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NEW YORK STATE ELECTRIC & GAS CORPORATION
INVESTIGATION OF THE FORMER
COAL GASIFICATION SITE IN
ONEONTA, NEW YORK

TASK 1 REPORT
PRELIMINARY SITE EVALUATION

AUGUST 1986

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1.0 INTRODUCTION

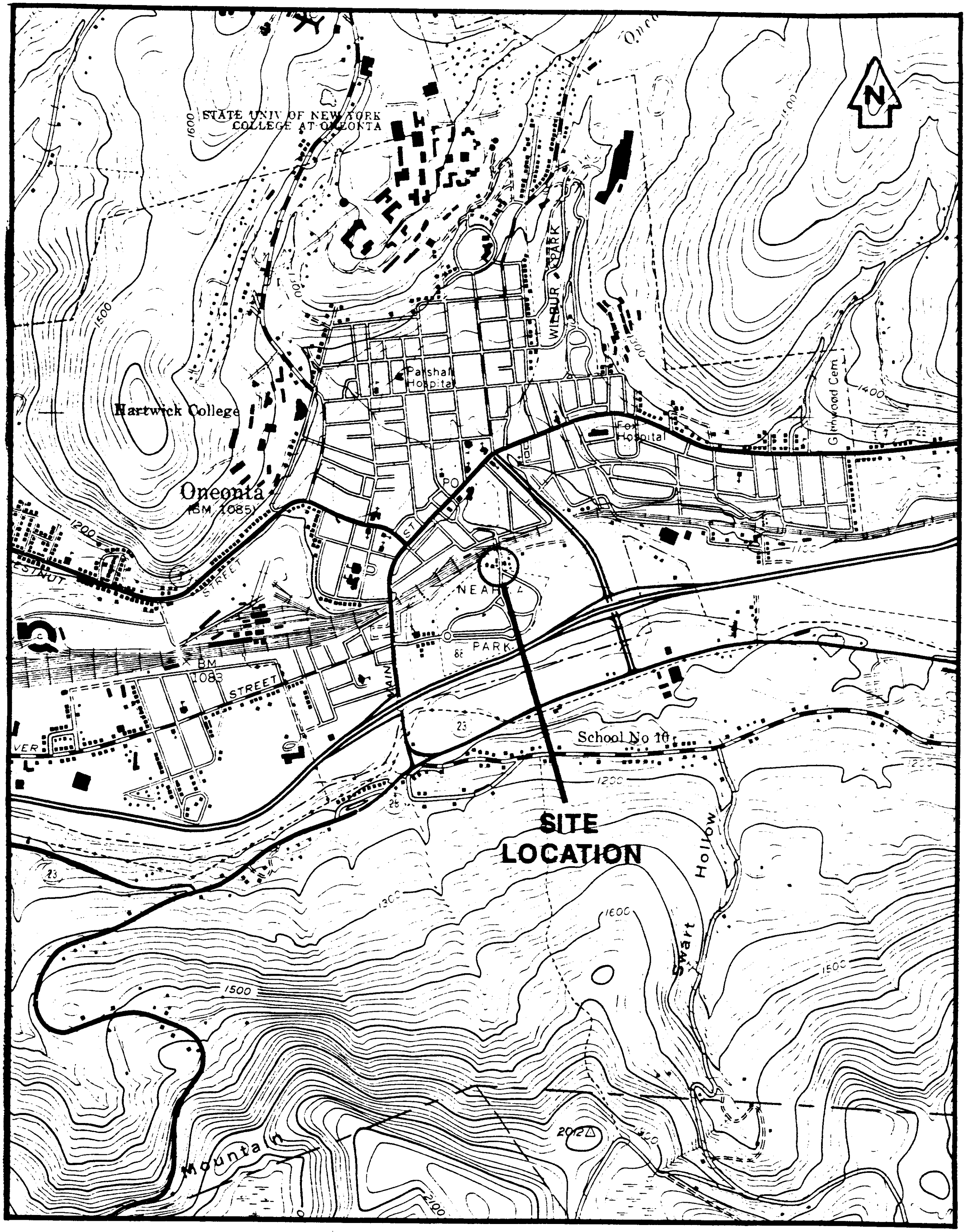
On April 21, 1986 TRC Environmental Consultants, Inc. (TRC), under contract to the New York State Electric and Gas Corporation (NYSEG), initiated investigation of the former coal gasification site on Gas Avenue, Oneonta, New York (Figure 1-1). TRC is to provide NYSEG with an investigation consisting of up to five separate tasks which include:

- Task 1 - Preliminary Site Evaluation.
- Task 2 - Initial Test Pit Program/Well Installation/ Sample Analyses.
- Task 3 - Expanded Problem Definition Program.
- Task 4 - Risk Assessment.
- Task 5 - Conceptual Remedial Design.

This report documents the results of Task 1 activities, the Preliminary Site Evaluation.

The purpose of Task 1 is to prepare a concise history of the site activities during the coal gasification plant's approximately 70 years of operation and to identify those areas of the property which may be contaminated by waste products from the plant. This information is used to develop an investigative strategy that is detailed in the attached Task 2 Sampling Plan, which on approval from NYSEG, will be implemented in Task 2.

The information collected for the Oneonta site history was generated from two visits by the TRC staff. On April 21 and 22, TRC visited the City of Oneonta Department of Public Services, the tax assessor's office, the local library, the State Historical Library in Cooperstown, and the Oneonta NYSEG office to conduct an interview with a former employee of the plant. During the week of April 28, 1986 additional interviews were conducted and a preliminary geophysical survey was performed. The information gathered during



from Oneonta, NY 7.5' USGS Topographic Map

0 3000 FT
SCALE

Figure 1-1. Oneonta Site Location Map

these visits is discussed in the following sections: Section 2.0 Site History, Section 3.0 Site Setting, Section 4.0 Preliminary Site Data, Section 5.0 Conclusions, and Section 6.0 Recommendations.

2.0 SITE HISTORY

During the periods of April 21 through 22, and April 28 through May 2, 1986, TRC visited the Oneonta area to gather information on the history of the Oneonta coal gasification plant operations. Historical photographs and maps were provided by NYSEG and an additional photograph and newspaper articles were obtained from Huntington Memorial Library.

Two NYSEG employees, Mr. Deforest Finch, semi-retired, and Mr. Ed Tate were interviewed to develop a more complete history of the plant processes. Both men worked as coal shovelers at the coal gasification plant and were familiar with operations of the plant.

The discussion of unit operations and review of the site conditions helped to determine potential sources of waste, areas in which wastes were handled, and disposal practices. The information collected during TRC's visits to the area is summarized and presented in the following four sub-sections.

2.1 Site Chronology

The Oneonta Gas Light Company was organized by M. L. Ford in 1881 and the plant was constructed on land purchased from Mr. and Mrs. B. VanSteenbergh. Gas was first admitted into the mains in January 1882. In 1887 the Gas Light Company merged with Oneonta Electric Power and Light Company (Milener, 1983). Additional land was sold to the gas company in 1888 by William T. Russell. More property at the site was bought from the City of Oneonta in 1909, and from Standard Oil Company of New York in 1914. Four years later, in 1918, the Electric Power and Light Company became part of Ithaca Gas and Electric Company, the parent company of New York State Electric and Gas.

A 1920 map of the site (Figure 2-1) indicates that three gas holders existed at that time: one 100,000 cu. ft., one 15,000 cu. ft. and one 10,000 cu. ft. These were located on the west side of Gas Avenue, south of Mill Race

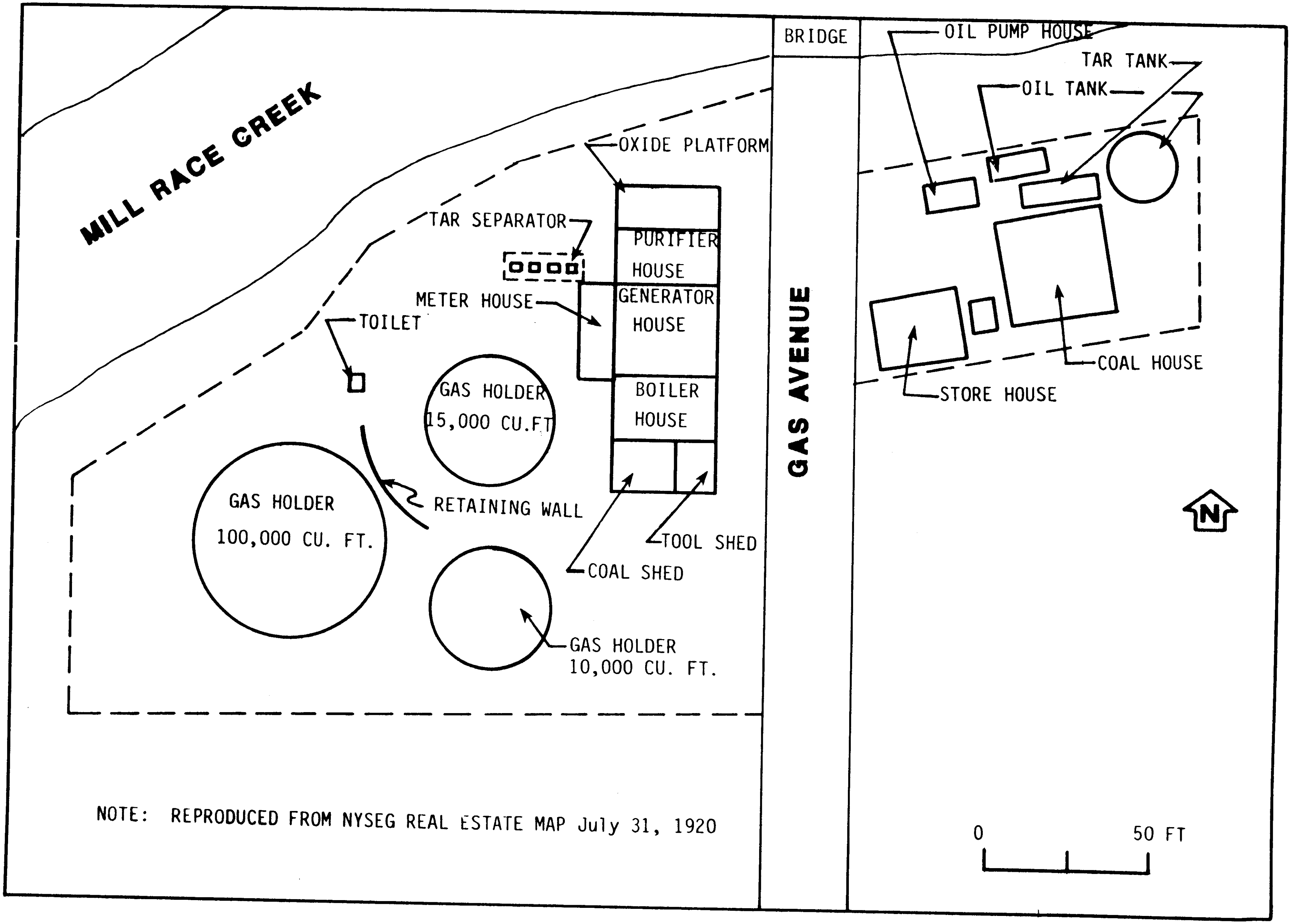


Figure 2-1. Oneonta Coal Gasification Plant, 1920.

Creek and west of the purifier house, oxide platform (purifiers), tar separators, generator and boiler house, and coal and tool sheds. On the east side of Gas Avenue there were two oil tanks, a coal house, oil pump house, tar tank and storage house.

By 1943 the gas plant had added six carburetors and two tar separator pits along the southern end of the plant building. Additional changes include the replacement of two smaller gas holders with one 28,000 cu. ft. relief holder and a new 100,000 gal. oil tank constructed west of the large gas holder (Figure 2-2). New purifiers were built west of the former oxide platform and the tool and coal sheds were removed and a tar tank and scrubber were located next to the purifiers. A garage, gas pressure tank, and two pump houses had been constructed on the east side of Gas Avenue. The oil tank and coal house which had also been located on the east of the road, had been removed. There appears to be some inconsistencies between Figure 2-1 and 2-2 such as magnetic North, the size of Mill Race Creek, and the location of the 100,000 cu ft gas holder.

An additional oil tank, with a 20,000 gal. capacity, had been constructed by 1947 and larger tar tanks were added to those on the east side of Gas Avenue (Figure 2-3).

Production records kept by the New York State Public Services Commission indicate that water gas was produced at the site since at least 1907. During the 40 years between 1910 and 1950 production steadily increased (Figure 2-4). The plant experienced an approximate 40 percent increase in output between 1945, when output was 81,120 MCF (MCF = 1,000 Ft^3) and 1948, when the plant reached peak output of 112,127 MCF.

A conversion factor of 1 gal of dry tar/thousand cu. ft. of gas produced (Environmental Research and Technology, Inc., 1984), was used to estimate tar production volumes. The approximate calculated volume of dry tar produced at

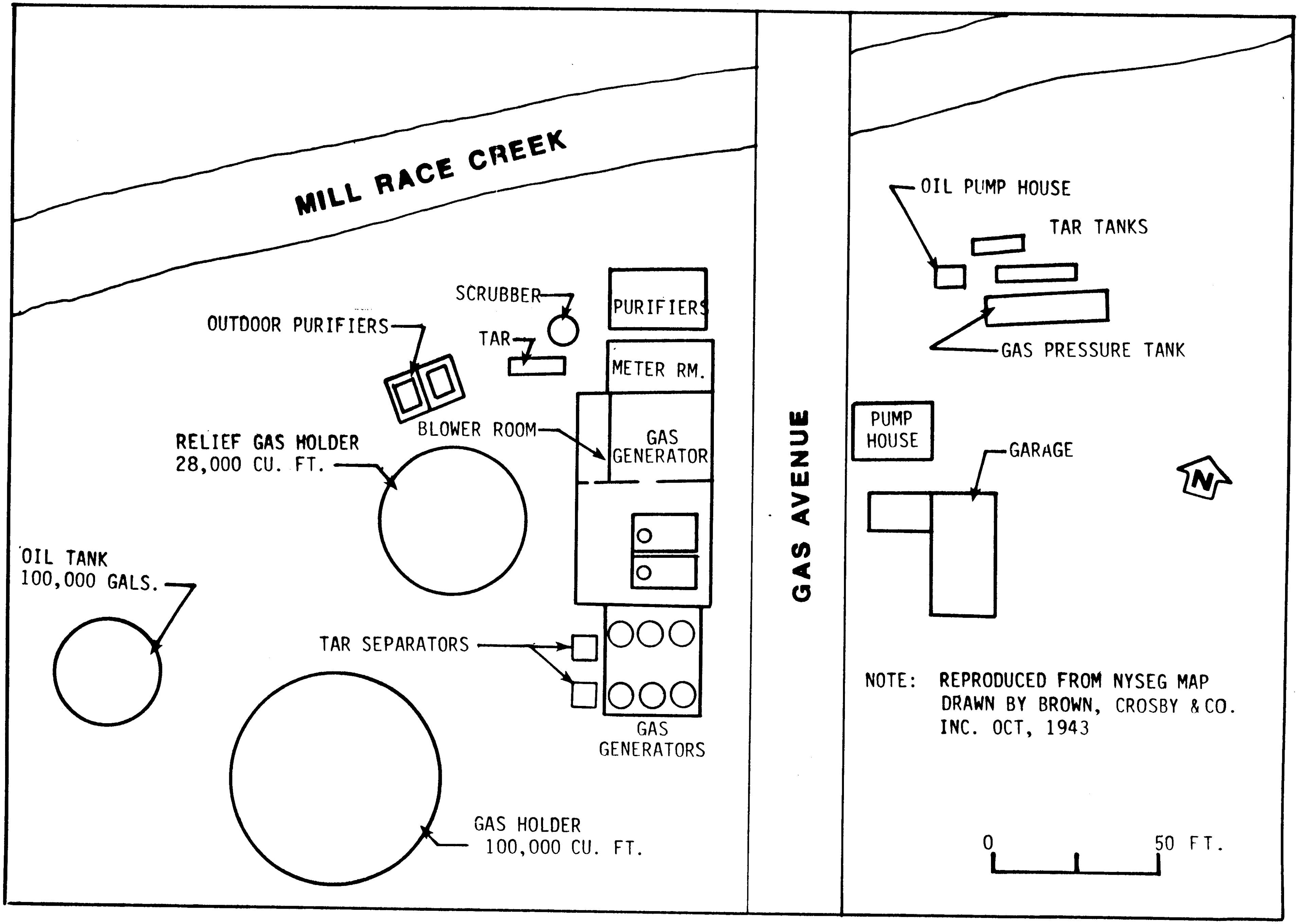


Figure 2-2. Oneonta Coal Gasification Plant, 1943.

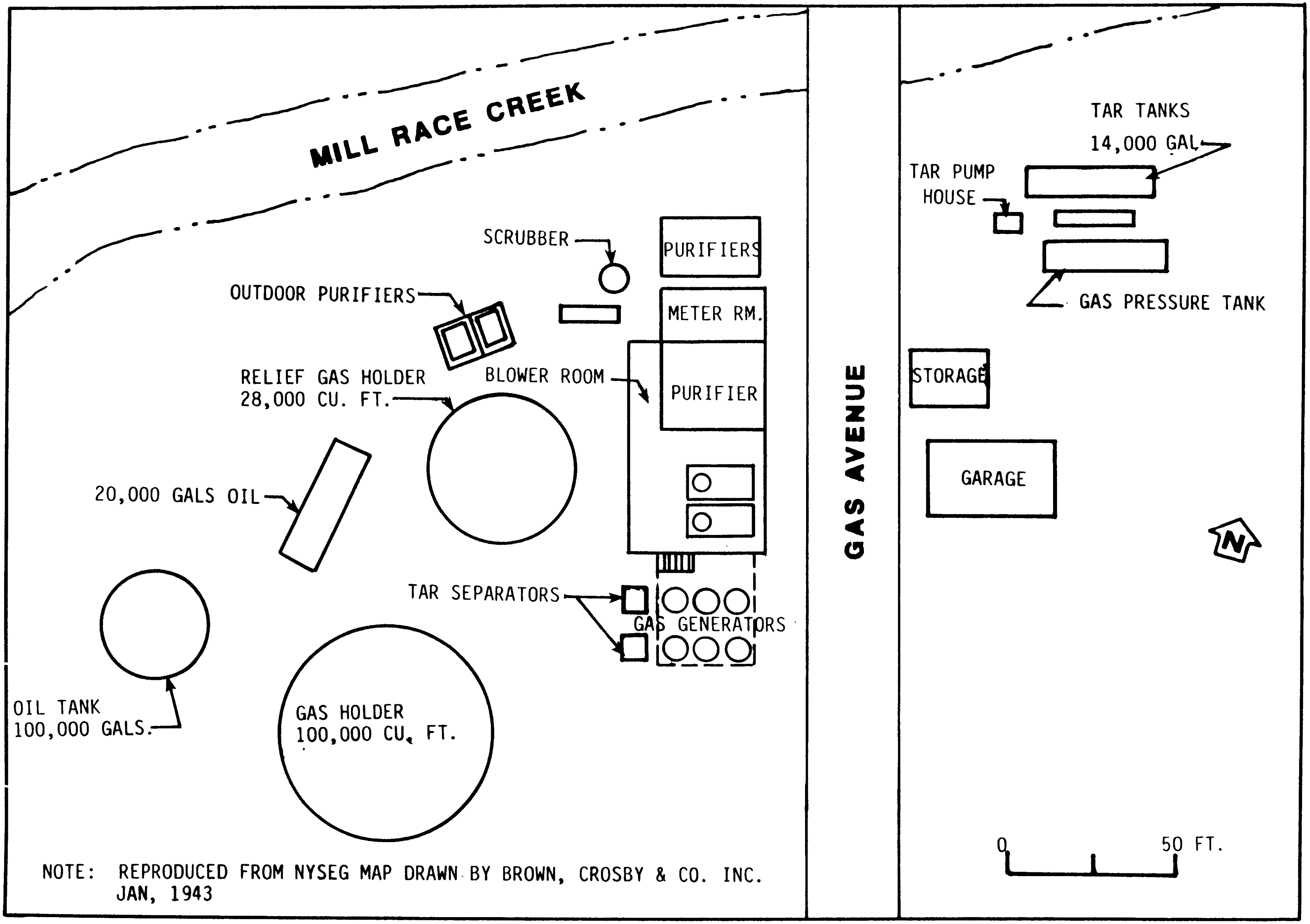


Figure 2-3. Oneonta Coal Gasification Plant, 1947.

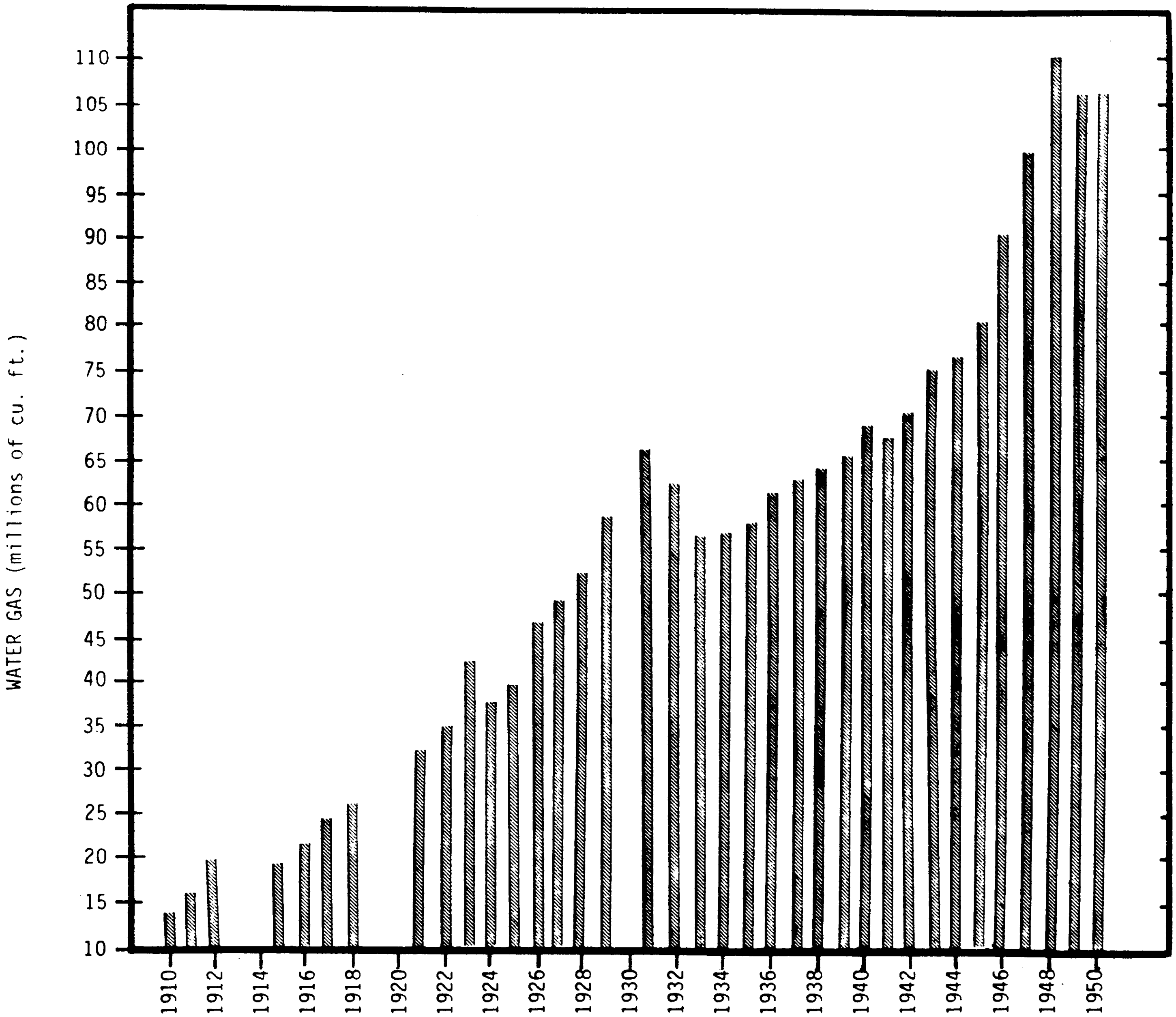


Figure 2-4. Gas Production at Oneonta 1910-1950.
(New York State Public Service Commission Annual Reports 1910-1950)

Oneonta between 1910 and 1950 using the conversion factor was 2.21 million gallons. This volume does not necessarily represent "waste", and is more indicative of by-product tars sold from the site.

