FINAL TASK 3 REPORT
INVESTIGATION OF THE FORMER COAL GASIFICATION SITE
GENEVA, NEW YORK

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1.0 INTRODUCTION

This is the third in a series of reports describing the ongoing investigation of the presence of coal gasification process residues at a New York State Electric and Gas Corporation (NYSEG) facility. The site discussed in this report is the Geneva coal gassification site located two miles east of Geneva, New York. Previously, TRC reported the presence of coking and coal gassification process residues in the soil, stream sediment, surface water and ground water at the site. Additional study was recommended to further define the extent of the site residues following the initial examinations described in the Task 1 and Task 2 reports.

TRC's Task 3 field investigation of the former coal gasification plant at Geneva (Border City), New York was conducted from December 15-17, 1986. This report summarizes those activities and the results of chemical analyses performed on soil, waste, sediment, and water samples collected during the field program.

The Task 3 investigation was designed to provide more detailed information that will be used for the Task 4 Site Risk Assessment and aid in developing remedial alternatives if they are needed.

1.1 Site History

A detailed history of the Geneva coal gasification site is provided in TRC's Task 1 and Task 2 reports (1986, 1987).

Briefly, the site is located two miles east of the City of Geneva, Seneca County, New York (Figure 1-1). The original plant was constructed during the period 1901 to 1903 by the Empire Coke Company. Blue gas production began in 1909 and ended in 1934. The property is currently the site of the NYSEG Geneva Service Center. The location of the present buildings and former structures is shown in Figure 1-2.

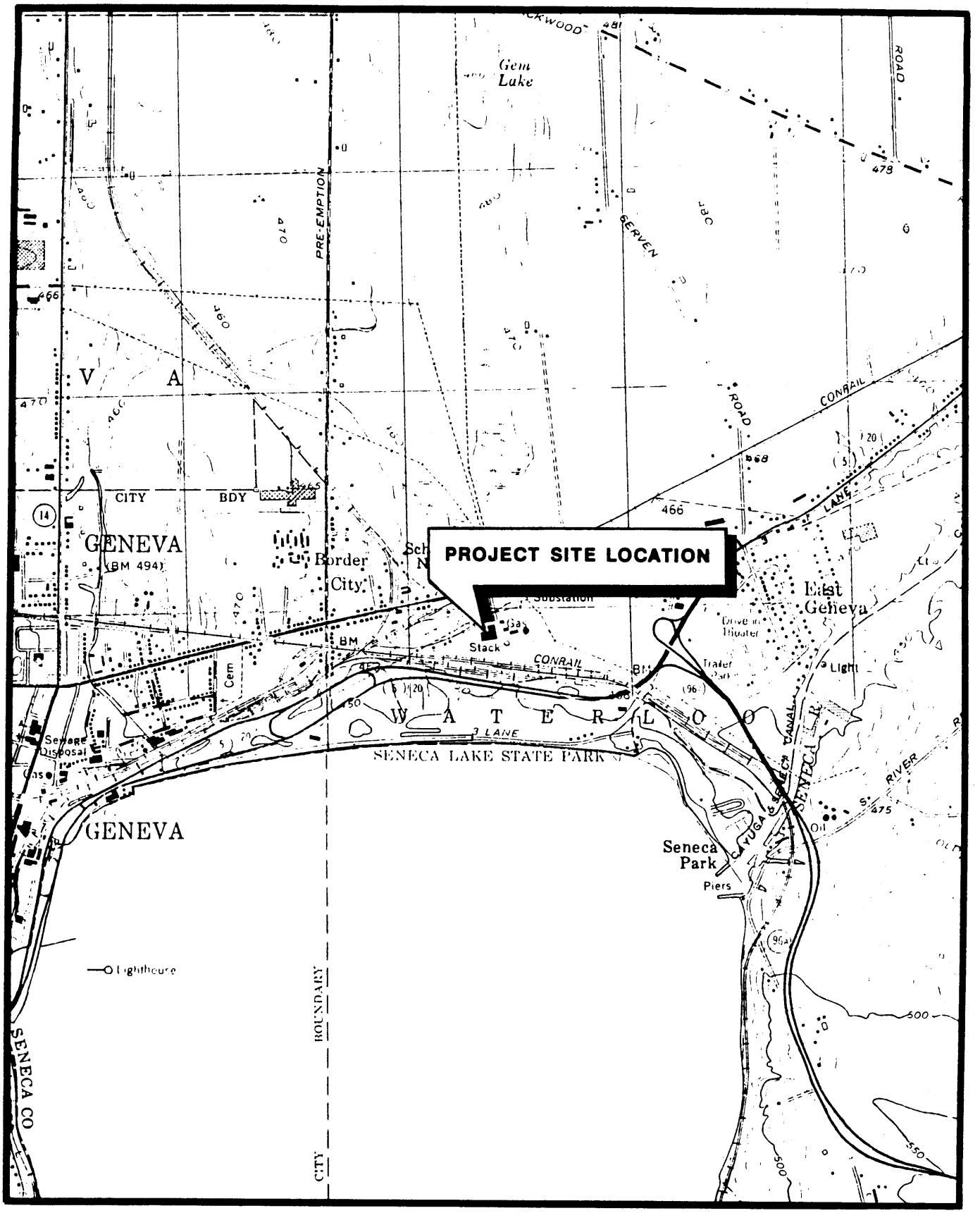

Figure 1-1. Location of the Former Geneva Coke Plant.

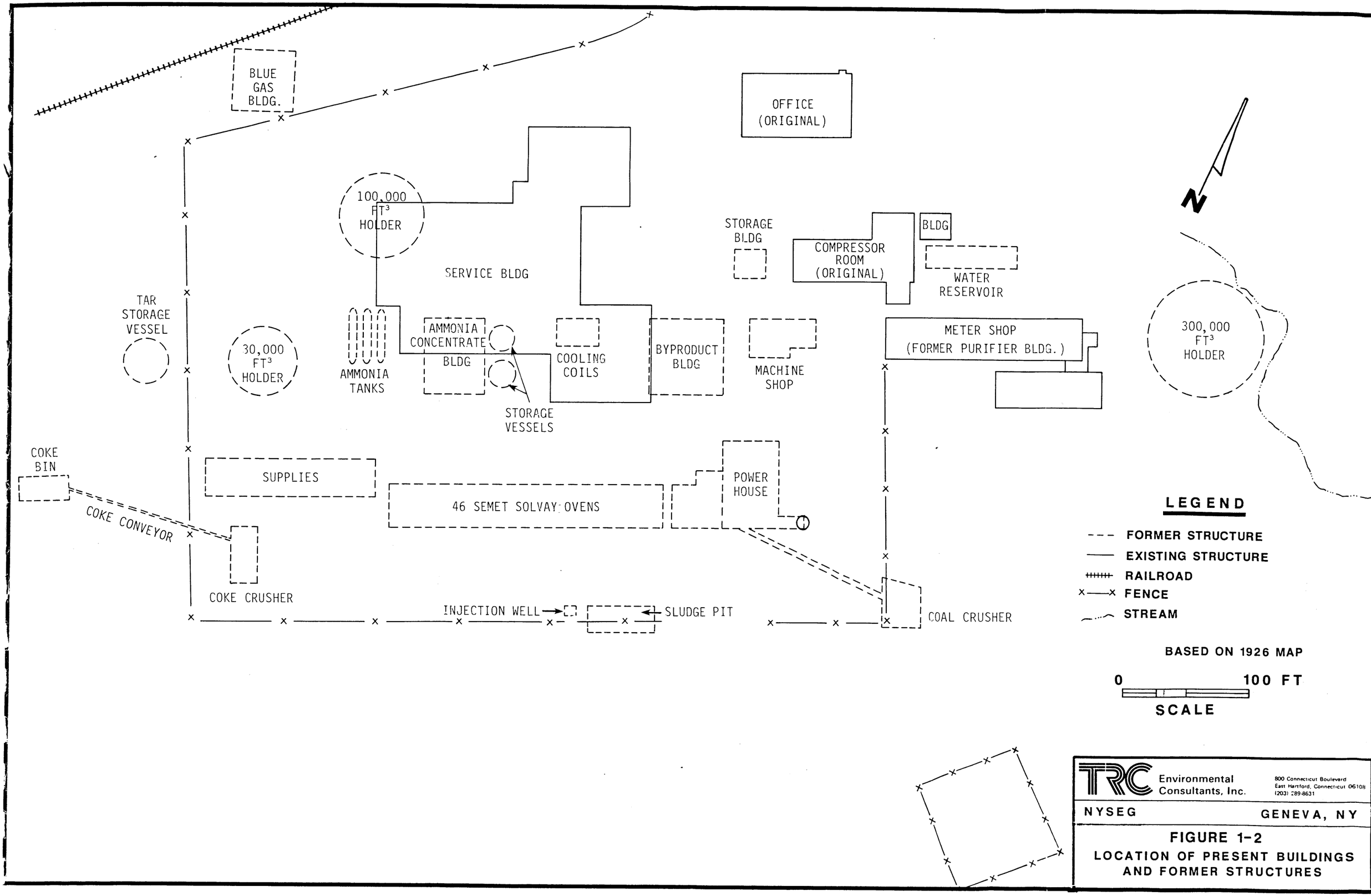

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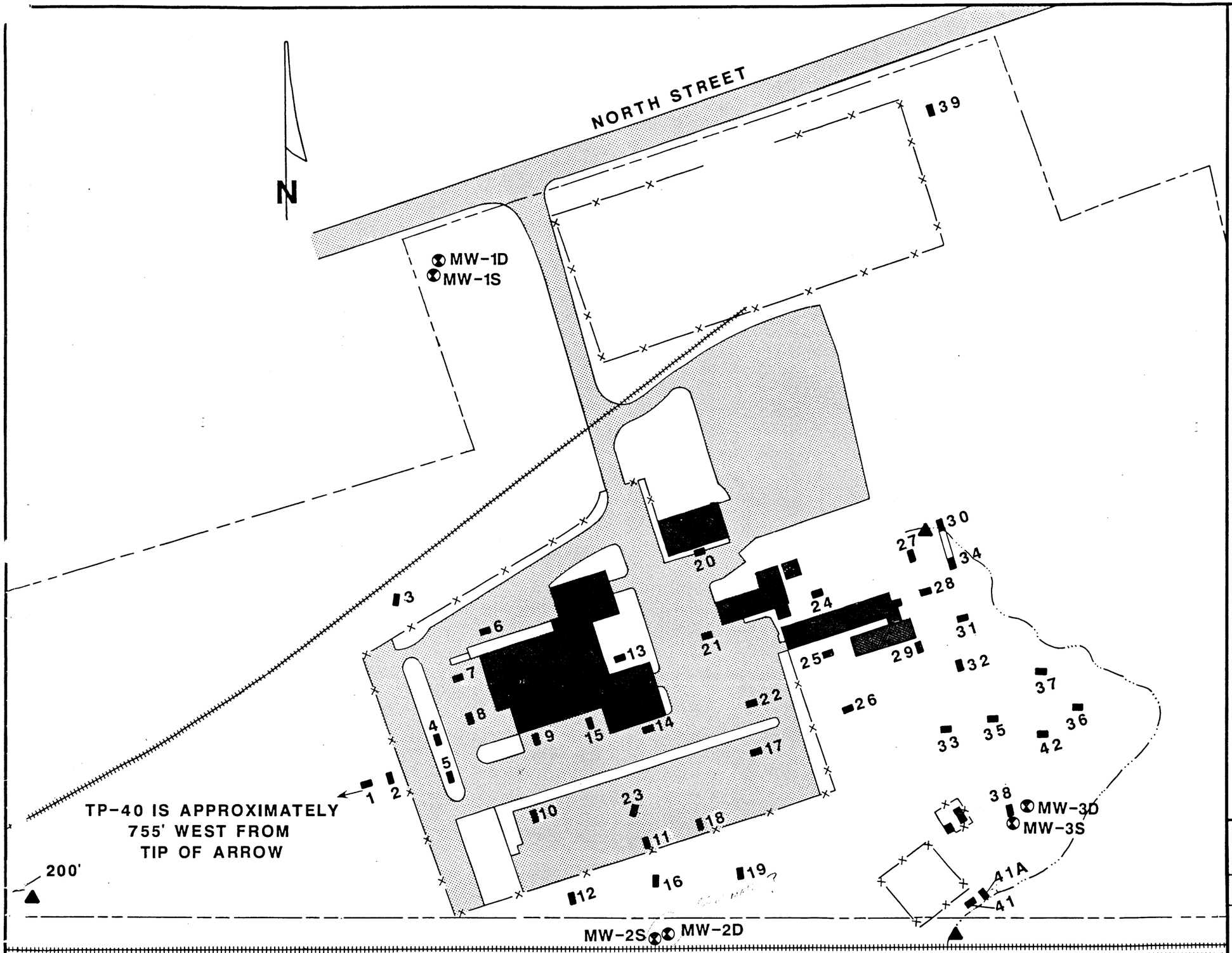
FIGURE 1-2
LOCATION OF PRESENT BUILDINGS AND FORMER STRUCTURES

A historical review of the site and its operations revealed that both solid and liquid wastes were disposed of on-site. The solid wastes included iron oxide impregnated wood shavings from the purification process and tars. These materials were disposed of in a somewhat confined area in the eastern section of the site and covered once yearly with soil. Also disposed of in this area were process waste water and wastes from drip boxes. Coke quench water was initially discharged to the site stream. In 1923, a concrete lined sludge basin was built to handle the coke quench water prior to discharge; and in 1927, a 336 foot deep injection well was installed at this site to dispose of the quench water. Other liquid wastes appear to have been disposed of in the eastern area of the site.

