.5	2,500	1,770	16	5.7	0.5	230	6.8
CYANIDE, FERRO-FERRIC AS CN	UG/G DRY	0.1	6.8	1,500	1,800	14	5.7	0.4	210	6.4

TABLE D-5

GENEVA SOIL SAMPLES

RESULTS FROM COMPUCHEM

CONSTITUENT	UNITS	TP-4 DETECTION LIMITS	SAMPLE ID TP-4 DATE 1/20/86 DEPTH IN FEET 4-5 SAMPLE TYPE GRAB	TP-36* DETECTION LIMITS	SAMPLE ID TP-36 DATE 1/14/86 DEPTH IN FEET 6-7 SAMPLE TYPE GRAB
ORGANIC COMPOUNDS					
ACID EXTRACTABLES					
PHENOL	UG/G	0.330	0.960	33.0	230.0
2-CHLOROPHENOL	UG/G	0.330	ND	33.0	ND
2-NITROPHENOL	UG/G	0.330	ND	33.0	ND
2,4-DIMETHYLPHENOL	UG/G	0.330	ND	33.0	61.0
2,4-DICHLOROPHENOL	UG/G	0.330	ND	33.0	ND
P-CHLORO-M-CRESOL	UG/G	0.330	ND	33.0	ND
2,4,6-TRICHLOROPHENOL	UG/G	0.330	ND	33.0	ND
2,4-DINITROPHENOL	UG/G	1.60	ND	160.0	ND
4-NITROPHENOL	UG/G	1.60	ND	160.0	ND
4,6-DINITRO-O-CRESOL	UG/G	1.60	ND	160.0	ND
PENTACHLOROPHENOL	UG/G	1.60	ND	160.0	ND

* The acid extractable fraction of this sample was diluted by a factor of 100 to prevent detector saturation. This dilution resulted in elevated detection limits.

ND = Not Detected

TABLE D-5 (Cont.)

GENEVA SOIL SAMPLES

RESULTS FROM COMPUCHEM

CONSTITUENT	SAMPLE ID DATE DEPTH IN FEET SAMPLE TYPE UNITS	TP-4 DETECTION LIMITS	TP-4 1/20/86 4 5 GRAB	TP-36 DETECTION LIMITS	TP-36 1/14/86 6-7 GRAB
ORGANIC COMPOUNDS					
BASE NEUTRALS					
N-NITROSODIMETHYLAMINE	UG/G	1.60	ND	660.0	ND
BIS (2-CHLOROETHYL) ETHER	UG/G	1.60	ND	660.0	ND
1,3-DICHLOROBENZENE	UG/G	1.60	ND	660.0	ND
1,4-DICHLOROBENZENE	UG/G	1.60	ND	660.0	ND
1,2-DICHLOROBENZENE	UG/G	1.60	ND	660.0	ND
BIS (2-CHLOROISOPROPYL) ETHER	UG/G	1.60	ND	660.0	ND
HEXACHLOROETHANE	UG/G	1.60	ND	660.0	ND
N-NITROSODI-N-PROPYLAMINE	UG/G	1.60	ND	660.0	ND
NITROBENZENE	UG/G	1.60	ND	660.0	ND
ISOPHORONE	UG/G	1.60	ND	660.0	ND
BIS (2-CHLOROETHOXY) METHANE	UG/G	1.60	ND	660.0	ND
1,2,4-TRICHLOROBENZENE	UG/G	1.60	ND	660.0	ND
NAPHTHALENE	UG/G	1.60	25.0	660.0	13,000
HEXACHLOROBUTADIENE	UG/G	1.60	ND	660.0	ND
HEXACHLOROCYCLOPENTADIENE	UG/G	1.60	ND	660.0	ND
2-CHLORONAPHTHALENE	UG/G	1.60	ND	660.0	ND

TABLE D-5 (Cont.)

GENEVA SOIL SAMPLES

RESULTS FROM COMPUCHEM

CONSTITUENT	SAMPLE ID DATE DEPTH IN FEET SAMPLE TYPE UNITS	TP-4 DETECTION LIMITS	TP-4 1/20/86 4-5 GRAB	TP-36 DETECTION LIMITS	TP-36 1/14/86 6-7 GRAB
ORGANIC COMPOUNDS					
BASE NEUTRALS (Cont.)					
DIMETHYLPHTHALATE	UG/G	1.60	ND	660.0	ND
ACENAPHTHYLENE	UG/G	1.60	ND	660.0	3,500
2,6-DINITROTOLUENE	UG/G	1.60	ND	660.0	ND
ACENAPHTHENE	UG/G	1.60	ND	660.0	ND
2,4-DINITROTOLUENE	UG/G	1.60	ND	660.0	ND
DIETHYLPHTHALATE	UG/G	1.60	ND	660.0	ND
FLUORENE	UG/G	1.60	ND	660.0	3,500
4-CHLOROPHENYL PHENYL ETHER	UG/G	1.60	ND	660.0	ND
DIPHENYLAMINE (N-NITROSO)	UG/G	1.60	ND	660.0	ND
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	UG/G	1.60	ND	660.0	ND
4-BROMOPHENYL PHENYL ETHER	UG/G	1.60	ND	660.0	ND
HEXACHLOROBENZENE	UG/G	1.60	ND	660.0	ND
PHENANTHRENE	UG/G	1.60	ND	660.0	11,000
ANTHRACENE	UG/G	1.60	ND	660.0	3,900
DI-N-BUTYLPHTHALATE	UG/G	1.60	ND	660.0	ND
FLUORANTHENE	UG/G	1.60	ND	660.0	7,200
BENZIDINE	UG/G	8.00	ND	3200.0	ND

TABLE D-5 (Cont.)

GENEVA SOIL SAMPLES

RESULTS FROM COMPUCHEM

CONSTITUENT	SAMPLE ID DATE DEPTH IN FEET SAMPLE TYPE UNITS	TP-4 DETECTION LIMITS	TP-4 1/20/86 4-5 GRAB	TP-36 DETECTION LIMITS	TP-36 1/14/86 6-7 GRAB
BASE NEUTRALS (Cont.)					
PYRENE	UG/G	1.60	ND	660.0	4,500
BUTYLBENZYLPHTHALATE	UG/G	1.60	ND	660.0	ND
BENZO(A)ANTHRACENE	UG/G	1.60	ND	660.0	2,900
3,3'-DICHLOROBENZIDINE	UG/G	3.30	ND	1300.0	ND
CHRYSENE	UG/G	1.60	ND	660.0	2,300
BIS(2-ETHYLHEXYL)PHTHALATE	UG/G	1.60	ND	660.0	ND
DI-N-OCTYLPHTHALATE	UG/G	1.60	ND	660.0	ND
BENZO(B)FLUORANTHENE	UG/G	1.60	ND	660.0	3,300
BENZO(K)FLUORANTHENE	UG/G	1.60	ND	660.0	3,300
BENZO(A)PYRENE	UG/G	1.60	ND	660.0	2,200
INDENO(1,2,3-C,D)PYRENE	UG/G	1.60	ND	660.0	1,000
DIBENZO(A,H)ANTHRACENE	UG/G	1.60	ND	660.0	ND
BENZO(G,H,I)PERYLENE	UG/G	1.60	ND	660.0	1000

TABLE D-5 (Cont.)

GENEVA SOIL SAMPLES

RESULTS FROM COMPUCHEM

CONSTITUENT	SAMPLE ID DATE DEPTH IN FEET SAMPLE TYPE UNITS	TP-4 DETECTION LIMITS	TP-4 1/20/86 4-5 GRAB	TP-36 DETECTION LIMITS	TP-36 1/14/86 6-7 GRAB
ORGANIC COMPOUNDS (CONT.) VOLATILE ORGANICS					
CHLOROMETHANE	UG/G	0.100	ND	0.020	ND
VINYL CHLORIDE	UG/G	0.100	ND	0.020	ND
CHLOROETHANE	UG/G	0.100	ND	0.020	ND
BROMOMETHANE	UG/G	0.100	ND	0.020	ND
ACROLEIN	UG/G	1.00	ND	0.200	ND
ACRYLONITRILE	UG/G	1.00	ND	0.200	ND
METHYLENE CHLORIDE	UG/G	0.100	0.880	0.020	0.034
TRICHLOROFLUOROMETHANE	UG/G	0.100	ND	0.020	ND
1,1-DICHLOROETHYLENE	UG/G	0.100	ND	0.020	ND
1,1-DICHLOROETHANE	UG/G	0.100	ND	0.020	ND
TRANS-1,2-DICHLOROETHYLENE	UG/G	0.100	ND	0.020	ND
CHLOROFORM	UG/G	0.100	ND	0.020	ND
1,2-DICHLOROETHANE	UG/G	0.100	ND	0.020	ND
1,1,1-TRICHLOROETHANE	UG/G	0.100	ND	0.020	ND
CARBON TETRACHLORIDE	UG/G	0.100	ND	0.020	ND
BROMODICHLOROMETHANE	UG/G	0.100	ND	0.020	ND
1,2-DICHLOROPROPANE	UG/G	0.100	ND	0.020	ND
TRANS-1,3-DICHLOROPROPENE	UG/G	0.100	ND	0.020	ND

TABLE D-5 (Cont.)

GENEVA SOIL SAMPLES

RESULTS FROM COMPUCHEM

CONSTITUENT	SAMPLE ID DATE DEPTH IN FEET SAMPLE TYPE UNITS	TP-4 DETECTION LIMITS	TP-4 1/20/86 4-5 GRAB	TP-36 DETECTION LIMITS	TP-5 1/14/86 6-7 GRAB
VOLATILE ORGANICS (Cont.)					
TRICHLOROETHYLENE	UG/G	0.100	ND	0.020	ND
BENZENE	UG/G	0.100	9.20	0.020	2.70
CIS-1,3-DICHLOROPROPENE	UG/G	0.100	ND	0.020	ND
1,1,2-TRICHLOROETHANE	UG/G	0.100	ND	0.020	ND
DIBROMOCHLOROMETHANE	UG/G	0.100	ND	0.020	ND
BROMOFORM	UG/G	0.100	ND	0.020	ND
1,1,2,2-TETRACHLOROETHYLENE	UG/G	0.100	ND	0.020	ND
1,1,2,2-TETRACHLOROTHANE	UG/G	0.100	ND	0.020	ND
TOLUENE	UG/G	0.100	23.0	0.020	1.40
CHLOROBENZENE	UG/G	0.100	ND	0.020	ND
ETHYLBENZENE	UG/G	0.100	1.70	0.020	0.042
2 CHLOROETHYL VINYL ETHER	UG/G	0.100	ND	0.020	ND
INORGANIC COMPOUNDS					
METALS					
ANTIMONY, TOTAL	UG/G	0.50	ND	0.50	ND
ARSENIC, TOTAL	UG/G	0.50	3.2	0.50	39
BERYLLIUM, TOTAL	UG/G	0.20	ND	0.20	ND

TABLE D-5 (Cont.)

GENEVA SOIL SAMPLES

RESULTS FROM COMPUCHEM

CONSTITUENT	SAMPLE ID DATE DEPTH IN FEET SAMPLE TYPE UNITS	TP-4 DETECTION LIMITS	TP-4 1/20/86 4-5 GRAB	TP-36 DETECTION LIMITS	TP-36 1/14/86 6-7 GRAB
METALS (CONT.)					
CADMIUM, TOTAL	UG/G	0.10	ND	0.10	1.3
CHROMIUM, TOTAL	UG/G	0.50	6.8	0.50	ND
COPPER, TOTAL	UG/G	1.0	6.0	1.0	ND
LEAD, TOTAL	UG/G	0.50	4.7	0.50	33
MERCURY, TOTAL	UG/G	0.0020	0.0020	0.0020	4.6
NICKEL, TOTAL	UG/G	1.0	9.4	1.0	ND
SELEMIUM, TOTAL	UG/G	0.10	ND	0.10	ND
SILVER, TOTAL	UG/G	0.50	ND	0.50	ND
THALLIUM, TOTAL	UG/G	0.50	ND	0.50	ND
ZINC, TOTAL	UG/G	0.20	22	0.20	72
PHENOLS					
TOTAL PHENOL	UG/G	0.10	5.7	0.10	1,300
CYANIDES					
TOTAL CYANIDE	UG/G	0.10	ND	0.10	440

TABLE D-5 (Cont.)

GENEVA SOIL SAMPLES

SUMMARY OF COMPUCHEM RESULTS

CONSTITUENT	SAMPLE ID DATE DEPTH IN FEET SAMPLE TYPE UNITS	TP 4 DETECTION LIMITS	TP 4 1/20/86 4-5 GRAB	TP-36 DETECTION LIMITS	TP-36 1/14/86 6-7 GRAB
ORGANIC COMPOUNDS					
ACID EXTRACTABLES					
PHENOL	UG/G	0.330	0.960	33.0	230.0
2,4-DIMETHYLPHENOL	UG/G	0.330	ND	33.0	61.0
BASE NEUTRALS					
NAPHTHALENE	UG/G	1.60	25.0	660.0	13,000
ACENAPHTHYLENE	UG/G	1.60	ND	660.0	3,500
FLUORENE	UG/G	1.60	ND	660.0	3,500
PHENANTHRENE	UG/G	1.60	ND	660.0	11,000
ANTHRACENE	UG/G	1.60	ND	660.0	3,900
FLUORANTHENE	UG/G	1.60	ND	660.0	7,200
PYRENE	UG/G	1.60	ND	660.0	4,500
BENZO(A)ANTHRACENE	UG/G	1.60	ND	660.0	2,900
CHRYSENE	UG/G	1.60	ND	660.0	2,300
BENZO(B)FLUORANTHENE	UG/G	1.60	ND	660.0	3,300
BENZO(K)FLUORANTHENE	UG/G	1.60	ND	660.0	3,300
BENZO(A)PYRENE	UG/G	1.60	ND	660.0	2,200
INDENO(1,2,3-C,D)PYRENE	UG/G	1.60	ND	660.0	1,000
BENZO(G,H,I)PERYLENE	UG/G	1.60	ND	660.0	1,000

TABLE D-5 (Cont.)