The gas plant closed in the early 1950's, as demand for less expensive natural gas increased (Tate, personal comm., 1986). By 1956 (Figure 2-5) the gas plant had been dismantled. However, NYSEG maintained a garage, record storage building, and an office at the site.

The property was sold to the City of Oneonta in 1966 and is presently the site of the city garage, dog pound and salt storage sheds (property record, 1986). No buildings presently exist on the east side of Gas Avenue (Figure 2-6). The location of plant structures as they existed in 1947 is superimposed on a present day site plan in Figure 2-7.

The site chronology is summarized in Table 2-1 and the property ownership in Table 2-2.

2.2 Oneonta Plant Operations and Waste Disposal Practices

The Oneonta plant operations and waste disposal practices discussed in the following sections are derived mainly from personal communications. Historical information on these subjects is scarce.

2.2.1 Oneonta Plant Operations

This sub-section briefly describes the sequence of the operations at the coal gasification plant from the arrival of the coal to the disposal of wastes. A flow diagram of the operation is presented in Figure 2-8.

Bituminous coal, brought to Oneonta by rail, was trucked on-site and stored in the southwestern corner. Oil, used in the carburetting process, arrived by rail and was pumped to aboveground storage tanks on site.

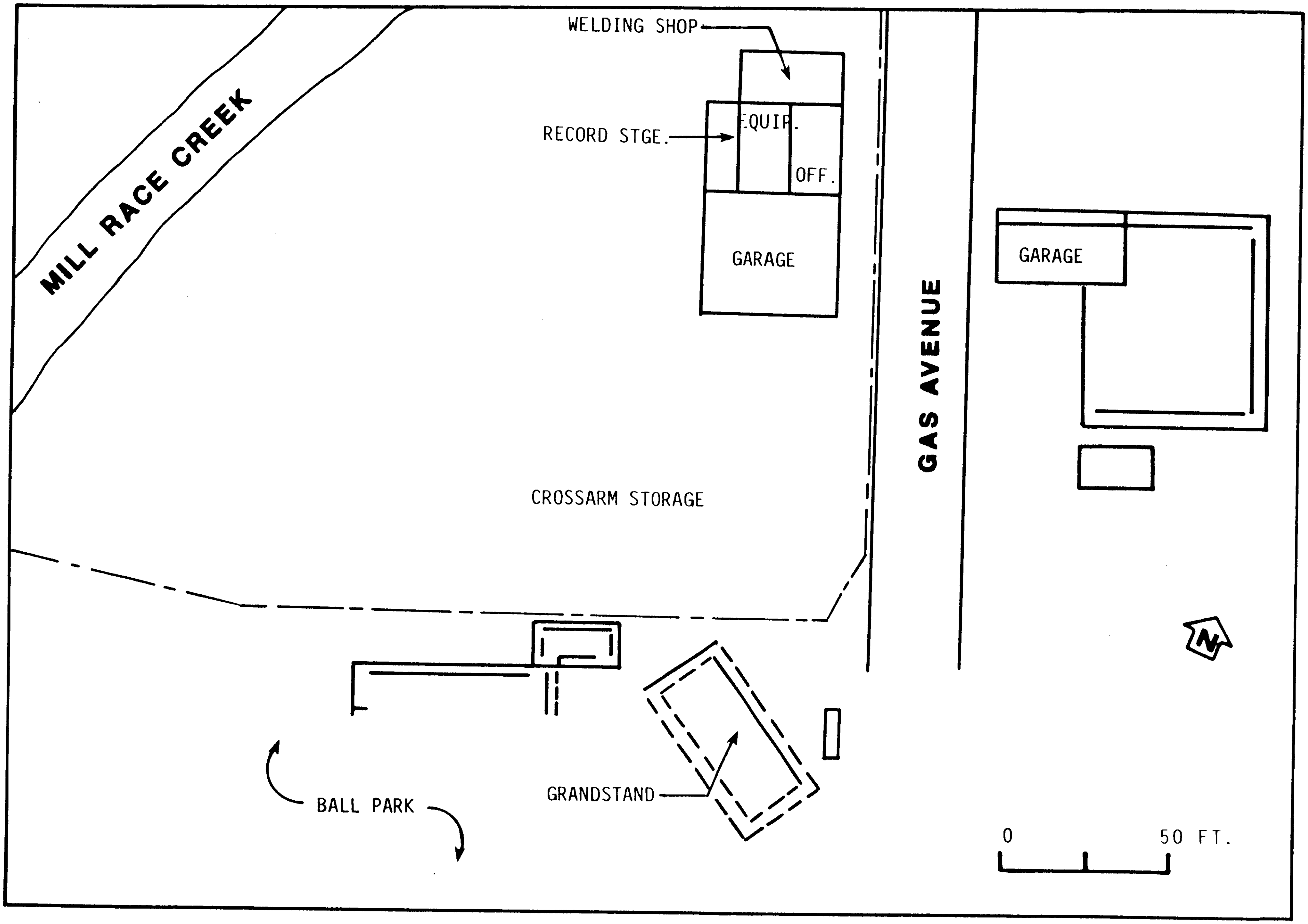


Figure 2-5. Oneonta Coal Gasification Plant, 1956.

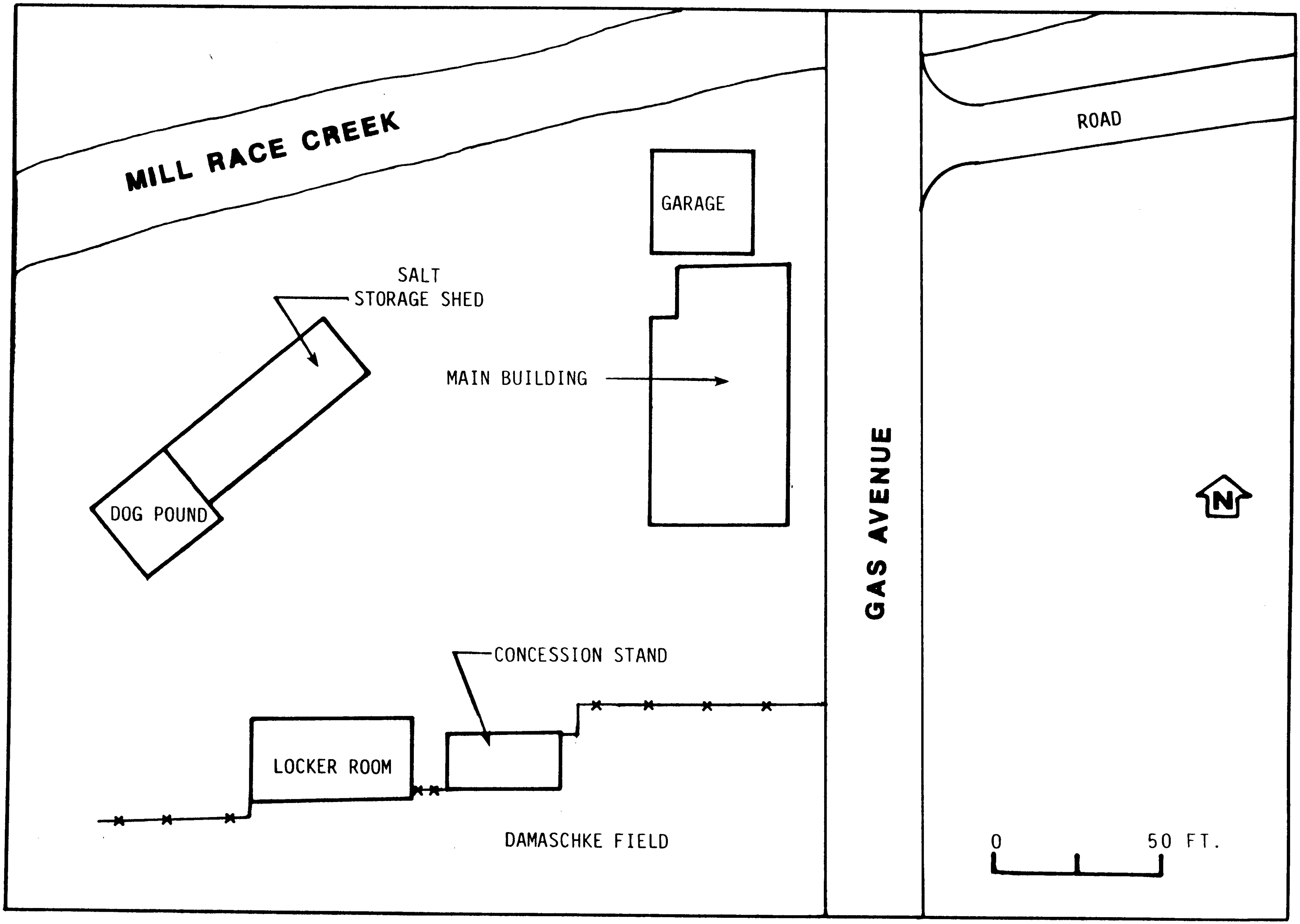


Figure 2-6. Oneonta Coal Gasification Plant, 1986.

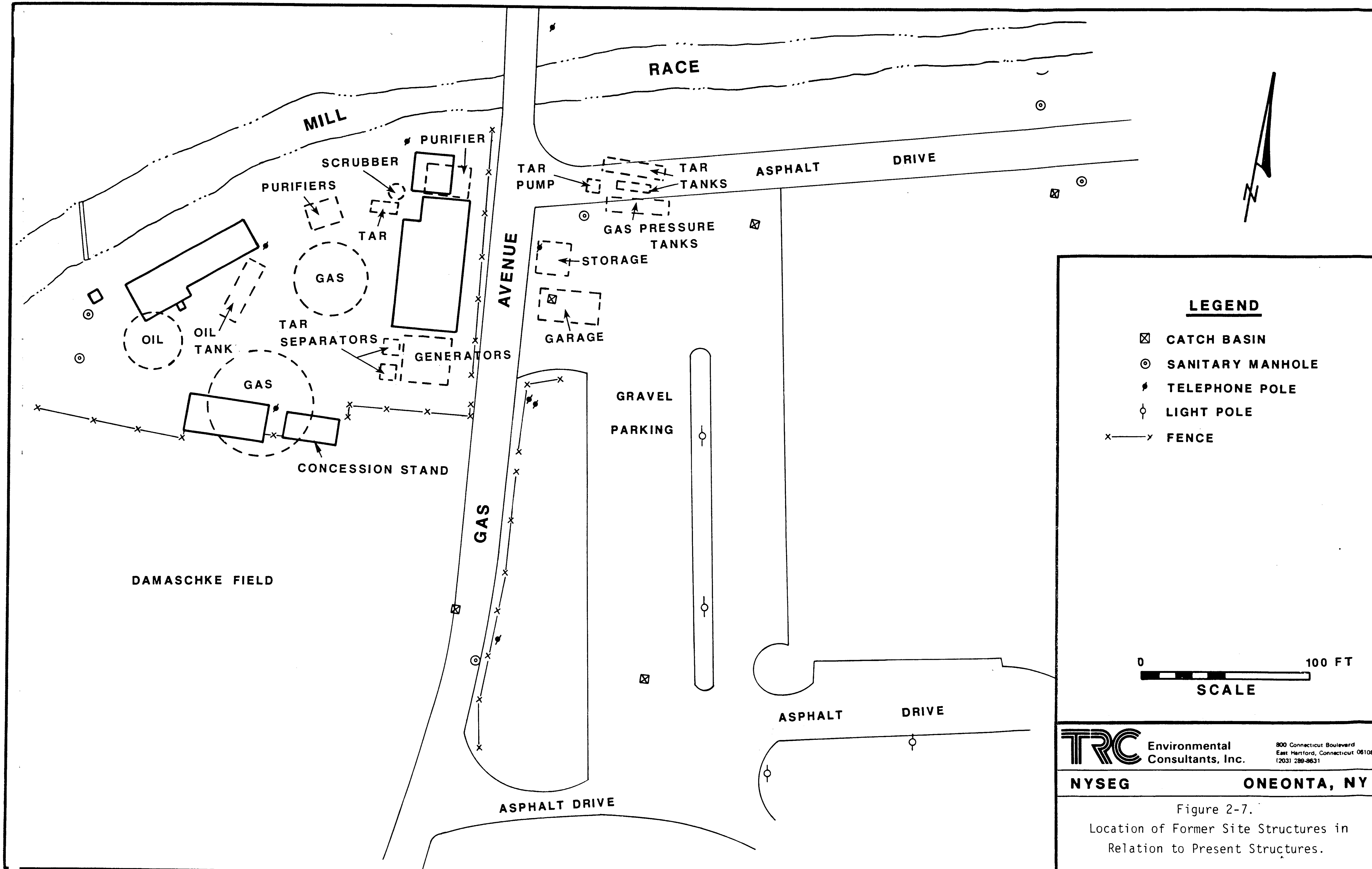


Figure 2-7.
Location of Former Site Structures in Relation to Present Structures.

TABLE 2-1

SUMMARY OF SITE CHRONOLOGY

1881	Oneonta Gas Light Company organized by M.L. Ford
1882	Gas first admitted into mains
1887	Oneonta Gas Light Company merges with Oneonta Electric Power and Light Company
1918	Oneonta Electric Power and Light becomes part of Ithaca Gas and Electric Company (NYSEG)
Early 1950's	Closure of the coal gasification site

TABLE 2-2

SUMMARY OF PROPERTY OWNERSHIP OF THE ONEONTA SITE

June, 1881	-	B. VanSteenbergh and Ione P. VanSteenbergh to the Oneonta Gas Light Company
March, 1888	-	William T. Russell to the Oneonta Gas Light Company
July, 1909	-	City of Oneonta to Oneonta Light and Power Company
May 1914	-	Standard Oil Company of New York to Oneonta Light and Power Company (Ithaca Gas and Electric Company)
November, 1966	-	New York State Electric and Gas Corp. to the City of Oneonta.

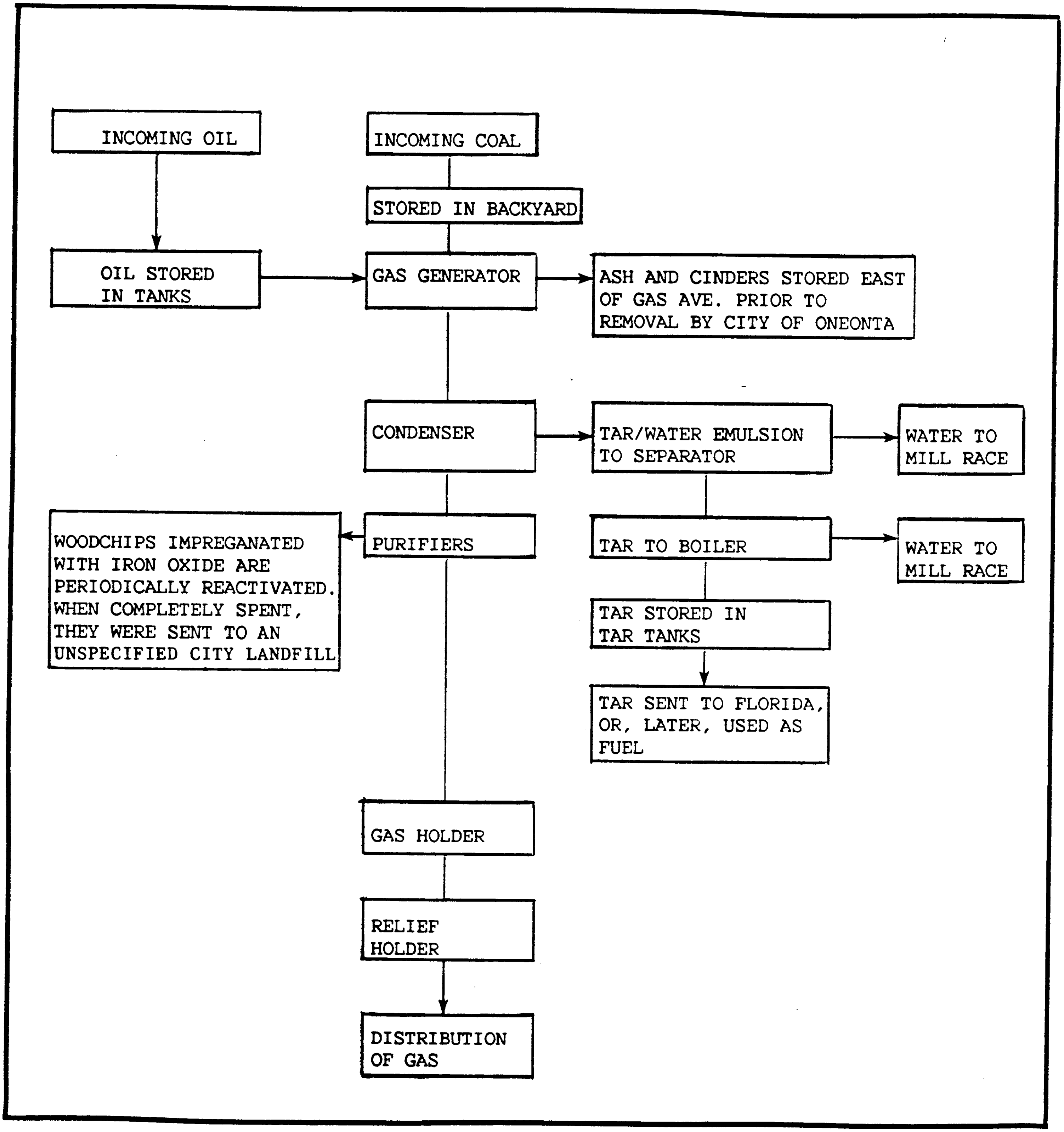


Figure 2-8. Flow Diagram of Oneonta Plant Operations.

Two carburetted water gas generators were operated at the plant. During production, coal was fed into the generator at a rate of 800 lbs/hr. The generated gas and steam passed from the generator to the carburetor where oil was introduced to form an oil gas in the presence of water gas and steam. This mixture was introduced into the superheater where the oil vapors were cracked to simpler gases.

The carburetted water gases were directed to a condenser where they were cooled and separated from the tar and water mixture. The gas was further purified by passing through iron oxide impregnated wood chips to remove hydrogen sulfide. From the purifiers the gas was pumped into the gas holder and then into a relief holder.

2.2.2 Summary of Waste Generation and Disposal

The Oneonta coal gasification plant generated both solid and liquid wastes. Wastes included ash and cinders from the coal combustion, oxide chips from the purification process, tars and wastewater. Much of these wastes were sold or disposed of off-site.

The ash and cinders were cleaned from the ovens each morning and transported by wheel barrow to an area east of Gas Avenue. They were removed from this area by the City of Oneonta and used to make cinder blocks (Tate, personal comm., 1986). The presence of cinders, ash, and coal in test borings completed in the baseball field adjacent to the site may indicate that this material was also used as fill. Mr. Deforest Finch stated that private citizens removed some of the ashes to use in driveways.

The iron oxide impregnated wood chips were regenerated every 6 months in an area adjacent to the purifiers. When they could no longer be reactivated, they were removed to an unspecified city landfill (Tate., personnel comm. 1986).

The tar/water mixture generated during the cooling of the gas was pumped into one of two separators, consisting of an open, concrete-lined, 30 ft by 30 ft by 15 ft pit. During the winter, these pits would occasionally overflow as water entering the bottom of the pit was unable to pass through the viscous tar fraction and, consequently, pushed the tar over the top of the pit (Finch, personal comm., 1986). Water from these separators was piped to and allowed to flow over the ground surface to Mill Race Creek for disposal (Finch, personal comm., 1986). The tar was pumped to the tanks located near the purifiers. There, the tar was boiled to further remove water which was, again, disposed of in Mill Race Creek (Finch, personal comn., 1986). The tar was then pumped to the final tar tank located on the east side of Gas Avenue.

Generated tar was at one time pumped from the final tar holding tank to the railroad tracks located north of the site across Mill Race Creek, where it was shipped to the state of Florida in rail cars. This practice was stopped, however, when a load of unboiled tar was accidentally shipped to Florida (Finch, personal comm., 1986). After that incident, all generated tar was used as fuel for the boilers.

In addition to the wastewaters mentioned above, water and light tars condensed in the city gas mains and required periodic removal. This waste was transported back to the site in barrels and disposed of on the ground (Finch, personal comm., 1986).

2.2.3 Chemical Characteristics of Wastes

To accurately assess the impact that the plant had on the nearby soil and water, the chemical characteristics of the wastes must be defined. Interviews with former employees of the coal gas plant indicate that much of the generated wastes, including tars, water, cinders, and oxide chips, were, at least in later years, removed from the site. However, it is possible that some of these wastes remained on site as a result of spills, leaks and earlier disposal practices.

Typical wastewaters from coal gasification plants have been shown to contain ammonia, cyanides, phenolic compounds, sulfides, oils and greases, acids, alkalies, and many toxic organic pollutants. Wastewaters from the Oneonta plant were generally discharged into Mill Race Creek. Most of these wastes were probably transported downstream of the site. Any liquid wastes spilled on-site may have contributed pollutants to the soil and water.