1.2 Previous Investigations

The results of TRC's Task 1 investigation, a background study including historical research, geophysical work, air quality monitoring, and Woodward-Clyde Consultants' borings, are presented in the Task 1 report and summarized in the Task 2 report.

TRC's Task 2 study consisted of: 1) excavation of forty-three test pits, 2) drilling of six test borings (3 nests of 1 deep and 1 shallow), 3) installation of six monitoring wells, and 4) air quality monitoring to determine background conditions as well as the effects of subsurface work on air quality. Soil samples were collected from the test pits and sediment samples were taken from the site streams. Three rounds of ground water and surface water samples were also collected. All samples were analyzed for purgeable aromatics, PAHs, non-chlorinated phenols and inorganics. Figure 1-3 shows the location of the Task 2 test pits, monitoring wells, and surface water and stream sediment sampling points. Figure 1-4 depicts the plant-related features identified during test pit excavations.



LEGEND

- PAVED AREA
- UNPAVED AREA
- BUILDING
- FENCE
- NYSEG PROPERTY LINE
- STREAM
- TEST PIT LOCATION
- MONITORING WELL LOCATION
- SURFACE WATER/STREAM SEDIMENT SAMPLE LOCATION

0 100 200 FT

SCALE

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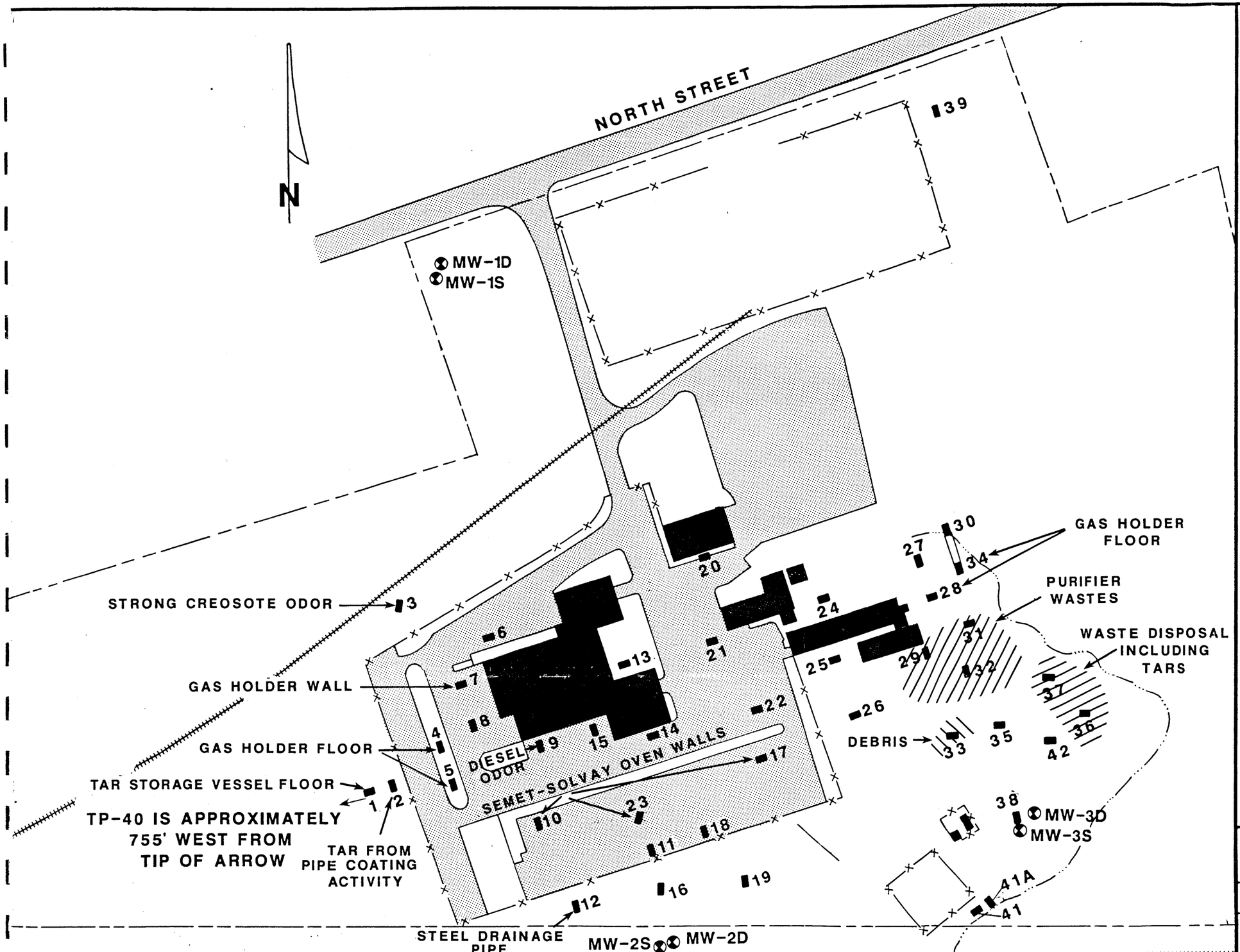
FIGURE 1-3
TASK 2 TEST PIT AND MONITORING WELL LOCATIONS



LEGEND

- PAVED AREA
- UNPAVED AREA
- BUILDING
- FENCE
- NYSEG PROPERTY LINE
- STREAM
- TEST PIT LOCATION
- MONITORING WELL LOCATION

0 100 200 FT

SCALE

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FIGURE 1-4

LOCATION OF PLANT-RELATED FEATURES FOUND IN TEST PITS

The hydrologic setting, based on water table elevation data gathered during the most recent (Round 4) sampling round on December 15, 1986, is shown in Figure 1-5.

A site stratigraphy was documented with data from test pits and boreholes. Task 2 additionally included a qualitative assessment of the potential risk to human health posed by the contaminants at the site.

Details of the Task 2 field investigation and results of the chemical analyses can be found in the Task 2 report (TRC, 1987).

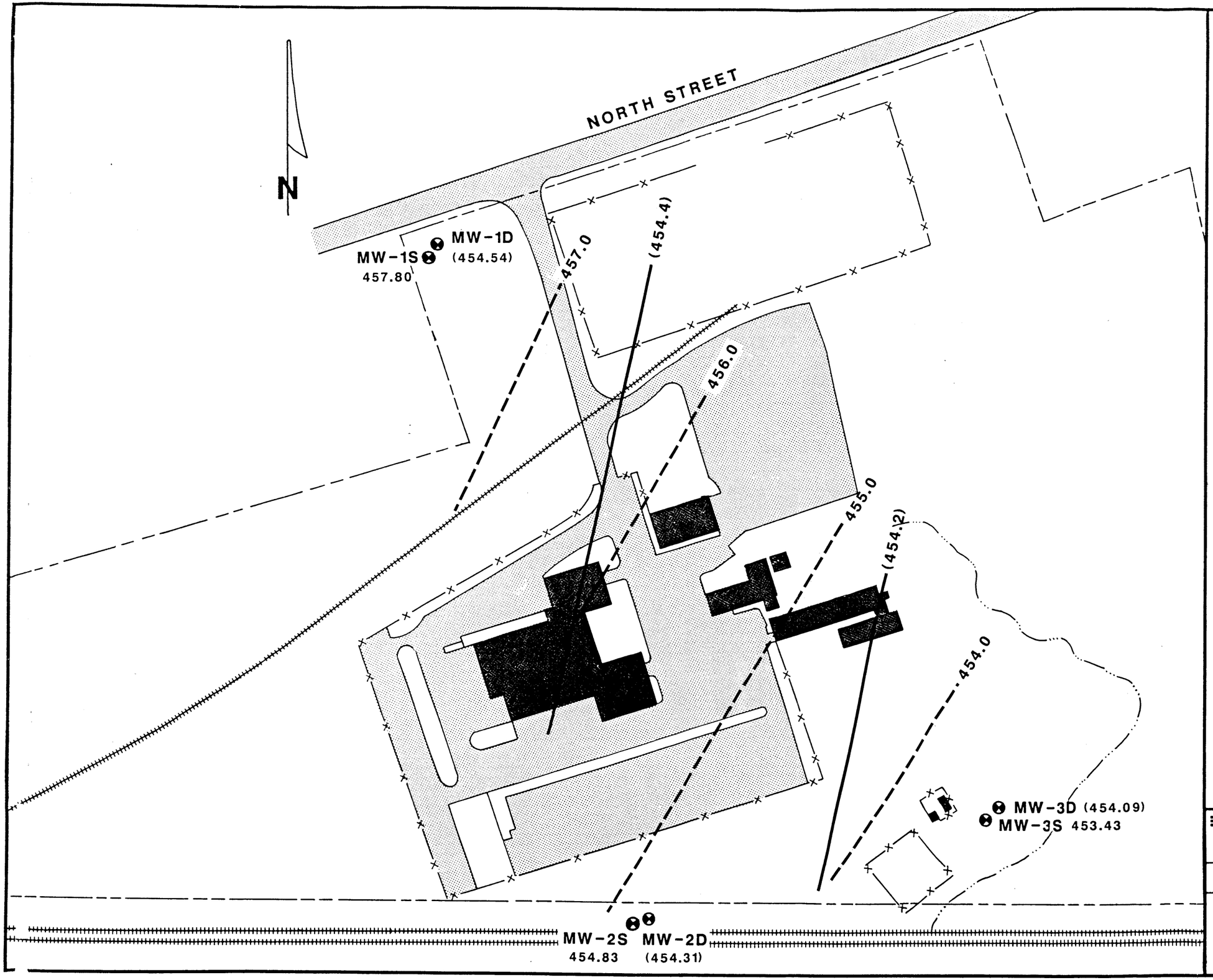
1.3 Summary of Task 2 Conclusions and Recommendations

Findings of the Task 2 field and analytical work include the following:

- Several plant-related structures and features (such as gas holders and disposal areas) were located.
- Elevated concentrations of coal gas manufacturing residues, e.g., PAHs and ferro-ferric cyanides, were identified in the soil in various areas within the site.
- Coal tar constituents were found in all monitoring wells during at least one sampling round. The New York State total regulated organic compounds standard was not exceeded, however, standards for some individual constituents, e.g. benzene, were exceeded.
- The shallow and deep ground water gradients were found to be in a southeasterly direction, toward the eastern site stream.
- Water and sediment samples from both of the site streams contained PAHs. Concentrations were highest in sediments close to the point where the streams leave the site.

These findings, as well as additional background research, allowed the identification of the following potential human health concerns:

- Potential direct contact and inhalation risk to workers doing subsurface work (and to a much lesser degree, visitors to the site during this work).
- Inhalation exposure to workers in crawl spaces and basements of on-site buildings.