GENEVA SOIL SAMPLES

SUMMARY OF COMPUCHEM RESULTS

CONSTITUENT	SAMPLE ID DATE DEPTH IN FEET SAMPLE TYPE UNITS	TP-4 DETECTION LIMITS	TP-4 1/20/86 4-5 GRAB	TP-36 DETECTION LIMITS	TP-36 1/14/86 6-7 GRAB
VOLATILE ORGANICS					
METHYLENE CHLORIDE	UG/G	0.100	0.880	0.020	0.034
BENZENE	UG/G	0.100	9.20	0.020	2.70
TOLUENE	UG/G	0.100	23.0	0.020	1.40
ETHYLBENZENE	UG/G	0.100	1.70	0.020	0.042
INORGANIC COMPOUNDS					
METALS					
ARSENIC, TOTAL	UG/G	0.50	3.2	0.50	39
CADMIUM, TOTAL	UG/G	0.10	ND	0.10	1.3
CHROMIUM, TOTAL	UG/G	0.50	6.8	0.50	ND
COPPER, TOTAL	UG/G	1.0	6.0	1.0	ND
LEAD, TOTAL	UG/G	0.50	4.7	0.50	33
MERCURY, TOTAL	UG/G	0.0020	0.0020	0.0020	4.6
NICKEL, TOTAL	UG/G	1.0	9.4	1.0	ND
ZINC, TOTAL	UG/G	0.20	22	0.20	72
PHENOLS					
TOTAL PHENOL	UG/G	0.10	5.7	0.10	1,300
CYANIDES					
TOTAL CYANIDE	UG/G	0.10	ND	0.10	440

APPENDIX E

LABORATORY RESULTS - GROUND WATER SAMPLES

TABLE E-1

GENEVA GROUND WATER SAMPLES - ROUND 1

RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-1S 2/26/86 GRAB	MW-1D 2/26/86 GRAB	MW-2S 2/25/86 GRAB	MW-2D 2/25/86 GRAB	MW-3S 2/25/86 GRAB	MW-3D 2/25/86 GRAB
PURGEABLE AROMATICS								
BENZENE	MG/L	0.001	0.002	ND	ND	ND	ND	ND
CHLOROBENZENE	MG/L	0.002	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.003	ND	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.003	0.003	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.003	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	MG/L	0.002	0.001	ND	ND	ND	ND	ND
TOLUENE	MG/L	0.001	0.005	ND	ND	ND	ND	ND
TOTAL			0.011	--	--	--	--	--

ND = Not Detected

TABLE E-2

GENEVA GROUND WATER SAMPLES - ROUND 1

RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-1S 2/26/86 GRAB	MW-1D 2/26/86 GRAB	MW-2S 2/25/86 GRAB	MW-2D 2/25/86 GRAB	MW-3S 2/25/86 GRAB	MW-3D 2/25/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS								
ACENAPHTHENE	MG/L	0.0004	ND	ND	ND	0.0004	ND	ND
ACENAPHTHYLENE	MG/L	0.0004	ND	ND	ND	ND	ND	ND
ANTHRACENE	MG/L	0.0004	ND	ND	ND	ND	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0004	ND	ND	ND	ND	0.0044	0.0044
BENZO (A) PYRENE	MG/L	0.0004	ND	0.0004	0.0004	ND	ND	ND
BENZO (B) FLUORANTHENE	MG/L	0.0004	ND	ND	0.0008	ND	ND	ND
BENZO (K) FLUORANTHENE	MG/L	0.0004	ND	ND	0.0036	ND	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0004	ND	ND	ND	ND	ND	ND<0.005
CHRYSENE	MG/L	0.0004	ND	ND	ND	ND	ND	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0004	ND	ND	ND	ND	ND	ND
FLUORANTHENE	MG/L	0.0004	ND	ND	0.0004	ND	ND	ND
FLUORENE	MG/L	0.0004	ND	ND	ND	0.0056	ND	ND
INDENO (1,2,3 CD) PYRENE	MG/L	0.0004	ND	ND	0.0030	ND	ND	ND
NAPHTHALENE	MG/L	0.0004	ND	0.0006	ND	0.0244	ND	ND
PHENANTHRENE	MG/L	0.0004	ND	ND	ND	0.0074	ND	ND
PYRENE	MG/L	0.0004	ND	ND	0.0018	0.013	ND	ND
TOTAL PAHs			--	0.0010	0.0100	0.0508	0.0044	0.0044

ND = Not Detected

ND< indicates that the detection limit was elevated. Sample matrix interferences necessitated diluting the sample, thus raising the detection limit.

TABLE E-3

GENEVA GROUND WATER SAMPLES - ROUND 1

RESULTS FOR NON-CHLORINATED PHENOLS

		SAMPLE ID	MW-1S	MW-1D	MW-2S	MW-2D	MW-3S	MW-3D
		DATE	2/26/86	2/26/86	2/25/86	2/25/86	2/25/86	2/25/86
		SAMPLE TYPE	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB
	UNITS	DETECTION LIMIT						
NON-CHLORINATED PHENOLS								
2,4-DIMETHYPHENOL	MG/L	0.008	ND	ND	ND	ND	ND	ND
2,4-DINITROPHENOL	MG/L	0.004	ND	ND	ND	ND	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.004	ND	ND	ND	ND	ND	ND
2-NITROPHENOL	MG/L	0.004	ND	ND	ND	ND	ND	ND
4-NITROPHENOL	MG/L	0.004	ND	ND	ND	ND	ND	ND
PHENOL	MG/L	0.004	ND	ND	ND	ND	ND	ND
TOTAL	MG/L		--	--	--	--	--	--

ND = Not Detected

TABLE E-4

GENEVA GROUND WATER SAMPLES - ROUND 1

RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-1S 2/26/86 GRAB	MW 1D 2/26/86 GRAB	MW-2S 2/25/86 GRAB	MW-2D 2/25/86 GRAB	MW-3S 2/25/86 GRAB	MW-3D 2/25/86 GRAB
INORGANIC COMPOUNDS								
IRON, TOTAL	MG/L	0.1	ND	ND	2.30	ND	0.66	ND
ZINC, TOTAL	MG/L	0.02	0.02	0.02	ND	ND	0.02	ND
SULFATE	MG/L	1.0	13.3	242	536	244	1,310	436
ORGANIC NITROGEN	MG/L	0.159	0.590	0.221	0.260	0.452	0.958	0.223
CYANIDE, TOTAL	MG/L	0.008	0.016	0.009	5.70	ND	0.970	ND
ORGANIC CARBON, TOTAL	MG/L	1.0	1.2	1.7	13	1.1	6.4	0.8

ND = Not Detected

TABLE E-5

GENEVA BLIND DUPLICATES - ROUND 1
GROUND WATER
RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE / DETECTION LIMIT	MW-2D 2/25/86 GRAB	MW-4* 2/25/86 GRAB
PURGEABLE AROMATICS				
BENZENE	MG/L	0.001	ND	ND
CHLOROBENZENE	MG/L	0.002	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.003	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.003	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.003	ND	ND
ETHYLBENZENE	MG/L	0.002	ND	ND
TOLUENE	MG/L	0.001	ND	ND
TOTAL	MG/L		--	--

* Sample MW-4 (Tables E-5 to E-8) is a blind duplicate used for QA/QC purposes.

TABLE E-6

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 1
RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-2D 2/25/86 GRAB	MW-4 2/25/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS				
ACENAPHTHENE	MG/L	0.0004	0.0004	ND
ACENAPHTHYLENE	MG/L	0.0004	ND	ND
ANTHRACENE	MG/L	0.0004	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0004	ND	ND
BENZO (A) PYRENE	MG/L	0.0004	ND	ND
			Ø/ØØØ4	ND
BENZO (B) FLUORANTHENE	MG/L	0.0004	ND	ND
BENZO (K) FLUORANTHENE	MG/L	0.0004	ND	ND
			Ø/Ø222	
BENZO (GHI) PERYLENE	MG/L	0.0004	ND	ND
CHRYSENE	MG/L	0.0004	0.0166	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0004	ND	ND
FLUORANTHENE	MG/L	0.0004	ND	ND
FLUORENE	MG/L	0.0004	0.0056	ND
INDENO (1,2,3-CD) PYRENE	MG/L	0.0004	ND	0.0004
NAPHTHALENE	MG/L	0.0004	0.0244	ND
NAPHTHALENE	MG/L	0.0004	ND	ND
PHENANTHRENE	MG/L	0.0004	0.0074	ND
PYRENE	MG/L	0.0004	0.013	ND
TOTAL PAHs	MG/L		0.0508	0.0004

ND = Not Detected

TABLE E-7

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 1
RESULTS FOR NON-CHLORINATED PHENOLS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-2D 2/25/86 GRAB	MW-4 2/25/86 GRAB
NON-CHLORINATED PHENOLS				
2,4-DIMETHYPHENOL	MG/L	0.008	ND	ND
2,4-DINITROPHENOL	MG/L	0.004	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.004	ND	ND
2-NITROPHENOL	MG/L	0.004	ND	ND
4-NITROPHENOL	MG/L	0.004	ND	ND
PHENOL	MG/L	0.004	ND	ND
TOTAL	MG/L		--	--

ND = Not Detected

TABLE E-8

GENEVA BLIND DUPLICATES - ROUND 1
GROUND WATER
RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON

		SAMPLE ID	MW-2D	MW-4
		DATE	2/25/86	2/25/86
		SAMPLE TYPE	GRAB	GRAB
	UNITS	DETECTION LIMIT		
INORGANIC COMPOUNDS				
IRON, TOTAL	MG/L	0.13	ND	0.16
ZINC, TOTAL	MG/L	0.02	ND	0.02
SULFATE	MG/L	1.0	244	286
ORGANIC NITROGEN	MG/L	0.159	0.452	0.988
CYANIDE, TOTAL	MG/L	0.008	ND	84
ORGANIC CARBON, TOTAL	MG/L	1.0	1.1	0.8

ND = Not Detected

TABLE E-9

GENEVA GROUND WATER SAMPLES - ROUND 2

RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-1S 5/2/86 GRAB	MW-1D 5/2/86 GRAB	MW-2S 5/2/86 GRAB	MW-2D 5/2/86 GRAB	MW-3S 5/1/86 GRAB	MW-3D 5/1/86 GRAB
PURGEABLE AROMATICS								
BENZENE	MG/L	0.002	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	MG/L	0.003	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.003	ND	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.003	ND	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.003	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	MG/L	0.003	ND	ND	ND	0.0041	0.0091	ND
TOLUENE	MG/L	0.002	ND	ND	ND	0.0048	0.0027	ND
TOTAL	MG/L		--	--	--	0.0089	0.0118	--

ND = Not Detected

TABLE E-10

GENEVA GROUND WATER SAMPLES - ROUND 2

RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-1S 5/2/86 GRAB	MW-1D 5/2/86 GRAB	MW-2S 5/2/86 GRAB	MW-2D 5/2/86 GRAB	MW-3S 5/1/86 GRAB	MW-3D 5/1/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS								
ACENAPHTHENE	MG/L	0.0002	ND	ND	ND	ND	0.0017	ND
ACENAPHTHYLENE	MG/L	0.0002	ND	ND	0.001	ND	ND	ND
ANTHRACENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0002	ND	0.0003	0.0018	ND	0.0002	ND
BENZO (A) PYRENE	MG/L	0.0002	0.0005	0.0012	0.0038	0.0004	ND	ND
BENZO (B) FLUORANTHENE	MG/L	0.0002	ND	ND	ND	ND	0.0011	ND
BENZO (K) FLUORANTHENE	MG/L	0.0002	ND	ND	0.0024	ND	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0002	ND	ND	0.0016	ND	ND	ND
CHRYSENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0002	0.0005	0.0002	0.0005	ND	ND	0.0003
FLUORANTHENE	MG/L	0.0002	ND	ND	0.003	ND	ND	ND
FLUORENE	MG/L	0.0002	0.0108	0.0139	0.0017	0.0024	0.0080	0.0034
INDENO (1,2,3-CD) PYRENE	MG/L	0.0002	ND	ND	0.0018	ND	ND	ND
NAPHTHALENE	MG/L	0.0002	ND	ND	0.0003	0.0012	0.0098	ND
PHENANTHRENE	MG/L	0.0002	ND	ND	0.0005	ND	ND	ND
PYRENE	MG/L	0.0002	ND	ND	0.0013	0.0019	ND	0.0062
TOTAL PAHs			0.0118	0.0156	0.0197	0.0059	0.0208	0.0099

ND = Not Detected

TABLE E-11

GENEVA GROUND WATER SAMPLES - ROUND 2

RESULTS FOR NON-CHLORINATED PHENOLS

		SAMPLE ID	MW-1S	MW-1D	MW-2S	MW-2D	MW-3S	MW-3D
		DATE	5/2/86	5/2/86	5/2/86	5/2/86	5/1/86	5/1/86
		SAMPLE TYPE	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB
	UNITS	DETECTION LIMIT						
NON-CHLORINATED PHENOLS								
2,4-DIMETHYPHENOL	MG/L	0.002	ND	ND	ND	ND	ND	ND
2,4-DINITROPHENOL	MG/L	0.030	ND	ND	ND	ND	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.002	ND	ND	ND	ND	ND	ND
2-NITROPHENOL	MG/L	0.002	ND	ND	ND	ND	ND	ND
4-NITROPHENOL	MG/L	0.002	ND	ND	ND	ND	ND	ND
PHENOL	MG/L	0.002	ND	ND	ND	ND	ND	ND
TOTAL	MG/L		--	--	--	--	--	--

ND = Not Detected

TABLE E-12

GENEVA GROUND WATER SAMPLES - ROUND 2

RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-1S 5/2/86 GRAB	MW-1D 5/2/86 GRAB	MW-2S 5/2/86 GRAB	MW-2D 5/2/86 GRAB	MW-3S 5/1/86 GRAB	MW-3D 5/1/86 GRAB
INORGANIC COMPOUNDS								
IRON, TOTAL	MG/L	0.13	0.14	ND	1.61	0.13	1.47	ND
ZINC, TOTAL	MG/L	0.02	ND	0.02	ND	ND	ND	ND
SULFATE	MG/L	1.0	64.2	224	772	274	1,340	372
ORGANIC NITROGEN	MG/L	0.136	ND	ND	0.981	ND	0.822	ND
CYANIDE, TOTAL	MG/L	0.008	ND	ND	3.2	ND	ND	ND
ORGANIC CARBON,	MG/L	1.0	81	27	179	23	78	105

ND = Not Detected

TABLE E-13

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 2
RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE / DETECTION LIMIT	MW-3S 5/1/86 GRAB	MW-4 5/1/86 GRAB
PURGEABLE AROMATICS				
BENZENE	MG/L	0.002	ND	ND
CHLOROBENZENE	MG/L	0.003	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.003	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.003	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.003	ND	ND
ETHYLBENZENE	MG/L	0.003	0.0091	ND
TOLUENE	MG/L	0.002	0.0027	ND
TOTAL	MG/L		0.0118	--

ND = Not Detected

* Sample MW-4 (Tables E-13 to E-16) is a blind duplicate used for QA/QC purposes.