By-product tars produced from coal gasification at the Oneonta plant were separated from the water and sent off-site, or burned as fuel. Tar which spilled, overflowed from pits or leaked from tanks and underground pipes, may still be present in the soil.

In general, chemical constituents of tars are primarily polynuclear aromatic hydrocarbons (PAH), including heterocyclic compounds. The potential impact of most concern with these materials is that some are known carcinogens. Carcinogenic PAH's are usually higher molecular weight compounds and tend to be relatively immobile and persistent in the environment. A list of typical coal tar constituents is presented in Table 2-3.

Iron oxide impregnated wood chips were used to remove hydrogen sulfide from the gas. Spent oxide was regenerated by contact with air, producing reactivated iron oxide and sulfur. Eventually, the iron oxide would lose too much activity from the accumulation of sulfur, from fouling by traces of tar in the gas and from the reaction of the iron with cyanide to produce ferrocyanides, so that the iron oxide could not be regenerated and did not react with hydrogen sulfide. At this point the spent oxide was discarded and replaced with fresh material. At the Oneonta gas plant, chips were placed in small piles on the ground near the purifiers and turned once a week to facilitate regeneration. Soil at the site of regeneration may have become

TABLE 2-3

MAJOR CONSTITUENTS OF TYPICAL COAL TAR
(PERCENTAGES BASED ON THE ORIGINAL TAR)

Coal Tar			
Light oil, up to 200°C (392°F)*	5.0		
Benzene		0.1	
Toluene		0.2	
Xylene		1.0	
Heavy solvent naphtha		1.5	
Middle oil, 200-250°C (392-482°F)*	17.0		
Tar acids		2.5	
Phenol			0.7
Cresols			1.1
Xylenols			0.2
Higher tar acids			0.5
Tar bases		2.0	
Pyridine			0.1
Heavy bases			1.9
Naphthalene		10.9	
Unidentified		1.7	
Heavy oil, 250-300°C (462-572°F)*	7.0		
Methylnaphthalenes		2.5	
Dimethylnaphthalenes		3.4	
Acenaphthene		1.4	
Unidentified		1.0	
Anthracene oil, 300-350°C (572-682°F)*	9.0		
Fluorene		1.6	
Phenanthrene		4.0	
Anthracene		1.1	
Carbazole		1.1	
Unidentified		1.2	
Pitch	62.0		
Gas		2.0	
Heavy oil		21.8	
Red wax		7.0	
Carbon		32.0	

* Temperatures reflect boiling point

Note: Reproduced from Handbook on Manufactured Gas Plant Sites, Environmental Research and Technology, Inc. 1984, and referenced from Wilson and Wells (1950, p. 374) and R.N. Shreve (1945, p. 91) contaminated by pollutants from the chips. A typical analysis of spent oxide is presented in Table 2-4.

Most of the ash and cinders were reportedly removed from the site, although some of the material may have been used for fill either on-site or in the adjacent park. Most of the potential adverse environmental conditions, such as dust, would have occurred at the time of generation. However, gradual leaching of trace metals may also have occured. Presented in Table 2-5 is a list of potential trace metals that may be leached from gasifier ash.

2.3 Plant Closure

The exact closure date of the Oneonta coal gasification plant is unknown. However, it is assumed to have been in the early 1950's when demand for less expensive natural gas replaced that for coal gas. A 1956 site map (Figure 2-5) shows that all gas generating equipment and holders had been removed.

At the time of closure, the aboveground tanks were cut apart and removed by Otsego Iron and Metal for scrap. The underground pipes were not removed and the two tar/water separator pits were filled with earth (Finch, personal comm., 1986). NYSEG maintained several buildings including a garage, welding shop, office and storage building on the site until the property was sold to the City of Oneonta in 1966.

2.4 Present Conditions

The property is now the site of a city-owned dog pound, garage, and salt storage shed. No buildings exist on the east side of Gas Avenue. The only existing original plant building is the main plant building located on the west side of Gas Avenue.

TABLE 2-4

AN ANALYSIS OF TYPICAL SPENT OXIDE

	Percent
Free sulfur	44.70
Moisture	17.88
Ferric monohydrate	5.26
Ferrous monohydrate	6.25
Basic ferric sulfate	1.25
Ferric ammonium ferrocyanide	3.80
Ferrosoferric ammonium ferrocyanide	2.50
Ferric pyridic ferrocyanide	1.20
Organic matter peat fiber	4.68
Tar	1.21
Silica	1.05
Naphthalene	0.72
Pyridine sulfate	0.77
Ammonium sulfate	2.06
Calicum sulfate	0.12
Ferrous sulfate	0.02
Ammonium thiocyanate	1.30
Sulfur otherwise combined	1.33
Organic matter soluble in alkalies (humus)	1.54
Combined water and loss (by difference)	2.36
	100.00

From Handbook on Manufactured Gas Plant Sites, Environmental Research and Technology, Inc., 1984.

TABLE 2-5

ELEMENTS ASSOCIATED WITH TYPICAL COAL ASH LEACHATES

Aluminum
Antimony
Boron
Cadmium
Chromium
Cobalt
Copper
Iron
Lead
Manganese
Nickel

From Handbook on Manufactured Gas Plant Sites, Environmental Research and Technology, Inc. 1984.

3.0 SITE SETTING

The following section describes both the regional and site specific geologic setting including bedrock geology, unconsolidated materials, and hydrology.

3.1 Regional Geology

In order to fully understand the geological variables involved at the Oneonta site the regional geologic setting must first be discussed. This sub-section has been broken into the following broad geologic catagories.

3.1.1 Bedrock

The former Oneonta coal gasification site lies within the dissected Appalachian Plateau physiographic province. The regional bedrock geology, shown on Figure 3-1, consists of upper Middle to lower Upper Devonian (380-360 million years before present) sandstones and shales of the Genesee Group deposited as part of the Catskill Delta Complex (Johnson and Friedman, 1969). The Oneonta and Gilboa Formations of the Genesee Group overlie similar clastics of the Middle Devonian Hamilton Group. South of Oneonta, the Genesee Group is overlain by shales, siltstones, sandstones and conglomerates of the Sonyea Group. The generalized stratigraphic column shown in Figure 3-2 is based on information from Rickard; 1964, and Fisher, Isachsen and Rickard, 1970. The regional dip in this area is less than ten degrees to the south-southeast, however, the strata is locally deformed into gentle folds (Johnson and Friedman, 1969; Rickard, 1964).

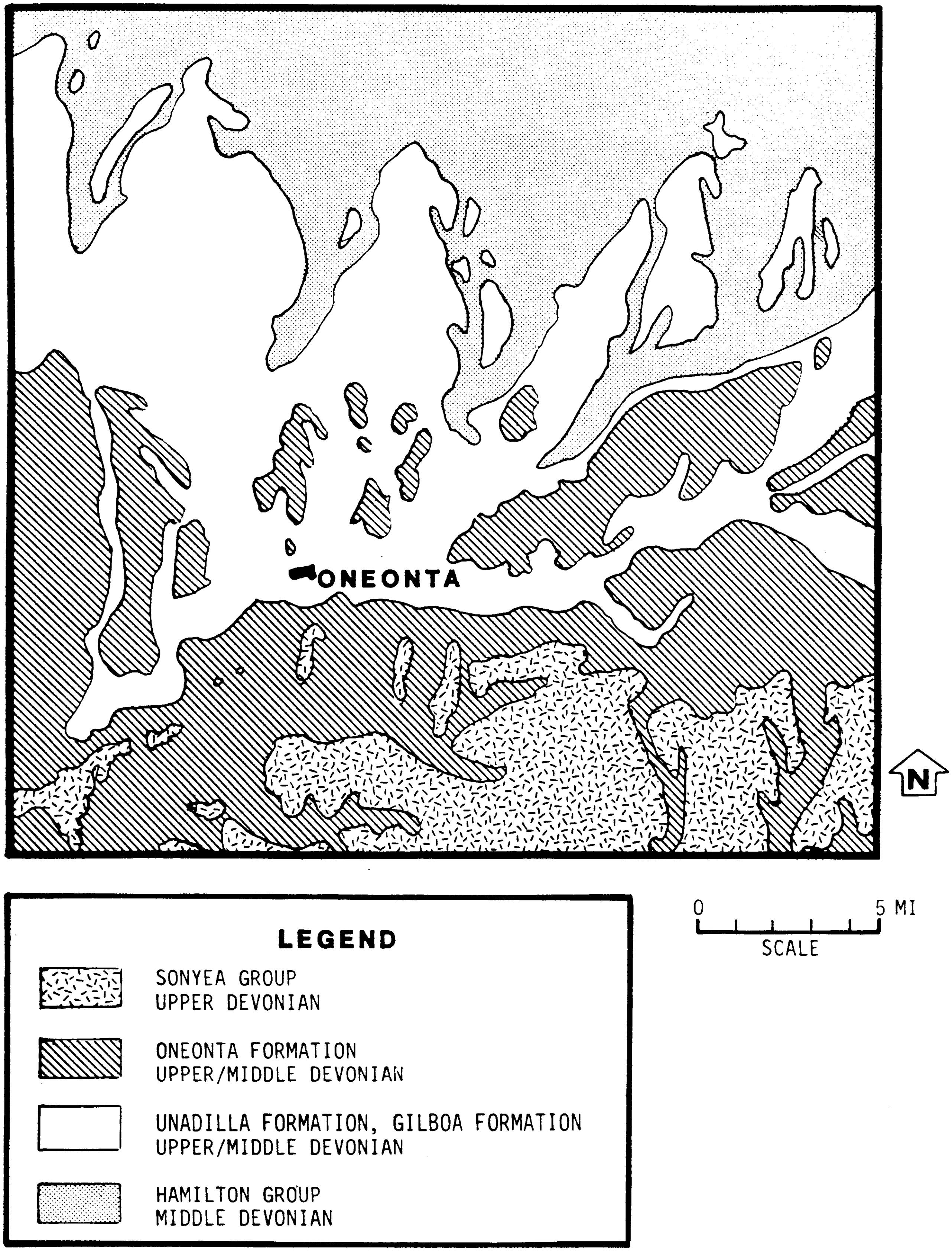


Figure 3-1. Generalized Map of Bedrock Geology in the Oneonta Region.

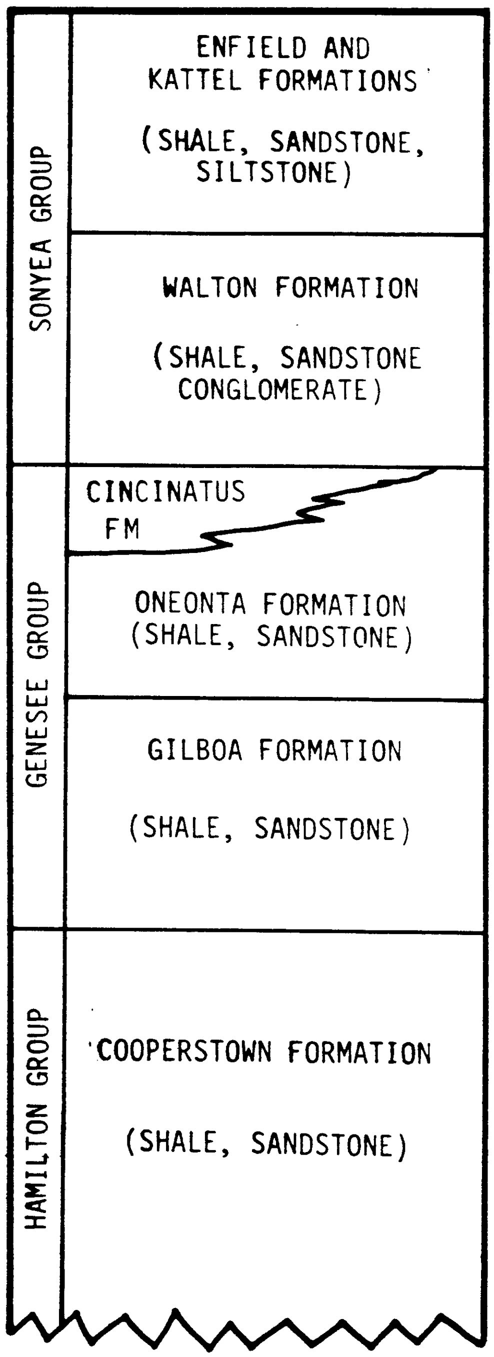


Figure 3-2. Generalized Stratigraphic Column of the Oneonta Region.

3.1.2 Unconsolidated Material

The unconsolidated materials can be divided into structural, glacial deposits, and formational soils. These deposits and soils are discussed in this section.

3.1.2.1 Glacial Deposits

Although east central New York State has experienced multiple glacial events, the deposits of the Wisconsin Glaciation are predominant. The valley walls and divides consist of both erosional and depositional landforms, whereas the valley forms are depositional.

Deposits associated with ice contact lakes dominate the valley fill of the upper Susquehanna Valley. In the Oneonta area, deposits of glacial Lake Otego are found. As the ice retreated, the lake expanded and lateral delta complexes formed where creeks entered (Fleisher, in prep.).

The City of Oneonta is situated on a hanging delta that marks the entrance of Oneonta Creek into the Susquehanna River Valley. The sediments consist of sands and silts overlying a gravel layer in the center of the valley, and gravel overlying "quicksand" and silt along the valley walls (Figure 3-3) (Fleisher, 1977).

3.1.2.2 Soils

The soils in the Susquehanna River Valley in the area south of Oneonta have been classified as Modern Flood Plain (Melia, 1975). The soils are mapped as the Tioga Silt Loam, a dark grayish brown, well drained soil situated above the line of frequent damaging overflow. The medium textured surface soil has a high organic content and the subsoil is a medium textured silt loam or fine sandy loam. This is underlain at various depths by 24 to 60 or more inches of deep gravelly and sandy deposits (Bartlett, 1964).

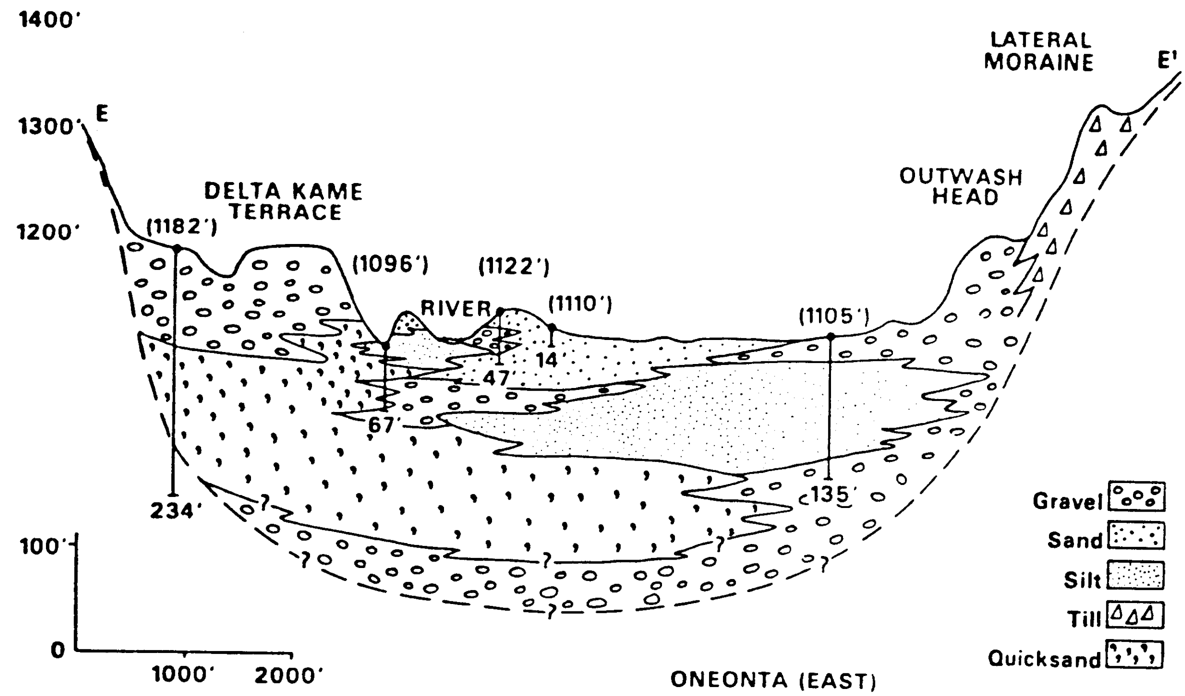


Figure 3-3. Cross Section of the Upper Susquehanna River Valley. (Modified from Fleisher, 1977)

3.1.3 Regional Hydrology

The regional hydrology of the Oneonta area is dominated by the Susquehanna River, which flows east to west, south of the city. Surface drainage from the City of Oneonta is into the Susquehanna River and its tributaries, Otego and Oneonta Creeks. Local aquifers include the stratified glacially deposited sands and gravels which fill the valleys, and bedrock. The unconsolidated sands and gravels are considered highly permeable and generally yield 20 gallons per minute of good quality water. The bedrock aquifers yield between 5 and 8 gallons per minute. Wells screened in "quicksand", saturated fine sand and silt, yield about 10 gallons per minute (Fleisher, 1981).

The city draws its water from Wilber Lake (Figure 3-4), a 490-million gallon reservoir on Oneonta Creek, located 3 miles north of the city. Wilber Lake has an estimated drainage area of 2.53 square miles. Oneonta Creek flows from the Lake into Lower Reservoir. This reservoir drains an additional 3.47 square miles and has an estimated capacity of 25 million gallons (U.S. Army Corps of Engineers, 1984).

There are three emergency back-up water sources for the city (shown on Figure 3-4) including two potable wells and one surface water pumping station. The municipal well located in the west end of the Town of Oneonta, 2.7 miles NW of the site, is 121.5 feet deep and is screened in sand and gravel. The yield from this well is 800,000 gallons per day. A recently installed 12-inch, 170 foot deep well in Wilber Park, approximately 3/4 mile north of the site, has a capacity of 250,000 gallons per day.

A pumping station is located on Mill Race Creek, 1500 feet upstream of the site, at the confluences of Oneonta Creek and Mill Race Creek. This is reported to have been used as an emergency drinking water source as recently as two years ago; however, according to a 1984 U.S. Army Corps of Engineers

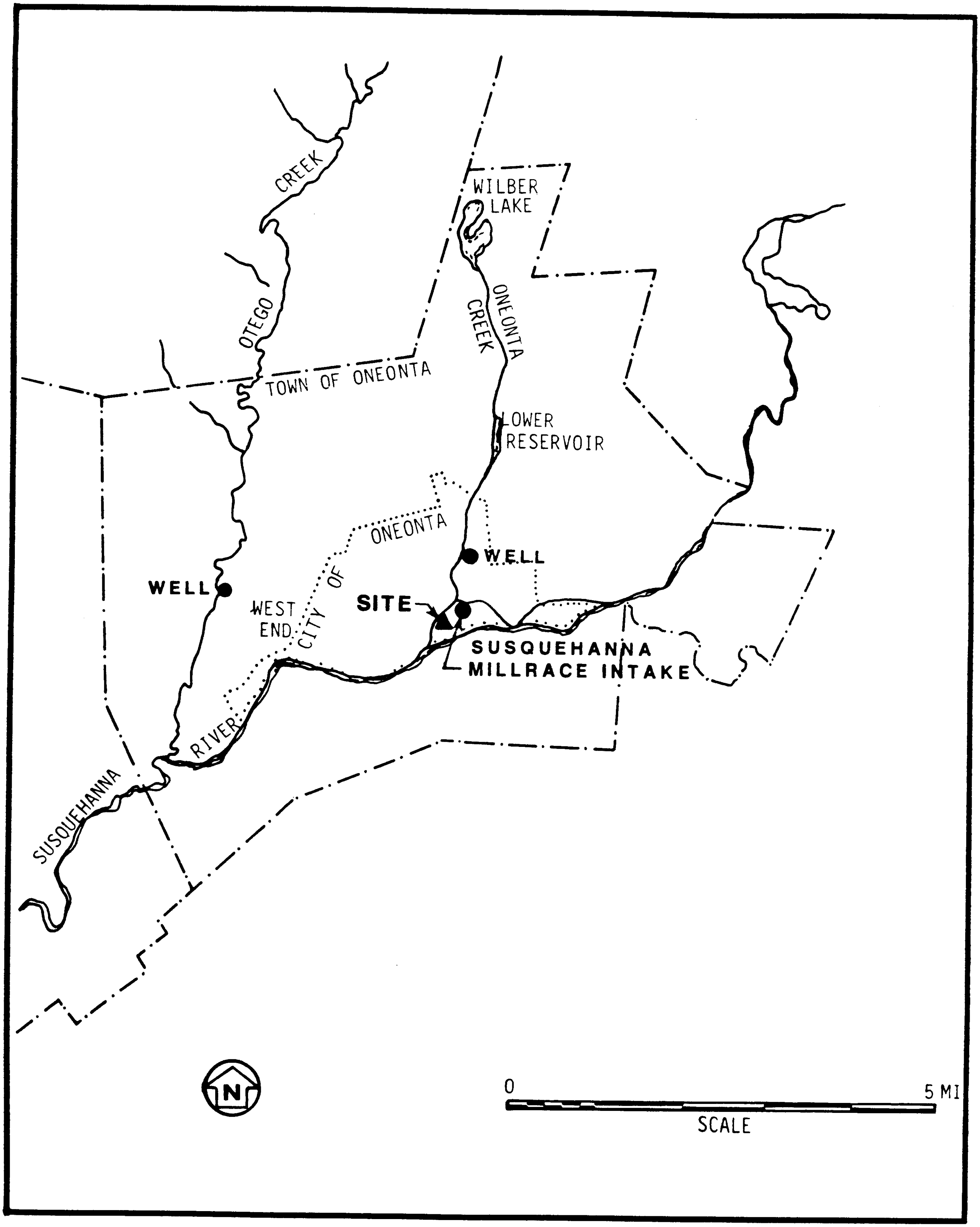


Figure 3-4. Regional Hydrologic Features and Oneonta Water Supply.

report, it is not considered a primary emergency source because of freezing in the winter and concern about upstream sewage discharges.

Located within one mile of the former coal gasification site are 2 domestic wells and 10 municipal monitoring wells (Figure 3-5). Both domestic wells are located across the Susquehanna River approximately 1,250 feet from the site. The aquifer for both wells is unconsolidated sand and gravel at approximately 100 feet. The yield of the more westerly well is recorded at 30 gallons per minute (Fleisher, 1981).

The municipal monitoring wells were installed to investigate the extent of ground water entering the sewer system. The depth of these wells ranges from 15 to 25 feet. Although TRC has not yet received a copy of the investigation report, the City Engineer, Mr. B. Bruni, indicated that the study found that excessive ground water enters the sewer system, increasing the volume of water which must be treated.