LEGEND

- PAVED AREA
- UNPAVED AREA
- BUILDING
- FENCE
- NYSEG PROPERTY LINE
- STREAM
- MONITORING WELL LOCATION

WATER LEVEL ELEVATIONS:
ROUND 4 SAMPLING : DEC. 15, 1986

(454.09) ELEVATION IN DEEP WELL

453.43 ELEVATION IN SHALLOW WELL

DEEP WATER CONTOUR

SHALLOW WATER CONTOUR

CONTOUR INTERVALS:

- DEEP - 0.2'
- SHALLOW - 1.0'

0 100 200 FT

SCALE

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FIGURE 1-5
GROUND WATER LEVEL CONTOUR MAP

- Potential direct contact risk to people using Seneca Lake Park facilities.
- Possible contamination of ground water aquifers.

The Task 3 field work was based on data requirements developed from the Task 2 findings and the need to provide more detailed information for risk assessment and identification of remedial alternatives. Details of the field activities are described in the Task 3 Field Work Plan (Appendix H of the Task 2 report).

The Task 3 data acquisition objectives included obtaining more detailed information on: 1) the vertical and aerial extent of soil contamination, 2) the off-site migration of constituents, and 3) the presence or absence of organic vapors in crawl spaces beneath site buildings.

Section 2.0 of this report describes the field work performed, and Section 3.0 presents the analytical data and findings. A summary of the Task 3 work is presented in Section 4.0 and Section 5.0 contains TRC's recommendations for future work.

2.0 FIELD INVESTIGATION

The field work for Task 3 was conducted during December 15-17, 1986, and included: 1) drilling of test borings, 2) collection of soil, purifier waste, sediment, and water samples, 3) probing lake and stream sediments to determine the presence/absence of PAHs, and 4) conducting an air quality survey in the crawl spaces of two site buildings.

2.1 Test Borings

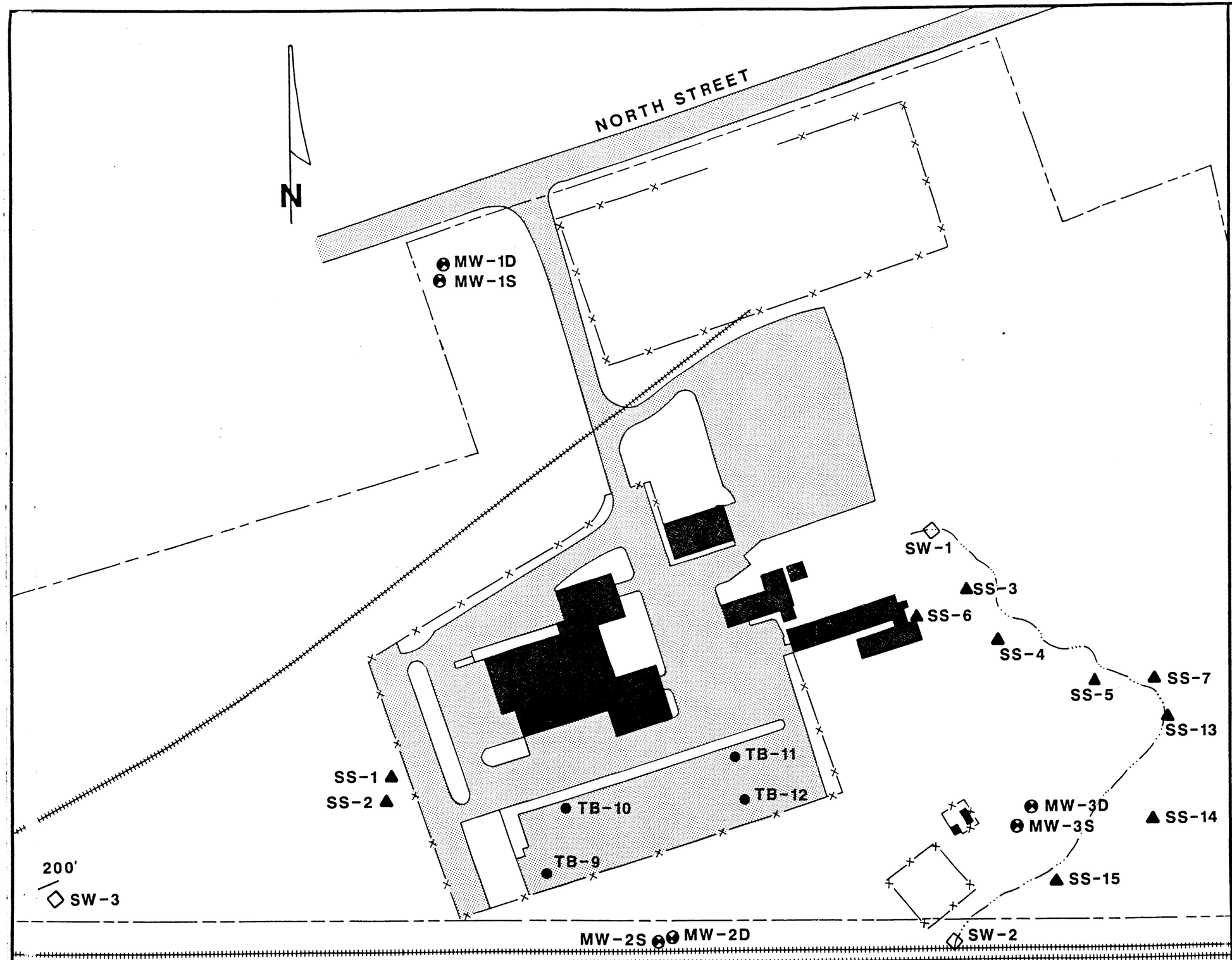
Four test borings were drilled by TRC's subcontractor, Empire Soils, Inc., in the parking area south of the main service facility building (See Figure 2-1 for sampling location). This area is the location of the former gas plant coke ovens, and soil samples previously collected there by Woodward-Clyde Consultants from depths of 6-8 feet were shown to contain PAHs. Soil samples from test pits excavated in this area during Task 2 contained levels of PAHs ranging from 60 to 267 ppm. These samples were taken at depths from 4 to 6.5 feet, and no visible contamination was noted.

The purpose of the Task 3 borings in this area was to examine and sample the soil at depths greater than those excavated during the test pit excavation program. Drilling was performed with a hollow stem auger, and continuous split-spoon samples were collected at depths from 5 to 19 feet. One composite sample was collected for chemical analysis from each boring (See Section 3.0 for analytical results). The samples were selected on the basis of visual, odor, or OVA evidence of possible contamination.

Boring logs and diagrams are presented in Appendix A, and the stratigraphy is discussed in Section 3.0.

2.2 Surface Soil/Waste Sampling

In order to provide data for direct contact risk assessment and to



LEGEND

- PAVED AREA
- UNPAVED AREA
- BUILDING
- FENCE
- NYSEG PROPERTY LINE
- STREAM
- MONITORING WELL (INSTALLED IN TASK 2)
- SURFACE SOIL/WASTE SAMPLE
- TEST BORING
- SURFACE WATER SAMPLE

0 100 200 FT

SCALE

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FIGURE 2-1

LOCATION OF SOIL BORINGS, SURFACE SOIL/WASTE SAMPLES, MONITORING WELLS AND SURFACE WATER SAMPLING POINTS

document the areal extent of contamination, nine surface soil samples and one purifier waste sample were collected. The sampling locations are shown on Figure 2-1, and the rationale for the collection of each sample is presented in Table 2-1.

Each soil sample was a composite collected per TRC Technical Standard T/S-971, Field Procedures for Collection of Surface Soil Samples. For risk assessment purposes, it is desirable to obtain an average concentration of constituents in a given area. Compositing samples allows a more representative concentration to be determined.

Sample SS-6 was a grab sample of material from a waste pile located beneath the rear door porch of the former purifier building.

Sample analytical results are presented in Section 3.0.

2.3 Stream/Lake Bed Investigation and Sampling

The Geneva Site contains two streams which extend through Seneca Lake Park. An investigation of these two site streams was performed to provide data on potential direct contact risk to people using the park facilities. In addition, those areas of the Seneca Lake shore near the stream inlets were investigated. Probing and sampling locations are shown in Figure 2-2.

The stream beds were probed in those areas where a natural stream bed exists in the park, i.e., in the northernmost portion of each stream. Probing of sediments in both streams resulted in oil films floating to the surface. Sediments of the western stream exhibited a coal tar-like odor. Composite sediment samples were taken from both streams and the analytical results appear in Section 3.0.

The streams discharge into Seneca Lake through culverts in a sea wall. The lake sediments were probed to a distance of 20 feet from shore approximately 250 feet in either direction from both points where the site

TABLE 2-1

SAMPLE LOCATION AND RATIONALE

FOR SURFACE SOIL/WASTE SAMPLE

Sample Number	Location/Rationale
SS-1 SS-2	Located in pipe-coating, storage vessel area
SS-3	Located in gas holder area
SS-4	Located in purifier waste disposal area
SS-5	Located in tar waste disposal area
SS-6	Purifier waste sample from pile located under the porch of the former purifier (gas meter) building
SS-7 SS-15 SS-13	Spoil pile from stream dredging
SS-14	In wooded area east of stream to define eastern limit of waste disposal areas.

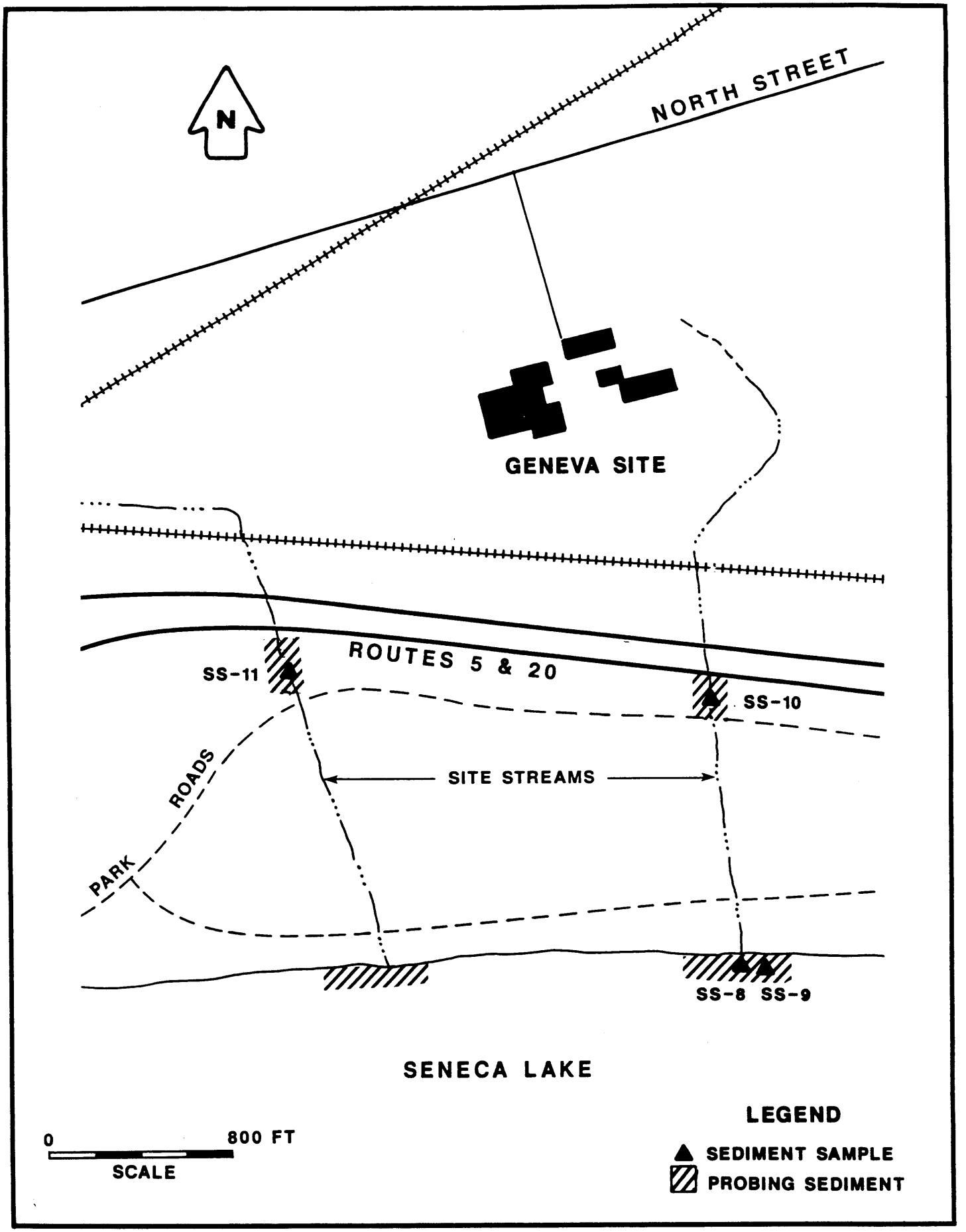


Figure 2-2. Location of Stream and Seneca Lake Sediment Samples and Investigation

streams enter the lake. No oil sheens were noted during the lake phase sediment probing.