TABLE E-14

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 2
RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-3S 5/1/86 GRAB	MW-4 5/1/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS				
ACENAPHTHENE	MG/L	0.0002	0.0017	0.0015
ACENAPHTHYLENE	MG/L	0.0002	ND	ND
ANTHRACENE	MG/L	0.0002	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0002	0.0002	0.0004
BENZO (A) PYRENE	MG/L	0.0002	ND	ND
BENZO (B) FLUORANTHENE	MG/L	0.0002	0.0011	0.0007
BENZO (K) FLUORANTHENE	MG/L	0.0002	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0002	ND	ND
CHRYSENE	MG/L	0.0002	ND	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0002	ND	0.0002
FLUORANTHENE	MG/L	0.0002	ND	0.0002
FLUORENE	MG/L	0.0002	0.0080	0.0089
INDENO (1,2,3-CD) PYRENE	MG/L	0.0002	ND	ND
NAPHTHALENE	MG/L	0.0002	0.0098	0.0073
PHENANTHRENE	MG/L	0.0002	ND	ND
PYRENE	MG/L	0.0002	~~ND~~ 0.0067	0.0075
TOTAL PAHs	MG/L		0.0208	0.0267

ND = Not Detected

TABLE E-15

GENEVA BLIND DUPLICATES
GROUNDWATER - ROUND 2
RESULTS FOR NON-CHLORINATED PHENOLS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-3S 5/1/86 GRAB	MW-4 5/1/86 GRAB
NON-CHLORINATED PHENOLS				
2,4-DIMETHYPHENOL	MG/L	0.002	ND	ND
2,4-DINITROPHENOL	MG/L	0.030	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.002	ND	ND
2-NITROPHENOL	MG/L	0.002	ND	ND
4-NITROPHENOL	MG/L	0.002	ND	ND
PHENOL	MG/L	0.002	ND	0.0050
TOTAL	MG/L		--	0.0050

ND = Not Detected

TABLE E-16

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 2
RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-3S 5/1/86 GRAB	MW-4 5/1/86 GRAB
INORGANIC COMPOUNDS				
IRON, TOTAL	MG/L	0.13	1.47	1.33
ZINC, TOTAL	MG/L	0.02	ND	0.03
SULFATE	MG/L	1.0	1,340	1,370
ORGANIC NITROGEN	MG/L	0.136	0.822	0.789
CYANIDE, TOTAL	MG/L	0.008	ND	0.75
ORGANIC CARBON, TOTAL	MG/L	1.0	78	84

ND = Not Detected

TABLE E-17

GENEVA GROUND WATER SAMPLES - ROUND 3

RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE / DETECTION LIMIT	MW-1S 8/7/86 GRAB	MW-1D 8/7/86 GRAB	MW-2S 8/7/86 GRAB	MW-2D 8/7/86 GRAB	MW-3S 8/8/86 GRAB	MW-3D 8/8/86 GRAB
PURGEABLE AROMATICS								
BENZENE	MG/L	0.001	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	MG/L	0.001	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.002	ND	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.002	ND	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.002	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	MG/L	0.001	ND	ND	ND	ND	ND	ND
TOLUENE	MG/L	0.001	ND	ND	ND	ND	ND	ND
TOTAL	MG/L		--	--	--	--	--	--

ND = Not Detected

TABLE E-18

GENEVA GROUND WATER SAMPLES - ROUND 3

RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-1S 8/7/86 GRAB	MW 1D 8/7/86 GRAB	MW 2S 8/7/86 GRAB	MW 2D 8/7/86 GRAB	MW 3S 8/8/86 GRAB	MW-3D 8/8/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS								
ACENAPHTHENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
ACENAPHTHYLENE	MG/L	0.0002	ND	0.0022	ND	0.0023	ND	ND
ANTHRACENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
BENZO (A) PYRENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
BENZO (B) FLUORANTHENE	MG/L	0.0002	ND	ND	ND	ND	0.0008	0.0013
BENZO (K) FLUORANTHENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0002	0.0024	ND	ND	0.0004	ND	ND
CHRYSENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
FLUORANTHENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
FLUORENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
INDENO (1,2,3-CD) PYRENE	MG/L	0.0010	ND	ND	ND	ND	ND	ND
NAPHTHALENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
PHENANTHRENE	MG/L	0.0002	ND	ND	ND	ND	ND	ND
PYRENE	MG/L	0.0010	ND	ND	ND	ND	ND	ND
TOTAL PAHs	MG/L		0.0024	0.0022	--	0.0027	0.0008	0.0013

ND = Not Detected

TABLE E-19

GENEVA GROUND WATER SAMPLES - ROUND 3

RESULTS FOR NON-CHLORINATED PHENOLS

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE / DETECTION LIMIT	MW-1S 8/7/86 GRAB	MW-1D 8/7/86 GRAB	MW-2S 8/7/86 GRAB	MW-2D 8/7/86 GRAB	MW-3S 8/8/86 GRAB	MW-3D 8/8/86 GRAB
NON-CHLORINATED PHENOLS								
2,4-DIMETHYPHENOL	MG/L	0.005	ND	ND	ND	0.0052	ND	ND
2,4-DINITROPHENOL	MG/L	0.002	ND	ND	ND	ND	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.002	ND	ND	ND	ND	ND	ND
2-NITROPHENOL	MG/L	0.002	ND	ND	ND	ND	ND	ND
4-NITROPHENOL	MG/L	0.002	ND	ND	ND	ND	ND	ND
PHENOL	MG/L	0.005	ND	ND	ND	ND	ND	ND
TOTAL	MG/L		--	--	--	0.0052	--	--

ND = Not Detected

TABLE E-20

GENEVA GROUND WATER SAMPLES - ROUND 3

RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE / DETECTION LIMIT	MW-1S 8/7/86 GRAB	MW-1D 8/7/86 GRAB	MW-2S 8/7/86 GRAB	MW-2D 8/7/86 GRAB	MW-3S 8/8/86 GRAB	MW-3D 8/8/86 GRAB
INORGANIC COMPOUNDS								
IRON, TOTAL	MG/L	0.15	0.15	0.24	2.58	ND	1.94	ND
ZINC, TOTAL	MG/L	0.02	0.031	ND	0.021	0.043	0.030	0.021
SULFATE	MG/L	1.0	47.6	205	1,180	247	1,050	359
ORGANIC NITROGEN	MG/L	0.036	0.753	0.070	1.49	0.092	0.741	ND
CYANIDE, TOTAL	MG/L	0.005	ND	ND	3.53	ND	0.287	ND
ORGANIC CARBON,	MG/L	1.0	8.0	6.0	21	3.0	10.0	9.0

ND = Not Detected

TABLE E-21

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 3
RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-2D 8/7/86 GRAB	MW-5* 8/7/86 GRAB
PURGEABLE AROMATICS				
BENZENE	MG/L	0.001	ND	ND
CHLOROBENZENE	MG/L	0.001	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.002	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.002	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.002	ND	ND
ETHYLBENZENE	MG/L	0.001	ND	ND
TOLUENE	MG/L	0.001	ND	ND
TOTAL	MG/L		--	--

ND = Not Detected

* Sample MW-5 (Tables E21-E24) is a blind duplicate used for QA/QC purposes.

TABLE E-22

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 3
RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-2D 8/7/86 GRAB	MW-5 8/7/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS				
ACENAPHTHENE	MG/L	0.0002	ND	ND
ACENAPHTHYLENE	MG/L	0.0002	0.0023	ND
ANTHRACENE	MG/L	0.0002	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0002	ND	ND
BENZO (A) PYRENE	MG/L	0.0002	ND	ND
BENZO (B) FLUORANTHENE	MG/L	0.0002	ND	ND
BENZO (K) FLUORANTHENE	MG/L	0.0002	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0002	ND	ND
CHRYSENE	MG/L	0.0002	0.0004	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0002	ND	ND
FLUORANTHENE	MG/L	0.0002	ND	ND
FLUORENE	MG/L	0.0002	ND	ND
INDENO (1,2,3-CD) PYRENE	MG/L	0.0010	ND	ND
NAPHTHALENE	MG/L	0.0002	ND	ND
PHENANTHRENE	MG/L	0.0002	ND	ND
PYRENE	MG/L	0.0010	ND	ND
TOTAL PAHs			0.0027	--

ND = Not Detected

TABLE E-23

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 3
RESULTS FOR NON-CHLORINATED PHENOLS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-2D 8/7/86 GRAB	MW-5 8/7/86 GRAB
NON-CHLORINATED PHENOLS				
2,4-DIMETHYPHENOL	MG/L	0.005	0.0052	ND
2,4-DINITROPHENOL	MG/L	0.002	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.002	ND	ND
2-NITROPHENOL	MG/L	0.002	ND	ND
4-NITROPHENOL	MG/L	0.002	ND	ND
PHENOL	MG/L	0.005	ND	ND
TOTAL	MG/L		0.0052	--

ND = Not Detected

TABLE E-24

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 3
RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-2D 8/7/86 GRAB	MW-5 8/7/86 GRAB
INORGANIC COMPOUNDS				
IRON, TOTAL	MG/L	0.15	ND	ND
ZINC, TOTAL	MG/L	0.02	0.043	0.040
SULFATE	MG/L	1.0	247	238
ORGANIC NITROGEN	MG/L	0.036	0.092	0.049
CYANIDE, TOTAL	MG/L	0.005	ND	ND
ORGANIC CARBON, TOTAL	MG/L	1.0	3.0	2.0

ND = Not Detected

TABLE E-25

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 3
RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-2S 8/7/86 GRAB	MW-4* 8/7/86 GRAB
PURGEABLE AROMATICS				
BENZENE	MG/L	0.001	ND	ND
CHLOROBENZENE	MG/L	0.001	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.002	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.002	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.002	ND	ND
ETHYLBENZENE	MG/L	0.001	ND	ND
TOLUENE	MG/L	0.001	ND	ND
TOTAL	MG/L			

ND = Not Detected

* MW-4 (Tables E-25 to E-28) is a blind duplicate used for QA/QC purposes.

TABLE E-26

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 3
RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-2S 8/7/86 GRAB	MW-4 8/7/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS				
ACENAPHTHENE	MG/L	0.0002	ND	ND
ACENAPHTHYLENE	MG/L	0.0002	ND	ND
ANTHRACENE	MG/L	0.0002	ND	0.0003
BENZO (A) ANTHRACENE	MG/L	0.0002	ND	ND
BENZO (A) PYRENE	MG/L	0.0002	ND	0.0005
BENZO (B) FLUORANTHENE	MG/L	0.0002	ND	0.0027
BENZO (K) FLUORANTHENE	MG/L	0.0002	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0002	ND	ND
CHRYSENE	MG/L	0.0002	ND	0.0004
DIBENZO (A,H) ANTHRACENE	MG/L	0.0002	ND	ND
FLUORANTHENE	MG/L	0.0002	ND	ND
FLUORENE	MG/L	0.0002	ND	ND
INDENO (1,2,3-CD) PYRENE	MG/L	0.0010	ND	ND
NAPHTHALENE	MG/L	0.0002	ND	ND
PHENANTHRENE	MG/L	0.0002	ND	ND
PYRENE	MG/L	0.0010	ND	ND
TOTAL PAHs	MG/L		--	0.0039

ND = Not Detected

TABLE E-27

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 3
RESULTS FOR NON-CHLORINATED PHENOLS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-2S 8/7/86 GRAB	MW-4 8/7/86 GRAB
NON-CHLORINATED PHENOLS				
2,4-DIMETHYPHENOL	MG/L	0.005	ND	ND
2,4-DINITROPHENOL	MG/L	0.002	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.002	ND	ND
2-NITROPHENOL	MG/L	0.002	ND	ND
4-NITROPHENOL	MG/L	0.002	ND	ND
PHENOL	MG/L	0.005	ND	ND
TOTAL	MG/L		--	--

ND = Not Detected

TABLE E-28

GENEVA BLIND DUPLICATES
GROUND WATER - ROUND 3
RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	MW-2S 8/7/86 GRAB	MW-4 8/7/86 GRAB
INORGANIC COMPOUNDS				
IRON, TOTAL	MG/L	0.15	2.58	2.63
ZINC, TOTAL	MG/L	0.02	0.021	0.043
SULFATE	MG/L	1.0	1180	1200
ORGANIC NITROGEN	MG/L	0.036	1.49	1.96
CYANIDE, TOTAL	MG/L	0.005	3.53	0.115
ORGANIC CARBON, TOTAL	MG/L	1.0	21.0	24.0

TABLE E-29

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 1

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-1D 2/26/86 GRAB MG/L	MW-2S 2/25/86 GRAB MG/L
ORGANIC COMPOUNDS			
ACID EXTRACTABLES			
PHENOL	0.010	0.036	ND
2-CHLOROPHENOL	0.010	ND	ND
2-NITROPHENOL	0.010	ND	ND
2,4-DIMETHYLPHENOL	0.010	0.011	ND
2,4-DICHLOROPHENOL	0.010	ND	ND
P-CHLORO-M-CRESOL	0.010	ND	ND
2,4,6-TRICHLOROPHENOL	0.010	ND	ND
2,4-DINITROPHENOL	0.050	ND	ND
4-NITROPHENOL	0.050	ND	ND
4,6-DINITRO-O-CRESOL	0.050	ND	ND
PENTACHLOROPHENOL	0.050	ND	ND
BASE NEUTRALS			
N-NITROSODIMETHYLAMINE	0.010	ND	ND
BIS (2-CHLOROETHYL) ETHER	0.010	ND	ND
1,3-DICHLOROBENZENE	0.010	ND	ND
1,4-DICHLOROBENZENE	0.010	ND	ND
1,2-DICHLOROBENZENE	0.010	ND	ND
BIS (2-CHLOROISOPROPYL) ETHER	0.010	ND	ND
HEXACHLOROETHANE	0.010	ND	ND
N-NITROSODI-N-PROPYLAMINE	0.010	ND	ND
NITROBENZENE	0.010	ND	ND
ISOPHORONE	0.010	ND	ND
BIS (2-CHLOROETHOXY) METHANE	0.010	ND	ND
1,2,4-TRICHLOROBENZENE	0.010	ND	ND
NAPHTHALENE	0.010	ND	ND
HEXACHLOROBUTADIENE	0.010	ND	ND
HEXACHLOROCYCLOPENTADIENE	0.010	ND	ND
2-CHLORONAPHTHALENE	0.010	ND	ND
DIMETHYLPHTHALATE	0.010	ND	ND