3.2 Site Geology

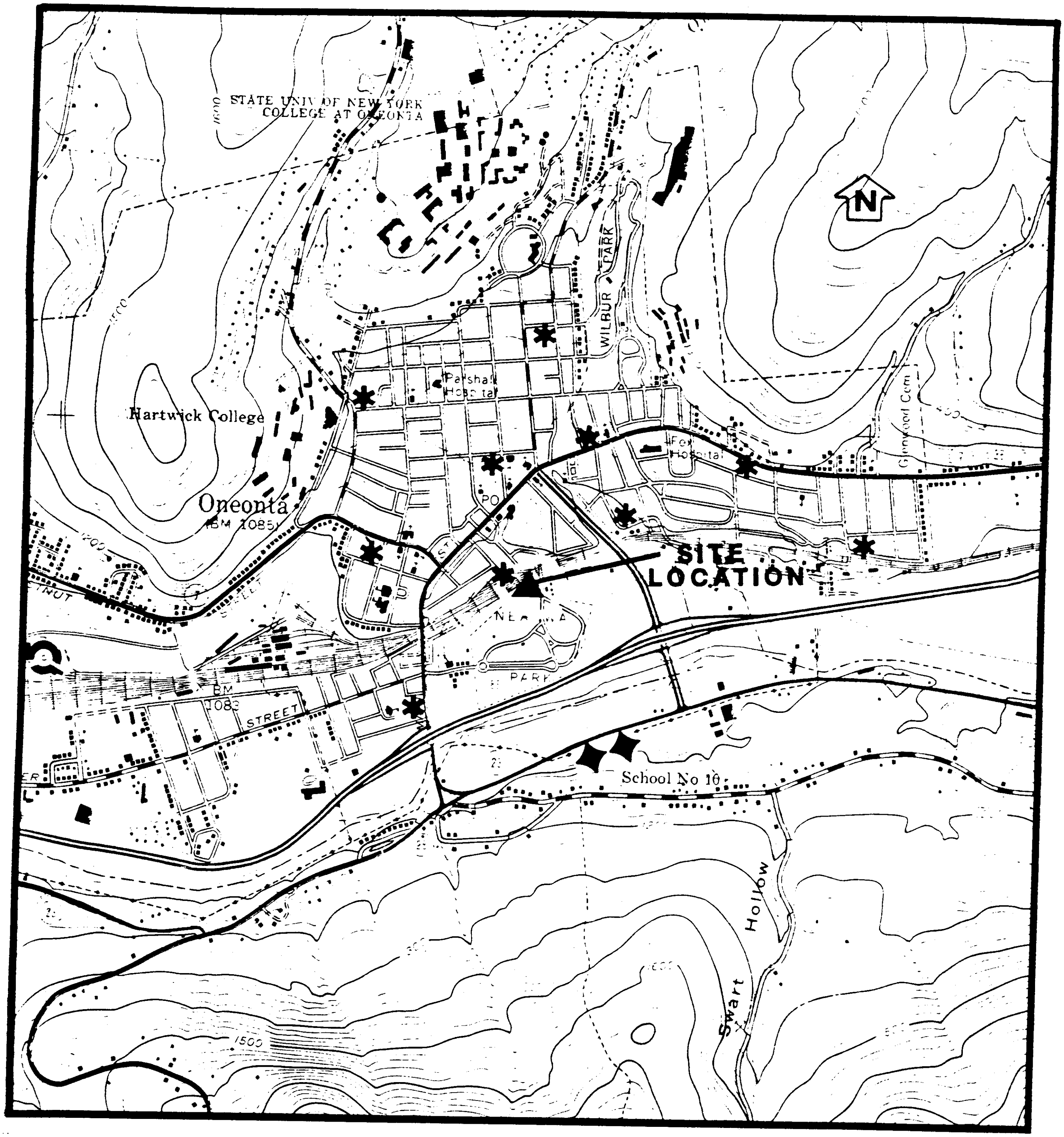
The following sub-sections provide the most site specific geologic information available.

3.2.1 Bedrock

No subsurface investigations to bedrock have been performed in the area of the Oneonta coal gasification site. From the regional information available, it is expected that the bedrock is sandstone and shale of the Gilboa Formation. Depth to bedrock is expected to be approximately 100 feet.

3.2.2 Unconsolidated Material

No information is available on the unconsolidated material present on site, however, regional information indicates that approximately 100 feet of



LEGEND

✱ MONITORING WELL

◆ DOMESTIC WELL

0 3000 FT

SCALE

Figure 3-5. Monitoring and Domestic Wells within 1 Mile of the Site.

sands, silt and gravel underlie the site. Six soil borings were recently completed for the installation of light poles in the baseball field adjacent to the site. The depth of these borings ranged from 11.5 to 12 feet. Logs from these borings indicate that there is 0 - 5 inches of topsoil underlain by up to 9 feet of silt and fine sand. This overlies fine to coarse grained sand and gravel of unknown thickness. Several of the borings indicated that coal, cinders, and ash were used as fill in the area.

Regional information also indicates that the site may be underlain at depth by "quicksand", although it is not noted in the boring logs of any deep wells or test borings within 1/2 mile of the site (Randall, 1972). The depths of these borings range from 65 to 154 feet.

3.2.3 Site Hydrology

The site hydrology includes surface water (Mill Race Creek and the Susquehanna River) and ground water.

3.2.3.1 Surface Water

The Oneonta coal gasification site and Neahwa Park are located on an island; surrounded by Mill Race Creek to the east, north and west, and the Susquehanna River to the south. The Mill Race diverges from the river 4,000 feet southeast of the site, flowing in a northwesterly direction, and re-enters the river 2,500 feet southwest of the site.

Tributaries to the Mill Race include Glenwood Creek, entering just northwest of the upstream end of the Mill Race, and Oneonta Creek which enters approximately 1500 feet upstream of the site.

A small pond, used for ice skating in the winter, is about 1,000 feet south-southwest of the site.

3.2.3.2 Ground Water

The water table at the site is expected to be approximately 6 to 8 feet beneath ground surface. The hydraulic gradient is assumed to be in a southwesterly direction.

3.3 Area Land Use

An analysis of land use within a one mile radius of the former Oneonta coal gasification site was performed based on a zoning map of the City of Oneonta and the U.S.G.S. Oneonta Quadrangle topographic map. The land use evaluation will identify sensitive areas, such as schools and hospitals and will aid in the evaluation of risk assessment. A generalized land use map was prepared from these sources (Figure 3-6). Although this map has not yet been field verified, several observations can be made.

Within a one mile radius of the site approximately half of the land is residential, 20 percent is public or semi-public (i.e. parks and schools), 20 percent is institutional, commercial, business and industrial, and 10 percent is agricultural.

Land use immediately to the south and east of the site is recreational. A minor league baseball field, Damaschke Field, is located on the adjacent property to the south. This field has been in existence since at least 1937. The ball field is part of Neahwa Park, a city park which includes a small ice skating pond. A landfill once occupied part of what is now the park in the area immediately to the southwest of the gas plant.

The Delaware and Hudson Railroad line runs east-west directly north of the site and, in general, land use to the north is commercial and residential.

Three schools are located within a one mile radius of the site. These include Valley View Elementary School, located 1,800 feet east-northeast of the site, Riverside Elementary, 2,250 feet to the southwest, and an

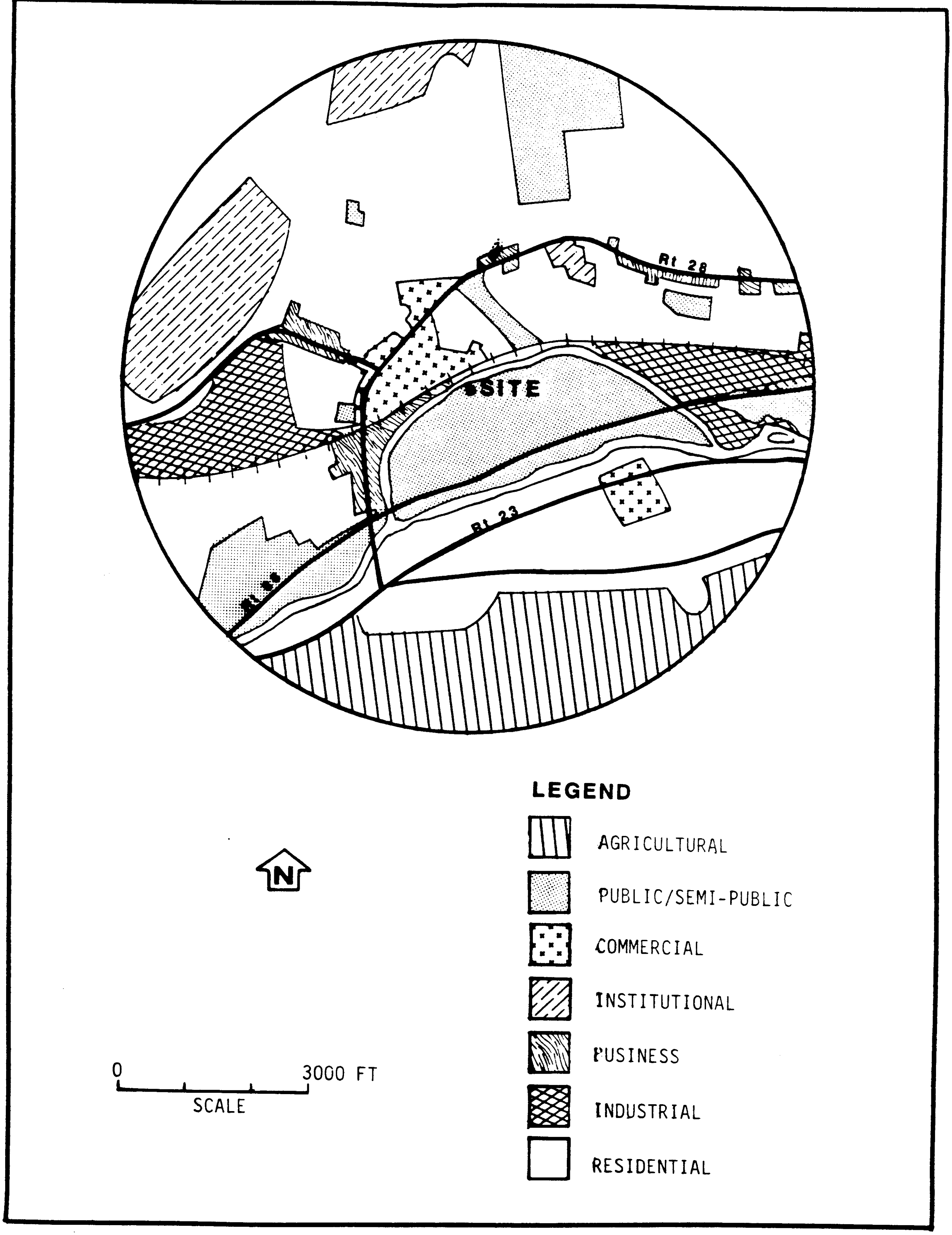


Figure 3-6. Area Land Use Map.

unidentified school on Center St., 1,650 feet northwest of the former gas plant. In addition, parts of Hartwick College and State University College at Oneonta campuses are within one mile. Enrollment at these colleges is 1,700 and 6,000 students respectively.

Fox Memorial Hospital is also within a mile of the site, located 1,200 feet to the northeast.

4.0 PRELIMINARY SITE DATA

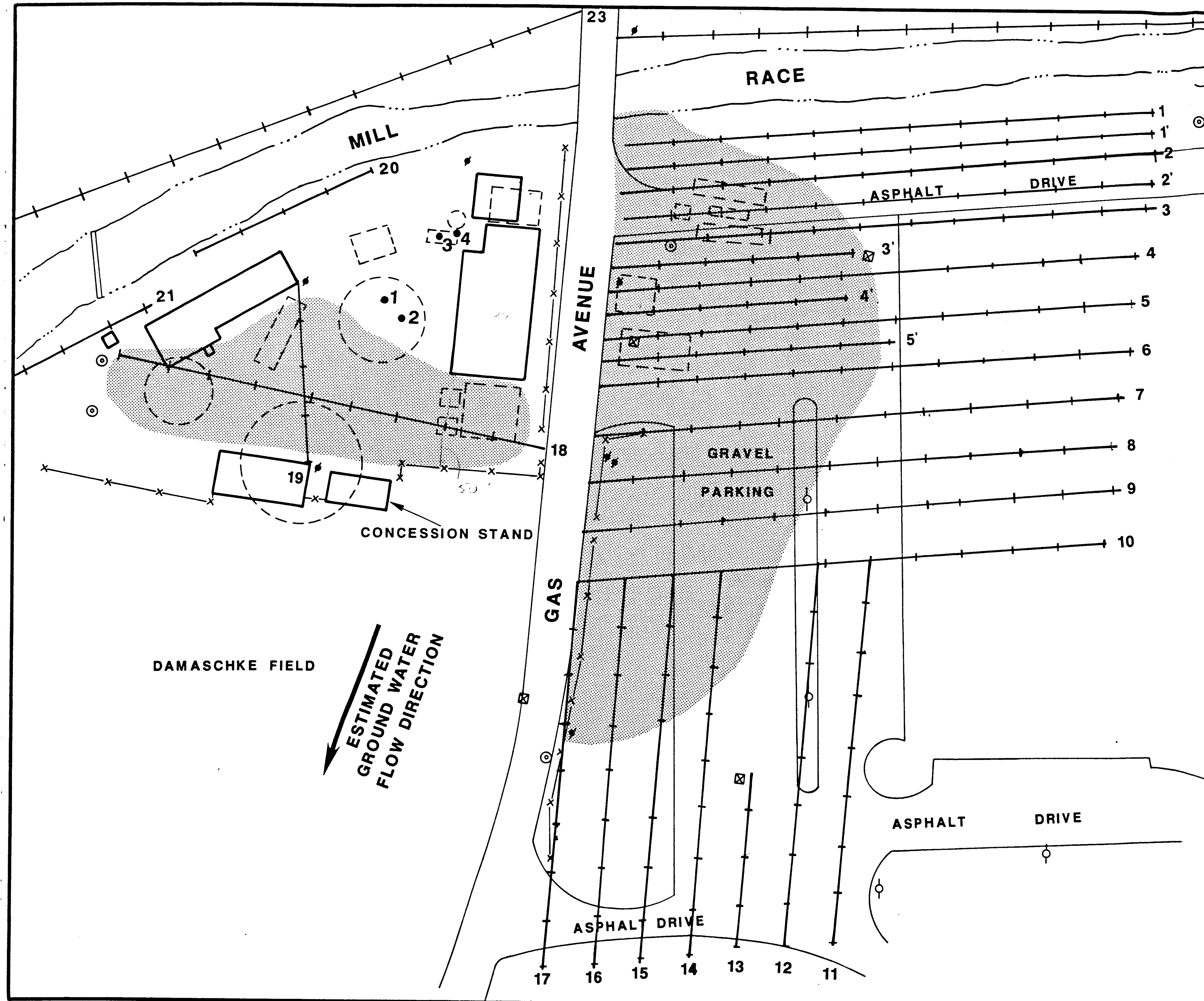
Site specific subsurface data have been generated by two exploratory techniques. These techniques, geophysical and soil boring, and the data generated are discussed in the following section.

4.1 Geophysical Survey

On April 29th and 30th, 1986, TRC conducted an electromagnetic terrain conductivity survey using a Geonics EM-31 Electromagnetic Terrain Conductivity meter. The EM-31 has an effective depth of exploration of 20 feet in its normal operating mode. The conductivity values recorded may be correlated with at least three variables: buried metal objects and pipes, depth to ground water, and concentration of conductive materials in the soil or ground water.

A 25 foot by 25 foot grid survey was conducted on the east side of Gas Avenue, starting at Mill Race Creek and proceeding south to the edge of the parking area. The survey concentration in this area is due to the historic tar storage and pumping activities along Mill Race Creek. Ground water flow is assumed to be in a south-southwesterly direction which would transport contamination, if any, under the gravel parking area away from Mill Race Creek. The survey was designed to detect a ground water plume, if one exists, traveling in a southerly direction. Several grid lines were also conducted in the gas plant operations area, but the survey was very limited due to the amount of metal debris on site which interferes with the EM readings. The final two grid lines were conducted north of Mill Race Creek, east and west of Gas Avenue parallel to the Delaware and Hudson Railroad tracks. Figure 4-1 shows the grid line locations.

The results from the electromagnetic survey indicate two large anomalous areas. The shaded areas in Figure 4-1 illustrate the two anomalous zones.



LEGEND

- CATCH BASIN
- SANITARY MANHOLE
- TELEPHONE POLE
- LIGHT POLE
- FENCE
- ANOMALOUS AREA
- FORMER GAS WORKS
- NYSEG SAMPLE LOCATIONS

NOTES:

Lines 1-10 and 22 were run west to east.

Lines 11-17 and 19 were run south to north.

Lines 18, 20, 21, and 23 were run east to west.

0 100 FT
SCALE

TRC Environmental Consultants, Inc.
800 Connecticut Boulevard
East Hartford, Connecticut 06108
(203) 289-8631

NYSEG ONEONTA, NY

Figure 4-1.
Electromagnetic Survey Grid Line Locations.

The anomalous zone east of Gas Avenue has conductivity readings 4 to 10 times the background reading of 10 millimhos per meter. This area is limited to approximately 125 feet east from Gas Avenue and 325 feet south from the Mill Race. The second anomalous area is the former gas plant operation area, presently accommodated by the city dog pound and municipal building. Conductivity readings in this area ranged from 20 to 842 millimhos per meter. Subsurface investigations during Task 2 will be concentrated in these two anomalous zones.

Results of the geophysical study are presented in Appendix A.

4.2 Ground Water/Soil Quality

In November of 1981 NYSEG collected three soil samples at the Oneonta site. The samples were taken from four excavations which were dug in pairs. (Figure 4-1). Excavations number one and two were located at the relief holder and were 18 inches and 6.5 feet deep respectively. The material in excavation number one consisted of a mixture of cinder and gravel with a solid layer at 18 inches which could not be penetrated. Excavation number two, from 0 to 4.5 feet, consisted of a mixture of cinder and gravel with some broken brick. This material was very dark, almost black, in color with a naptha like odor. One half of sample ONE-01 was collected at 4.5 feet. The excavation continued to 6.0 feet in similar material where the second half of sample ONE-01 was collected. At a depth of 6.5 feet a solid layer was encountered and the excavation could go no deeper. The material at this depth consisted of a tar like substance and sample ONE-02 was collected.

The remaining two excavations, number three and four were located adjacent to the tar well or pit and were dug to depth of 2.0 feet and 6.0 feet respectively. Excavation number three encountered a solid layer at 2.0 feet and could go no deeper. The overlaying material consisted of a gravel with no odor. Excavation number four, approximately four feet to the east, encountered a gravel layer from 0 to 3.5 feet with a mixture of tar and wood fibers to 6.0 feet. Sample ONE-03 was collected at 6.0 feet.

The soils were leached following the Extraction Procedure Toxicity* (EP Toxicity) method and analyzed for the eight EP Toxicity metals as well as copper, zinc, total phenols, ortho- and para-cresol, napthalene and quinoline. In addition, the samples were analyzed for cyanide, sulfide, pH and flash point. The analytical results are summarized in Table 4-1.

The existance of cresols, naphthalene and quinoline in the leachate indicates the presance of coal tar or coal gasification products in the soil.

On September 5, 1984, Empire Soils Investigations, Inc. performed eight hollow stem auger borings for the City of Oneonta for new light poles in the baseball field adjacent to the coal-gas site (Figure 4-2). Although no mention of tar appears in the boring logs, the City Engineer, Mr. B. Bruni, noted that after the holes remained open overnight a material, which may have been coal tar, was found floating on water in the two holes closest to the site, A-1 and A-2.

Material appearing to be coal tar was also found in the soil near the former large gas holder when excavation for a water line was done in 1981 or 1982 (Figure 4-2). In May, 1986, two trenches, approximately one foot deep, were excavated for electric line conduits along the first and third base lines. No coal tar odor was observed by Mr. Bruni during this work.

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* In accordance with 40 CFR 261 (Federal Register, Vol. 45, No. 98, May 19, 1980.)