Two composite lake sediment samples were collected near the eastern stream outlet. This was performed because sediments from this stream were found to contain the highest concentrations of PAH's and other constituents (TRC, 1987). One sample was collected 20 feet directly out from the eastern site stream culvert and the other was taken 115 feet east of that point. Analytical results for these samples are presented in Section 3.0.

2.4 Ground Water and Surface Water Sampling

Six ground water monitoring wells were installed at the Geneva site during the Task 2 investigation (See Figure 2-1 for well locations). Three rounds of sampling, one round every three months, were conducted as part of that task. In order to complete a program representative of one year of sampling, a fourth round was conducted during the Task 3 field work. Similarly, a year long surface water sampling program was completed with three samples collected from the site streams (one sample every four months).

Prior to sampling, the water level in each well was measured and recorded. Table 2-2 presents the water table elevation data with elevations from the previous measurements (Task 2) for comparison.

Ground water samples were collected in the same manner as in Task 2, i.e. 4 well volumes of water bailed from each well prior to sampling. Dedicated bailers were used to collect the samples in all but one well (MW-3D). Monitoring well MW-3D has a bulge in the riser wall which prevents the use of bailers. Therefore, an ISCO pump with dedicated PVC hose was used to sample that well. The pH, conductivity and temperature of each ground water sample were recorded at the time of collection.

Surface water was collected with a dedicated sampling jar, with sampling

TABLE 2-2

WATER LEVELS AND ELEVATIONS - GENEVA

Well Number	Casing Elevation	2/24/86 Water Depth	2/24/86 Water Elevation	5/1/86 Water Depth	5/1/86 Water Elevation	8/6/86 Water Depth	8/6/86 Water Elevation	12/15/86 Water Depth	12/15/86 Water Elevation
MW - 1S	459.05	1.98	457.07	1.75	457.30	1.50	457.55	1.25	457.80
MW - 1D	458.99	4.60	454.39	3.80	455.19	5.64	453.35	4.45	454.54
MW - 2S	463.09	7.73	455.56	7.99	455.10	8.96	454.13	8.26	454.83
MW - 2D	462.49	8.40	454.09	7.56	454.93	8.96	453.16	8.18	454.31
MW - 3S	458.88	5.17	453.71	5.42	453.46	9.41	449.47	5.45	453.43
MW - 3D	458.54	4.64	453.90	3.78	454.76	5.55	452.99	4.45	454.09
LAKE			446.2		446.2		446.6		446.05

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

(Modified From: Table 5-1, Geneva Site Task 2 Report, TRC, 1987.)

proceeding from downstream to upstream. The pH, conductivity, and temperature of each surface water sample was measured at the time of collection. This data is reported in Section 3.0.

All samples were shipped following TRC's chain of custody protocol to CompuChem Laboratories for analysis. The analytical results are presented in Section 3.0.

2.5 Air Quality Survey

During the preliminary risk assessment phase of Task 2, TRC noted that the air quality in the crawl spaces beneath two site buildings should be investigated. This element of concern was investigated during Task 3, and the results of that investigation are presented here.

Both buildings, the former purifier building (presently the gas meter lab) and the compressor room building, are original site structures. A 3-foot deep crawl space with a dirt floor exists beneath the compressor room building. A crawl space with a concrete floor containing 3 concrete bins used during coking operations exists beneath the former purifier building. Workers occasionally enter both of these areas to perform plumbing system maintenance.

The air quality survey was conducted using a Century model 98 Organic Vapor Analyzer (OVA). No readings above ambient levels were detected in the purifier building crawl space. A slight coal tar odor was noted beneath the compressor building; however, OVA reading were only 2 ppm above ambient in two locations.

3.0 FINDINGS AND ANALYTICAL RESULTS

The findings and analytical results of the Task 3 investigation are presented in this section. The analytical methods employed during this task differed slightly from those used in Task 2. A brief description of these methods are presented here.

3.1 Analytical Methods

The soil sample analyses were performed by TRC Laboratories and included several inorganic analytes not included in Task 2. These inorganic analytes included: arsenic, cadmium, chromium, and lead. These metals were selected because they were detected in some Task 2 ground and surface water samples. A complete list of the organic and inorganic compounds analyzed in the soil samples is presented in Table 3-1, and the analytical methods used are listed in Table 3-2.

Ground water and surface water organic and inorganic compound analyses were performed by CompuChem Laboratories following the same methods described in the Task 2 report. However, unlike Task 2, the total organic carbon analyses were also performed by CompuChem. A complete list of the compounds analyzed for is shown in Table 3-3, and the analytical methods used are presented in Table 3-2.

3.2 Test Borings

As described in Section 2.1, four test borings were performed, and samples were collected for analysis (See Figure 2-1 for boring locations). This section describes the stratigraphy encountered and presents the analytical data.

3.2.1 Stratigraphy

The stratigraphy described here is presented in diagrams and boring logs found in Appendix A.

TABLE 3-1

ORGANIC AND INORGANIC CHEMICAL

COMPOUNDS ANALYZED BY TRC LABORATORIES IN SOIL AND WASTE SAMPLE

Purgeable Aromatics:

Benzene
Chlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Ethylbenzene
Toluene

Polynuclear Aromatic Hydrocarbons:

Acenaphthene
Acenaphthylene

Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(g,h,i)perylene
Chrysene
Dibenzo(a,h)anthracene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenanthrene
Pyrene

Non-Chlorinated Phenols:

2,4-Dimethylphenol
2,4-Dinitrophenol
2-Methyl-4,6-Dinitrophenol
2-Nitrophenol
4-Nitrophenol
Phenol

Inorganic Compounds:

Arsenic
Cadmium
Chromium
Lead
Zinc
Organic Nitrogen
Cyanide, Total
Cyanide, Ferro-Ferric

TABLE 3-2

SUMMARY OF ANALYTICAL METHODS USED FOR SOIL AND WATER SAMPLE ANALYSES

Lab	Analysis Performed	Methods*
TRC	Purgeable Aromatics	602
	PAHs	610
	Nonchlorinated Phenols	604
	Inorganic Compounds:	
	Arsenic	7060 (soil)
	Cadium	7130 (soil)
	Chromium	7190 (soil)
	Iron	236.1
	Lead	7420 (soil)
	Zinc	289.1
	Organic Nitrogen	351.3
	Sulfate	375.2
	Total Cyanide	9010 (soil)
	Ferric-Ferro cyanide	9010 (soil)
CompuChem	Priority Pollutant (excluding PCB/Pesticides):	
	Purgeables	624
	Acid and Base/Neutral Extractables	625
	Trace Metals	200.7
	Total Phenols	420.1
	Total Cyanides	412B
	Total Organic Carbon	415.1

* 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).

TABLE 3-3

ORGANIC AND INORGANIC
COMPOUNDS ANALYZED 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 3-3 (continued)

Inorganic Compounds:
Antimony
Arsenic
Beryllium
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Selenium
Silver
Thallium
Zinc
Cyanide (total)
Sulfate
Total Organic Carbon

Fill, consisting of soil, brick fragments, gravel, and concrete, was encountered to depths of 13.5 feet as the borings were advanced. In all but one boring, these materials were underlain by a clay-rich silt layer ranging in thickness from 5 inches to 2 feet. Beneath the clay-rich silt layer, a very stiff red clay layer up to 6 feet in thickness was encountered. In TB-4, a 4 feet thick layer of silty clay was found to be interbedded with the stiff red clay. A very runny, wet, red clay was encountered at the bottom of the boring.

3.2.2 Analytical Data

The analytical data for the four boring samples is presented in Table 3-4. This table is a compilation of "hits" only. Analytes which were not detected are not listed.

No purgeable aromatics or PAHs were detected in TB-10, TB-11, or TB-12; and no non-chlorinated phenols were found in any of the samples.

Benzene (0.16 ppm) and toluene (0.03 ppm) were found in TB-9. Benzo (b) fluoranthene (2.73 ppm) was also detected in TB-9.

Ferric-ferro cyanides were found in TB-9 (6.99 ppm) and TB-12 (11.90 ppm). Arsenic, chromium, iron, and zinc were found in all samples, and cadmium and lead were detected in at least one sample.

3.2.3 Comparison to Regulatory Guidelines and Standards

There are no published guidelines or regulatory action levels for soil quality in New York State which can be compared to the analytical results for the Geneva Site. Generally, evaluations are performed on a case by case basis taking into consideration land usage, location of nearby water bodies, proximity to wells, etc.

TABLE 3-4
GENEVA TASK 3 TEST BORING ANALYTICAL RESULTS

CONSTITUENT	TB-9	TB-10	TB-11	TB-12	TB-12*
PURGEABLE AROMATICS (UG/G)					
BENZENE	0.16	<0.03	<0.03	<0.03	<0.04
TOLUENE	0.03	<0.03	<0.03	<0.03	<0.04
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/G)					
ANTHRACENE	0.66	<0.49	<0.51	<0.51	<0.50
BENZO(b)FLUORANTHENE	2.73	<1.93	<1.99	<1.98	<1.96
TOTAL PAHs	3.39	-	-	-	-
INORGANIC AND OTHER COMPOUNDS (UG/G)					
ARSENIC	8.80	18.50	11.00	11.90	8.20
CADMIUM	<1.87	2.06	<1.86	<1.78	<1.75
CHROMIUM	9.00	15.00	12.80	8.60	7.80
IRON	16000	23000	17900	21100	21400
LEAD	<34.90	<33.70	<34.6	34.50	32.50
ZINC	51.80	57.40	42.10	50.20	55.80
CYANIDE-IRON	6.99	<0.02	<0.20	10.10	11.90
CYANIDE-TOTAL	9.16	<0.02	<0.20	12.90	13.80
ORGANIC NITROGEN	1250	324	346	2340	2350
SULFATE	527	607	362	599	760

* Duplicate

3.3 Surface Soil and Waste Samples

One purifier waste sample and nine surface soil samples were analyzed for purgeable aromatics, PAHs, non-chlorinated phenols, inorganic compounds, metals, and organic nitrogen.

3.3.1 Analytical Data

The analytical data for the surface soil and waste samples are presented in Table 3-5 (see Figure 2-1 for sampling locations). This table is a table of "hits" only. Analytes which were not detected are not listed.

The range of total PAH concentration ("not detected" to 1834 ppm) is depicted graphically in Figure 3-1. Areas of the site which showed the highest concentration of PAH in the surface soil included the area of former pipe coating activities (SS-1 at 1834 ppm and SS-2 at 590 ppm) and the tar disposal area (SS-5, 293 ppm).

The northernmost stream dredging spoil pile sample, SS-7, contained 65 ppm total PAH; however, an adjacent spoil pile sample, SS-13, did not contain detectable PAH concentrations. The southernmost spoil pile sample, SS-15, contained 4 ppm PAH.

As would be expected, the purifier waste sample, SS-6, contained the highest concentration of ferric-ferro cyanide (2,520 ppm). Surface soil from the purifier waste disposal area contained 156 ppm (SS-4). The remainder of the samples exhibited concentrations ranging from 4 ppm in SS-1 to 222 ppm in SS-13 (spoil pile sample). A ferric-ferro cyanide concentration of 118 ppm was detected in the easternmost sample collected at the site (SS-14).

Three samples exhibited detectable concentrations of phenols. These included SS-1 (10 ppm total phenol), SS-4 (12 ppm), and the waste sample SS-6 (450 ppm). The majority of the phenol in SS-6 was found to be 2-nitrophenol.

Trace metals including arsenic, cadmium, chromium, and lead were found in the samples. Waste sample SS-6 was found to contain 9,600 ppm lead.