ND = Not Detected

TABLE E-29 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 1

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-1D 2/26/86 GRAB MG/L	MW-2S 2/25/86 GRAB MG/L
BASE NEUTRALS (Cont.)			
ACENAPHTHYLENE	0.010	ND	ND
2,6-DINITROTOLUENE	0.010	ND	ND
ACENAPHTHENE	0.010	ND	ND
2,4-DINITROTOLUENE	0.010	ND	ND
DIETHYLPHTHALATE	0.010	ND	ND
FLUORENE	0.010	ND	ND
4-CHLOROPHENYL PHENYL ETHER	0.010	ND	ND
DIPHENYLAMINE (N-NITROSO)	0.010	ND	ND
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	0.010	ND	ND
4-BROMOPHENYL PHENYL ETHER	0.010	ND	ND
HEXACHLOROBENZENE	0.010	ND	ND
PHENANTHRENE	0.010	ND	ND
ANTHRACENE	0.010	ND	ND
DI-N-BUTYLPHTHALATE	0.010	ND	ND
FLUORANTHENE	0.010	ND	ND
BENZIDINE	0.050	ND	ND
PYRENE	0.010	ND	ND
BUTYLBENZYLPHTHALATE	0.010	ND	ND
BENZO(A)ANTHRACENE	0.010	ND	ND
3,3'-DICHLOROBENZIDINE	0.020	ND	ND
CHRYSENE	0.010	ND	ND
BIS(2-ETHYLHEXYL)PHTHALATE	0.010	ND	ND
DI-N-OCTYLPHTHALATE	0.010	ND	ND
BENZO(B)FLUORANTHENE	0.010	ND	ND
BENZO(K)FLUORANTHENE	0.010	ND	ND
BENZO(A)PYRENE	0.010	ND	ND
INDENO(1,2,3-C,D)PYRENE	0.010	ND	ND
DIBENZO(A,H)ANTHRACENE	0.010	ND	ND
BENZO(G,H,I)PERYLENE	0.010	ND	ND

TABLE E-29 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 1

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-1D 2/26/86 GRAB MG/L	MW-2S 2/25/86 GRAB MG/L
ORGANIC COMPOUNDS (CONT.)			
VOLATILE ORGANICS			
CHLOROMETHANE	0.010	ND	ND
VINYL CHLORIDE	0.010	ND	ND
CHLOROETHANE	0.010	ND	ND
BROMOMETHANE	0.010	ND	ND
ACROLEIN	0.100	ND	ND
ACRYLONITRILE	0.100	ND	ND
METHYLENE CHLORIDE	0.010	ND	0.010
TRICHLOROFLUOROMETHANE	0.010	ND	ND
1,1-DICHLOROETHYLENE	0.010	ND	ND
1,1-DICHLOROETHANE	0.010	ND	ND
TRANS-1,2-DICHLOROETHYLENE	0.010	ND	ND
CHLOROFORM	0.010	ND	ND
1,2-DICHLOROETHANE	0.010	ND	ND
1,1,1-TRICHLOROETHANE	0.010	ND	ND
CARBON TETRACHLORIDE	0.010	ND	ND
BROMODICHLOROMETHANE	0.010	ND	ND
1,2-DICHLOROPROPANE	0.010	ND	ND
TRANS-1,3-DICHLOROPROPENE	0.010	ND	ND
TRICHLOROETHYLENE	0.010	ND	ND
BENZENE	0.010	ND	ND
CIS-1,3-DICHLOROPROPENE	0.010	ND	ND
1,1,2-TRICHLOROETHANE	0.010	ND	ND
DIBROMOCHLOROMETHANE	0.010	ND	ND
BROMOFORM	0.010	ND	ND
1,1,2,2-TETRACHLOROETHYLENE	0.010	ND	ND
1,1,2,2-TETRACHLOROTHANE	0.010	ND	ND
TOLUENE	0.010	ND	ND
CHLOROBENZENE	0.010	ND	ND
ETHYLBENZENE	0.010	ND	ND
2-CHLOROETHYL VINYL ETHER	0.010	ND	ND

TABLE E-29 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 1

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-1D 2/26/86 GRAB MG/L	MW-2S 2/25/86 GRAB MG/L
INORGANIC COMPOUNDS			
METALS (TOTAL)			
ANTIMONY	0.050	ND	ND
ARSENIC	0.050	ND	ND
BERYLLIUM	0.020	ND	ND
CADMIUM	0.010	ND	ND
CHROMIUM	0.050	ND	ND
COPPER	0.10	ND<1.0	ND
LEAD	0.050	ND	ND
MERCURY	0.00020	0.00032	0.0070
NICKEL	0.10	ND<1.0	ND
SELENIUM	0.010	ND	ND
SILVER	0.050	ND	ND
THALLIUM	0.050	ND	ND
ZINC	0.020	0.080	0.16
PHENOLS			
TOTAL PHENOL	0.010	ND	ND
CYANIDES			
TOTAL CYANIDE	0.010	ND	1.8

TABLE E-29 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - SUMMARY OF RESULTS - ROUND 1

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-1D 2/26/86 GRAB MG/L	MW-2S 2/25/86 GRAB MG/L
ORGANIC COMPOUNDS			
ACID EXTRACTABLES			
PHENOL	0.010	0.036	ND
2,4-DIMETHYLPHENOL	0.010	0.011	ND
VOLATILE ORGANICS			
METHYLENE CHLORIDE	0.010	ND	0.010
INORGANIC COMPOUNDS			
METALS			
MERCURY, TOTAL	0.00020	0.00032	0.0070
ZINC, TOTAL	0.020	0.080	0.16
CYANIDES			
TOTAL CYANIDE	0.010	ND	1.8

TABLE E-30

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 2

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-3S 5/1/86 GRAB MG/L	MW-3D 5/1/86 GRAB MG/L
ORGANIC COMPOUNDS			
ACID EXTRACTABLES			
PHENOL	0.010	ND	ND
2-CHLOROPHENOL	0.010	ND	ND
2-NITROPHENOL	0.010	ND	ND
2,4-DIMETHYLPHENOL	0.010	ND	ND
2,4-DICHLOROPHENOL	0.010	ND	ND
P-CHLORO-M-CRESOL	0.010	ND	ND
2,4,6-TRICHLOROPHENOL	0.010	ND	ND
2,4-DINITROPHENOL	0.050	ND	ND
4-NITROPHENOL	0.050	ND	ND
4,6-DINITRO-O-CRESOL	0.050	ND	ND
PENTACHLOROPHENOL	0.050	ND	ND
BASE NEUTRALS			
N-NITROSODIMETHYLAMINE	0.010	ND	ND
BIS (2-CHLOROETHYL) ETHER	0.010	ND	ND
1,3-DICHLOROBENZENE	0.010	ND	ND
1,4-DICHLOROBENZENE	0.010	ND	ND
1,2-DICHLOROBENZENE	0.010	ND	ND
BIS (2-CHLOROISOPROPYL) ETHER	0.010	ND	ND
HEXACHLOROETHANE	0.010	ND	ND
N-NITROSODI-N-PROPYLAMINE	0.010	ND	ND
NITROBENZENE	0.010	ND	ND
ISOPHORONE	0.010	ND	ND
BIS (2-CHLOROETHOXY) METHANE	0.010	ND	ND
1,2,4-TRICHLOROBENZENE	0.010	ND	ND
NAPHTHALENE	0.010	ND	ND
HEXACHLOROBUTADIENE	0.010	ND	ND
HEXACHLOROCYCLOPENTADIENE	0.010	ND	ND
2-CHLORONAPHTHALENE	0.010	ND	ND
DIMETHYLPHTHALATE	0.010	ND	ND

ND = Not Detected

TABLE E-30 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 2

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-3S 5/1/86 GRAB MG/L	MW-3D 5/1/86 GRAB MG/L
BASE NEUTRALS (Cont.)			
ACENAPHTHYLENE	0.010	ND	ND
2,6-DINITROTOLUENE	0.010	ND	ND
ACENAPHTHENE	0.010	ND	ND
2,4-DINITROTOLUENE	0.010	ND	ND
DIETHYLPHTHALATE	0.010	ND	ND
FLUORENE	0.010	ND	ND
4-CHLOROPHENYL PHENYL ETHER	0.010	ND	ND
DIPHENYLAMINE (N-NITROSO)	0.010	ND	ND
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	0.010	ND	ND
4-BROMOPHENYL PHENYL ETHER	0.010	ND	ND
HEXACHLOROBENZENE	0.010	ND	ND
PHENANTHRENE	0.010	ND	ND
ANTHRACENE	0.010	ND	ND
DI-N-BUTYLPHTHALATE	0.010	ND	ND
FLUORANTHENE	0.010	ND	ND
BENZIDINE	0.050	ND	ND
PYRENE	0.010	ND	ND
BUTYLBENZYLPHTHALATE	0.010	ND	ND
BENZO(A)ANTHRACENE	0.010	ND	ND
3,3'-DICHLOROBENZIDINE	0.020	ND	ND
CHRYSENE	0.010	ND	ND
BIS(2-ETHYLHEXYL)PHTHALATE	0.010	ND	ND
DI-N-OCTYLPHTHALATE	0.010	ND	ND
BENZO(B)FLUORANTHENE	0.010	ND	ND
BENZO(K)FLUORANTHENE	0.010	ND	ND
BENZO(A)PYRENE	0.010	ND	ND
INDENO(1,2,3-C,D)PYRENE	0.010	ND	ND
DIBENZO(A,H)ANTHRACENE	0.010	ND	ND
BENZO(G,H,I)PERYLENE	0.010	ND	ND

TABLE E-30 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 2

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-3S 5/1/86 GRAB MG/L	MW-3D 5/1/86 GRAB MG/L
VOLATILE ORGANICS			
CHLOROMETHANE	0.010	ND	ND
VINYL CHLORIDE	0.010	ND	ND
CHLOROETHANE	0.010	ND	ND
BROMOMETHANE	0.010	ND	ND
ACROLEIN	0.100	ND	ND
ACRYLONITRILE	0.100	ND	ND
METHYLENE CHLORIDE	0.010	ND	ND
TRICHLOROFLUOROMETHANE	0.010	ND	ND
1,1-DICHLOROETHYLENE	0.010	ND	ND
1,1-DICHLOROETHANE	0.010	ND	ND
TRANS-1,2-DICHLOROETHYLENE	0.010	ND	ND
CHLOROFORM	0.010	ND	ND
1,2-DICHLOROETHANE	0.010	ND	ND
1,1,1-TRICHLOROETHANE	0.010	ND	ND
CARBON TETRACHLORIDE	0.010	ND	ND
BROMODICHLOROMETHANE	0.010	ND	ND
1,2-DICHLOROPROPANE	0.010	ND	ND
TRANS-1,3-DICHLOROPROPENE	0.010	ND	ND
TRICHLOROETHYLENE	0.010	ND	ND
BENZENE	0.010	ND	ND
CIS-1,3-DICHLOROPROPENE	0.010	ND	ND
1,1,2-TRICHLOROETHANE	0.010	ND	ND
DIBROMOCHLOROMETHANE	0.010	ND	ND
BROMOFORM	0.010	ND	ND
1,1,2,2-TETRACHLOROETHYLENE	0.010	ND	ND
1,1,2,2-TETRACHLOROTHANE	0.010	ND	ND
TOLUENE	0.010	ND	ND
CHLOROBENZENE	0.010	ND	ND
ETHYLBENZENE	0.010	ND	ND
2-CHLOROETHYL VINYL ETHER	0.010	ND	ND

TABLE E-30 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 2

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-3S 5/1/86 GRAB MG/L	MW-3D 5/1/86 GRAB MG/L
INORGANIC COMPOUNDS			
METALS			
ANTIMONY, TOTAL	0.050	ND	ND
ARSENIC, TOTAL	0.050	0.075	ND
BERYLLIUM, TOTAL	0.020	ND	ND
CADMIUM, TOTAL	0.010	ND	ND
CHROMIUM, TOTAL	0.050	ND	ND
COPPER, TOTAL	0.10	ND	ND
LEAD, TOTAL	0.050	0.16	ND
MERCURY, TOTAL	0.00020	0.00038	0.00038
NICKEL, TOTAL	0.10	ND	ND
SELENIUM, TOTAL	0.010	ND	ND
SILVER, TOTAL	0.050	ND	ND
THALLIUM, TOTAL	0.050	ND	ND
ZINC, TOTAL	0.020	0.20	0.080
PHENOLS			
TOTAL PHENOL	0.010	0.034	ND
CYANIDES			
TOTAL CYANIDE	0.010	0.075	ND

TABLE E-31

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 3

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-2S 8/7/86 GRAB MG/L	MW-2D 8/7/86 GRAB MG/L
ORGANIC COMPOUNDS			
ACID EXTRACTABLES			
PHENOL	0.010	ND	ND
2-CHLOROPHENOL	0.010	ND	ND
2-NITROPHENOL	0.010	ND	ND
2,4-DIMETHYLPHENOL	0.010	ND	ND
2,4-DICHLOROPHENOL	0.010	ND	ND
P-CHLORO-M-CRESOL	0.010	ND	ND
2,4,6-TRICHLOROPHENOL	0.010	ND	ND
2,4-DINITROPHENOL	0.050	ND	ND
4-NITROPHENOL	0.050	ND	ND
4,6-DINITRO-O-CRESOL	0.050	ND	ND
PENTACHLOROPHENOL	0.050	ND	ND
BASE NEUTRALS			
N-NITROSODIMETHYLAMINE	0.010	ND	ND
BIS (2-CHLOROETHYL) ETHER	0.010	ND	ND
1,3-DICHLOROBENZENE	0.010	ND	ND
1,4-DICHLOROBENZENE	0.010	ND	ND
1,2-DICHLOROBENZENE	0.010	ND	ND
BIS (2-CHLOROISOPROPYL) ETHER	0.010	ND	ND
HEXACHLOROETHANE	0.010	ND	ND
N-NITROSODI-N-PROPYLAMINE	0.010	ND	ND
NITROBENZENE	0.010	ND	ND
ISOPHORONE	0.010	ND	ND
BIS (2-CHLOROETHOXY) METHANE	0.010	ND	ND
1,2,4-TRICHLOROBENZENE	0.010	ND	ND
NAPHTHALENE	0.010	ND	ND
HEXACHLOROBUTADIENE	0.010	ND	ND
HEXACHLOROCYCLOPENTADIENE	0.010	ND	ND
2-CHLORONAPHTHALENE	0.010	ND	ND
DIMETHYLPHTHALATE	0.010	ND	ND