TABLE 4-1

SUMMARY TABLE OF CHEMICAL DATA FOR THE ONEONTA COAL GASIFICATION SITE - ONEONTA, NEW YORK

Compound	Sample ID Date Lab No. Units	ONE-01 11/17/81 81-1928	ONE-02 11/17/81 81-1929	ONE-03 11/17/81 81-1930
Arsenic	mg/L	ND<0.025	ND<0.025	ND<0.025
Barium	mg/L	0.34	0.52	ND<0.20
Cadmium	mg/L	ND<0.002	ND<0.002	ND<0.002
Chromium	mg/L	ND<0.010	ND<0.010	ND<0.01
Copper	mg/L	ND<0.05	ND<0.05	ND<0.05
Lead	mg/L	0.075	0.160	0.012
Mercury	mg/L	ND<0.0004	0.001	ND<0.0004
Selenium	mg/L	ND<0.04	ND<0.04	ND<0.04
Silver	mg/L	ND<0.05	ND<0.05	ND<0.05
Zinc	mg/L	0.17	0.24	0.05
Phenols, total	mg/L	ND<0.002	ND<0.002	202.0
o-Cresol	mg/L	1.64	3.40	4.56
p-Cresol	mg/L	ND<0.001	ND<0.001	0.237
Naphthalene	mg/L	1.18	3.94	6.15
Quinoline	mg/L	0.703	1.13	1.68
pH	-	8.4	9.6	7.7
Flashpoint	°F	>170	>170	>170
Cyanide	mg/kg	ND<1.0	ND<1.0	ND<1.0
Sulfide	mg/Kg	4.9	ND<2.0	42.0

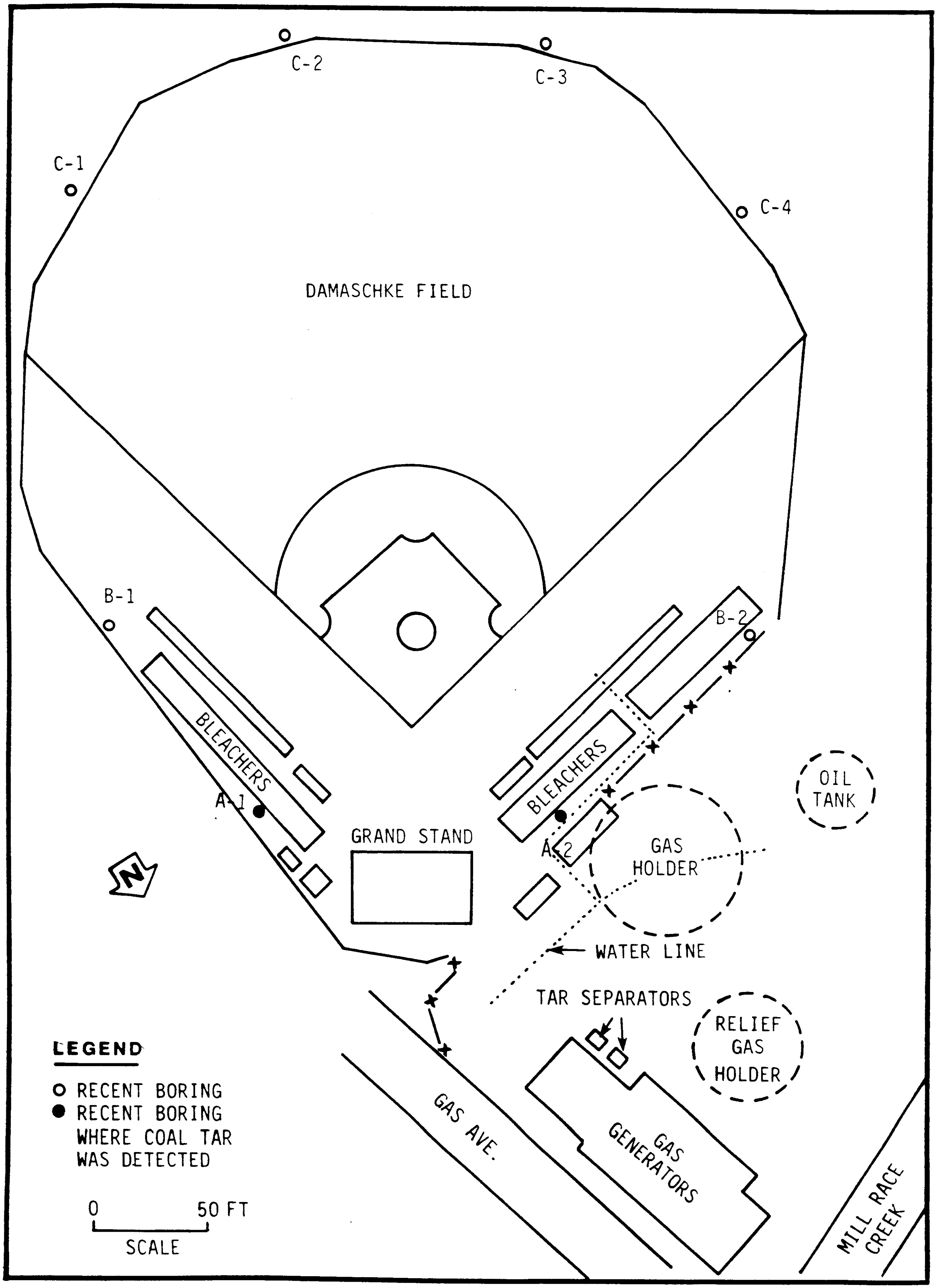

Figure 4-2. Location of Borings in Damaschke Field.

5.0 DISCUSSION OF FINDINGS

This section presents the summary of conclusions that have been made from the data collected to date (5.1), as well as an evaluation of that data to guide Task 2 investigations (5.2).

5.1 Summary of Findings

Based on the preliminary data gathered in Task 1, several observations were made regarding the former Oneonta Gas Plant:

- Much of the waste generated at the Oneonta site was removed from the site. However, some waste disposal apparently did occur on-site and included liquid wastes spilled on-site. Purifier wastes were placed on the ground for regeneration, and coal tar occasionally overflowed from the tar/water separator pits.
- Material which appears to be coal tar has been identified in the soil near the former site of the large gas holder.
- Material which appears to be coal tar has been found off-site in the adjacent ball field.
- The hydraulic gradient is assumed to be in a southwesterly direction, away from Mill Race Creek.
- Geophysical investigations revealed two zones of anomalously high conductivity: the first is east of Gas Avenue near the former site of the tar tanks, and the second is west of Gas Avenue in the area of the plant. These may be the result of near surface coal tar contamination.

5.2 Preinvestigative Evaluation

The objectives of the Task 2 and Task 3 investigations for the Oneonta site are to obtain sufficient site specific field data to determine if there are any environmental problems at the site and to afford site characterization, risk assessment, and identification of remedial alternatives as appropriate. To assure that the investigations (Task 2 and Task 3) will result in development of the necessary data, the preinvestigative evaluation (Task 1) is undertaken to summarize the potential for environmental problems existing at the Oneonta site and to identify remedial technologies which may be applicable to those environmental problems. With potential remedial technologies identified, it is possible to review the field program to verify that it will develop sufficient data to enable the specific remedial technologies to be evaluated. As the project progresses and our understanding of the site improves, these technologies will be reviewed and refined as necessary. Additional data needs which may be identified as a result of Task 2 will be satisfied in Task 3.

Table 5-1 summarizes the potential for environmental problems which may exist at the Oneonta site. The media addressed in Table 5-1 are soils, surface water ground water, sewers, and air. The potential for environmental problems have been summarized for these media based on a number of technical factors including the chemicals present at the site, the chemical transport mechanisms, the expected persistence of chemicals in the environment, and existing or potential receptors of those chemicals.

Based on the environmental problems which may be identified at the site, several remedial technologies have been considered for each media. These technologies are identified in Table 5-2. Comments are provided for each of the remedial technologies presented.

5.2.1 Data Needs

The data requirements for risk assessment and remediation fall into four general categories:

1. Establishment of background conditions.
2. Characterization of contamination sources.
3. Determination of transport routes.
4. Identification of potential receptors.

TABLE 5-1

SUMMARY OF POTENTIAL FOR ENVIRONMENTAL PROBLEMS AT THE ONEONTA SITE

Technical Factors	On-Site Soils	Ground Water	Sewers	Surface Water	Air
Chemicals Present	Three soil samples have been collected at the site and contain the following: • barium • lead • zinc • o-cresol • p-cresol • naphthalene • quinoline • sulfide • • • The following chemicals may also be present in the soils: • benzene • toluene • ethylbenzene • xylenes • polynuclear aromatic hydrocarbons • heavy metals • cyanides • phenols	There are no ground water wells at the site and no ground water samples have been collected. Chemicals that may be expected in ground water if coal gasification wastes were deposited on site are: • benzene • toluene • ethylbenzene • xylenes • naphthalene • phenols • cyanide Low concentrations of polynuclear aromatic hydrocarbons may also be found in the ground water.	No sewer samples have been collected at the site, but the chemicals that may be expected in the ground water may also be expected in the sewers.	No surface water samples have been collected at the site, but the chemicals that may be expected in the ground water may also be expected in the surface water.	No air samples have been collected at the site but the more volatile chemicals present in the soil may also be present in the air.
Chemical Transport Mechanism	Volatilization to air and/or seepage and leaching of soluble or free liquid wastes to ground water.	The ground water surface is expected to be within 6-8 feet of the ground surface. The silt with fine sand and coarse sand with gravel sediments are moderately to highly permeable. Shallow ground water movement is anticipated to be to the southwest with discharge to the Susquehanna River.	The combined sanitary and storm sewer parallels Gas Avenue, and passes through the middle of the site. The sewers and their bedding material may serve as a conduit for migration of contaminants off site.	Volatile constituents will vaporize while non-volatile consituents will move downstream. The coal tar fraction, which is heavier than water, immiscible, and viscous will move relatively slowly compared to the other coal tar fractions.	Volatilization and particulate migration occur via wind scour. Winds in the area are generally from the northwest. Movement of City of Oneonta vehicles over the unpaved portions of Gas Avenue would further enhance particulate migration.

TABLE 5-1
(CONTINUED)

SUMMARY OF POTENTIAL FOR ENVIRONMENTAL PROBLEMS AT THE ONEONTA SITE

Technical Factors	On-Site Soils	Ground Water	Sewers	Surface Water	Air
Expected Persistence of Chemicals in the Environment	Biodegradation of coal tar present in the soils is very slow or nonexistent. The volatile fraction of the coal tar (benzene, toluene, ethylbenzene, and xylenes) is expected to leach slowly into ground water or vaporize slowly into the air. Naphthalene, phenols, and cyanides are also expected to leach into the ground water slowly. The polynuclear aromatic hydrocarbons and the heavy metals are not expected to vaporize or leach into the ground water at any significant rate.	Any constituent of coal tar present in the ground water is not expected to biodegrade very rapidly except perhaps the phenols. These constituents are expected to remain in ground water until it discharges to a surface water body where vapori- ization will eventually occur.	Any constituent which enters the sewer, and remains in it, will reach the sewage treatment plant and be treated there. However, constituents may leave the sewer prior to reaching the treatment plant. The persistence of the constituent would then be as described for on-site soils or ground water.	The volatile constituents will vaporize into the air. The non-volaitle constituents of coal tar will decrease due to bio-degradation. Some constituents will persist either in a free state or bound by chemical complers or sorbed to particulates.	Contaminants are rapidly dispersed and susceptible to photo-oxidation.
Existing or Potential Receptors of Chemicals	The probability of direct contact to humans or animals is moderately high because unpaved portions of the site are used by the public and city employees. Also leaching and volatilization may transport these chemicals to other media such as ground water and expose humans and animals off-site.	Ground water may discharge to nearby surface water bodies such as Mill Race Creek and the Susquehanna. There are domestic water and industrial wells in a one-mile radious of the site. However, they appear to be hydrologically isolated from the site.	The probability of direct contact to humans or animals is low since there is no access to the sewers other than through manholes.	The probability of direct contact to humans is high through drinking water supplies downstream and water related recreation. However dilution and dispersion effects will bring constituent concentrations down to trace levels.	Humans or animals in the vicinity of the site are potential receptors of any chemicals present in the air.

TABLE 5-2

PRELIMINARY IDENTIFICATION OF REMEDIAL ALTERNATIVES
FOR THE ONEONTA 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	Solidification	Large quantity of soils would be involved. Potential impact on air quality during excavation.
		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.
		Land Treatment	Generally not effective for high molecular weight organic or metallic contaminated materials. Requires suitable land be available. Surface application will require revegetation to control erosion and periodic cultivation to stimulate biological activity.
	No Action	Posting, Fencing, Land Restructions	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.
		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.
	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 5-2
(Continued)

PRELIMINARY IDENTIFICATION OF REMEDIAL ALTERNATIVES
FOR THE ONEONTA 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.
Air	Removal of Source	Excavation	Major excavation to remove source of volatilizing chemicals may result in short-term degradation of air quality when soils are exposed to the atmosphere.
	Control	Capping • clay liner • synthetic liner	The addition of a cover will considerably reduce the release of volatilized chemicals and may require collection and removal of contains vapors.
	No Action		To be considered in conjunction with other technologies.
Sewer	Removal	Excavation and Relocation of Sewers	Removal of sewers will involve excavation and removal of contaminated soils and pipes and may require subsequent transportation to an approved disposal site. Potential impact on air quality during excavation.
		Lowering of Water Table via Pumping	The City of Oneonta already recognizes the problem of ground water influx to sewers. If large volumes of water are to be extracted, on-site treatment may be appropriate. Extent of contamination and required operating period is not known.
		Plugging and Relocation of Sewers	Avoids the air quality concerns of excavation. However, the sewer pipe's bed may still act as a permeable conduit for contaminated ground water.
		Sealing Sewer Pipe	Coating the interior of the sewer pipe has the same advantages and disadvantages as Plugging.
	Treatment	Stripping or Carbon Adsorbtion	Stripping or ground water generated from lowering the water table may cause air contamination without proper and expensive controls applicable to organic constituents; contaminated carbon filters require appropriate disposal or regeneration.

TABLE 5-2
(Continued)

PRELIMINARY IDENTIFICATION OF REMEDIAL ALTERNATIVES
FOR THE ONEONTA SITE

Medium	Conceptual Action	Remedial Measure	Remarks
	No Action		To be considered in conjunction with other technologies.
Surface Water	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

Table 5-3 lists specific data requirements in each of these categories for the Oneonta site. Activities referred to in Table 5-3 are described in detail in the Task 2 Sampling Plan which is included as Appendix B.

5.2.2 Data Quality Requirements

In order to investigate the presence or absence of coal gasification wastes at the Oneonta site, the following parameters will be included in the soil and water analytical program: volatile organics, polynuclear aromatic hydrocarbons, total cyanide, ferroferric cyanide, total organic carbon (water samples only), non chlorinated phenolics, iron, zinc, ammonia and sulfate. RCRA disposal parameters are not included in the Task 2 analytical program, but will be added later if the need for an evaluation of off-site disposal alternatives for wastes arises. Air samples will be analyzed for polynuclear aromatic hydrocarbons, volatile organic compounds, metals, total cyanide and total particulates. The list of parameters analyzed may be expanded during Task 3.

The primary use of the Task 2 data is for problem identification, preliminary risk assessment, and preliminary in-house engineering rather than final engineering determinations. The methods used to analyze for the above parameters must be appropriate for this use. In addition, analytical methods for air, soil, and water samples must generate data that are comparable so that relationships between contaminants in different media can be examined. The data must also be of a quality which will allow comparison between site conditions and regulatory criteria. Where sources of contamination not related to past use of the site for coal gasification are present, the analytical methods must provide sufficient information to allow contaminant source identification.

TABLE 5-3

TASK 2 DATA REQUIREMENTS
ONEONTA SITE

General Data Requirement	Specific Data Requirement	Related Task 2 Activity
A. Establishment of Background Conditions	Analytical data from soil, ground water, sewer, stream sediment, surface water and air samples collected from areas not expected to be influenced by former coal gasification plant activities.	Samples collected and analyzed from test pit 20, boring B-1, surface soil sampling point 4, monitoring wells 1S and 1D, sewer sampling point SR-4, stream sediment sampling point 1, surface water sampling point 1, and an upwind air sample (to be determined in the field).
B. Characterization of Contaminant Sources		
1. Location	Confirmation of location of gas holder foundations.	Test pits 1, 2, 9, 10, and 12.
	Soil conditions adjacent to former coal gasification structures.	Test pits 3, 4, 5, 6, 7, 8, 11, 13, 14, 15, 16, 17, 18 and 19.
2. Chemical nature	Analytical data from soil, ground water, sewer, stream sediment, surface water, and air samples collected from areas adjacent to former coal gasification structures.	Analyses of samples from test pits 1 through 20, surface soil samples 1 through 4, stream sediment samples 1 through 3, sewer sampling locations SR-1 through SR-4, monitoring wells 1S, 1D, 2S, 2D, 3S, 3D, 4S, and 5S, surface water samples 1 through 3, and up to 50 dosimeters and 12 tenax tubes.
	Chemical data which will allow differentiation between coal gasification related contamination and other contaminant sources.	Two GC/MS samples of ground water from 1S and a shallow downgradient well and two other wells.

TABLE 5-3
(CONTINUED)

TASK 2 DATA REQUIREMENTS
ONEONTA SITE

General Data Requirement	Specific Data Requirement	Related Task 2 Activity
C. Determination of Potential Transport Routes		
1. Airborne transport	Meteorological data (wind speed, wind direction, ambient temperature, humidity).	Meteorological monitoring during air sampling.
	Air quality data downwind of site.	Sampling and analysis at locations determined by field conditions.
2. Ground water transport	Site stratigraphy; identification of changes in soil permeability.	All borings and test pits.
	Ground water gradient.	Water level measurements in monitoring wells.
	Quality of ground water upgradient and downgradient of potential sources of contamination.	Sampling and analysis at 1S, 1D, 2S, 2D, 3S, 3D, 4S, and 5S.
3. Sewer transport	Quality of sewage water upgradient and downgradient of the site.	Sampling and analysis at SR1 through SR4.
	Proximity of the water table to the sewers.	Water level measurements in monitoring wells and piezometers.
4. Surface water transport	Quality of surface water and stream sediment upstream and downstream of the site.	Sampling and analysis at surface water and stream sediment sampling points 1 through 3.
	Relationship between ground water flow and surface water.	Water level measurements in all monitoring wells and peizometers.

TABLE 5-3
(CONTINUED)

TASK 2 DATA REQUIREMENTS
ONEONTA SITE

General Data Requirement	Specific Data Requirement	Related Task 2 Activity
D. Identification of Potential Receptors	Evaluation of ground water discharge points and potentially impacted surface water bodies (Mill Race Creek and the Susquehanna River).	Water level measurements in wells and plotting of ground water contours; surface water studies of impacted streams, including water use.
	Evaluation of potential for direct human contact with waste.	Surface soil samples 1 through 4, and two high volume air samples.

6.0 RECOMMENDATIONS

The following activities are recommended for Task 2, and are designed to meet the data requirements described in Section 5.2 and shown in Table 5-3. Recommended activities involve subsurface investigations, and sampling of site soils, ground water, sewers, and air. Detailed discussion of these proposed Task 2 activities is presented in Appendix B, Task 2 Sampling Plan.

Subsurface investigations will involve test pits, borings, and monitoring wells. Test pits will allow for discovery and investigation of buried structures and past disposal practices. Twelve soil borings will allow for determination of the stratigraphy of the unconsolidated sediments at the site, as well as delineation of potential aquifers. Eight of the borings will be converted into monitoring wells and four will become piezometers. The eight wells will be grouped into 3 well nests, which will have a deep and shallow well, and two wells will be single downgradient wells. One well nest will be upgradient and the other two well nests, as well as the two single wells, will be downgradient. The four pieozometers will be located to determine the postition of a ground water divide. The wells and piezometers will provide hydrologic information, such as vertical and horizontal hydraulic gradients, aquifer hydraulic conductivities, and seasonal fluctuations of water levels. Various media at the site will be sampled for potential contaminants. Four surface soil samples will be collected, one north of the site for background information and three on the site.

An average of one soil sample will be collected from each test pit. At test pits which appear to be uncontaminated, a composite sample over the entire depth will be taken. At contaminated test pits, the most apparently contaminated zone will be sampled. Where several test pits are clustered in a contaminated area, samples will be collected from different levels in the various pits, in order to delineate the vertical extent of contamination.

During the excavation of test pits, air samples will be collected upwind, downwind, and at the test pit, in order to develop data for risk assessment of remedial activities involving excavation. Two sampling media will be used. One media will collect volatile organic compounds for GC/MS analysis while the other will be focused on polynuclear aromatic hydrocarbons. Two 12-hour high volume air samples will be collected and analyzed for chemical constituents characteristic of coal gasification sites, as well as total particulates. These two sampling events will be designed to provide data or fugitive dust risks during normal work and recreation activities at the site.

Four weeks after installation of the monitoring wells, the ground water will be sampled for analysis. The combination storm and sanitary sewer which passes through the site will be sampled at four locations, one upgradient, one downgradient, and two in the middle of the site.

The Mill Race Creek water and bottom sediments will be sampled at three locations, one upstream, one downstream, and one adjacent to the site. The stream sediment will be sampled once (first round), and the surface water will be sampled quarterly.

The proposed surface soil, test pit, boring, monitoring well, surface water, stream sediment and air sampling locations are discussed in detail in Appendix B, Task 2 Sampling Plan.

The analytical program is designed to fulfill the data quality requirements discussed previously. The organic analyses for soil, ground water, surface water, sediment and air will be done by GC/PID, with GC/MS confirmation on two soil samples collected from the test pits, and two ground water samples from the first two sampling rounds. This program will allow comparison of data from different media and will yield concentrations at the trace level which is sufficient for comparison with regulatory and health criteria.

A report will be prepared to assess the data obtained in Task 2 in conjunction with the site information developed in Task 1. On the basis of the Task 2 findings, a preliminary risk assessment will be performed (Task 3) and recommendations for continued investigation, monitoring the existing situation, or discontinuing the program will be provided where appropriate.

The detailed scope of work for Task 2 is described in the Task 2 Sampling Plan, Oneonta Site, provided as Appendix B to this report.