TABLE 3-5

GENEVA TASK 3 SURFACE SOIL/WASTE ANALYSES

CONSTITUENT	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-13	SS-14	SS-15
PURGEABLE AROMATICS (UG/G)										
BENZENE	0.13	<0.05	<0.04	<0.06	<0.09	0.25	<0.06	<0.07	<0.04	<0.04
TOLUENE	0.08	0.08	<0.04	<0.06	<0.09	0.23	<0.06	<0.07	<0.04	<0.04
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/G)										
ACENAPHTHENE	0.70	33.90	<0.37	<0.40	<0.42	<0.56	<0.41	<0.41	<0.41	<0.40
ACENAPHTHYLENE	21.80	38.80	<0.39	<0.42	2.12	<0.59	0.87	<0.44	<0.44	<0.43
ANTHRACENE	16.40	52.90	<0.47	<0.50	3.96	<0.69	0.86	<0.52	<0.52	<0.51
BENZO(a)ANTHRACENE	49.50	147.00	<0.72	<0.78	42.80	<1.08	5.06	<0.80	<0.80	<0.79
BENZO(a)PYRENE	60.00	81.90	<0.39	<0.42	<0.45	<0.59	6.80	<0.44	<0.44	<0.43
BENZO(b)FLUORANTHENE	<1.98	86.10	<1.82	<1.96	26.30	<2.71	5.00	<2.02	<2.02	<1.98
BENZO(k)FLUORANTHENE	126.00	96.70	<0.25	<0.27	30.80	<0.37	7.44	<0.28	<0.28	<0.27
BENZO(ghi)PERYLENE	<0.44	<0.39	<0.40	<0.43	<0.46	0.60	5.13	<0.45	<0.45	<0.44
CHRYSENE	50.00	149.00	<0.52	<0.56	39.30	<0.78	6.58	<0.58	0.84	1.47
DIBENZO(ah)ANTHRACENE	5.90	3.28	<0.40	<0.44	0.67	<0.60	<0.45	<0.45	<0.45	<0.44
FLUORANTHENE	103.00	357.00	<0.38	<0.41	69.10	<0.56	10.60	<0.42	<0.42	<0.41
FLUORENE	4.87	50.50	<0.39	<0.42	<0.44	<0.58	<0.42	<0.43	<0.43	<0.42
INDENO(1,2,3-cd)PYRENE	<0.42	47.90	<0.38	<0.41	28.10	<0.57	4.40	<0.42	<0.42	<0.42
NAPHTHALENE	16.10	75.40	<0.41	<0.45	1.88	4.17	0.83	<0.46	0.50	<0.45
PHENANTHRENE	48.20	346.00	<0.42	<0.45	11.30	<0.62	2.50	<0.46	<0.46	<0.45
PYRENE	87.70	268.00	<0.36	<0.39	64.00	<0.54	9.14	<0.40	<0.40	2.86
TOTAL PAHs	590.17	1834.38	-	-	293.33	4.77	65.21	-	1.34	4.33
NON-CHLORINATED PHENOLS (UG/G)										
2-METHYL-4,6-DINITROPHENOL	<7.55	<6.88	<7.00	<7.38	<7.93	15.20	<7.57	<7.72	<7.91	<7.65
2-NITROPHENOL	<3.15	<2.87	<2.92	<3.08	<3.30	435.00	<3.16	<3.22	<3.30	<3.19
4-NITROPHENOL	<5.03	10.30	<4.66	11.60	<5.29	<6.92	<5.04	<5.15	<5.27	<5.10
INORGANIC AND OTHER COMPOUNDS (UG/G)										
ARSENIC	11.40	53.00	9.10	35.40	85.70	3.40	16.90	9.90	13.20	14.10
CADMIUM	2.62	2.38	1.86	1.92	3.11	2.64	<1.84	<1.84	<1.84	<1.85
CHROMIUM	9.30	7.10	10.70	13.20	7.90	7.70	15.40	<5.10	14.60	10.20
IRON	19100	18000	18200	25800	24100	3500	24300	15800	27500	25400
LEAD	87.20	86.80	435.00	322.00	141.00	9640.00	117.00	<34.20	<34.3	34.40
ZINC	94.30	125.00	151.00	149.00	158.00	24.00	57.30	27.10	61.40	56.60
CYANIDE-IRON	11.40	3.88	87.10	156.00	7.00	2520.00	72.00	222.00	118.00	43.10
CYANIDE-TOTAL	13.90	10.10	91.00	229.00	42.00	4570.00	110.00	227.00	119.00	43.10
ORGANIC NITROGEN	2450	2965	559	2560	1560	4220	2160	2990	1480	1580
SULFATE	249	121	125	9130	343	72700	476	195	311	193

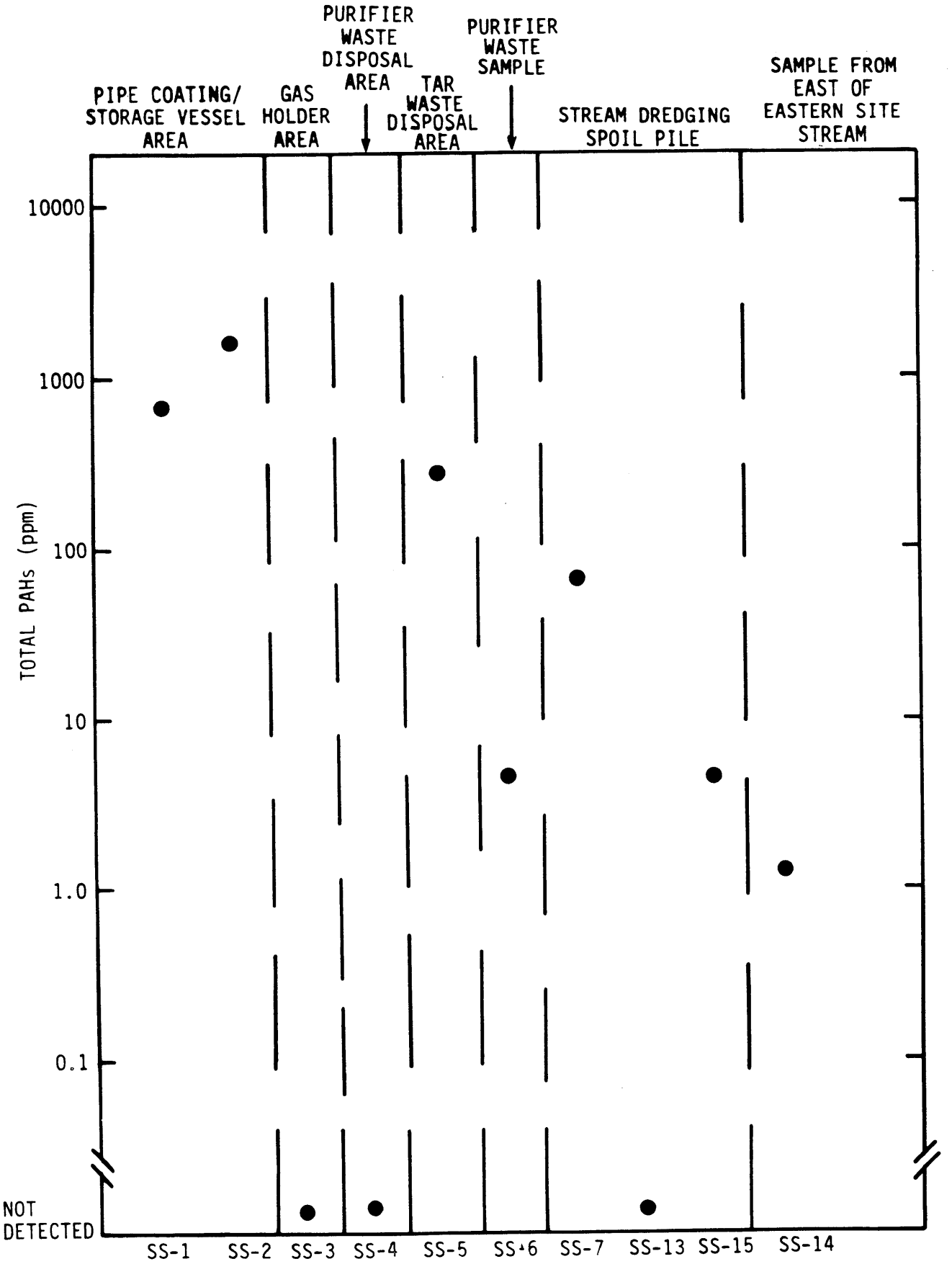


Figure 3-1. Total PAH concentration in surface soil and waste samples.

3.4 Stream and Lake Sediment Samples

The four stream and lake sediment samples collected from Seneca Lake Park were analyzed for purgeable aromatics, PAHs, non-chlorinated phenols, inorganic compounds, metals, and organic nitrogen. The analytical data for these samples are presented in Table 3-6 (See Figure 2-2 for sampling locations). This table is a table of "hits" only. Analytes not found in any of the samples are not listed.

The only PAH compound detected in any of these samples was benzo(k) fluoranthene. Concentrations of 0.75 ppm and 0.82 ppm were found in samples from the extension of the eastern site stream (SS-10) and easternmost lake sample (SS-9), respectively.

No detectable quantities of phenols were found in the sediment samples. Ferric-ferro cyanide was found only in SS-11, a sample from the extension of the western site stream in the park. The ferric-ferro cyanide concentration for this sample was found to be 0.74 ppm.

The two stream sediment samples, SS-10 and SS-11, were found to contain several of the trace metals including arsenic (20.7 ppm and 17.8 ppm respectively), cadmium (5.4 and 4.72 ppm), chromium (49.8 ppm and 41.0 ppm), lead (285 ppm in SS-11), and zinc (316 ppm and 595 ppm).

The lake sediment samples, SS-8 and SS-9, were each found to contain 0.4 ppm arsenic. Zinc was detected at concentrations of 23.7 ppm and 19.1 ppm respectively in each of these samples.

The significance of these concentrations relative to health concerns will be addressed in Task 4, Risk Assessment.

3.5 Ground Water and Surface Water Samples

This section contains the analytical results of the fourth round of ground water and surface water sampling (See Figure 2-1 for sampling locations).

TABLE 3-6

GENEVA TASK 3 STREAM AND LAKE SEDIMENT ANALYTICAL RESULTS

CONSTITUENT	SS-8	SS-9	SS-10	SS-11	SS-12 (1)
PURGEABLE AROMATICS (UG/G)					
TOLUENE	<0.03	<0.02	<0.08	<0.05	0.07
POLYNUCLEAR AROMATIC HYDROCARBONS (UG/G)					
BENZO(k)FLUORANTHENE	<0.28	0.82	0.75	<0.45	<0.47
TOTAL PAHs	-	0.82	0.75	-	-
INORGANIC AND OTHER COMPOUNDS (UG/G)					
ARSENIC	0.40	0.40	20.70	17.80	16.90
CADMIUM	<1.83	<1.85	5.39	4.72	4.52
CHROMIUM	<5.10	<5.10	49.80	41.00	38.60
IRON	2480	2350	48500	27900	28300
LEAD	<34.20	<34.40	<99.60	285.00	263.00
ZINC	23.70	19.10	316.00	595.00	553.00
FERRIC-FERRO CYANIDE	<0.20	<0.20	<0.20	0.74	<0.20
CYANIDE-TOTAL	<0.20	<0.20	6.94	1.82	1.87
ORGANIC NITROGEN	104.00	11	3140	3420	3310
SULFATE	<128	<130	3390	5580	6170

(1) Duplicate of Sample SS-11

Data from the previous three rounds can be found in the Geneva Site Task 2 report (TRC, 1987).

This section additionally contains a comparison of analytical results to New York State water quality criteria.

3.5.1 Analytical Results

Samples from the six monitoring wells and three surface water samples were analyzed for acid extractables, base/neutrals, volatile organics, total organic carbon, metals, total phenol, total cyanide, and sulfate. Two of the samples, MW-2S and MW-3D, were sampled in triplicate for QA/QC purposes.

Tables 3-7 and 3-8 present the data for ground water and surface water samples. These tables are summaries of "hits" only. Analytes which were not found in any of the samples are not listed.

At the time of collection, the temperature, pH, and conductivity of the samples were recorded. These data are shown in Table 3-9.

No acid extractables, base/neutral or volatile organic compounds were detected in wells MW-1S, MW-1D, MW-2D or MW-3S.