ND = Not Detected

TABLE E-31 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 3

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-2S 8/7/86 GRAB MG/L	MW-2D 8/7/86 GRAB MG/L
BASE NEUTRALS (Cont.)			
ACENAPHTHYLENE	0.010	ND	ND
2,6-DINITROTOLUENE	0.010	ND	ND
ACENAPHTHENE	0.010	ND	ND
2,4-DINITROTOLUENE	0.010	ND	ND
DIETHYLPHTHALATE	0.010	ND	ND
FLUORENE	0.010	ND	ND
4-CHLOROPHENYL PHENYL ETHER	0.010	ND	ND
DIPHENYLAMINE (N-NITROSO)	0.010	ND	ND
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	0.010	ND	ND
4-BROMOPHENYL PHENYL ETHER	0.010	ND	ND
HEXACHLOROBENZENE	0.010	ND	ND
PHENANTHRENE	0.010	ND	ND
ANTHRACENE	0.010	ND	ND
DI-N-BUTYLPHTHALATE	0.010	ND	ND
FLUORANTHENE	0.010	ND	ND
BENZIDINE	0.050	ND	ND
PYRENE	0.010	ND	ND
BUTYLBENZYLPHTHALATE	0.010	ND	ND
BENZO(A)ANTHRACENE	0.010	ND	ND
3,3'-DICHLOROBENZIDINE	0.020	ND	ND
CHRYSENE	0.010	ND	ND
BIS(2-ETHYLHEXYL)PHTHALATE	0.010	ND	ND
DI-N-OCTYLPHTHALATE	0.010	ND	ND
BENZO(B)FLUORANTHENE	0.010	ND	ND
BENZO(K)FLUORANTHENE	0.010	ND	ND
BENZO(A)PYRENE	0.010	ND	ND
INDENO(1,2,3-C,D)PYRENE	0.010	ND	ND
DIBENZO(A,H)ANTHRACENE	0.010	ND	ND
BENZO(G,H,I)PERYLENE	0.010	ND	ND

TABLE E-31 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 3

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-2S 8/7/86 GRAB MG/L	MW-2D 8/7/86 GRAB MG/L
VOLATILE ORGANICS			
CHLOROMETHANE	0.010	ND	ND
VINYL CHLORIDE	0.010	ND	ND
CHLOROETHANE	0.010	ND	ND
BROMOMETHANE	0.010	ND	ND
ACROLEIN	0.100	ND	ND
ACRYLONITRILE	0.100	ND	ND
METHYLENE CHLORIDE	0.010	0.011*	0.014*
1,1-DICHLOROETHYLENE	0.010	ND	ND
1,1-DICHLOROETHANE	0.010	ND	ND
TRANS-1,2-DICHLOROETHYLENE	0.010	ND	ND
CHLOROFORM	0.010	ND	ND
1,2-DICHLOROETHANE	0.010	ND	ND
1,1,1-TRICHLOROETHANE	0.010	ND	ND
CARBON TETRACHLORIDE	0.010	ND	ND
BROMODICHLOROMETHANE	0.010	ND	ND
1,2-DICHLOROPROPANE	0.010	ND	ND
TRANS-1,3-DICHLOROPROPENE	0.010	ND	ND
TRICHLOROETHYLENE	0.010	0.021	ND
BENZENE	0.010	ND	ND
CIS-1,3-DICHLOROPROPENE	0.010	ND	ND
1,1,2-TRICHLOROETHANE	0.010	ND	ND
DIBROMOCHLOROMETHANE	0.010	ND	ND
BROMOFORM	0.010	ND	ND
1,1,2,2-TETRACHLOROETHYLENE	0.010	ND	ND
1,1,2,2-TETRACHLOROTHANE	0.010	ND	ND
TOLUENE	0.010	ND	ND
CHLOROBENZENE	0.010	ND	ND
ETHYLBENZENE	0.010	ND	ND
2-CHLOROETHYL VINYL ETHER	0.010	ND	ND

* Detected in method blank in a concentration greater than 1/2 the detection limit and greater than 1/2 the sample concentration.

TABLE E-31 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 3

CONSTITUENT		SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-2S 8/7/86 GRAB (FILTERED SAMPLES) MG/L	MW-2D 8/7/86 GRAB MG/L	MW-2S 8/7/86 GRAB (UNFILTERED SAMPLES) MG/L	MW-2D 8/7/86 GRAB MG/L
INORGANIC COMPOUNDS						
METALS			DISSOLVED		TOTAL	
	ANTIMONY	0.050	ND	ND	ND	ND
	ARSENIC	0.050	ND	ND	0.052	ND
	BERYLLIUM	0.020	ND	ND	ND	ND
	CADMIUM	0.010	0.027	0.013	0.035	0.014
	CHROMIUM	0.050	ND	ND	0.069	ND
	COPPER	0.10	ND	ND	ND	ND
	LEAD	0.050	ND	ND	ND	ND
	MERCURY	0.00020	ND	ND	0.0047	ND
	NICKEL	0.10	0.110	ND	0.19	ND
	SELENIUM	0.010	ND	ND	ND	ND
	SILVER	0.050	ND	ND	ND	ND
	THALLIUM	0.050	ND	ND	ND	ND
	ZINC	0.020	0.050	0.065	0.24	0.048

TABLE E-31 (Cont.)

GENEVA GROUND WATER SAMPLES

RESULTS FROM COMPUCHEM - ROUND 3

CONSTITUENT		SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT MG/L	MW-2S 8/7/86 GRAB MG/L	MW-2D 8/7/86 GRAB MG/L
PHENOLS				
	TOTAL PHENOL	0.010	0.028	ND
CYANIDES				
	TOTAL CYANIDE	0.010	0.016	ND

APPENDIX F

LABORATORY RESULTS - SURFACE WATER SAMPLES

TABLE F-1

GENEVA SURFACE WATER SAMPLES
RESULTS FOR PURGEABLE AROMATICS - ROUND 1

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMITS	SW-1 2/24/86 GRAB	SW-2 2/24/86 GRAB	SW-3 2/24/86 GRAB
PURGEABLE AROMATICS					
BENZENE	MG/L	0.001	0.062	ND	ND
CHLOROBENZENE	MG/L	0.002	ND	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.003	0.007	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.003	0.013	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.003	ND	ND	ND
ETHYLBENZENE	MG/L	0.002	0.003	ND	ND
TOLUENE	MG/L	0.001	0.059	ND	ND
TOTAL	MG/L		0.144	--	--

ND = Not Detected

TABLE F-2

GENEVA SURFACE WATER SAMPLES
RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS - ROUND 1

		SAMPLE ID DATE SAMPLE TYPE	SW-1 2/24/86 GRAB	SW-2 2/24/86 GRAB	SW-3 2/24/86 GRAB
	UNITS	DETECTION LIMIT			
POLYNUCLEAR AROMATIC HYDROCARBONS					
ACENAPHTHENE	MG/L	0.0004	ND	ND	ND
ACENAPHTHYLENE	MG/L	0.0004	ND	ND	ND
ANTHRACENE	MG/L	0.0004	ND	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0004	0.0010	ND	ND
BENZO (A) PYRENE	MG/L	0.0004	ND	ND 1	0.0046
BENZO (B) FLUORANTHENE	MG/L	0.0004	ND	ND	ND
BENZO (K) FLUORANTHENE	MG/L	0.0004	ND	0.0224	ND
BENZO (GHI) PERYLENE	MG/L	0.0004	ND	ND	ND
CHRYSENE	MG/L	0.0004	ND	0.0168	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0004	ND	0.004	ND
FLUORANTHENE	MG/L	0.0004	ND	0.0008	0.0032
FLUORENE	MG/L	0.0004	ND	0.0064	ND
INDENO (1,2,3-CD) PYRENE	MG/L	0.0004	ND	ND	ND
NAPHTHALENE	MG/L	0.0004	0.0006	0.0016	ND
PHENANTHRENE	MG/L	0.0004	ND	0.0088	ND
PYRENE	MG/L	0.0004	ND	0.014	ND
TOTAL	MG/L		0.0016	0.0748	0.0078

ND = Not Detected

TABLE F-3

GENEVA SURFACE WATER SAMPLES

RESULTS FOR NON-CHLORINATED PHENOLS - ROUND 1

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-1 2/24/86 GRAB	SW-2 2/24/86 GRAB	SW-3 2/24/86 GRAB
NON-CHLORINATED PHENOLS					
2,4-DIMETHYPHENOL	MG/L	0.008	ND	ND	ND
2,4-DINITROPHENOL	MG/L	0.004	ND	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.004	ND	ND	ND
2-NITROPHENOL	MG/L	0.004	ND	ND	ND
4-NITROPHENOL	MG/L	0.004	ND	ND	ND
PHENOL	MG/L	0.004	0.012	ND	ND
TOTAL	MG/L		0.012	--	--

ND = Not Detected

TABLE F-4

GENEVA SURFACE WATER SAMPLES
RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE / DETECTION LIMITS	SW-1 2/24/86 GRAB	SW-2 2/24/86 GRAB	SW-3 2/24/86 GRAB
INORGANIC COMPOUNDS					
IRON, TOTAL	MG/L	0.1	2.43	6.54	1.04
ZINC, TOTAL	MG/L	0.02	0.03	0.04	0.05
SULFATE	MG/L	1.0	81.8	160	86.7
NITROGEN	MG/L	0.159	0.560	0.775	0.608
CYANIDE, TOTAL	MG/L	0.008	0.071	0.089	0.042
CYANIDE, FERRO-FERRIC	-	-	*	*	*
ORGANIC CARBON, TOTAL	MG/L	1.0	4.6	5.3	6.7

*THE REDOX TITRATION METHOD USED IN THE DETERMINATION OF IRON CYANIDES IN THE WATER SAMPLES PROVED TO BE IMPRACTICAL DUE TO LARGE POSITIVE INTERFERING SUBSTANCES (OTHER OXIDIZABLE COMPONENTS) PRESENT IN THE SAMPLES.

TABLE F-5

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR PURGEABLE AROMATICS - ROUND 1

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE / DETECTION LIMIT	SW-1 2/24/86 GRAB	SW-4* 2/24/86 GRAB
PURGEABLE AROMATICS				
BENZENE	MG/L	0.001	0.062	0.080
CHLOROBENZENE	MG/L	0.002	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.003	0.007	0.008
1,3-DICHLOROBENZENE	MG/L	0.003	0.013	0.015
1,4-DICHLOROBENZENE	MG/L	0.003	ND	ND
ETHYLBENZENE	MG/L	0.002	0.003	0.004
TOLUENE	MG/L	0.001	0.059	0.077
TOTAL	MG/L		0.144	0.184

ND = Not Detected

* Sample SW-4 (Tables F-5 to F-8) is a blind duplicate used for QA/QC purposes.

TABLE F-6

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS - ROUND 1

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-1 2/24/86 GRAB	SW-4 2/24/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS				
ACENAPHTHENE	MG/L	0.0004	ND	ND
ACENAPHTHYLENE	MG/L	0.0004	ND	ND
ANTHRACENE	MG/L	0.0004	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0004	0.0010	ND
BENZO (A) PYRENE	MG/L	0.0004	ND	ND
BENZO (B) FLUORANTHENE	MG/L	0.0004	ND	ND
BENZO (K) FLUORANTHENE	MG/L	0.0004	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0004	ND	0.0004
CHRYSENE	MG/L	0.0004	ND	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0004	ND	ND
FLUORANTHENE	MG/L	0.0004	ND	ND
FLUORENE	MG/L	0.0004	ND	ND
INDENO (1,2,3-CD) PYRENE	MG/L	0.0004	ND	0.0006
NAPHTHALENE	MG/L	0.0004	0.0006	0.0004
PHENANTHRENE	MG/L	0.0004	ND	ND
PYRENE	MG/L	0.0004	ND	ND
TOTAL			0.0016	0.0014

ND = Not Detected

TABLE F-7

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR NON-CHLORINATED PHENOLS - ROUND 1

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE / DETECTION LIMIT	SW-1 2/24/86 GRAB	SW-4 2/24/86 GRAB
NON-CHLORINATED PHENOLS				
2,4-DIMETHYPHENOL	MG/L	0.008	ND	ND
2,4-DINITROPHENOL	MG/L	0.004	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.004	ND	ND
2-NITROPHENOL	MG/L	0.004	ND	ND
4-NITROPHENOL	MG/L	0.004	ND	ND
PHENOL	MG/L	0.004	0.012	0.012
TOTAL	MG/L		0.012	0.012

ND = Not Detected

TABLE F-8

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR INORGANIC COMPOUNDS - ROUND 1
AND
TOTAL ORGANIC CARBON

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-1 2/24/86 GRAB	SW-4 2/24/86 GRAB
INORGANIC COMPOUNDS				
IRON, TOTAL	MG/L	0.13	2.43	2.89
ZINC, TOTAL	MG/L	0.02	0.08	0.07
SULFATE	MG/L	1.0	81.8	90.2
ORGANIC NITROGEN	MG/L	0.159	0.560	0.584
CYANIDE, TOTAL	MG/L	0.008	0.071	.110
ORGANIC CARBON, TOTAL	MG/L	1.0	4.6	4.7

TABLE F-9

GENEVA SURFACE WATER SAMPLES

RESULTS FOR PURGEABLE AROMATICS - ROUND 2

		SAMPLE ID	SW-1	SW-2	SW-3
		DATE	5/1/86	5/1/86	5/1/86
		SAMPLE TYPE	GRAB	GRAB	GRAB
	UNITS	DETECTION LIMITS			
PURGEABLE AROMATICS					
BENZENE	MG/L	0.002	0.0533	ND	ND
CHLOROBENZENE	MG/L	0.003	ND	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.003	ND	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.003	ND	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.003	ND	ND	ND
ETHYLBENZENE	MG/L	0.003	0.0045	ND	ND
TOLUENE	MG/L	0.002	0.0242	ND	ND
TOTAL	MG/L		0.082	--	--