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APPENDIX A

RESULTS OF THE GEOPHYSICAL INVESTIGATION

EM-31 GEOPHYSICAL DATA

Line 1

STA	mmhos / meter
0+00	80.64
0+25	32.64
0+50	15.36
0+75	11.20
1+00	10.08
1+25	10.08
1+50	9.52
1+75	9.24
2+00	9.52
2+25	10.08
2+50	11.20
2+75	9.52

Line 1'

STA	mmhos / meter
0+00	83.72
0+25	45.50
0+50	27.30
0+75	16.38
1+00	18.20
1+25	16.38
1+50	14.56
1+75	14.56
2+00	14.56
2+25	14.56
2+50	10.92
2+25	14.56

Line 2

STA	mmhos / meter
0+00	96.00+
0+25	56.64
0+50	34.56
0+75	28.80
1+00	19.60
1+25	21.00
1+50	59.52
1+75	15.40
2+00	14.00
2+25	15.68
2+50	17.36
2+75	15.40

Line 2'

STA	mmhos / meter
0+00	274.00+
0+25	43.84
0+50	43.84
0+75	30.94
1+00	28.21
1+25	32.76
1+50	28.21
1+75	24.57
2+00	25.48
2+25	23.66
2+50	23.66
2+75	21.84

Line 3

STA	mmhos / meter
0+00	96.00+
0+25	21.12
0+50	51.84
0+75	36.48
1+00	33.60
1+25	30.72
1+50	32.64
1+75	32.64
2+00	29.76
2+25	27.84
2+50	25.92
2+75	23.04

Line 3'

STA	mmhos / meter
0+00	91.00+
0+25	41.86
0+50	91.00+
0+75	89.18
1+00	76.44
1+25	91.00+

EM-31 GEOPHYSICAL DATA

Line 4

STA	mmhos/meter
0+00	96.00^{+}
0+25	10.56
0+50	96.00^{+}
0+75	88.32
1+00	42.24
1+25	59.52
1+50	-----
1+75	36.48
2+00	30.72
2+25	19.20
2+50	19.20
2+75	18.24

Line 4'

STA	mmhos/meter
0+00	91.00^{+}
0+25	72.80
0+50	60.06
0+75	52.78
1+00	43.68
1+25	45.50

Line 5

STA	mmhos/meter
0+00	51.84
0+25	32.64
0+50	42.24
0+75	29.76
0+00	24.96
1+25	36.48
1+50	-----
1+75	22.08
2+00	19.20
2+25	14.00
2+50	14.40
2+75	14.40

Line 5'

STA	mmhos/meter
0+00	91.00^{+}
0+25	40.95
0+50	38.22
0+75	30.03
1+00	29.12
1+25	30.03
1+50	28.21

Line 6'

STA	mmhos/meter
0+00	NEG
0+25	90.24
0+50	45.12
0+75	30.72
1+00	42.24
1+25	59.52
1+50	-----
1+75	24.00
2+00	12.04
2+25	12.88
2+50	16.52
2+75	9.52

Line 7

STA	mmhos/meter
0+00	24.96
0+25	36.48
0+50	48.00
0+75	15.36
1+00	44.16
1+25	48.00
1+50	32.64
1+75	-----
2+00	22.08
2+25	45.12
2+50	34.56
2+75	32.64

EM-31 GEOPHYSICAL DATA

Line 8

STA	mmhos/meter
0+00	NEG
0+25	82.56
0+50	19.20
0+75	61.94
1+00	73.92
1+25	24.96
1+50	-----
1+75	-----
2+00	39.36
2+25	34.56
2+50	34.56
2+75	31.68

Line 9

STA	mmhos/meter
0+00	60.48
0+25	67.20
0+50	86.40
0+75	96.00^{+}
1+00	92.16
1+25	36.48
1+50	-----
1+75	-----
2+00	17.28
2+25	11.52
2+50	6.16
2+75	10.36

Line 10

STA	mmhos/meter
0+00	26.88
0+25	38.40
0+50	94.08
0+75	86.40
1+00	-----
1+25	31.68
1+50	-----
1+75	-----
2+00	15.12
2+25	11.20
2+50	10.36
2+75	10.36

Line 11

STA	mmhos/meter
0+00	12.76
0+25	NEG
0+50	24.94
0+75	NEG
1+00	27.30
1+25	20.02
1+50	14.60
1+75	16.38
2+00	27.30

Line 12

STA	mmhos/meter
0+00	10.92
0+25	20.93
0+50	34.58
0+75	36.40
1+00	43.68
1+25	47.32
1+50	22.75
1+75	22.75
2+00	30.03

Line 13

STA	mmhos/meter
0+00	10.01
0+25	14.56
0+50	38.22
0+75	38.22
1+00	NEG
1+25	-----
1+50	-----
1+75	-----
2+00	-----

Line 14

STA	mmhos/meter
0+00	7.28
0+25	12.74
0+50	20.02
0+75	NEG
1+00	18.20
1+25	50.05
1+50	49.14
1+75	45.50
2+00	74.62

Line 15

STA	mmhos/meter
0+00	10.92
0+25	12.74
0+50	14.56
0+75	21.84
1+00	25.48
1+25	NEG
1+50	34.40
1+75	78.26
2+00	82.81

Line 16

STA	mmhos/meter
0+00	17.29
0+25	20.02
0+50	20.02
0+75	23.66
1+00	30.94
1+25	NEG
1+50	65.52
1+75	50.96
2+00	91.00^{+}

EM-31 GEOPHYSICAL DATA

Line 17

STA	mmhos meter
0+00	25.48
0+25	41.86
0+50	38.22
0+75	38.22
1+00	45.50
1+25	56.42
1+50	78.26
1+75	86.45
2+00	91.00+

Line 18

STA	mmhos meter
0+00	269.44
0+25	269.44
0+50	168.40
0+75	NEG
1+00	117.88
1+25	126.30
1+50	109.46
1+75	92.62
2+00	151.56
2+25	25.26

Line 19

STA	mmhos meter
0+00	842.00+
0+25	387.32
0+50	421.00
0+75	656.76
1+00	842.00+

Line 20

STA	mmhos meter
0+00	46.58
0+25	49.32
0+50	60.28
0+75	60.28
1+00	71.24

Line 21

STA	mmhos meter
0+00	68.50
0+25	43.84
0+50	24.66
0+75	43.84
1+00	43.84
1+25	54.80

Line 22

STA	mmhos meter
0+00	NEG
0+25	49.32
0+50	46.58
0+75	32.88
1+00	36.40
1+25	23.66
1+50	23.66
1+75	29.12
2+00	47.32
2+25	47.32
2+50	43.68
2+75	41.86
3+00	38.22
3+25	18.20

EM-31 GEOPHYSICAL DATA

Line 23

STA	mmhos/meter
0+00	274.00+
0+25	213.72
0+50	49.32
0+75	98.64
1+00	76.72
1+25	38.36
1+50	213.72
1+75	246.60
2+00	191.80
2+25	32.88
2+50	30.14
2+75	52.06
3+00	131.52
3+25	120.56
3+50	208.24
3+75	147.96

NOTE:

- 96.00+ value is greater than 96.00
- NEG value is below zero
- _____ no reading taken due to surface metal debris

APPENDIX B

TASK 2 FIELD SAMPLING PLAN ONEONTA SITE

THE TASK 2 SAMPLING PLAN
THE FORMER ONEONTA COAL GASIFICATION PLANT

FOR
NEW YORK STATE ELECTRIC & GAS CORPORATION

Prepared By:

Glenn Daukas
Curtis A. Kraemer, P.G.

Reviewed By:

James Gould, P.E.

TRC Project No. 3435-N61

August 20, 1986

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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 2 investigation at the Oneonta site. Included in this plan are the schedules, locations of samples, and procedures to be employed in sampling site soils, test pits, ambient air, ground water, surface water, and stream sediments. Where a specific TRC quality assurance procedure is incorporated, the procedure number has been referenced.

A number of maps are included to illustrate the various sampling locations; the maps are based on a site map, included as Exhibit A, developed by Weiler Mapping, Inc. of Horseheads, N.Y. The site map developed by Weiler has a scale of 1" equals 50'.

The work plan is organized according to the chronological order of events starting with field mobilization and ending with sample shipping and documentation. The program schedules are presented at the end of the plan.

2.0 FIELD MOBILIZATION

Based upon approval of this plan by NYSEG, TRC will mobilize to the Oneonta site. It is estimated one day will be required to prepare the project site so that subsurface explorations can commence.

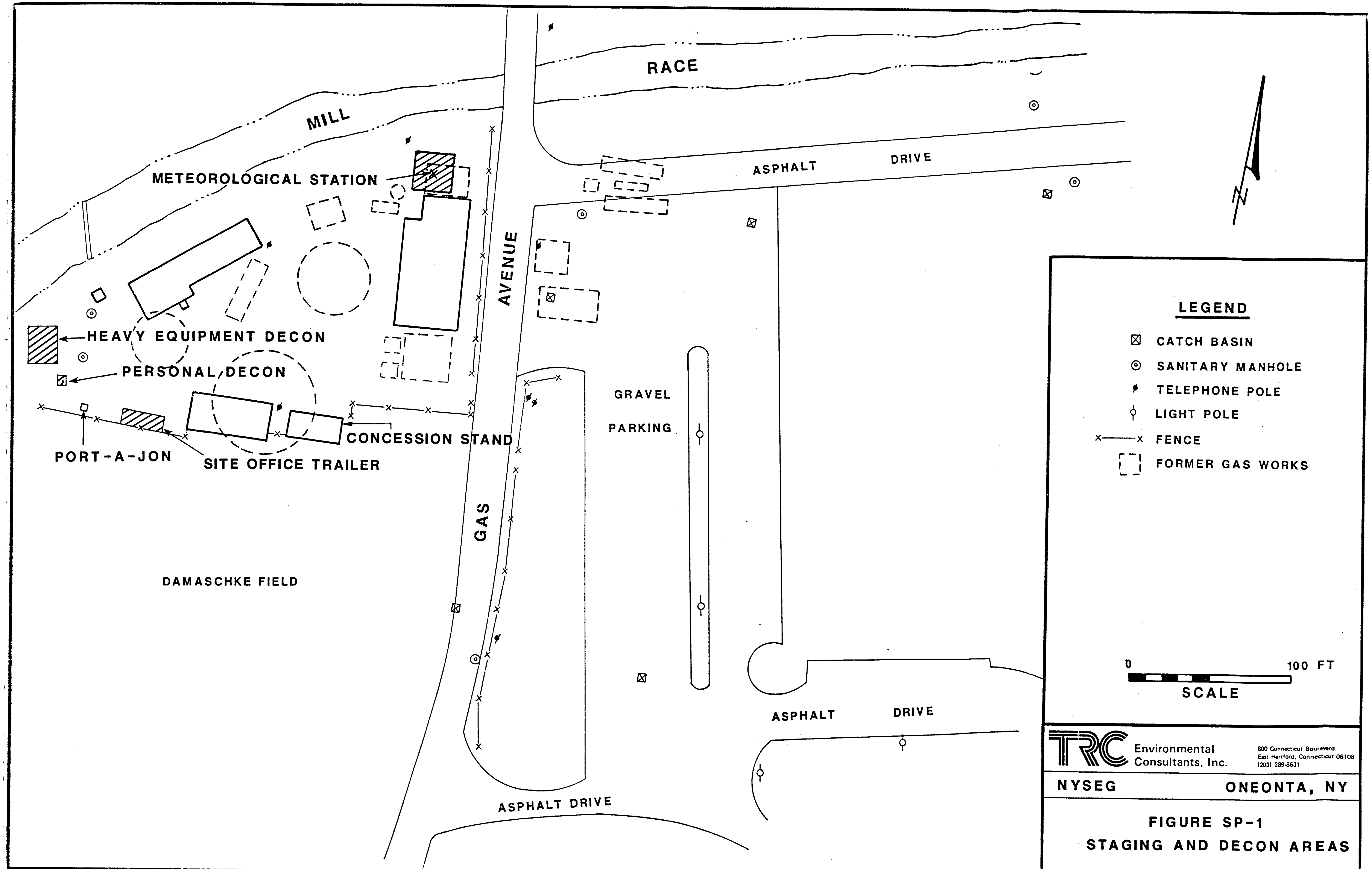
The field mobilization will include the following work elements:

2.1 Establish Field Office and Sanitary Facilities

A trailer suitable for a field office with a separate room for a field laboratory and equipment storage will be moved on-site. The trailer will be located west of the concession stand along the southern property fence line. See Figure SP-1 for the exact location. This trailer will be designated a "clean" area where only authorized personnel will be allowed. Sanitary facilities, Port-A-Jon, will be located adjacent to the trailer. The trailer and sanitary facilities will be kept on-site for a period of two to three months.

2.2 Establish Decontamination Area

A heavy equipment decontamination (decon) area used primarily for steam cleaning backhoes and drilling rigs will be located in the extreme western end of the site. Materials generated during steam cleaning will not be collected. This location was chosen because it is outside the area of concentrated subsurface investigations and is inside the facility's chain link fence. Immediately adjacent to the heavy equipment decon area will be facilities for boot and glove washing, disposable coverall removal, and hand washing. Location of the decon area is shown in Figure SP-1.



RACE
MILL
METEOROLOGICAL STATION
ASPHALT DRIVE
AVENUE
GAS
HEAVY EQUIPMENT DECON
PERSONAL DECON
CONCESSION STAND
PORT-A-JON
SITE OFFICE TRAILER
GRAVEL PARKING
DAMASCHKE FIELD
ASPHALT DRIVE
ASPHALT DRIVE
N
LEGEND
CATCH BASIN
SANITARY MANHOLE
TELEPHONE POLE
LIGHT POLE
FENCE
FORMER GAS WORKS
0
100 FT
SCALE
TRC Environmental Consultants, Inc.
800 Connecticut Boulevard
East Hartford, Connecticut 06108
(203) 289-8631
NYSEG
ONEONTA, NY
FIGURE SP-1
STAGING AND DECON AREAS

2.3 Establish Field Communications

As outlined in the Health and Safety Plan (HASP) dated April 10, 1986, the field office will be equipped with an FM two-way radio base station and a telephone. The two-way FM radio system will facilitate communication to field work teams. This system will include an AC to DC converter, the base station, and an antenna. Field personnel will be equipped with hand-held radios. While the site is not large, the FM two-way radio will provide frequent and easy communication between members of the field party. The phone is to provide communication off-site, including the remote possibility of emergency services such as the police or fire departments.

2.4 Backhoe and Drilling Equipment Mobilization

A backhoe and drill rig will be delivered to the site by Empire Soils Investigations, Inc. and parked in the heavy equipment decon area (Figure SP-1). All small tools, safety equipment, etc. will be locked in the tool storage area.

2.5 Set Up Site Laboratory

Half of the office trailer will be used as a field laboratory. A Century Organic Vapor Analyzer (OVA) Model 128 and an HNu Photoionizer PI-101 will be the survey tools used to detect levels of organics in site soils. The primary procedures for operation and calibration of the OVA and HNu will follow TRC Technical Standard T/S-990, Operation and Calibration of the Century Organic Vapor Analyzer Model OVA-128, and Technical Standard T/S-993, Operation and Calibration of the HNu PI-101 Photoionizer Analyzer. The OVA and HNu will be maintained in the clean, protected area of the office trailer where they will be prepared for monitoring site soils and test pits. TRC has chosen both methods to analyze soils since they are both portable and can serve as backup instrumentation to each other. Samples of site soils from borings, surface soils, stream sediments, and test pit soils will be collected and immediately taken to the field laboratory for scanning. Sample shipping containers and all site log books will be maintained by the field chemist based in the site laboratory.

2.6 Meteorological Monitoring Station Setup

As part of the ambient air monitoring program TRC will, during the site mobilization, establish a station which will monitor and record wind speed and direction. The tentative location is on top of the garage building to the north of the site (see Figure SP-1). This instrument will include a 12 foot tower with vane and anemometer powered by a battery located in a weathertight recorder box. The device is a Climatronics EWS-1 Electronic Weather Station and it will be checked as necessary to determine upwind and downwind directions just prior to and during drilling operations.

2.7 Identification of Sampling Locations

During the mobilization phase, wooden stakes with orange flagging will be placed around the site to identify test pits and monitoring well locations. Where these locations are over asphalt, orange spray paint will be used to mark the spot.

After the drillers and backhoe operator have set up their equipment, they will be shown the sequence of sampling locations so that they can prepare for any contingencies.

3.0 SURFACE SOIL SAMPLING

Surface soil samples will be collected from around the site to determine the nature and extent of risk associated with direct contact with contaminated dust and soils. Locations for these samples were determined during the site reconnaissance (based on potential for direct contact) and are illustrated in Figure SP-2.

Sampling of surface soils will be performed according to TRC Technical Standard T/S-971, Surface Soil Sample Collection. All surface soil samples will be collected during the same day. The hand auger used for surface soils will be thoroughly cleaned with laboratory detergent, tap water, dilute acetone and distilled water between each sample.

Referring to Figure SP-2 the following is a summary of the location and purpose for each sample:

Sample Number	Description
1	West end of the dog pound where there was an excavation for a concrete footer and coal tar odors were reported.
2	North side of concession stand where a gas holder foundation with coal tar in it was uncovered.
3	General area where purifier chips were reported to be recycled on the ground.
4	Background soil sample in apparently clean area.

The surface soil samples will be analyzed for the parameters listed in Table SP-1.

Each surface soil sample will be logged and numbered according to the following scheme (based on the NYSEG protocol):

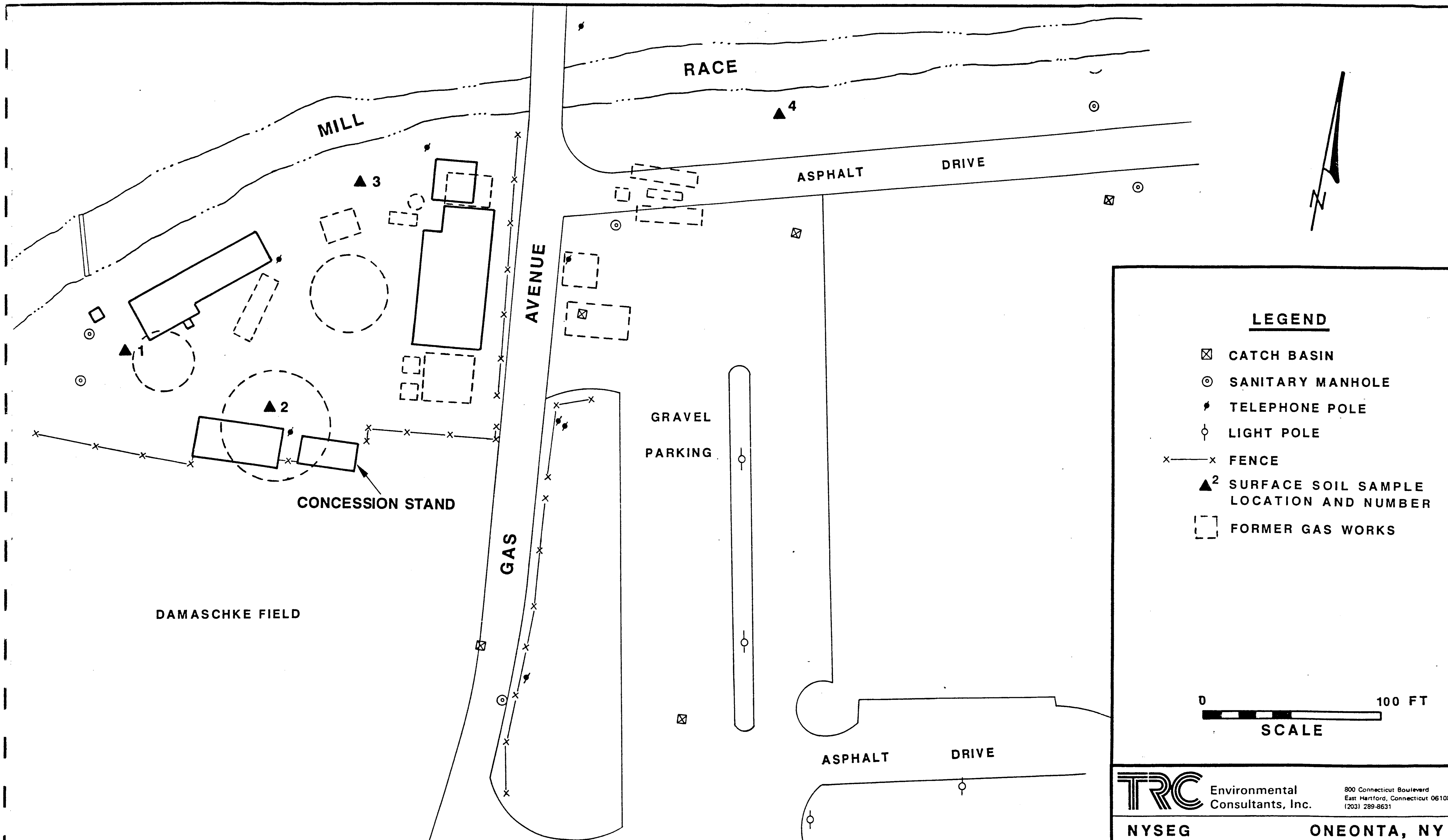


FIGURE SP-2
SURFACE SOIL SAMPLING LOCATIONS

TABLE SP-1

SOIL SAMPLE ANALYSIS

<u>Parameter</u>

Iron
Zinc
Ammonia (organic nitrogen)
Sulfate
Total Cyanide
Ferroferric Cyanide

<u>Method 602</u> (Aromatics)

Benzene
Toluene
Ethylbenzene
p-xylene
o-exylene
Styrene
n-propylbenzene

<u>Method 604</u>

Phenols (non-chlorinated)

<u>Method 610</u> (Polynuclear Aromatic Hydrocarbons)

Acenaphthene
Acenaphthylene
Anthracene
Benzo (a) Anthracene
Benzo (a) Pyrene
Benzo (b) Fluoranthene
Benzoperylene
Benzo (k) Fluoranthene
Chrysene
Fluoranthene
Fluorene
Indeno (1,2,3-CD) Pyrene
Naphthalene
Pyrene

Example: ONEXSW8505 11/06/85
where: ON - Oneonta Site
E - Soil Sample
X - Rloc, N/A
SW - Loc, N/A
85 - Year
05 - Soil sample location No. 5
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.);
- Composite hours (COMP HRS, number of hours over which a sample was composited);
- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory).

All surface 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 surface soil sampling event:

- One field blank.
- One blind duplicate.

4.0 SUBSURFACE INVESTIGATIONS

The purpose of the subsurface investigations (test pits and borings) is to delineate the extent of soils contamination and define the nature of the contaminants, and to establish a ground water monitoring system that will define the effects that possible site contamination has had on area ground water, specificially contaminant migration rates and directions.

4.1 Test Pits

In TRC's Work Plan for the Oneonta Site (April 1, 1986), one of the program options discussed was the use of the test pits to locate areas of contamination. The use of test pits is an efficient means for quick delineation of shallow subsurface conditions and for locating former tank foundations and associated pipes. Based on the geophysics work completed during Task 1 and the likelihood that ground water on the site is between 5 and 10 feet below ground surface, at least 20 test pits will be excavated at the site. The approximate test pit locations are shown on Figure SP-3.

TRC has allotted five days for backhoe work, and based on our experience, the number of test pits will most likely be increased to greater than 25. Based on the findings of the geophysical survey, the majority of the test pits will be in the vicinity of former plant operations and east across Gas Avenue adjacent to Mill Race Creek where the tar pumps and tar tanks were located. Particular emphasis will be placed around the separators, purifier boxes, and gas holders. The test pits have been located to determine the extent of soil contamination around the plant site, characterize the waste products, and determine the pathways of contaminant migration, e.g., the old buried tar and oil pipeline.

In order to conduct the test pit excavations within the former plant operation area in an efficient manner, most of the equipment and debris in this area will have to be removed, either by the City of Oneonta or TRC.

The area east, across Gas Avenue and adjacent to Mill Race Creek is overlain by a paved city road. TRC will make arrangements with the City of Oneonta to excavate this area in a safe and efficient manner. TRC will be responsible for returning the excavated areas back to their original condition.

Referring to Figure SP-3, the following is a summary of the location and purpose for each test pit:

Sample Number	Description
1 and 2	To verify the location and extent of demolition debris removal from large gas holder.
3, 4 and 5	To verify the location and determine extent of contamination, if any, from gas generators and water/tar separator pits.
6, 7 and 8	Based on discussions with previous employees and review of old NYSEG maps, area where tar boiler, tar pits, tar pipe line, and outdoor purifier and chip regeneration area are thought to be located.
9 and 10	Possible location of relief holder.
11 and 12	Possible locations of oil tanks.
13	Determine extent of contamination, if any, leaving the site. Will be completed last and only if necessary.
14, 15 and 16	Based on discussion with previous employees and reference to old NYSEG maps, possible area of tar tanks and tar pump house.
17	Locate pipe used for tar and oil transportation.
18	Possible location of second oil and tar pump house.