The concentration of total New York State regulated organic compounds ranged from 0.058 to 0.213 ppm among the MW-2S samples and from "not detected" to 0.020 ppm in the MW-3D samples.

Phenols were detected in all wells. The highest concentration (0.021 ppm) was found in MW-2S.

Several trace metals were found in the ground water samples. Arsenic and copper were found in all the samples, while antimony, beryllium, lead, mercury, selenium, and zinc were found in at least one sample.

Surface water sample SW-1, collected near the head of the eastern site stream, was the only stream sample found to contain PAHs (total PAH: 0.065 ppm). Sample SW-2, collected close to the point where that stream leaves the

TABLE 3-7

ANALYTICAL DATA - ROUND 4 GROUND WATER SAMPLES

CONSTITUENT	DETECTION LIMIT MG/L	SAMPLE ID	MW-1S	MW-1D	MW-2S	MW-4S (4)	MW-2S (4)	MW-2D	MW-3S	MW-3D	MW-5S (5)	MW-3D (5)
		DATE	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86
		SAMPLE TYPE	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB
	MG/L		MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
ORGANIC COMPOUNDS												
BASE NEUTRALS												
PHENANTHRENE	0.010		ND	ND	ND	ND	0.007 (2)	ND	ND	ND	ND	ND
FLUORANTHENE	0.010		ND	ND	0.025	0.011	0.039	ND	ND	ND	ND	ND
PYRENE	0.010		ND	ND	0.027	0.010	0.030	ND	ND	ND	ND	ND
BENZO(A)ANTHRACENE	0.010		ND	ND	0.020	0.007 (2)	0.025	ND	ND	ND	ND	ND
BIS(2-ETHYLHEXYL)PHTHALATE	0.010		ND	ND	ND	ND	ND	ND	ND	ND	0.020	ND
CHRYSENE	0.010		ND	ND	0.018	0.007 (2)	0.024	ND	ND	ND	ND	ND
BENZO(B)FLUORANTHENE	0.010		ND	ND	0.039 (1)	0.015 (1)	0.048	ND	ND	ND	ND	ND
BENZO(K)FLUORANTHENE	0.010		ND	ND	0.039 (1)	0.015 (1)	0.048	ND	ND	ND	ND	ND
BENZO(A)PYRENE	0.010		ND	ND	0.023	0.008 (2)	0.028	ND	ND	ND	ND	ND
INDENO(1,2,3-C,D)PYRENE	0.010		ND	ND	0.011	ND	0.012	ND	ND	ND	ND	ND
DIBENZO(A,H)ANTHRACENE	0.010		ND	ND	0.006 (2)	ND	0.006 (2)	ND	ND	ND	ND	ND
BENZO(G,H,I)PERYLENE	0.010		ND	ND	0.013	ND	0.016	ND	ND	ND	ND	ND
TOTAL ORGANIC CARBON	0.50		4.3	3.0	30	36	-	4.8	10	4.9	1.4	-
INORGANIC COMPOUNDS												
METALS												
ANTIMONY	0.035		ND	ND	0.081	0.065	0.065	ND	0.064	ND	ND	0.035
ARSENIC	0.003		(0.0074)	(0.0043)	(0.0083)	(0.0077)	(0.005)	0.013	(0.0068)	0.013	0.012	0.013
BERYLLIUM	0.001		ND	ND	ND	(0.0035)	ND	(0.0014)	(0.0035)	ND	ND	ND
COPPER			(0.017)	(0.017)	0.042	(0.023)	(0.022)	(0.017)	(0.017)	(0.013)	(0.017)	(0.022)
IRON			0.103	(0.029)	6.230	6.600	-	0.178	3.160	(9.8)	(0.048)	-
LEAD	0.0034		ND	ND	ND	ND	ND	ND	ND	ND	0.050	0.050
MERCURY	0.00020		ND	ND	0.00026	ND	0.0003	ND	ND	0.0015 (3)	ND	0.0003
SELENIUM	0.0028		ND	ND	ND	ND	ND	ND	ND	0.0055	(0.0036)	ND
ZINC			(0.016)	(0.006)	0.079	(0.016)	(0.0066)	(0.0064)	(0.018)	(0.006)	(0.0088)	(0.019)

TABLE 3-7 (Continued)

ANALYTICAL DATA - ROUND 4 GROUND WATER SAMPLES

CONSTITUENT	SAMPLE ID	MW-1S	MW-1D	MW-2S	MW-4S (4)	MW-2S (4)	MW-2D	MW-3S	MW-3D	MW-5S (5)	MW-3D (5)
	DATE	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86	12/15/86
	SAMPLE TYPE	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB
	DETECTION LIMIT MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
PHENOLS											
TOTAL PHENOL	0.010	0.010	0.010	0.021	0.012	0.019	0.012	0.010	0.010	0.010	0.010
CYANIDES,SULFATE											
TOTAL CYANIDE	0.010	0.010	0.010	1.9	2.1	1.9	0.010	0.010	-	0.010	0.010
SULFATE	3.0	55	160	1200	1100	-	280	1100	320	320	-

ND - Below Detection Limits
(1) Indistinguishable Isomers
(2) Estimated concentration; values are between the detection limit and one-half of that limit.
(3) The method blanks associated with this sample showed mercury contamination. Additional sample was not available for reanalysis.
(4) Duplicate of Sample MW-2S
(5) Duplicate of Sample MW-3D

( ) The result is a value greater than or equal to the instrument detection limit but less than the EPA Contract Laboratory Program Contract Required Detection Limit.

TABLE 3-8

ANALYTICAL DATA - ROUND 4 SURFACE WATER SAMPLES

CONSTITUENT	DETECTION LIMIT MG/L	SAMPLE ID: SW-1 DATE: 12/15/86 SAMPLE TYPE: GRAB MG/L	SW-2 12/15/86 GRAB MG/L	SW-4 (3) 12/15/86 GRAB MG/L	SW-3 12/15/86 GRAB MG/L
ORGANIC COMPOUNDS					
BASE NEUTRALS					
PHENANTHRENE	0.010	0.006 (2)	ND	ND	ND
FLUORANTHENE	0.010	0.011	ND	ND	ND
PYRENE	0.010	0.010	ND	ND	ND
BENZO(A)ANTHRACENE	0.010	0.007 (2)	ND	ND	ND
CHRYSENE	0.010	0.008 (2)	ND	ND	ND
BENZO(B)FLUORANTHENE	0.010	0.015 (1)	ND	ND	ND
BENZO(K)FLUORANTHENE	0.010	0.015 (1)	ND	ND	ND
BENZO(A)PYRENE	0.010	0.008 (2)	ND	ND	ND
VOLATILE ORGANICS					
TRANS-1,2-DICHLOROETHYLENE	0.010	ND	ND	ND	0.032
TRICHLOROETHYLENE	0.010	ND	ND	ND	0.009 (2)
TOTAL ORGANIC CARBON	0.50	37	16	13	5.3
INORGANIC COMPOUNDS					
METALS					
ANTIMONY	0.035	ND	0.035	ND	(0.039)
ARSENIC	0.003	0.042	(0.0051)	(0.0054)	ND
COPPER		0.042	0.042	(0.017)	(0.017)
IRON		64.500	4.570	4.660	0.548
LEAD	0.0034	0.207	0.013	0.0085	ND
SELENIUM	0.0028	ND	ND	ND	(0.0031)
ZINC		0.142	0.110	0.045	0.020

TABLE 3-8

ANALYTICAL DATA - ROUND 4 SURFACE WATER SAMPLES (Continued)

CONSTITUENT	SAMPLE ID DATE SAMPLE TYPE	DETECTION LIMIT MG/L	SW-1 12/15/86 GRAB MG/L	SW-2 12/15/86 GRAB MG/L	SW-4 (3) 12/15/86 GRAB MG/L	SW-3 12/15/86 GRAB MG/L
PHENOLS						
TOTAL PHENOL		0.010	0.015	0.010	0.013	0.010
CYANIDES,SULFATE						
TOTAL CYANIDE		0.010	0.019	0.023	0.024	0.010
SULFATE		3.0	240	140	140	79

ND - Below Detection Limits
(1) Indistinguishable Isomers
(2) Estimated concentration; values are between the detection limit and one-half of that limit.
(3) Duplicate of Sample SW-2

( ) The result is a value greater than or equal to the instrument detection limit but less than the EPA Contract Laboratory Program Contract Required Detection Limit.

TABLE 3-9

pH, Conductivity and Temperature
for Round 4 Ground Water and Surface Water Samples

Sample	pH	Conductivity (µMhos/cm)	Temperature (°C)
MW-1S	7.30	580	10.0
MW-1D	10.27*	620	10.0
MW-2S	7.38	2200	10.5
MW-2D	7.59	1000	11.0
MW-3S	6.94	1700	11.0
MW-3D	7.87	1150	10.5
SW-1	7.04	600	0.0
SW-2	6.77	355	0.5
SW-3	7.28	625	5.0

*Anomalous reading due to sampling error.

site, was the only sample found to contain volatile organics (0.032 ppm trans - 1,2 - dichlorethylene and 0.009 ppm trichloroethylene). Phenols were found in all surface water samples; the highest concentration (0.015 ppm) was found in SW-1.

Trace metals found in these samples included antimony, arsenic, copper, lead, selenium, and zinc.

3.5.2 Comparison to Regulatory Guidelines and Standards

The source of ground water and surface water quality criteria used for evaluating measured constituent concentrations was a New York State Department of Environmental Conservation (NYSDEC) Division of Water Technical and Operational Guidance Series (85-W-38) for Ambient Water Quality Standard and Guidance Values, dated July, 1985.

Ground water criteria listed in this document are from NYCRR Part 703 and apply to class GA ground water, i.e., waters which can be used for a potable water supply. Although the ground water down gradient of the site is not currently being used as a drinking water supply, it is NYSDEC's policy to evaluate all ground waters as though they are class GA.

A list of the ground water sample concentrations which exceed the NY State criteria is shown in Table 3-10. A similar list for the surface water samples is presented in Table 3-11. The surface water data is compared to Class C (secondary contact recreation and fishing) criteria. These criteria are used because New York State is currently in the process of upgrading all streams within the State to Class C. The surface water sample data is also compared to EPA Freshwater Aquatic Life Toxicity values (EPA, 1986) in Table 3-12. These values are not regulatory criteria, but were developed as aids to establishing regulatory standards. Comparisons of the data from the previous three rounds of sampling to these criteria can be found in the Geneva Site Task 2 report (TRC, 1987).

TABLE 3-10

COMPARISON OF NEW YORK STATE
GROUND WATER STANDARDS AND GUIDANCE
VALUES WITH ROUND 4 SAMPLE DATA

Constitutent	Standard (mg/l)	Guidance Value (mg/l)	Sample Concentration (mg/l)
Benzo (a) pyrene	ND	NL	0.028 (MW-2S)[1]
Chrysene	NL	0.000002	0.024 (MW-2S)[1]
Benzo (b) fluoranthene Benzo (k) fluoranthene	NL NL	0.000002 0.000002	0.048 (MW-2S)[1, 2]
Ideno (1, 2, 3-c,d) pyrene	NL	0.000002	0.012 (MW-2S)[1]
Total Phenols	0.001	NL	0.010 (MW-1S) 0.010 (MW-1D) 0.021 (MW-2S)[1] 0.012 (MW-2D) 0.010 (MW-3S) 0.010 (MW-3D)[1]
Total Regulated Organic Compounds	0.100	NL	0.213 (MW-2S)[1]
Antimony	NL	0.003	0.081 (MW-2S)[1] 0.064 (MW-3S) 0.035 (MW-3D)[1]
Beryllium	NL	0.003	0.0035 (MW-2S)[1] 0.0035 (MW-3S)
Iron	0.300	NL	6.60 (MW-2S)[1] 3.16 (MW-3S) 9.80 (MW-3D)[1]
Lead	0.025	NL	0.050 (MW-3D)[1]

ND = Not Detected
NL = Not Listed

[1]Well sampled in triplicate. Value given is the highest concentration per well for this constituent.

[2]Value represents the sum of Benzo (b) fluoranthene and Benzo (k) flouranthene which are indistinguishable isomers.