ND = Not Detected

TABLE F-10

GENEVA SURFACE WATER SAMPLES

RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS - ROUND 2

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-1 5/1/86 GRAB	SW-2 5/1/86 GRAB	SW-3 5/1/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS					
ACENAPHTHENE	MG/L	0.0002	0.0016	ND	ND
ACENAPHTHYLENE	MG/L	0.0002	ND	0.0002	ND
ANTHRACENE	MG/L	0.0002	ND	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0002	0.0007	ND	0.0002
BENZO (A) PYRENE	MG/L	0.0002	0.0008	ND	0.0002
BENZO (B) FLUORANTHENE	MG/L	0.0002	ND	ND	ND
BENZO (K) FLUORANTHENE	MG/L	0.0002	0.0006	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0002	ND	ND	ND
CHRYSENE	MG/L	0.0002	0.0004	ND	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0002	0.0005	ND	ND
FLUORANTHENE	MG/L	0.0002	0.0022	ND	0.0003
FLUORENE	MG/L	0.0002	0.0021	0.0031	0.0040
INDENO (1,2,3-CD) PYRENE	MG/L	0.0002	ND	ND	ND
NAPHTHALENE	MG/L	0.0002	ND	ND	ND
PHENANTHRENE	MG/L	0.0002	0.0006	ND	ND
PYRENE	MG/L	0.0002	0.0055	0.0040	0.0065
TOTAL	MG/L		0.015	0.0073	0.0112

ND = Not Detected

TABLE F-11

GENEVA SURFACE WATER SAMPLES

RESULTS FOR NON-CHLORINATED PHENOLS - ROUND 2

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-1 5/1/86 GRAB	SW-2 5/1/86 GRAB	SW-3 5/1/86 GRAB
NON-CHLORINATED PHENOLS					
2,4-DIMETHYPHENOL	MG/L	0.002	ND	ND	ND
2,4-DINITROPHENOL	MG/L	0.030	ND	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.002	ND	ND	ND
2-NITROPHENOL	MG/L	0.002	ND	ND	ND
4-NITROPHENOL	MG/L	0.002	ND	ND	ND
PHENOL	MG/L	0.002	ND	0.015	0.0040
TOTAL	MG/L		--	0.015	0.0040

ND = Not Detected

TABLE F-12

GENEVA SURFACE WATER SAMPLES

RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON - ROUND 2

		SAMPLE ID DATE SAMPLE TYPE	SW-1 5/1/86 GRAB	SW-2 5/1/86 GRAB	SW-3 5/1/86 GRAB
	UNITS	DETECTION LIMITS			
INORGANIC COMPOUNDS					
IRON, TOTAL	MG/L	0.13	3.88	3.61	3.76
ZINC, TOTAL	MG/L	0.02	0.10	0.08	0.15
SULFATE	MG/L	1.0	66.0	283	80.7
ORGANIC NITROGEN	MG/L	0.136	1.47	1.15	0.822
CYANIDE, TOTAL	MG/L	0.008	ND	ND	ND
CYANIDE, FERRO-FERRIC	-	-	*	*	*
ORGANIC CARBON, TOTAL	MG/L	1.0	58	36	58

*THE REDOX TITRATION METHOD USED IN THE DETERMINATION OF IRON CYANIDES IN THE WATER SAMPLES PROVED TO BE IMPRACTICAL DUE TO LARGE POSITIVE INTERFERING SUBSTANCES (OTHER OXIDIZABLE COMPONENTS) PRESENT IN THE SAMPLES.

ND = Not Detected

TABLE F-13

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR PURGEABLE AROMATICS - ROUND 2

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-2 5/1/86 GRAB	SW-4* 5/1/86 GRAB
PURGEABLE AROMATICS				
BENZENE	MG/L	0.002	ND	ND
CHLOROBENZENE	MG/L	0.003	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.003	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.003	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.003	ND	ND
ETHYLBENZENE	MG/L	0.003	ND	ND
TOLUENE	MG/L	0.002	ND	ND
TOTAL	MG/L		--	--

ND = Not Detected

* Sample SW-4 (Tables F-13 to F-16) is a blind duplicate used for QA/QC purposes.

TABLE F-14

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS - ROUND 2

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-2 5/1/86 GRAB	SW-4 5/1/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS				
ACENAPHTHENE	MG/L	0.0002	ND	ND
ACENAPHTHYLENE	MG/L	0.0002	0.0002	0.0004
ANTHRACENE	MG/L	0.0002	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0002	ND	ND
BENZO (A) PYRENE	MG/L	0.0002	ND	ND
BENZO (B) FLUORANTHENE	MG/L	0.0002	ND	0.0004
BENZO (K) FLUORANTHENE	MG/L	0.0002	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0002	ND	ND
CHRYSENE	MG/L	0.0002	ND	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0002	ND	ND
FLUORANTHENE	MG/L	0.0002	ND	ND
FLUORENE	MG/L	0.0002	0.0031	0.0036
INDENO (1,2,3-CD) PYRENE	MG/L	0.0002	ND	ND
NAPHTHALENE	MG/L	0.0002	ND	0.0003
PHENANTHRENE	MG/L	0.0002	ND	ND
PYRENE	MG/L	0.0002	0.0040	0.0080
TOTAL	MG/L		0.0073	0.0127

ND = Not Detected

TABLE F-15

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR NON-CHLORINATED PHENOLS - ROUND 2

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-2 5/1/86 GRAB	SW-4 5/1/86 GRAB
NON-CHLORINATED PHENOLS				
2,4-DIMETHYPHENOL	MG/L	0.002	ND	ND
2,4-DINITROPHENOL	MG/L	0.030	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.002	ND	ND
2-NITROPHENOL	MG/L	0.002	ND	ND
4-NITROPHENOL	MG/L	0.002	ND	ND
PHENOL	MG/L	0.002	0.0150	0.0132
TOTAL	MG/L		0.0150	0.0132

ND = Not Detected

TABLE F-16

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON - ROUND 2

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-2 5/1/86 GRAB	SW-4 5/1/86 GRAB
INORGANIC COMPOUNDS				
IRON, TOTAL	MG/L	0.13	3.61	3.48
ZINC, TOTAL	MG/L	0.02	0.08	0.04
SULFATE	MG/L	1.0	283	321
ORGANIC NITROGEN	MG/L	0.136	1.15	0.804
CYANIDE, TOTAL	MG/L	0.008	ND	ND
ORGANIC CARBON, TOTAL	MG/L	1.0	36	29

ND = Not Detected

TABLE F-17

GENEVA SURFACE WATER SAMPLES
RESULTS FOR PURGEABLE AROMATICS - ROUND 3

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMITS	SW-1 8/8/86 GRAB	SW-2 8/8/86 GRAB	SW-3 8/8/86 GRAB
PURGEABLE AROMATICS					
BENZENE	MG/L	0.001	ND	ND	ND
CHLOROBENZENE	MG/L	0.001	ND	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.002	ND	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.002	ND	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.002	ND	ND	ND
ETHYLBENZENE	MG/L	0.002	ND	ND	ND
TOLUENE	MG/L	0.001	ND	ND	ND
TOTAL	MG/L		--	--	--

ND = Not Detected

TABLE F-18

GENEVA SURFACE WATER SAMPLES
RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS - ROUND 3

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE / DETECTION LIMIT	SW-1 8/8/86 GRAB	SW-2 8/8/86 GRAB	SW-3 8/8/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS					
ACENAPHTHENE	MG/L	0.0002	ND	ND	ND
ACENAPHTHYLENE	MG/L	0.0002	ND	0.0020	ND
ANTHRACENE	MG/L	0.0002	ND	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0002	ND	ND	ND
BENZO (A) PYRENE	MG/L	0.0002	0.0003	1	ND
BENZO (B) FLUORANTHENE	MG/L	0.0002	0.0019	0.0020	0.0014
BENZO (K) FLUORANTHENE	MG/L	0.0002	ND	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0002	ND	ND	ND
CHRYSENE	MG/L	0.0002	0.0005	ND	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0002	ND	ND	ND
FLUORANTHENE	MG/L	0.0002	ND	ND	ND
FLUORENE	MG/L	0.0002	ND	ND	ND
INDENO (1,2,3-CD) PYRENE	MG/L	0.0010	ND	ND	ND
NAPHTHALENE	MG/L	0.0002	ND	ND	ND
PHENANTHRENE	MG/L	0.0002	ND	ND	ND
PYRENE	MG/L	0.0010	ND	ND	ND
TOTAL	MG/L		0.0027	0.0040	0.0014

ND = Not Detected

TABLE F-19

GENEVA SURFACE WATER SAMPLES

RESULTS FOR NON-CHLORINATED PHENOLS - ROUND 3

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-1 8/8/86 GRAB	SW-2 8/8/86 GRAB	SW-3 8/8/86 GRAB
NON-CHLORINATED PHENOLS					
2,4-DIMETHYPHENOL	MG/L	0.005	ND	ND	ND
2,4-DINITROPHENOL	MG/L	0.002	ND	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.002	ND	ND	ND
2-NITROPHENOL	MG/L	0.002	ND	ND	ND
4-NITROPHENOL	MG/L	0.002	ND	ND	ND
PHENOL	MG/L	0.005	ND	ND	ND
TOTAL	MG/L		--	--	--

ND = Not Detected

TABLE F-20

GENEVA SURFACE WATER SAMPLES
RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON - ROUND 3

		SAMPLE ID	SW-1	SW-2	SW-3
		DATE	8/8/86	8/8/86	8/8/86
		SAMPLE TYPE	GRAB	GRAB	GRAB
	UNITS	DETECTION LIMITS			
INORGANIC COMPOUNDS					
IRON, TOTAL	MG/L	0.15	2.60	2.21	0.81
ZINC, TOTAL	MG/L	0.02	0.037	0.055	0.046
SULFATE	MG/L	1.0	38.5	222	57.5
ORGANIC NITROGEN	MG/L	0.036	1.333	0.629	0.485
CYANIDE, TOTAL	MG/L	0.005	0.342	0.211	0.007
ORGANIC CARBON, TOTAL	MG/L	1.0	21.0	10.0	8.0

TABLE F-21

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR PURGEABLE AROMATICS- ROUND 3

		SAMPLE ID DATE SAMPLE TYPE	SW-2 8/8/86 GRAB	SW-4* 8/8/86 GRAB
	UNITS	DETECTION LIMIT		
PURGEABLE AROMATICS				
BENZENE	MG/L	0.001	ND	ND
CHLOROBENZENE	MG/L	0.001	ND	ND
1,2-DICHLOROBENZENE	MG/L	0.002	ND	ND
1,3-DICHLOROBENZENE	MG/L	0.002	ND	ND
1,4-DICHLOROBENZENE	MG/L	0.002	ND	ND
ETHYLBENZENE	MG/L	0.001	ND	ND
TOLUENE	MG/L	0.001	ND	ND
TOTAL	MG/L		--	--

ND = Not Detected

* Sample SW-4 (Tables F-21 to F-24) is a blind duplicate used for QA/QC purposes.

TABLE F-22

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS - ROUND 3

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-2 8/8/86 GRAB	SW-4 8/8/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS				
ACENAPHTHENE	MG/L	0.0002	ND	ND
ACENAPHTHYLENE	MG/L	0.0002	0.0020	ND
ANTHRACENE	MG/L	0.0002	ND	ND
BENZO (A) ANTHRACENE	MG/L	0.0002	ND	ND
BENZO (A) PYRENE	MG/L	0.0002	ND	ND
BENZO (B) FLUORANTHENE	MG/L	0.0002	0.0020	0.0024
BENZO (K) FLUORANTHENE	MG/L	0.0002	ND	ND
BENZO (GHI) PERYLENE	MG/L	0.0002	ND	ND
CHRYSENE	MG/L	0.0002	ND	ND
DIBENZO (A,H) ANTHRACENE	MG/L	0.0002	ND	ND
FLUORANTHENE	MG/L	0.0002	ND	ND
FLUORENE	MG/L	0.0002	ND	ND
INDENO (1,2,3-CD) PYRENE	MG/L	0.0010	ND	ND
NAPHTHALENE	MG/L	0.0002	ND	ND
PHENANTHRENE	MG/L	0.0002	ND	ND
PYRENE	MG/L	0.0010	ND	ND
TOTAL	MG/L		0.0040	0.0024

ND = Not Detected

TABLE F-23

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR NON-CHLORINATED PHENOLS - ROUND 3

	UNITS	SAMPLE ID / DATE / SAMPLE TYPE / DETECTION LIMIT	SW-1 / 8/8/86 / GRAB	SW-4 / 8/8/86 / GRAB
NON-CHLORINATED PHENOLS				
2,4-DIMETHYPHENOL	MG/L	0.005	ND	ND
2,4-DINITROPHENOL	MG/L	0.002	ND	ND
2-METHYL-4,6-DINITROPHENOL	MG/L	0.002	ND	ND
2-NITROPHENOL	MG/L	0.002	ND	ND
4-NITROPHENOL	MG/L	0.002	ND	ND
PHENOL	MG/L	0.005	ND	ND
TOTAL	MG/L		--	--

ND = Not Detected

TABLE F-24

GENEVA BLIND DUPLICATES
SURFACE WATER
RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON - ROUND 3

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMIT	SW-2 8/8/86 GRAB	SW-4 8/8/86 GRAB
INORGANIC COMPOUNDS				
IRON, TOTAL	MG/L	0.15	2.21	2.71
ZINC, TOTAL	MG/L	0.02	0.055	0.061
SULFATE	MG/L	1.0	222	211
ORGANIC NITROGEN	MG/L	0.036	0.629	0.072
CYANIDE, TOTAL	MG/L	0.005	0.211	0.314
ORGANIC CARBON, TOTAL	MG/L	1.0	10.0	11.0