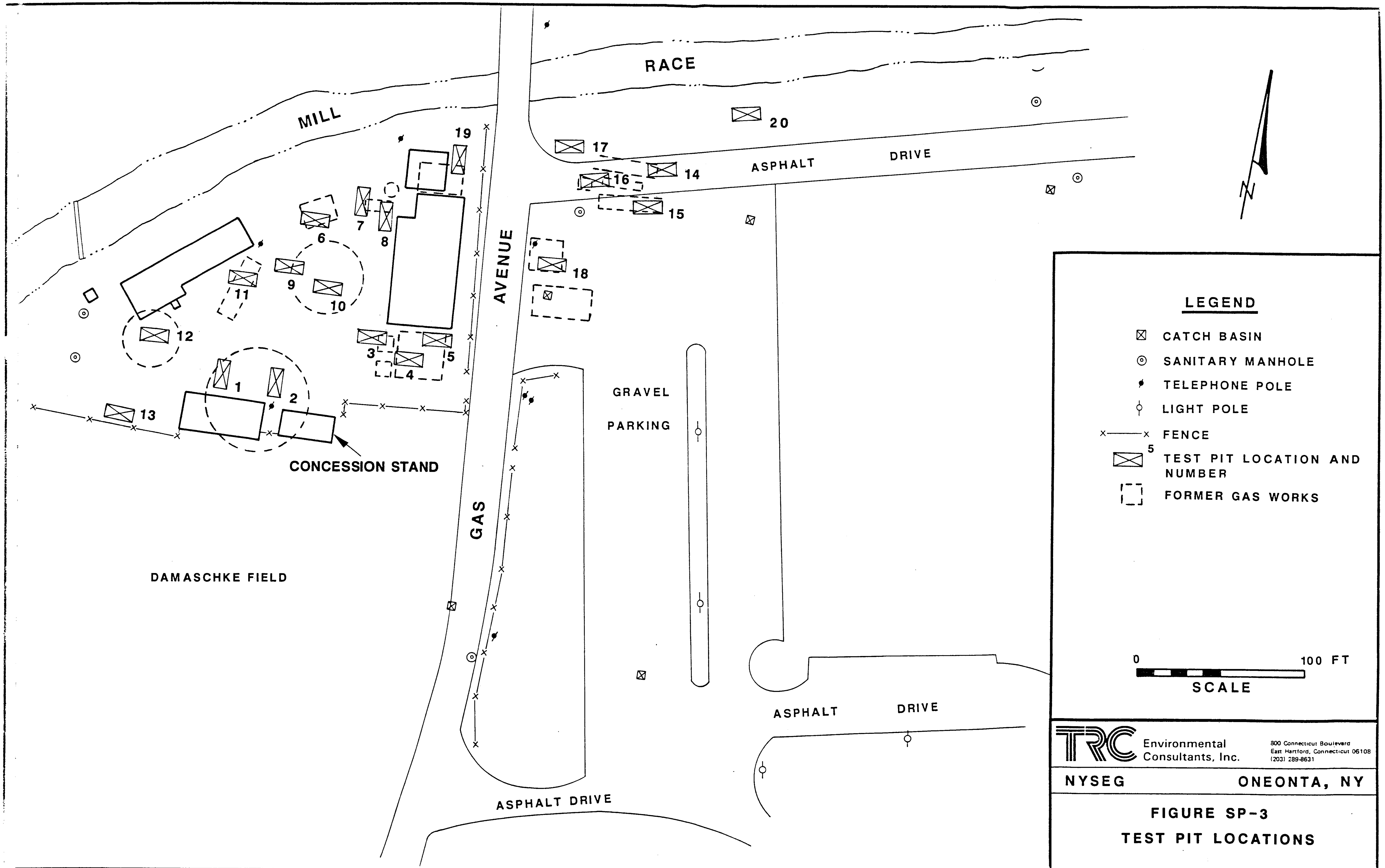


FIGURE SP-3
TEST PIT LOCATIONS

19	Possible location of purifiers based on old NYSEG maps.
20	Background clean area.

The test pits will be excavated in a sequence starting from the areas suspected to have the heaviest contamination to areas of little or no contamination. Thus, in the most efficient manner possible, TRC should be able to identify the limits of contamination on site. After excavation of a contaminated test pit the backhoe bucket will be decontaminated at the heavy equipment decon zone before moving on to the next test pit. If the test pit is across Gas Avenue from the decon zone, the backhoe will be cleaned with a shovel at the test pit to remove any soil which may fall off when traveling to the decon zone.

The test pit exploration is scheduled for five days and will begin immediately after the field mobilization tasks are complete. Prior to any test pit work, the backhoe will be utilized to scrape about one foot of material from the top of a 10 foot by 20 foot area into which about six inches of coarse gravel will be laid. This area will be the decontamination zone, but no material will be taken off the site. The gravel will allow the decon fluids to drain below the heavy equipment. All heavy equipment will be decontaminated using steam, and detergent.

Test pits will be excavated by backhoe with a maximum reach of approximately 12 feet. The top 2 feet of soil will be stockpiled on the right side of the test pit, while the remaining soil will be piled on the left side on top of a tarp. The soils, waste products, and ground water encountered in the test pit will be logged and photographed according to TRC Technical Standard T/S-973, <u>Procedures for Logging and Collecting Subsurface Soils in Test Pit Excavations</u>. No one will be allowed to enter the test pits; TRC personnel will use a long-reach sampling tool to collect samples for detailed descriptions. The samples will be placed in air-tight jars and taken to the field laboratory for head space analysis with the OVA at the end of each day. Test pits will not be left unattended or left open overnight. The TRC field supervisor will direct the backhoe operator and have control over the depth of excavation. Excavation will be terminated if any of the following occurs:

- A gross show of contaminant that may endanger the health and safety of the field team is encountered.
- A confining layer (lense) is encountered at a lower elevation than contaminated soil.
- A heavy flow of contaminated ground water or contaminants enters the pit, where a continued excavation would cause heavier flow and subsequent problems in backfilling when the contaminant is displaced and brought to the ground surface.

Assisting the backhoe supervisor will be a field technician whose principal responsibility will be to collect and label soil and waste samples according to TRC Technical Standard T/S-973.

After the test pit has been excavated to its maximum depth, the soil on the left side of the pit will be returned to the pit in 1 foot layers with compacting of each layer. In non-paved areas, the clean soil on the right side will be used to fill the pit to grade, and the area will be reseeded. For test pits in areas paved with asphalt or crushed stone, the top 1 foot will be filled with crushed stone and compacted to grade. In addition, pits in asphalt areas will be covered with a tarp until they are repaved at the conclusion of test pitting. The only material remaining after the conclusion of test pitting will be clean soil, crushed stone, and broken asphalt. The latter two materials will be piled on site, and the clean soil will be spread in a depression on the east end of the site. After backfilling, the test pit locations will be marked with a stake and flagging or spray paint.

During the test pit excavations, all personnel observing (including the backhoe operator) the operation will wear, at a minimum, Level 'D' protective clothing (work boots, work gloves, coveralls) as specified in TRC's HASP. Level 'C' protection will be available in the field trailer at all times and will be used at the discretion of the site safety director or his designee. The test pit operation will be monitored with either an HNu or OVA for increased levels of organic vapors. It is TRC's policy that Level 'C' gear must be used when the level of total organics (based on OVA or HNu) in the air exceeds 10 ppm above background.

Upon completion of the test pit excavations, the backhoe will be completely decontaminated prior to leaving the site. Decontamination of the backhoe wheels, undercarriage and arm may be warranted between test pits and will be done, based on field conditions, at the discretion of the TRC supervisor.

4.2 Drilling, Installation and Development of Monitoring Wells

A total of 8 borings will be drilled and completed as monitoring wells at locations shown on Figure SP-4. The following is a summary of the purpose for each well:

Well Number	Description
1S, 1D	Upgradient wells for the site based on Task 1 reconnaisance.
2S, 2D	Located downgradient of gas generators and tar pits to determine the variations in ground water quality with depth.
3S, 3D	Located downgradient of the site to help define the ground water quality leaving the site.
4S	Located west of the oil tanks along the Mill Race to determine contribution, if any, to the Mill Race from the site.
5S	Located in areas of reported historic purifier chip regeneration.

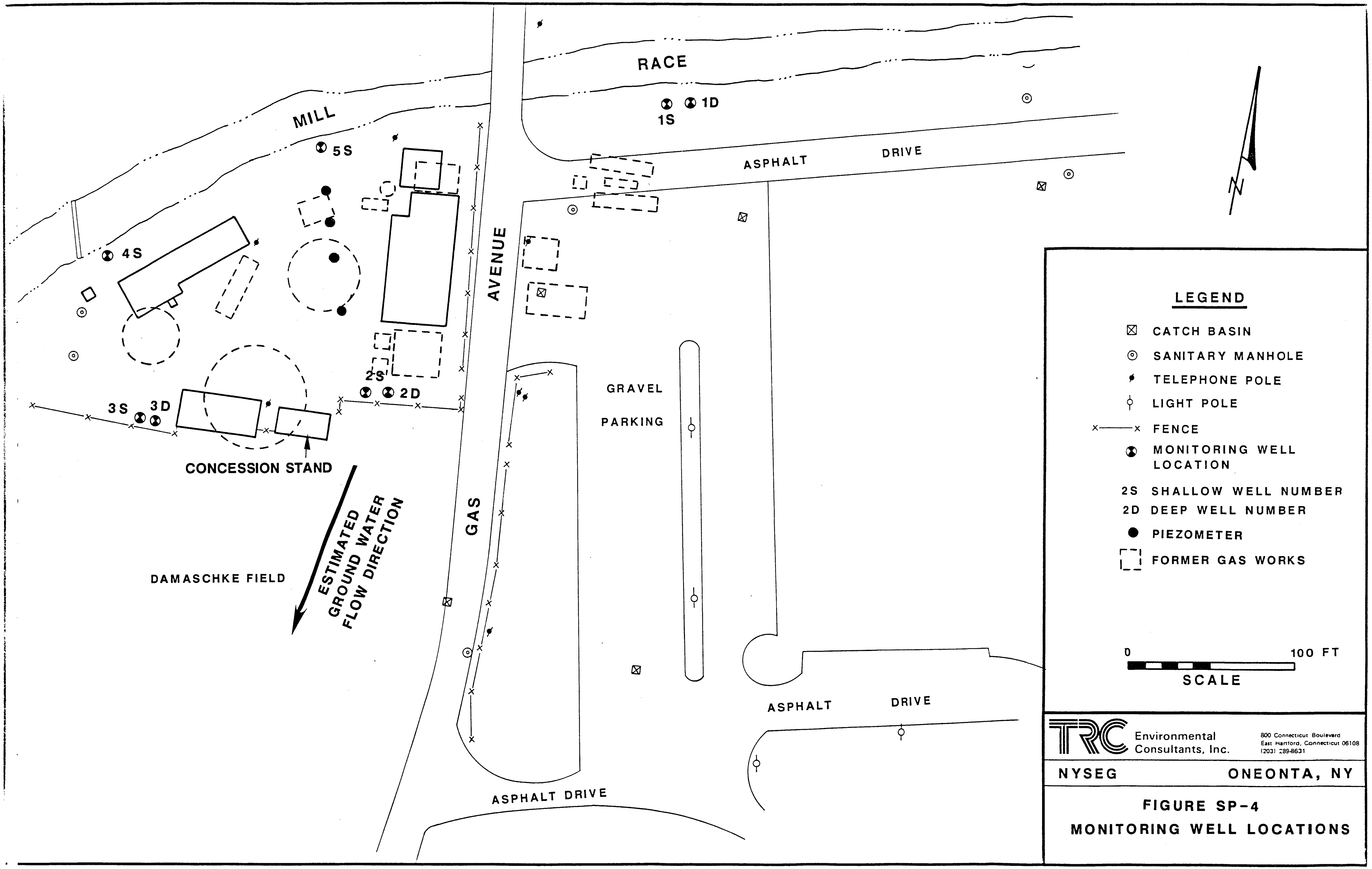


FIGURE SP-4
MONITORING WELL LOCATIONS

There will be three paired monitoring well clusters constructed similar to each other, the first pair located up gradient of the site, and the second pair located downgradient of the site and adjacent to the western edge of the concession stand. The third pair will be located along the property fence line due south of the plant building and the historic gas generator location. Each pair will consist of a shallow and a deep well. The shallow well (no greater than 20 feet) will be placed above any intermediate confining layer above the deeper, permeable geologic formation. These wells are designed to detect any "immiscible" compounds and any other soluble ground water contamination. The deep well will be completed to a depth of approximately 80 feet which will be in the deeper permeable geologic (Empire Soil Inv. Inc. Drill Logs) formation to identify any migration pathway that could transmit contaminants to a greater depth.

Upgradient has been assumed to be the northern end of the site. This conclusion was drawn as a result of the past and present topography of the area and the presence of ground water contamination south of the site under Damaschke Field, as reported by the City of Oneonta Engineering Department. This information was collected during the Task 1 site investigations.

The remaining two wells will be installed as shallow wells, constructed as described in the paired wells, and will be located along the Mill Race Creek bank. These wells are located to intercept site specific ground water flow towards Mill Race Creek.

To further define the site specific ground water characteristics, four piezometers will be installed on the site west of Gas Avenue. The piezometers will be installed in a northwest alignment across the site to locate a possible groundwater flow divide. No samples will be collected from the piezometers, although they will be constructed of two inch diameter PVC, which creates the potential for ground water sampling.

At each of the five shallow monitoring well locations, the borings will be advanced using an 8 inch diameter hollow stem auger with a four inch inside diameter. The four deep wells will be installed using casing and grouting to prevent possible contamination migration into the deeper permeable geologic formation. Final depths for the wells will be decided in the field once the test pits have been completed and the background deep well has been placed. Split spoon samples will be collected continuously from the boring for the deeper monitoring well in a well nest and from all single monitoring well locations.

All the borings and well installations will be supervised by the site geologist, who will log and classify samples according to TRC Technical Standard T/S-974, Procedures for Logging and Collecting Subsurface Soils During Test Boring and Well Drilling. The site geologist will be assisted by a field technician who will collect, label, and deliver samples to the site chemist for screening. All samples will be collected in 1 liter glass containers.

Each split spoon sample will be screened with a HNu or OVA while it is still in the split spoon. Part of the split spoon sample will be retained in an air-tight jar for later headspace analysis with a HNu or OVA. All headspace samples will be analyzed a uniform period of time after collection when equilibrium conditions have been achieved.

During the drilling of the monitoring wells, Level D protection will be worn by all personnel at the drill rig. Level C protection will be readily available and will be used at the discretion of the site safety director (based on organic vapor levels exceeding background by 10 ppm).

The monitoring wells will consist of 2-inch stainless steel riser with a maximum of 30 feet of stainless steel screen (20 slot size). For the shallow wells, the top of the screen will be set approximately 2 feet above the water table. The actual screen length will be determined in the field, depending on the depth to the confining layer, depth to water table, and any noted zones of contamination. The well screen will be packed in clean sand/gravel pack. A three-foot thick bentonite clay seal will be placed above this pack. The annular space will then be backfilled with a cement/bentonite slurry to the ground surface. A protective steel casing with a vented locking cap will be set in this slurry at a minimum of three feet below the ground surface. A vented stainless steel cap will be placed on the finished well. A concrete apron, pitched to drain, will be placed around the well. Wells which have to be drilled in the driveway or parking areas will be completed flush with the asphalt surface with a steel road box protecting them.

To prevent cross-contamination during drilling, the split spoon sampler will be cleaned between samples with detergent, tap water, acetone (if there is gross contamination on the spoon), and distilled water. Any acetone used will be collected and allowed to evaporate from the collection container. Drill rods and casing will be steam cleaned after each boring is completed. The drill rig will be steam cleaned when the project is completed.

Completed wells will be surveyed by a licensed surveyor to the nearest hundredth foot (0.01) for location and elevation of the top of the stainless steel well pipe, the locking protective casing, and the ground surface. These locations and elevations will be plotted on the site map.

All wells will be developed by pumping and surging to remove cuttings and silt. The wells will be evacuated with a pump or bailer until the water attains visual clarity. In order to prevent cross-contamination, the pump will be thoroughly cleaned with detergent, tap water, and acetone before another well is pumped.

After each well is completed and developed, a permeability test will be performed using the procedures in Table SP-2. The particular procedure used

TABLE SP-2

PERMEABILITY TEST METHODS

Aquifer Condition	Type of Test	Reference
Medium to high permeability (clean sand and gravel), screen below or partially above the water table	Pump/recover test with gasoline powered pump	Determining the Permeability of Water Table Aquifers. The Recovery Method for Determining the Coefficient of Transmissibility. In USGS Water Supply Paper 1536-I.
Low permeability (silt and silty sand), entire screen below watertable	Slug injection/ extraction test	The Slug-Injection Test for Estimating the Coefficient of Transmissibility of an Aquifer. In USGS Water-Supply Paper 1536-I.
Low permeability (silt and silty sand), screen partially above table	Pump with low-discharge battery-powered pump	Determining the Permeability of Water Table Aquifers. The Recovery Method for Determining the Coefficient of Transmissibility. In USGS Water-Supply Paper 1536-I.
Extremely low permeability (clay), screen below or partially above the water table	Slug injection and extraction test	The Slug-Injection Test for Estimating the Coefficient of Transmissibility of an Aquifer. In USGS Water-Supply Paper 1536-I.

will depend on the expected permeability and whether the well is screened above the water table. Using the permeability data in conjunction with hydraulic gradients and other aquifer properties, TRC will conduct a hydraulic analysis on the site to determine the rate and direction of ground water flow.

4.3 Geophysical Survey

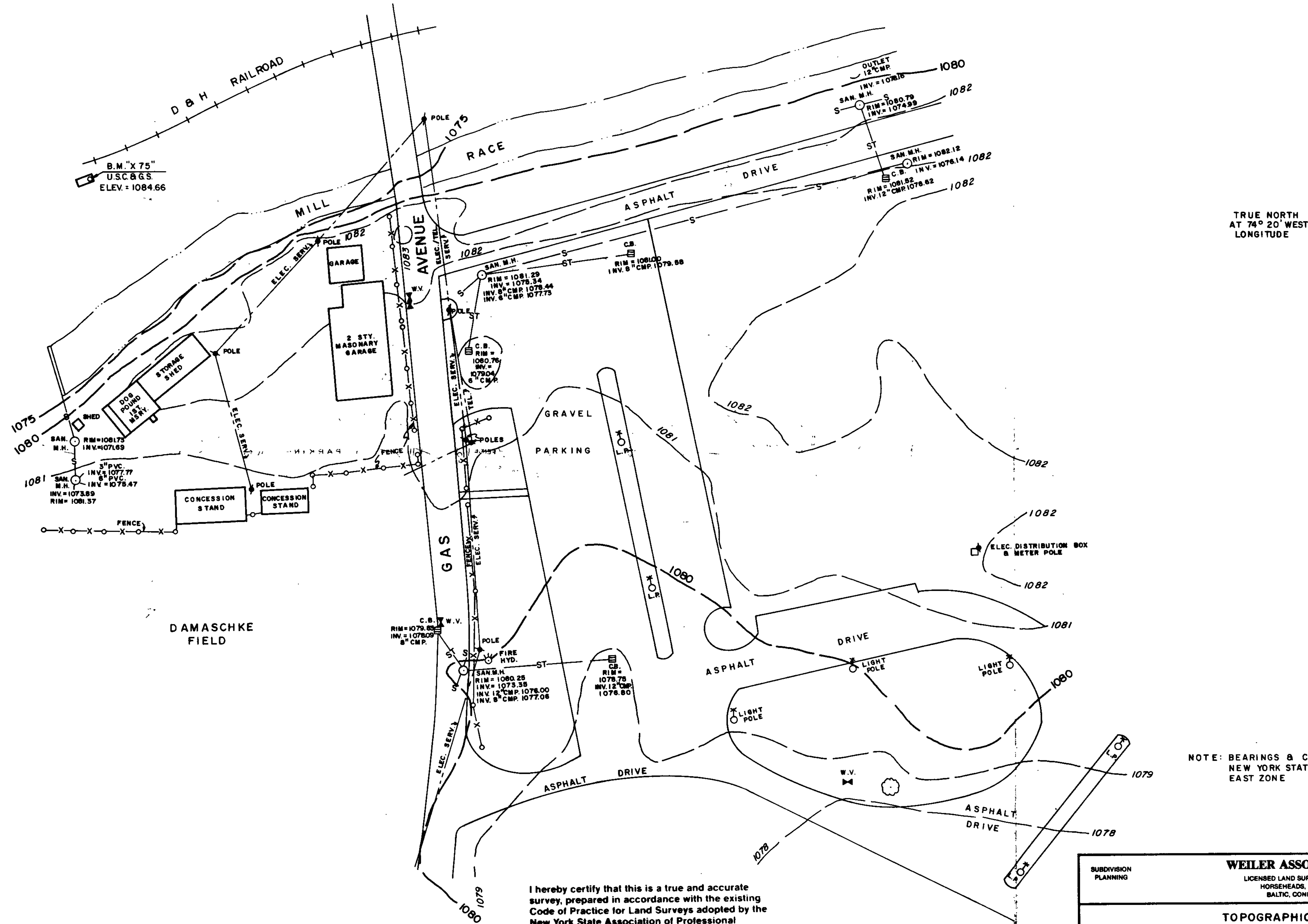
During the Task 1 site investigation it was reported by the City of Oneonta Engineering Department that subsurface contamination exists at Damaschke Field. In the course of conducting exploratory borings to design footers for a new lighting system, the City of Oneonta encountered contamination in two borings (Bruni, personal comm., 1986). The borings are located approximately halfway down the first and third base lines. TRC will conduct a geophysical survey in the Damaschke Field area to try to determine the extent of contamination.

The geophysical survey will be performed concurrent with the Task 2 field investigations at an opportune time when the field is not scheduled for use. The survey will be conducted using a Geonics Limited EM-31 Electromagnetic Terrain Conductivity Meter on a twenty-five foot by twenty-five foot grid system. This survey technique does not damage or break the ground surface in any way.

5.0 SUBSURFACE SOIL SAMPLING

Soil samples will be collected from the test pits for laboratory analysis to help identify all potential site contaminants. Generally, the source of contamination is associated with the formal coal gasification structures which are usually no more than five feet below the ground surface and easily uncovered with a backhoe. At each test pit a soil sample will be collected for laboratory analysis for the parameters listed in Table SP-1. Approximately one soil sample collected per test pit will be chemically analyzed. The methodology discussed below will be used for selecting the sample for analysis.

During the test pit excavation, exposed soils will be continuously monitored for organic vapor emissions. Excavated soil exhibiting elevated volatile organic emissions will be collected in a laboratory sample jar for possible analysis. Where test pits are "clustered" near potential contamination areas, the selected sample locations will alternate from a shallow sample (0-1 foot depth) with an elevated OVA reading to a deeper sample just above the water table (10± foot depth). This process will provide information relative to the variation of contaminant concentrations with depth to 1) assess vertical contaminant migration and migration potential and 2) to provide risk data relative to direct contact with surface soils. At test pit locations which are not "clustered", the sample collected for analysis will be from the horizon exhibiting the greatest degree of organic emissions. This will allow the assessment of the contaminant concentration at that depth. At test pit locations where no significant variation in organic emissions is noted, a composite soil sample will be analyzed. A maximum of one sample per test pit will be collected. A total of 20 samples have been assumed for analysis, but field conditions may permit a smaller number of samples to be collected. At two different test pit locations on the site,



NOTE: BEARINGS & COORDINATES REFER TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, EAST ZONE

I hereby certify that this is a true and accurate survey, prepared in accordance with the existing Code of Practice for Land Surveys adopted by the New York State Association of Professional Land Surveyors.