TABLE 3-11

COMPARISON OF NEW YORK STATE CLASS C
SURFACE WATER STANDARDS WITH ROUND 4 SAMPLE DATA

Constitutent	Standard (mg/l)	Sample Concentration (mg/l)
Iron	0.300	64.5 (SW-1) 4.66 (SW-2)[1] 0.548 (SW-3)
Zinc	0.030	0.142 (SW-1) 0.110 (SW-2)

[1]Sample collected in duplicate. Value given is the highest concentration detected.

Table 3-12

COMPARISON OF EPA FRESHWATER AQUATIC
LIFE TOXICITY VALUES WITH ROUND 4 SAMPLING DATA

Constiutent	Toxicity Value (mg/l) Chronic	Acute	Sample Concentration (mg/l)
Copper	0.003873-0.06036	0.01674-10.24	0.042 (SW-1) 0.042 (SW-2)[2] 0.017 (SW-3)
Iron	1.0[3]		64.500 (SW-1) 4.660 (SW-2)[2]
Lead	0.01226-0.1281	0.1425-235.9[1]	0.207 (SW-1) 0.013 (SW-2)[2]

[1]At a hardness of 50 mg/l.

[2]Sample taken in duplicate. The value given is the higher of the two sample concentrations.

[3]Value is a criteria, not a toxicity value.

4.0 SUMMARY

The following observations and conclusions can be made based on the data gathered during the Task 3 investigation:

- Based on OVA readings performed during Task 3, the air quality in the crawl spaces beneath the former purifier building and compressor room building does not appear to pose a health concern.
- No gross contamination was found in the near surface borings in the coke oven area. Analyses detected PAHs in TB-9 only.
- PAHs and ferric-ferro cyanides were found in the spoil pile from the stream dredging.
- The sediments from the extension of the western site stream exhibited coal tar-like odors, and disturbance of these sediments resulted in an oily sheen appearing on the surface. A sheen was also noted on the eastern site stream extension when these sediments were disturbed. Analysis of the eastern stream sample sediments detected 0.075 ppm total PAHs.
- No oily sheen was noted when lake sediments were disturbed near the point where the streams enter Seneca Lake.
- Several constituents were found in ground water samples at levels above regulatory guidelines and standards. These include: benzo (a) pyrene, chrysene, benzo (b) fluoranthene, benzo (k) fluoranthene, indeno (1,2,3-c,d) pyrene, total phenols, antimony, beryllium, iron and lead.
- Iron and zinc were found in the site surface water in concentrations above New York State Class C surface water standards.
- Iron, copper, and lead were found in the site surface water in concentrations above the EPA Freshwater Aquatic Life Toxicity Values.

The data collected during Task 3 will be used in the site risk assessment and to aid in developing remedial alternatives (if required).

5.0 RECOMMENDATIONS

Based on the results of the Task 3 investigation and the cumulative results of Task 1 and 2 investigations, TRC hereby recommends that the Geneva program move forward into Task 4 - Risk Assessment. This recommendation is based on the following:

1. A number of constituents associated with coal gasification residues have been found on or beneath the Geneva Site in concentrations that exceed either New York State Ground Water Standards or Guidance Values, or both.

2. Persons having access to the site (NYSEG employees or park visitors) may be potential receptors of these coal gasification constituents.

6.0 REFERENCES

New York State Department of Environmental Conservation, 1985, Division of Water Technical and Operational Guidance Series (85-W-38), Ambient Water Quality Standards and Guidance Values.

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, 57p.

TRC Environmental Consultants, Inc., 1987, Investigation of the Former Coal Gasification Site, Geneva, New York, Task 2 Report, for New York State Electric and Gas Corporation.

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-600/4-79-0220.

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.

APPENDIX A

TEST BORING LOGS

BORING LOG

PROJECT NO. 3436-N61-14 PAGE ___ OF ___ BORING NO. B-9

PROJECT: NYSEG-Geneva TOP OF CASING ELEVATION: ___ DATE STARTED: 12/15/86

CLIENT: New York State Electric and Gas WELL DEPTH: ___ COMPLETED: 12/15/86

LOCATION: Geneva, NY CASING STICK UP: ___ TOP OF SCREEN: ___

DRILLING CONTRACTOR: Empire Soils, Inc. WATER LEVEL: ___ BOTTOM OF SCREEN: ___

DRILLER: John Warner DRILLING METHOD: Hollow stem auger

TRC INSPECTOR: Lynne France COMPLETION AND DEVELOPMENT: ___

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-5					No sampling.	Bit jumped
5'-7'	4-5-5-6	55			Fill, fine to coarse black sand. Some gravel (up to 1/2" diameter). Hit water table at approximately 7'.	No OVA response.
7'-9'	8-7-10-10	90			Fill, fine to coarse black sand, wet.	Smells like coal tar. No OVA response.
9'-11'	10-8-16-12	50			Brown, very fine sand and silt, little clay.	Composite sample 7-11'.

BORING LOG

PROJECT NO. 3436-N61-14 PAGE ___ OF ___ BORING NO. B-10

PROJECT: NYSEG-Geneva TOP OF CASING ELEVATION: ___ DATE STARTED: 12/15/86

CLIENT: New York State Electric and Gas WELL DEPTH: ___ COMPLETED: 12/15/86

LOCATION: Geneva, NY CASING STICK UP: ___ TOP OF SCREEN: ___

DRILLING CONTRACTOR: Empire Soils, Inc. WATER LEVEL: ___ BOTTOM OF SCREEN: ___

DRILLER: John Warner DRILLING METHOD: Hollow stem auger

TRC INSPECTOR: Lynne France COMPLETION AND DEVELOPMENT: ___

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-4.5'					No sampling.	Easy drilling, bricks (as evidenced by cuttings) split spoon dropped to 9.
9'-11'	5-7-100 (0.3')					Refusal.
11.5'-13.5	9-11-14-18	60			11.5'-13' compacted fill, sand, fine to coarse, black-brown. At 13' 2" concrete plug. 13'2"-13'6" very viscous red clay.	
13.5-15.5'	9-9-12-11	100			Red clay, viscous, 15'3 - 15'6" contains silty layers.	Composite sample 13'2"-15'6".

BORING LOG

PROJECT NO. 3436-N61-14 PAGE ___ OF ___ BORING NO. B-11

PROJECT: NYSEG-Geneva TOP OF CASING ELEVATION: ___ DATE STARTED: 12/15/86

CLIENT: New York State Electric and Gas WELL DEPTH: ___ COMPLETED: 12/15/86

LOCATION: Geneva, NY CASING STICK UP: ___ TOP OF SCREEN: ___

DRILLING CONTRACTOR: Empire Soils, Inc. WATER LEVEL: ___ BOTTOM OF SCREEN: ___

DRILLER: John Warner DRILLING METHOD: Hollow stem auger

TRC INSPECTOR: Lynne France COMPLETION AND DEVELOPMENT: ___

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
11-13'	8-10-7-7	83			4-18" fill, broken concrete	
					18-23" brown clay, some silt and sand	
					23-24" viscous red clay	
13-15'	8-10-13-12	75			Red viscous clay	Composite sample: 11'17"-15'
15-17'		42			16"-19" Red clay	Borehole - 3ppm over background, no odor.
					19-20" Brown clay and sand	
					20-24" Wet, runny, red clay	
17-19'	3-2-1-1	67			16"-19" Red clay	
					19-20" Brown clay and sand	
					20-29" wet, runny, red clay	

BORING LOG

PROJECT NO. 3436-N61-14 PAGE ___ OF ___ BORING NO. B-12

PROJECT: NYSEG-Geneva TOP OF CASING ELEVATION: ___ DATE STARTED: 12/15/86

CLIENT: New York State Electric and Gas WELL DEPTH: ___ COMPLETED: 12/15/86

LOCATION: Geneva, NY CASING STICK UP: ___ TOP OF SCREEN: ___

DRILLING CONTRACTOR: Empire Soils, Inc. WATER LEVEL: ___ BOTTOM OF SCREEN: ___

DRILLER: John Warner DRILLING METHOD: Hollow stem auger

TRC INSPECTOR: Lynne France COMPLETION AND DEVELOPMENT: ___

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-5'					No sample taken	
5-7'	3-5-8-6	50			1-3" fine-coarse brown fill 3-12" black fill, some pitch, fine-coarse sand, brick fragments, coal	No OVA response, no odor.
7-9'	5-7-8-6	100			Black fill, fine-coarse sand, some gravel.	No odor, no OVA response.
9-11'	3-4-7-8	75			5-6" rock 6-24" Brown clay, some silt.	Composite sample from 5-11'.

BORING LOG

PROJECT NO. 3436-N61-14 PAGE ___ OF ___ BORING NO. B-12

PROJECT: NYSEG-Geneva TOP OF CASING ELEVATION: ___ DATE STARTED: 12/15/86

CLIENT: New York State Electric and Gas WELL DEPTH: ___ COMPLETED: 12/15/86

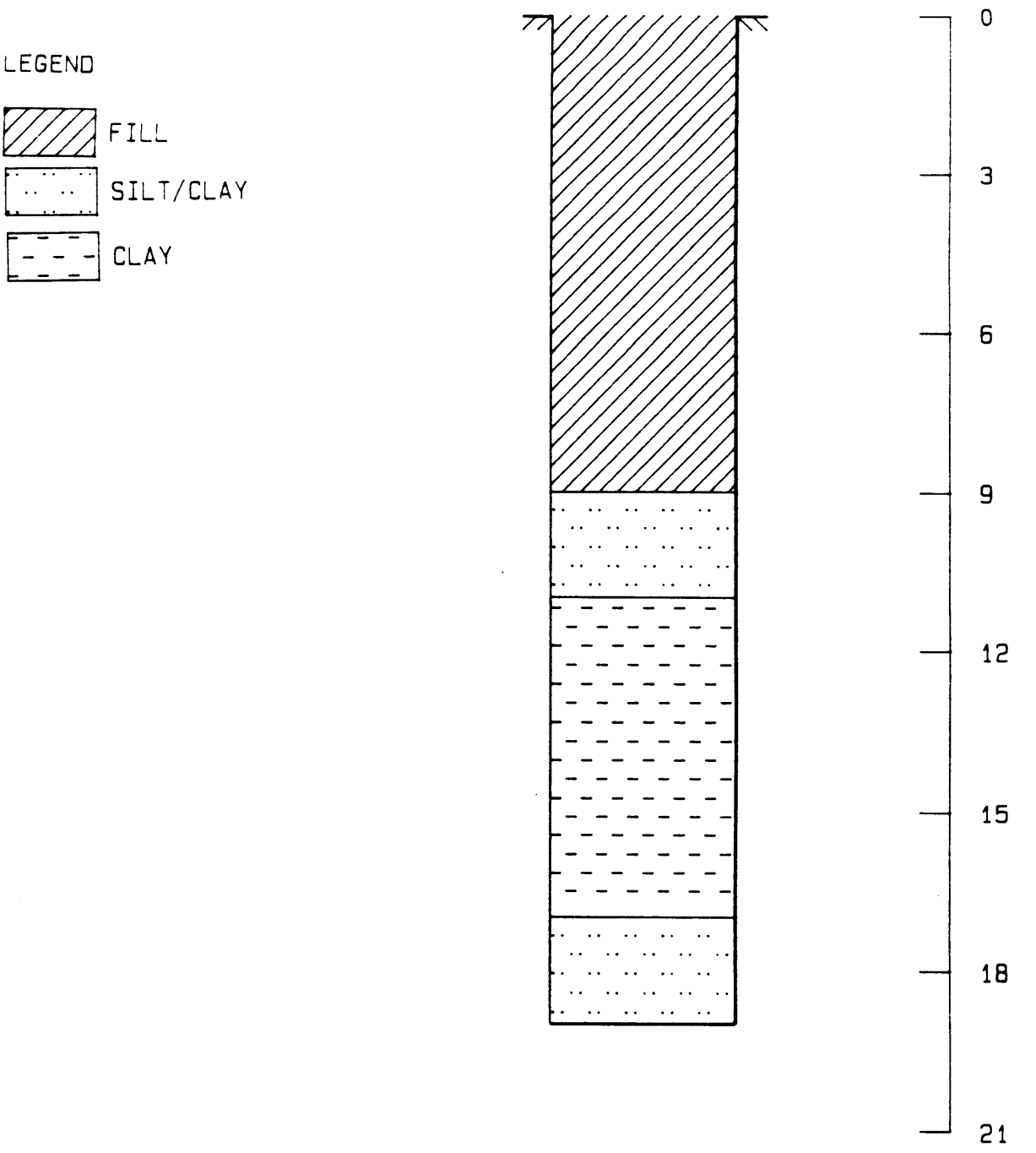
LOCATION: Geneva, NY CASING STICK UP: ___ TOP OF SCREEN: ___