APPENDIX G

LABORATORY RESULTS - STREAM SEDIMENT SAMPLES

TABLE G-1

GENEVA STREAM SEDIMENT SAMPLES
RESULTS FOR PURGEABLE AROMATICS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMITS	SD-1 2/24/86 GRAB	SD-2 2/24/86 GRAB	SD-3 2/24/86 GRAB
PURGEABLE AROMATICS					
BENZENE	UG/G DRY	0.4	ND	ND	ND
CHLOROBENZENE	UG/G DRY	0.7	ND	ND	ND
1,2-DICHLOROBENZENE	UG/G DRY	0.7	ND	ND	ND
1,3-DICHLOROBENZENE	UG/G DRY	0.7	ND	ND	ND
1,4-DICHLOROBENZENE	UG/G DRY	0.7	ND	ND	ND
ETHYLBENZENE	UG/G DRY	0.7	ND	ND	ND
TOLUENE	UG/G DRY	0.4	ND	ND	ND
TOTAL	UG/GDRY		--	--	--

ND = Not Detected

TABLE G-2

GENEVA STREAM SEDIMENT SAMPLES

RESULTS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMITS	SD-1 2/24/86 GRAB	SD-2 2/24/86 GRAB	SD-3 2/24/86 GRAB
POLYNUCLEAR AROMATIC HYDROCARBONS					
ACENAPHTHENE	UG/G DRY	0.9	ND	8	ND
ACENAPHTHYLENE	UG/G DRY	0.9	0.9	5	ND
ANTHRACENE	UG/G DRY	0.9	ND	20	3
BENZO (A) ANTHRACENE	UG/G DRY	0.9	9.6	48	23
BENZO (A) PYRENE	UG/G DRY	0.9	15	46	28
BENZO (B) FLUORANTHENE	UG/G DRY	0.9	3	22	32
BENZO (K) FLUORANTHENE	UG/G DRY	0.9	16	43	ND<4
BENZO (GHI) PERYLENE	UG/G DRY	0.9	5	46	21
CHRYSENE	UG/G DRY	0.9	ND	ND<4	3
DIBENZO (A,H) ANTHRACENE	UG/G DRY	0.9	7	116	ND
FLUORANTHENE	UG/G DRY	0.9	15	110	50
FLUORENE	UG/G DRY	0.9	ND	5	ND<4
INDENO (1,2,3-CD) PYRENE	UG/G DRY	0.9	4	53	26
NAPHTHALENE	UG/G DRY	0.9	0.9	ND<4	ND<4
PHENANTHRENE	UG/G DRY	0.9	ND	110	17
PYRENE	UG/G DRY	0.9	11	71	33
TOTAL	UG/G DRY		87.4	703	236

ND = Not Detected
ND< = Indicates that the detection limit was elevated. Sample matrix interferences necessitated diluting the sample, thus raising the detection limit.

TABLE G-3

GENEVA STREAM SEDIMENT SAMPLES

RESULTS FOR NON-CHLORINATED PHENOLS

	UNITS	SAMPLE ID DATE SAMPLE TYPE DETECTION LIMITS	SD-1 2/24/86 GRAB	SD-2 2/24/86 GRAB	SD-3 2/24/86 GRAB
NON-CHLORINATED PHENOLS					
2,4-DIMETHYPHENOL	UG/G DRY	20	ND	110	ND
2,4-DINITROPHENOL	UG/G DRY	10	ND	ND	ND
2-METHYL-4,6-DINITROPHENOL	UG/G DRY	5	ND	ND	ND
2-NITROPHENOL	UG/G DRY	10	ND	ND	ND
4-NITROPHENOL	UG/G DRY	10	ND	28	ND
PHENOL	UG/G DRY	10	ND	ND	ND
TOTAL	UG/G DRY		--	138	--

ND = Not Detected

TABLE G-4

GENEVA STREAM SEDIMENT SAMPLES

RESULTS FOR INORGANIC COMPOUNDS
AND
TOTAL ORGANIC CARBON

		SAMPLE ID DATE SAMPLE TYPE	SD-1 2/24/86 GRAB	SD-2 2/24/86 GRAB	SD-3 2/24/86 GRAB
	UNITS	DETECTION LIMITS			
INORGANIC COMPOUNDS					
IRON, TOTAL	UG/G DRY	27	53,000	23,000	16,000
ZINC, TOTAL	UG/G DRY	3.4	550	270	170
SULFATE	UG/G DRY	1.0	158	63.9	68.3
ORGANIC NITROGEN	UG/G DRY	150	9,600	2,600	3,640
CYANIDE, TOTAL	UG/G DRY	0.32	120	72	ND<0.32
CYANIDE, FERRO-FERRIC	UG/G DRY	0.32	100	51	2.6
ORGANIC CARBON, TOTAL	-	-	-	-	-

ND< = Indicates that the detection limit was elevated. Sample matrix interferences necessitated diluting the sample, thus, raising the detection limit.

TASK 2 REPORT
NEW YORK STATE ELECTRIC & GAS CORPORATION
INVESTIGATION OF THE FORMER COAL
GASIFICATION SITE
GENEVA, NEW YORK

GEM372CG ~~ww~~ BU

VOLUME III
APPENDIX H

TRC Environmental Consultants, Inc.

Prepared by:

Lynne France
John Palmer, P.G.

Reviewed by:

James E. Gould, P.E.

October 1, 1987

TRC Project No. 3292-N61

800 Connecticut Blvd.
East Hartford, CT 06108
(203) 289-8631

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1.0 INTRODUCTION

This field work plan describes in detail the plan to conduct the various field tasks necessary during the Task 3 investigation at Geneva. Included in this plan are the schedules, locations and numbers of samples, and procedures to be employed in sampling site soils, stream sediments and ground water. Where a specific TRC quality assurance procedure is incorporated, the procedure number will be referenced.

Site maps are included to illustrate the various sampling locations. The plan is organized according to the chronological order of events starting with field mobilization and ending with sample shipping and documentation. The program schedule is found at the end of this plan.

2.0 FIELD MOBILIZATION

Upon approval of this plan by NYSEG, TRC will mobilize to the Geneva site. Field mobilization for Task 3 will be similar to the arrangements made for Task 2.

2.1 Establish Field Office and Field Laboratory

A field office and laboratory will be established in the Service Center building where the field crew will have access to a telephone. The laboratory will have instruments for the screening of soil samples for organic vapors and the measurement of water samples for pH, temperature, and conductivity.

Soil samples will be screened with a Century Vapor Analyzer (OVA) Model 128. The primary procedures for operation and calibration of the OVA will follow TRC Technical Standard T/S-990, Operation and Calibration of the Century Organic Vapor Analyzer Model OVA-128. The instrument will be maintained in this clean area.

Sample shipping containers, sample documentation, and all site log books will be maintained by the field chemist based in the site laboratory.

2.2 Establish Decontamination Area

A heavy equipment decon area used for steam cleaning the drilling rigs will be located at the rear of the Service Center Building. Materials generated during steam cleaning will not be collected.

2.3 Identification of Sampling Locations

During the mobilization phase, orange paint will be used to identify soil boring sample locations. After the drillers have mobilized, they will be shown the sequence of sampling locations so that they can prepare for any contingencies.

3.0 SURFACE SOIL SAMPLING

Ten surface soil samples will be collected from six areas of the site and analyzed for the parameters listed in Table WP-1. The list of inorganic parameters has been expanded from that used in Task 2 to include arsenic, cadmium, lead, and chromium . All of these metals, are part of a preliminary list of metals of concern in human health risk assessment being developed for the Gas Reserach Institute. Each of these parameters was detected in ground water analyzed for priority pollutants during Task 2.

Two composite samples will be taken from soil collected at six locations (three per sample) in the area where pipes were coated with tar in the 1950's. The objective of this sampling is to determine the risk associated with direct contact, and the limits of the area containing high levels of tar. This area, shown in Figure WP-1, is situated west of the main service building. Tar-coated material was found within one foot of the surface in test pits excavated in this area (TP-1 and TP-2). Prior to selecting the sample locations for the composite samples, exploratory holes will be made to determine the areal limits of the contaminated area. The sampling points will be at the outer edge of the area of visable high contamination. OVA readings of the exploratory locations will be taken to assist in determining sampling locations.

Four hand-augered samples will be collected from the eastern side of the site (Figure WP-1). Two of these will be taken from the spoil pile generated when the stream was dredged sometime after coking operations ceased at the plant. These samples will determine if tar constituents were dredged from the stream. The remaining two will be collected from the wooded area on the eastern part of the site, across the stream from the former waste disposal area. These samples will be taken to confirm that the stream defines the eastern edge of the disposal area.

TABLE WP-1

SOIL SAMPLE ANALYSIS

Parameter

- Arsenic
- Cadmium
- Lead
- Chromium
- Iron
- Zinc
- Ammonia (organic nitrogen)
- Sulfate
- Total Cyanide
- Ferroferric cyanide

Method 602 (Aromatics)

- Benzene
- Toluene
- Ethylbenzene
- Chlorobenzene
- 1,2 Dichlorobenzene
- 1,3 Dichlorobenzene
- 1,4 Dichlorobenzene

Method 604

- Phenols (non-chlorinated)

Method 610 (Polynuclear Aromatic Hydrocarbons)

- Acenaphthene
- Anenaphthylene
- Anthracene
- Benzo(a)Anthracene
- Benzo(a)Pyrene
- Benzo(b)Fluroanthene
- Benzo(g,h,i)perylene
- Benzo(k)Fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Fluoranthene
- Fluorene
- Indeno (1,2,3-cd) Pyrene
- Naphthalene
- Phenanthrene
- Pyrene

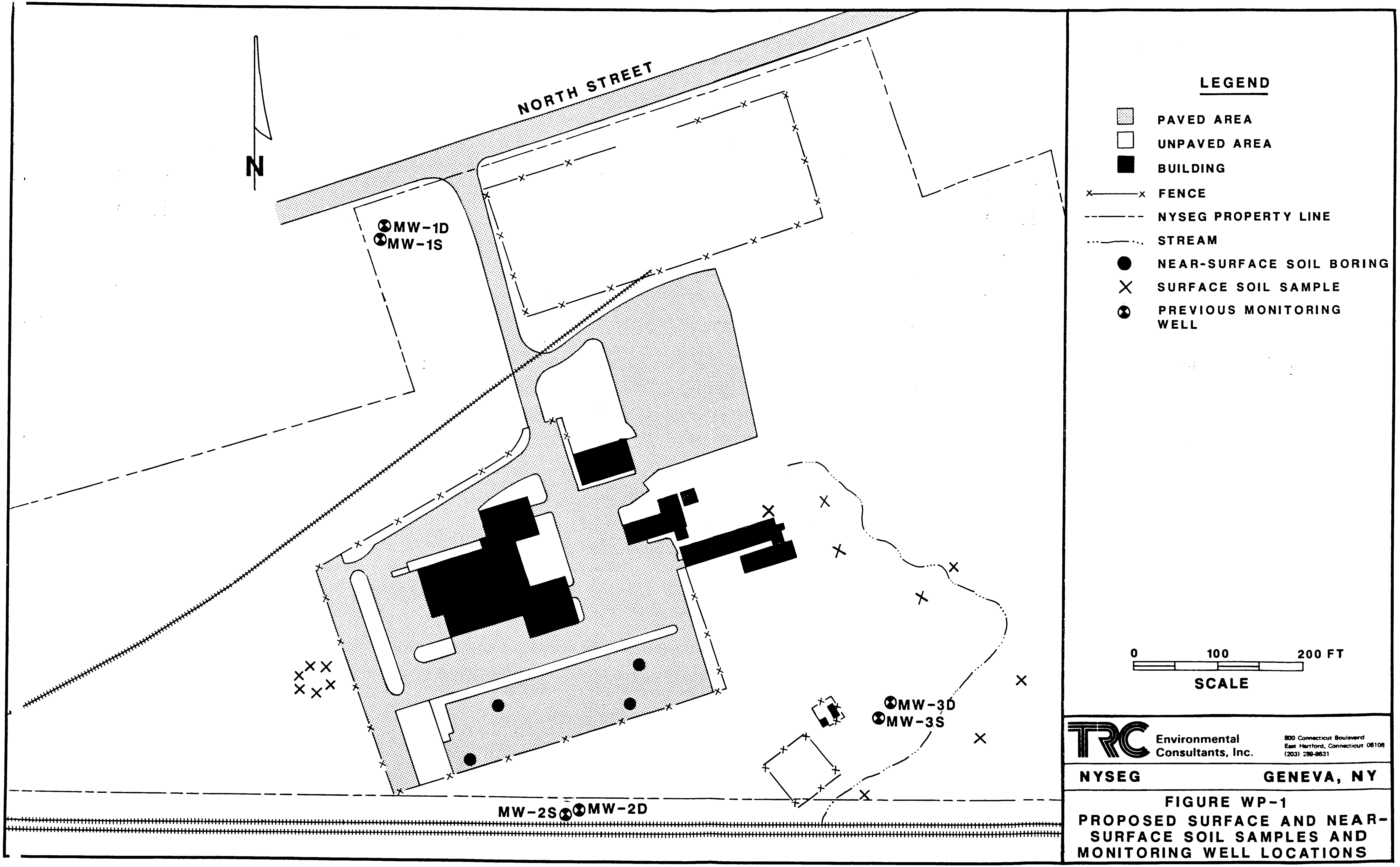

FIGURE WP-1
PROPOSED SURFACE AND NEAR-SURFACE SOIL SAMPLES AND MONITORING WELL LOCATIONS

Three composite samples will be collected from areas of the site associated with waste disposal and former structures. One sample will be taken from the area of the former 300,000 ft^3 gas holder (near the location of Test Pit 34 and Test Pit 28). Soils from these pits contained high concentrations of PAHs. A second sample will be collected from the former purifier waste disposal area. Test pit soil samples from that area (TP-31 and TP-32) contained high concentrations of ferric-ferro cyanide and PAHs. The third sample will be located in the area of Test Pits 36 and 37 in the former waste disposal area. High concentrations of PAHs were found in this area.

A final surface soil sample will be collected near the northeast corner of the former purifier building. Purifier waste-like material is exposed at the surface near the building foundation at this location.

All surface soil sampling will be performed according to TRC Technical Standard T/S-971, Surface Soil Sample Collection.

4.0 SUBSURFACE SOIL SAMPLING

Subsurface soil quality data collected during Task 2 test pit excavations are sufficient to perform the necessary risk assessment and remedial alternative design for all areas except the coke oven area. Therefore, as part of Task 3, a maximum of four near-surface soil samples will be collected from that area (Figure WP-1).