DRILLING CONTRACTOR: Empire Soils, Inc. WATER LEVEL: ___ BOTTOM OF SCREEN: ___

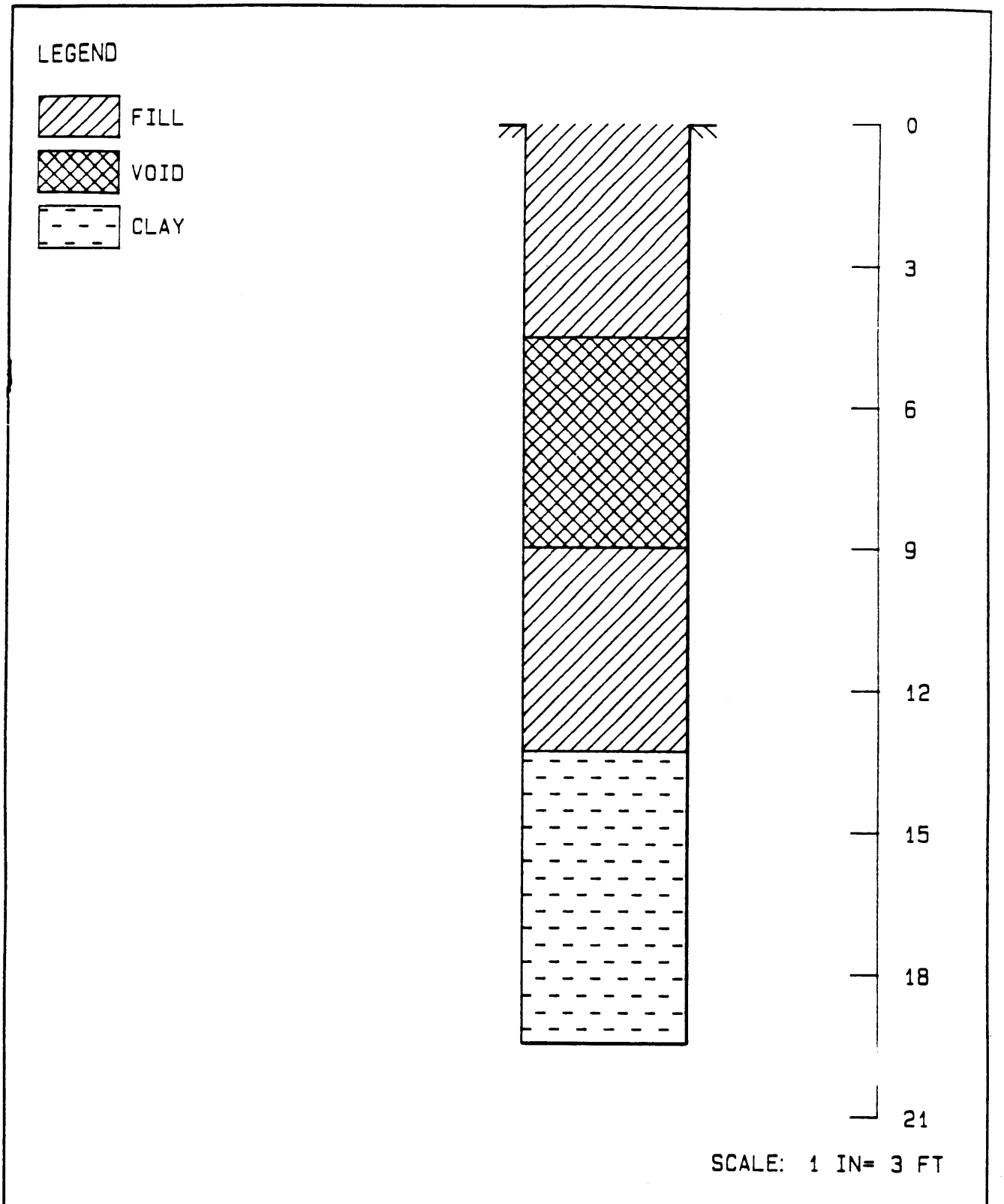
DRILLER: John Warner DRILLING METHOD: Hollow stem auger

TRC INSPECTOR: Lynne France COMPLETION AND DEVELOPMENT: ___

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
11-13'	6-10-12-12	33			Viscous red clay.	
13-15'	10-10-12-11	83			4-20" brown clay, some silt. 20-24" red brown clay.	
15-17'	6-4-4-4	100			Brown clay, some silt 20-24," varved, fine silt layers in red clay.	
17-19'	2-2-1-1	100			0-8" Brown clay. 5-24" very wet, runny, red clay.	No OVA response from borehole.



PROJECT: NYSEG-GENEVA FILE: 3292-N61 LOCATION: GENEVA NY	**B-9 LITHOLOGY**
TRC ENVIRONMENTAL CONSUL.	FIGURE 1



PROJECT: NYSEG-GENEVA FILE: 3292-N61 LOCATION: GENEVA NY	**B-10 LITHOLOGY**
TRC ENVIRONMENTAL CONSUL.	FIGURE 2

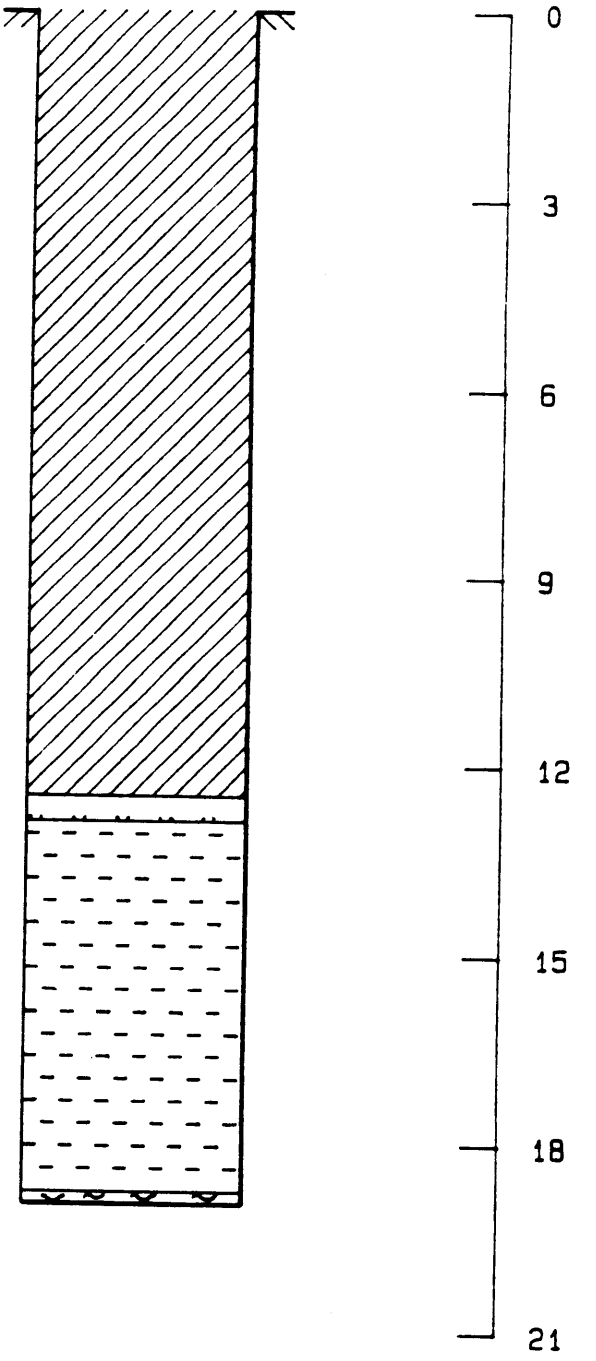
LEGEND

FILL

SILT/CLAY

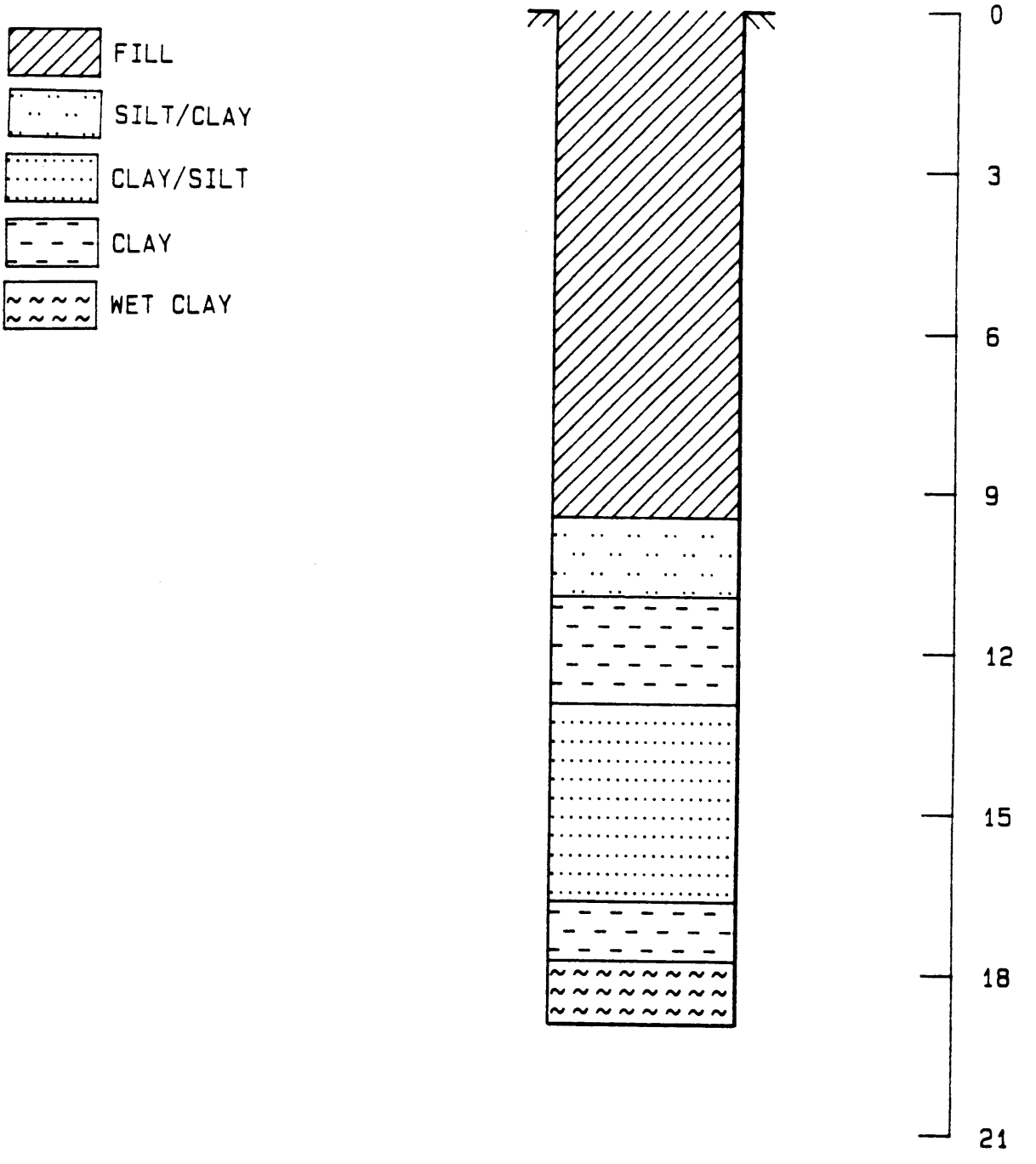
CLAY

WET CLAY



SCALE: 1 IN= 3 FT

PROJECT: NYSEG-GENEVA FILE: 3292-N61 LOCATION: GENEVA NY	**B-11 LITHOLOGY**
TRC ENVIRONMENTAL CONSUL.	FIGURE 3



PROJECT: NYSEG-GENEVA FILE: 3292-N61 LOCATION: GENEVA NY	**B-12 LITHOLOGY**
TRC ENVIRONMENTAL CONSUL.	FIGURE 4