Continuous split-spoon samples will be collected using a hollow stem auger from a depth interval of between 5 and 19 feet. One sample per boring will be sent for chemical analyses. The sample selected will be the most contaminated based on visual and OVA examination.

The samples will be logged and collected according to TRC Technical Standard T/S 974, Procedure for Logging and Collecting Subsurface Soils During Test Borings and Well Drilling, and a TRC geologist will provide full-time supervision of the augering and sampling. All split spoon samples will be screened with a HNU photoionizer or OVA and retained according to TRC Technical Standard T/S 958, Chain of Custody Procedures. All samples will be described in detail, noting the physical characteristics and nature of any contaminants.

The sampling spoon will be cleaned between samples; as outlined below, to prevent any cross-contamination:

- scrub with water and detergent (alconox)
- scrub with tap water
- rinse with acetone (only if contaminants cannot be easily removed with above scrub)
- rinse with distilled water.

Drilling tools will be steam cleaned between borings to prevent cross-contamination.

The samples will be logged and numbered according to the following scheme (based on the NYSEG protocol found in Appendix A):

```
Example:  BCEXSW8505  11/06/85
  where:  BC - Border City (Geneva) Site
           E - Soil Sample
           X - Rloc, N/A
          SW - Loc, N/A
          85 - Year
          05 - Fifth soil sample location
    11/06/85 - Date of collection
```

The sample number may be further defined with the following:

- Type (TYP, bailer vs HNu sample, etc.)
- Reason no sample (RNS, equipment failure vs. not enough water, etc.)
- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory)

All soil samples will be preserved in 1 liter glass containers and subjected to chain-of-custody procedures. The following QA/QC samples will be collected during the soil sampling event:

- One field blank per day of sampling.
- One blind duplicate

The samples will be sent to the TRC Laboratories for analysis for the parameters listed in Table WP-1.

5.0 GROUND WATER SAMPLING

A fourth round of sampling will be done on the six existing monitoring wells. Determination of temperature, pH, and specific conductance will be made in the field immediately after sample collection. The pH will be measured to the nearest tenth of a standard unit using an "Orion" 407A specific ion meter, following TRC Technical Standard T/S 961, Calibration and Operating Procedures for the Orion Research Specific Ion/pH Meter Model 407A. Specific conductance will be measured with a "YSI" conductivity meter.

Samples taken for metals analyses will be field filtered using a 0.45 micron filter according to TRC Technical Standard T/S 976, Filtering of Water Samples for Dissolved Metals Analysis. All samples will be placed in laboratory prepared sample holding bottles and sent in iced containers to the analytical laboratory using the TRC Technical Standard T/S 980, Shipping Procedures for Water and Soil Samples of Hazardous Waste Sites. TRC Technical Standard T/S 958, Chain of Custody Procedures, will be used for all samples.

All ground water samples will be numbered as follows (based on NYSEG protocol):

```
Example:  BCGXMW8506  11/09/85
  where:  BC - Border City (Geneva)
           U - Upgradient
          MW - Monitoring well
          85 - Year
          06 - sixth water sample location
    11/09/85 - Date of collection
```

The sample number may be further defined with the following:

- Reason no sample (RNS, equipment failure vs. not enough water, etc.)
- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory)

The ground water sample will be analyzed for the parameters listed in Table WP-2.

TABLE WP-2

GROUND WATER SAMPLES ANALYSIS

Parameter

- Arsenic
- Lead
- Cadmium
- Mercury
- Ferro-Ferric Cyanide
- Free Cyanide
- Total Cyanide
- Complex Cyanides
- Sulfate
- Sulfide
- Total Phenols (Non-Chlorinated)
- TOC

Method 602 (Aromatics)

- Benzene
- Toluene
- Ethyl Benzene
- Chlorobenzene
- 1,2-Dichlorobenzene
- 1,3-Dichlorobenzene
- 1,4-Dichlorobenzene

Method 610 (Polyaromatic Hydrocarbons)

- Acenaphthene
- Acenaphthylene
- Anthracene
- Benzo(a)Anthracene
- Benzo(a)Pyrene
- Benzo(b)Fluoranthene
- Benzo(g,h,i)perylene
- Benzo (k) Fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Fluoranthene
- Fluorene
- Indeno (1,2,3-cd) Pyrene
- Naphthalene
- Phenanthrene
- Pyrene

6.0 <u>SITE STREAM INVESTIGATION</u>

The preliminary site investigation (Task 1) indicated the possible presence of hydrocarbons in the stream which drains the east side of the site. Sediment and water samples taken from both this stream and the western site stream during Task 2, contained some polynuclear aromatic hydrocarbons (PAHs). These streams, which discharge into Seneca Lake, present a high potential for direct contact with human receptors. A review will be made of presently available maps and photos to determine if the stream discharge points have changed over time.

During Task 3, the portion of the streams located downstream of the site will be investigated by surface probing for PAHs (Figure WP-2). The Seneca Lake bed region, 250 feet along the shore in both directions from the point or points of discharge, will be similarly investigated. Two samples from the streams (one from each stream) and two from the lake bed will be taken. Sample collection will follow procedures described in TRC Technical Standard T/A 972, <u>Field Procedures for Collection of Surface Water and Sediment Samples at Hazardous Waste Sites</u>. A field blank and duplicate will also be collected.

The samples will be shipped in iced containers to the analytical laboratory within 24 hours of sampling following TRC Technical Standard T/A 980, <u>Shipping Procedures for Water and Soil Samples at Hazardous Waste Sites</u>. Technical Standard T/S 958, <u>Chain of Custody Procedures</u>, will also be used.

Each stream sediment sample will be labeled and numbered according to the following;

```
Example:  BCSXSS8504  07/20/86
  where:  BC - Border City (Geneva)
           T - Sediment
           X - Rloc, N/A
          SS - Stream, surface water
          85 - Year
          04 - fourth sample collected
    07/20/86 - Date of collection
```

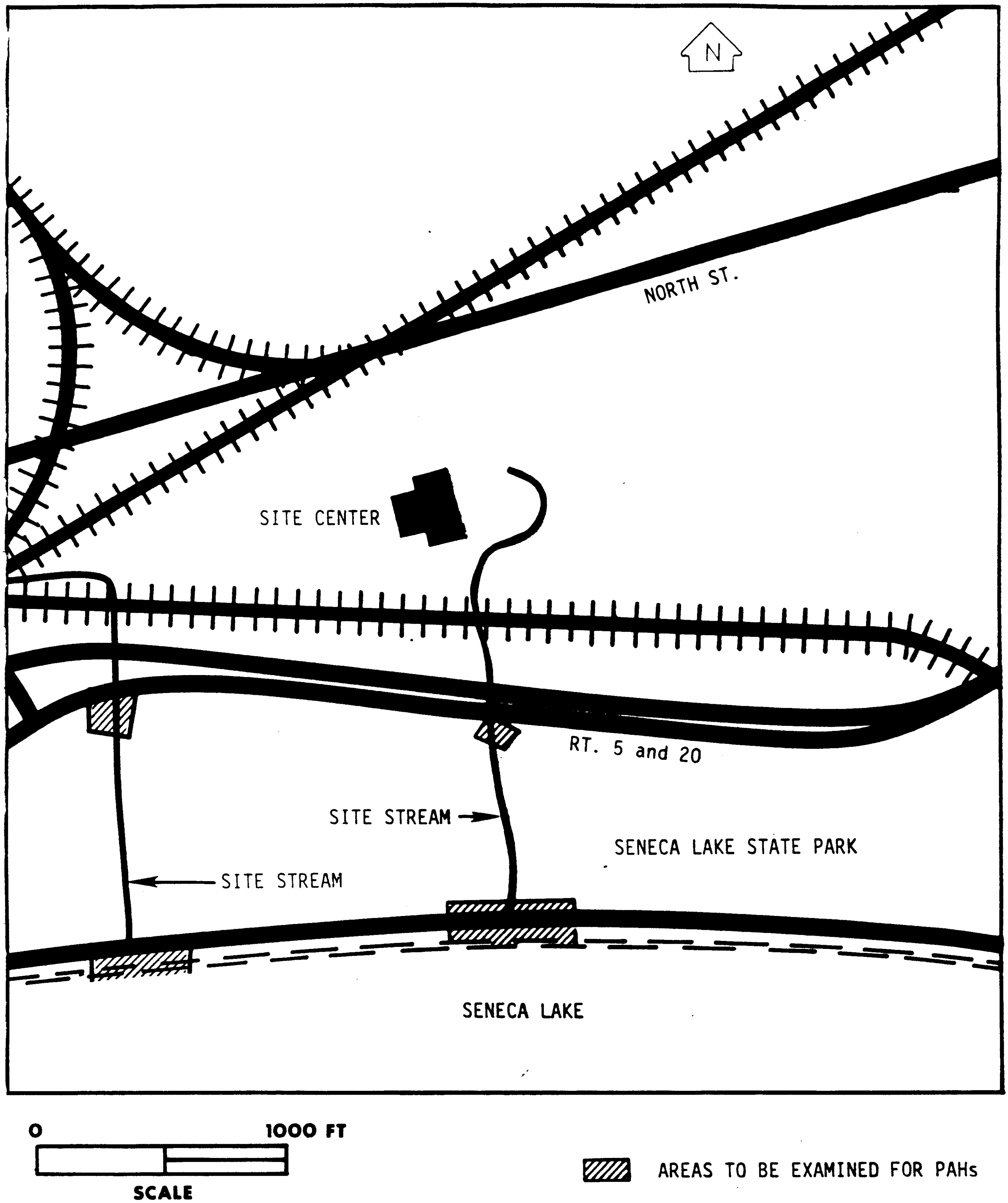

Figure WP-2. Location of Stream Investigation

The sample number may be further defined with the following:

- Type (TYP, bailer vs. grab sample, etc);
- Reason no sample (RNS, equipment failure vs. not enough water, etc.);
- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory)

The following QA/QC samples will be collected for both surface water and stream sediment samples at the frequency specified:

- One field blank, per each day of sampling
- One blind duplicate per 10 samples collected. (NOTE: At least 1 duplicate will accompany each sampling event.)

The samples will be analyzed for the parameters listed on Table WP-1.

7.0 AIR QUALITY SURVEY

The results of earlier air quality surveys (Task 1 and Task 2) indicate that no excessively elevated levels of organic vapors exist within the frequently occupied areas of the buidings, and that exposure through inhalation is not a problem outside the site buildings. In addition, much of the site is covered with buildings, pavement or grass, or is generally moist so that exposure through inhalation of fugitive dust is of minimal concern.

During Task 3, the air quality of the crawl space beneath two of the site buildings will be investigated. A 3 foot-deep, dirt floored, crawl space exists beneath the compressor room building. A concrete floored space containing 3 concrete bins used during the coke plant operarations is beneath the former purifier building (presently the gas meter lab). Both spaces occasionally are partially filled with water.

Workers periodically enter these areas for maintenance of pipes and pumps. In order to assess the health risk associated with these activities a real-time air quality survey will be performed with a Century Organic Vapor Analyzer.

8.0 RECORD KEEPING AND DOCUMENTATION

TRC will follow specific record keeping and site documentation procedures to document all soil and water samples, QA/QC procedures, and site investigation activities. The following logs and documents will be used to accomplish this:

Document	
1. Site Field Logs	Issued to each field team member with a control number on it. These logs are waterproof and will be the prime source of field data.
2. Master Sample Log	A page-numbered bound laboratory notebook that will remain in the site command post to document every sample taken. At the end of each field sampling day, the field operations manager will log in all samples and list those sent to the laboratories with the waybill number.
3. Chain-of-Custody	To track the possession of all samples from field to lab.

TRC will follow specific record keeping and site documentation procedures to document all soil and water samples, QA/QC procedures, and site investigation activites. The following logs and documents will be used to accomplish this:

4. Site Laboratory Notebook	A page-numbered bound laboratory notebook that will be the responsibility of the field chemist. This notebook will document all analysis, e.g., OVA, HNU, temperature, ETC., performed during field screening.
5. TRC Accident Report, Daily First Aid Report,	Data sheets attached to the Health and Safety Plan, located in the site command post, that will document any accident occurring at the

Employer's First Report of Injury, and OSHA 100 Forms	site during the field investigations.
6. Waybills	Once a shipment of samples is accepted by the courier, all waybill receipts will be maintained in a sealed envelope attached to the Master Sample Log (MSL). Also the MSL will list which samples were shipped under specific waybill numbers.

At the conclusion of each week of field sampling, the site field logs, master sample log and site laboratory notebook will be copied with the copies maintained in the project file at TRC in East Hartford, CT.

9.0 SCHEDULE

Task 3 activities will proceed according to the operations and sampling schedules presented in this section. These schedules are summarized in Table WP-3.

9.1 Operations Schedule

Site operations will commence within two weeks of receipt of a written authorization to proceed from NYSEG, if subcontractor availability permits. The project schedule for the work that will definitely be done, as well as work that is contingent on the ground water sampling results, is as follows:

Week	Task
0	Written authorization to proceed
2	Site setup
2	Lake bed and stream investigation, surface and near surface soil sampling. Monitoring well sampling

9.2 Sample Schedule

All samples (sediment, surface soil, near-surface soil, and monitoring well samples) will be collected during week 2.

TABLE WP-3

GENEVA SITE
TASK 3 SCHEDULE

TASK	1986	
	NOV	DEC
Task Authorization	*	
Soil Borings		**
Surface Soil Sampling		**
Lake Bed Investigation		**
Sediment Sampling		**
Air Quality Invest.		**
Well Sampling		**

10.0 COSTING

A cost breakdown is presented in Table WP-4. Toaal cost of the Task 3 work is $59,830.56.

TABLE WP-4

TASK 3 COSTS - GENEVA SITE

Discipline/Task	Hours	Amount
Manpower		
Project Management	240	$14,944.32
Data Analysis/Report Preparation	184	7,977.28
Field Work	169	6,536.58
Drafting	22	622.38
Secretarial	48	1,008.00
Total Manpower Costs	663	$31,088.56
Direct Costs		
1. Drilling		
Mobilization		500.00
Borings		2,500.00
2. Laboratory Analyses (19 Soil/sediment and 3 blind duplicates)		16,698.00
3. Other		
Equipment		$300.00
Travel and Subsistence		5,847.00
Expendibles		400.00
Computer Graphics		275.00
Reprographics, telephone, shipping		2,222.00
Total Direct Costs		$28,742.00
Total Cost		59,830.56