SUBDIVISION PLANNING	**WEILER ASSOCIATES** LICENSED LAND SURVEYORS HORSEHEADS, N.Y. BALTIC, CONN.		SURVEYING & MAPPING

TOPOGRAPHIC SURVEY FOR

T.R.C. ENVIRONMENTAL CONSULTANTS, INC.

CITY OF ONEONTA — OTSEGO COUNTY

NEW YORK

DRAWN BY: S. P. O.	SCALE: 1" = 50'	REVISED:	JOB NO. RE: X-553
CHECKED BY: E. L. G.	DATE: MAY 19, 1986	REVISED:	

75037

HHS-191153

2-8-1-26

significantly contaminated soil will be tested for priority pollutants to identify all potential site contaminants.

The samples will be collected from the test pits with a stainless steel sampling spoon which can collect soil from a test pit wall without personnel entering the test pit, in accordance with TRC Technical Standard T/S 973. Samples collected for laboratory analysis will not be used for head space analysis; duplicate samples will be collected for that purpose. The samples will be shipped to the analytical laboratory within 24 hours of sampling following TRC Technical Standard T/S 980, Shipping Procedures for Water and Soil Samples. Soil sampling will be completed concurrent with the test pit excavations and all personnel will wear Level 'D' protective clothing with level 'C' protective gear available at the personnel decon area.

The stainless steel spoon will be decontaminated between samples with the following:

- Scrub with non-foaming detergent (alconox);
- Rinse (scrub) with tap water;
- Rinse with acetone (only if gross contamination was noted on the spoon, scrubbed with acetone if necessary);
- Rinse with distilled water; and
- Allowed to air dry.

The acetone used for decontamination will be collected and allowed to evaporate from the collection container. Less than one gallon of waste acetone will be generated per day.

Stainless steel bowls will be used to composite samples where necessary and will be decontaminated between samples with the above procedure.

Each sample will be logged and numbered according to the following (based on the NYSEG protocol):

example: ONEXTP8501 11/07/85

where: ON = Oneonta Site
E = Soil Sample
I = In source
TP = Test Pit
85 = Year
01 = Subsurface soil sampling location No. 1
11/07/85 = Date of Collection

- Per each day of sampling
  - one field blank.
  - one blind duplicate per 10 samples collected.

  (NOTE: At least 1 duplicate will accompany each sampling event.)

The sample number may be further defined with the following:

- Location (LOC, gas holder vs. oil storage area);
- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory).

One blind duplicate per 10 soil samples will be collected as part of the field QA/QC program. Additionally, one field blank (organic free water poured over the sampling instrument after decontamination) per day will be collected as part of the program.

6.0 GROUND WATER SAMPLING

A one-year long quarterly sampling program for the monitoring wells will be initiated four weeks after the last monitoring well has been installed. The first sampling event will include the eight new monitoring wells (Figure SP-4). One sample from the shallow upgradient, and one sample from the shallow downgradient well will be analyzed for the U.S.E.P.A. priority pollutants, excluding the PCB/pesticide fraction. The samples from the other wells will be analyzed for the parameters listed in Table SP-3. Two of the samples from either the second or third quarterly event will be analyzed for U.S.E.P.A. priority pollutants excluding pesticides and PCBs (not necessarily the same two wells as the first round). All other samples may be analyzed for the parameters listed in Table SP-3, however the list of parameters may change based on the laboratory results of the first event and discussions with NYSEG. All ground water sampling will be completed in accordance with TRC Technical Standard T/S-975, Field Procedures for Collection of Ground Water Samples.

Prior to sampling the monitoring wells, the water level will be measured to within 0.01 feet and recorded. The well will then be evacuated a minimum of three well volumes by using either a hand operated bailer, or a peristaltic pump. The bailers or suction lines for the pump will be dedicated to each well. Typically, the automatic pumps are set up and left to evacuate wells while sampling personnel bail other wells by hand.

During all ground water sampling, personnel will be equipped with Level 'D' protection according to the site health and safety plan. Higher levels of protection will be available and used according to the discretion of the site safety director.

The following QA/QC samples will be collected during all ground water sampling episodes at the frequency specified:

TABLE SP-3

GROUND WATER SAMPLE ANALYSIS

Parameter

- Ferro-Ferric Cyanide
- Free Cyanide
- Total Cyanide
- Complex Cyanides
- Sulfate
- Sulfide
- Total Phenols (Non-Chlorinated)
- TOC

Method 602 (Aromatics)

- Benzene
- Toluene
- Ethyl Benzene
- p-xylene
- o-xylene
- Styrene
- n-Propylbenzene

Method 610 (Polyaromatic Hydrocarbons)

- Acenaphthene
- Acenaphthylene
- Anthracene
- Benzo (a) Anthracene
- Benzo (a) Pyrene
- Benzo (b) Fluoranthene
- Benzoperylene
- Benzo (k) Fluoranthene
- Chrysene
- Fluoranthene
- Fluorene
- Indeno (1,2,3-CD) Pyrene
- Naphthalene
- Pyrene

- Per each day of sampling:
  - one field blank.
  - one blind duplicate per 10 samples collected (note: at least 1 duplicate will accompany each sampling event).

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. The samples will be refrigerated and shipped to the appropriate laboratory within 24 hours of collection, in accordance with TRC Technical Standard T/S 980.

Each well sample will be labeled and numbered according to the following scheme (based on the NYSEG protocol):

Example: ONGUMW8506 11/09/85
Where:
ON - Oneonta Site
G - Ground water sample
U - Upgradient
MW - monitoring well
85 - year
06 - Monitoring well No. 6
11/09/85 - Date of collection

The sample number may be further defined with the following:

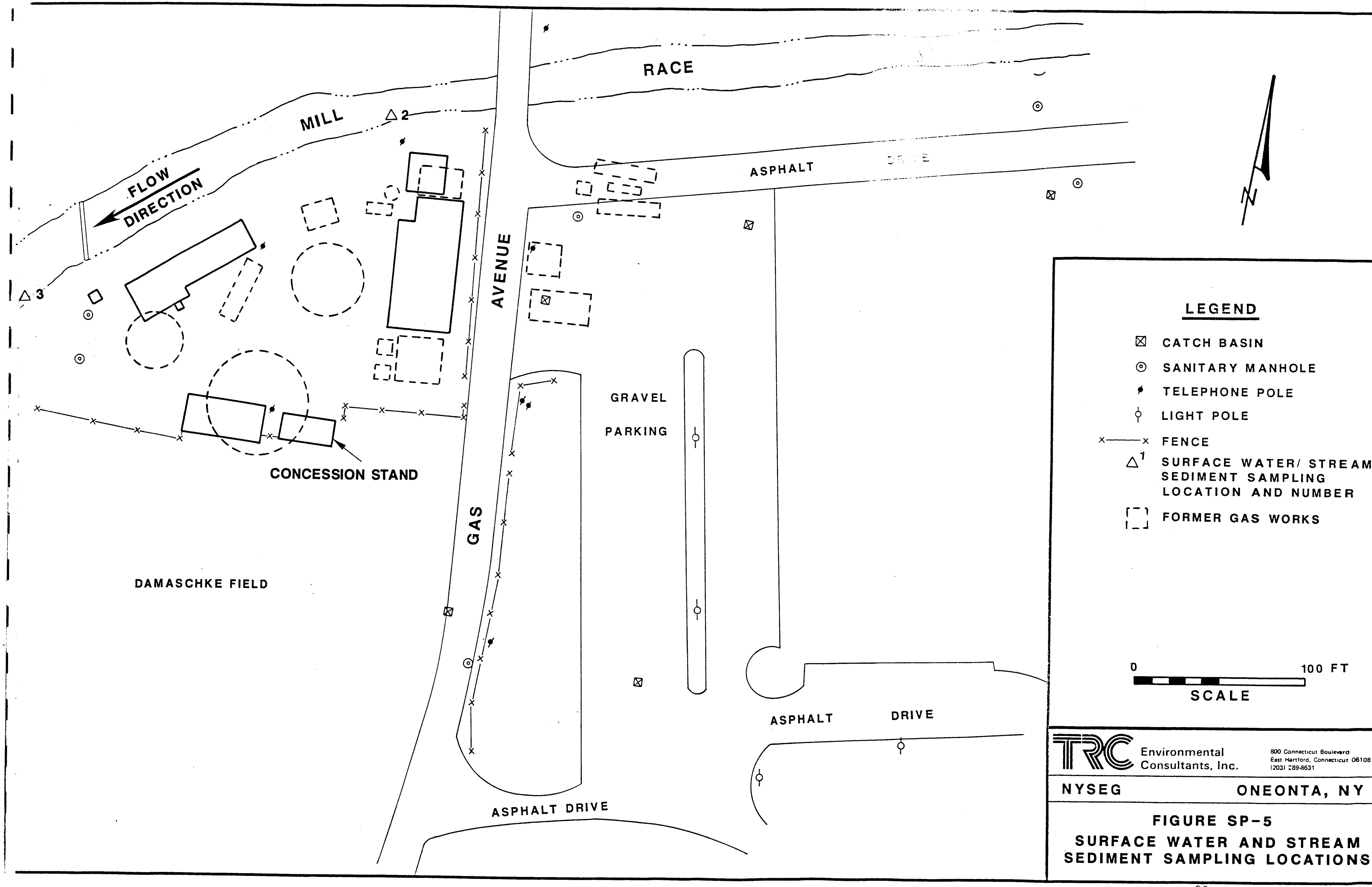
- Reason no sample (RNS, equipment failure vs. not enough water, etc.);
- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory).

7.0 SURFACE WATER/SEDIMENT SAMPLING

The local ground water gradient appears to flow generally in a south-southwesterly direction according to information generated during the Task 1 investigation. However, there can be local variations of this direction, such as in the vicinity of the banks of Mill Race Creek where the flow is probably in a site specific direction. Surface runoff and ground water flow may enter the stream sediments and surface water.

Locations for surface water and sediment sampling will be determined in the field during Task 2 activities by inspecting the watercourse. Actual sample collection will be completed concurrent with ground water sampling approximately four weeks later, which will allow sufficient time for the stream channel to reequilibrate. The watercourse will be completely inspected by TRC field personnel, wearing waders, for any visible contamination. Bottom sediments will be disturbed to check for coal tar globules. Three sample locations will be located, one upstream of the site, a second downstream of the site, and a third located at the area of highest contamination, if any was found during the watercourse walk, or midway between the upstream and downstream sample locations as shown in Figure SP-5. At the locations of surface water sampling, a stream sediment sample (one sampling event) will also be collected for analysis. The surface water samples (3) and sediment samples (3) will be analyzed for parameters listed in Table SP-3 and SP-1 respectively. All sampling will be done in relatively slow-moving areas of the stream where contaminated water may collect, and will proceed from the furthest downstream location to the furthest upstream location.

Surface water sampling will be performed quarterly on the same dates that the ground water samples are collected. Sediment sample locations will be sampled once during the first ground water sampling round. All procedures



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NYSEG ONEONTA, NY

FIGURE SP-5
SURFACE WATER AND STREAM SEDIMENT SAMPLING LOCATIONS

will follow TRC Technical Standard T/S 972, Field Procedures for Collections of Surface Water and Sediment Samples.

The quarterly sampling events will be performed using the appropriate sample containers and preservatives according to TRC Technical Standard T/S 959, Soil and Water Sampling Preservation Procedures. Samples for metals analysis will be preserved directly so that only total metals are reported in the surface water. The samples will be shipped to the analytical laboratory within 24 hours of sampling following TRC Technical Standard T/S 980, Shipping Procedures for Water and Soil Samples at Hazardous Waste Sites.

Each stream sediment and surface water sample will be labeled and numbered according to the following (based on NYSEG Protocol):

Example: ONSXSS8604 07/20/86
Where:

ON - Oneonta Site
S - Surface water
X - Rloc, N/A
ZZ,SS - Stream, surface water
86 - year
04 - Surface water sampling station No. 4
07/20/86 - Date of collection

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.);
- Composite hours (COMP HRS, number of hours over which a sample was composited);
- 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:

- Per each day of sampling
  - One field blank.
  - One blind duplicate per 10 samples collected. (NOTE: At least 1 duplicate will accompany each sampling event.)

Using MA7CD/10 and MA7CD/30 low flow information and the water quality data collected during the field investigation, an evaluation of the applicability of the NYSDEC ambient water quality criteria (filing date July 3, 1985) or TOGS 84-W-38, as applicable, will be made.

8.0 SEWER SAMPLING

It has been determined that storm and sanitary sewers have the potential to intercept and transport contaminated ground water. For this reason, TRC plans to collect four sewer samples, one upstream of the site, two in the middle of the site, and one downstream from the combined storm and sanitary sewer which parallels Gas Avenue and travels between both areas of interest. Figure SP-6 shows approximate sample locations. The samples will be taken in relatively low flow areas of the sewer where contaminated water may collect. Exact sample locations will be determined in the field. The sewer sampling will be performed quarterly on the same dates that the ground water and stream samples are collected. All procedures will follow TRC Technical Standard T/S 972, Field Procedures for Collection of Surface Water and Sediment Samples. The samples will be analyzed for the parameters found in Table SP-3.

The samples will be shipped to the analytical laboratory within 24 hours of sampling following TRC Technical Standard T/S 980.

Each sewer sample will be labeled and numbered according to the following (based on NYSEG protocol):

Example: ONSUSR8604 07/20/86
Where:

- ON - Oneonta Site
- S - Surface water
- U - Upgradient
- SR - Sewer
- 86 - year
- 04 - Sewer sampling station No. 4
- 07/20/86 - Date of collection

The sample number may be further defined with the following:

- Reason no sample (RNS, equipment failure vs. not enough water, etc.);
- Composite hours (COMP HRS, number of hours over which a sample was composited);

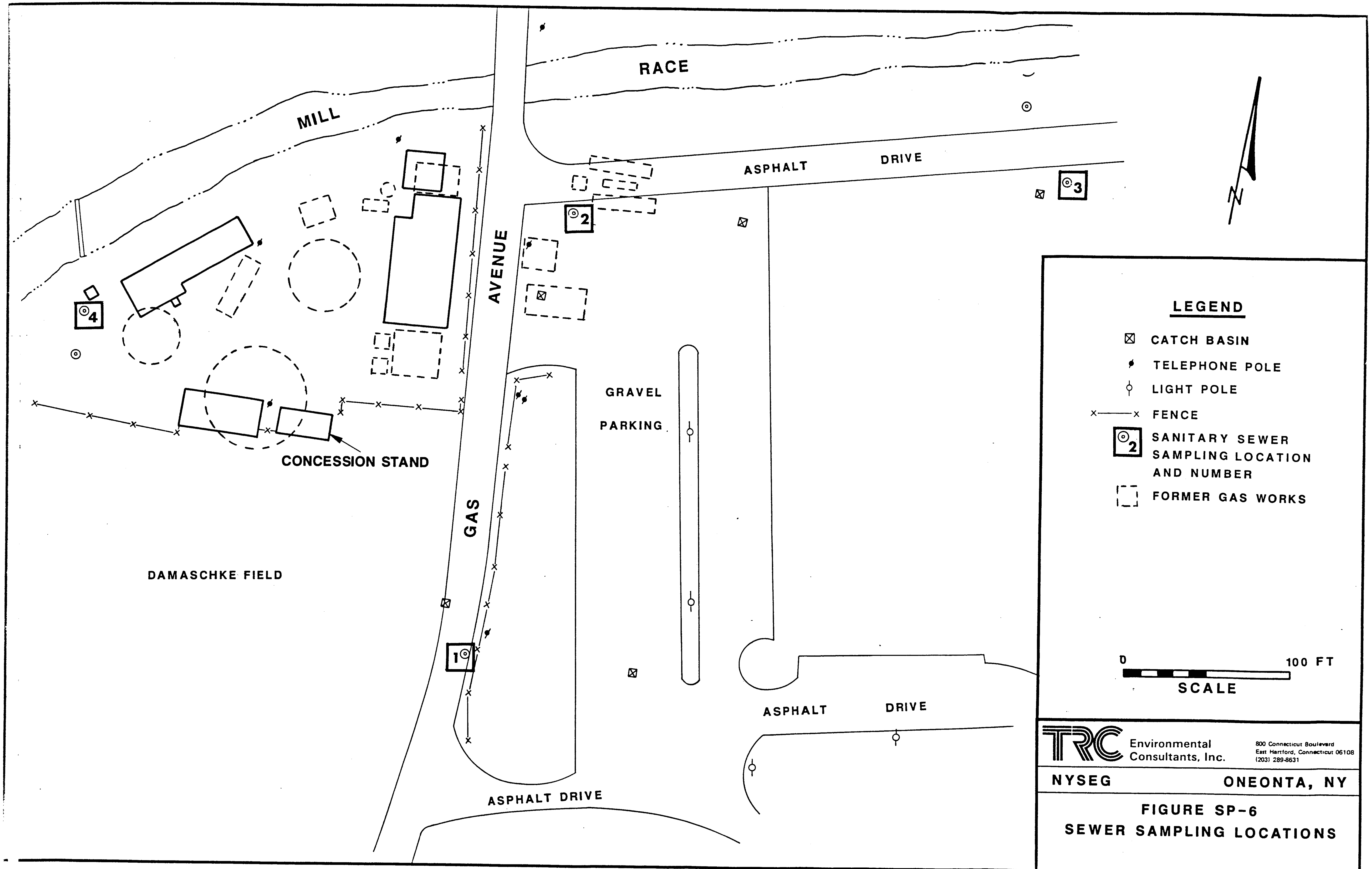

FIGURE SP-6
SEWER SAMPLING LOCATIONS

- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory).

One blind duplicate per 10 samples will be collected as part of the field QA/QC program. Additionally, one field blank (organic free water poured over the sampling instrument after decontamination) per day will be collected as part of the program.

9.0 AIR QUALITY SAMPLING PROGRAM

Air quality samples will be collected on the Oneonta site utilizing methodologies which are appropriate for the pollutants associated with the production of coal gas.

The approach and methods for the air quality investigations will be the same and equivalent to those described in the following EPA compilations:

- "Standard Operating Procedure for Sampling Gaseous Organic Air Pollutants for Quantitative Analysis Using Solid Adsorbents" (EPA EMSL/RTP-SOR EMD-018)
- "Standard Operating Procedures for the GC/MS Determination of Volatile Organic Compounds Collected on Tenax" (EPA EMSL RTP-SOP-EMD-014)
- "Sampling and Analysis of Toxic Organics in the Atmosphere" (ASTM PCN 04-721000-19)

There are two types of ambient air monitoring that can be utilized at inactive coal tar or waste sites. The first type involves the use of portable instrumentation that gives real-time results while the second involves the use of stationary sampling equipment to obtain longer duration or time averaged samples at set locations; samples are subsequently analyzed by laboratory instrumentation. The portable air samplers are used for screening samples to develop a qualitative analysis or for a worker protection program. The stationary sampling equipment, which collects time averaged samples, is used to characterize and quantify the air quality impact from a site.

TRC will use either of two types of portable air samplers for performing the screening analysis, the HNu photoionization gas analyzer, or the Century OVA (Organic Vapor Analyzer).

The HNu is a sealed UV light source that emits photons which are energetic enough to ionize trace species, particularly organics, but not the major components of air. The ionized species are collected at an electrode, and the resulting current is proportional to the concentration. The detection limit may be as low as 0.1 ppm, with an operating range extending to 2,000 ppm. The photoionization detector responds to all ionizable gases present and does not distinguish between different compounds. The "total organics" measurement obtained will give useful screening results during site investigations but may be supplemented with chemical-specific analyses. TRC Technical Standard - T/S 993 Operation and Calibration of the HNu PI 101 Photoionizer will be used to operate this device.

The Century OVA uses a flame ionization detector to give a real-time analysis of total hydrocarbons. The detection limit may be as low as 0.1 ppm, with an operating range extending to 1,000 ppm. TRC Technical Standard T/S 990 Operation and Calibration of the Century Organic Vapor Analyzer Model OVA-128 will be used to operate this device.

The stationary ambient air monitoring sampling equipment is used near the point of anticipated maximum contaminant concentrations and for background (upwind) areas. At least 10 samples will be taken on 3M® dosimeters for analysis with a GC to determine points of high concentration. A grid system of approximately 10 points will be established prior to the field work. The dosimeters (diffusion samplers) used for on-site screening will be chemically desorbed with carbon disulfide and analyzed for benzene and naphthalene by using gas chromatograph equipped with a flame ionization detector (FID). The dosimeter consists of a charcoal based badge-like device which absorbs the organic contaminants.

Twelve samples will be collected on solid sorbent or Tenax/silica gel/activated charcoal tubes for analysis by gas chromatography or gas chromatography/mass spectrometry (GC/MS). This type of sampling tube collects both polar and non-polar compounds. The absorbent medium varies depending on the compounds being sought. A low flow portable pump will be used to draw ambient air through the solid absorbent.

Two high volume air quality samples will be collected over a twelve hour period from two separate locations. The first location will be inside the plant area where there is heavy traffic from the City of Oneonta vehicles driving on the unpaved parking lot. The second location will be east across Gas Avenue in the unpaved parking lot for Neahwa Park and Damaschke Field. This sample will be collected on a day when there is a baseball game scheduled. This will allow for a sample which is best suited for health risk assessment. Both samples will be analyzed by TRC's laboratory in East Hartford, CT, for PAH's, metals, total cyanide, and total particulates.

TRC will utilize standard sampling and sample preparation/preservation procedures in performing the sampling. These procedures will include but not be limited to: 1) pre-cleaning sampling sorbent, 2) pre- and post-test calibration of sampling pumps, 3) collecting field blank samples, and 4) sealing, labeling, and storing the sample. At the analytical laboratory, the sampling tubes will be thermally desorbed and qualitatively screened by using GC/MS. Qualitative identification will be made by a computerized library search that compares the sample compound mass spectrum to the 31,000 member National Bureau of Standards (NBS) special library. This qualitative analysis includes a semi-quantitative determination of the concentrations of up to 10 compounds that may be present on the sample collection media. The quantitative determination can only identify the relative concentration of a compound because the equipment is not comparing the results to a newly run standard, but to a library standard.

Each air sample will be labeled and numbered according to the following (based on NYSEG protocol):

Example: ONAUXX8602 06/20/86

Where:

ON - Oneonta Site
A - Air sample
U - Upgradient
XX - N/A
86 - year
02 - Air sampling station No. 2
06/20/86 - Date of collection

The sample number may be further defined with the following:

- Reason no sample (RNS, equipment failure vs. operator error);
- Composite hours (COMP HRS, number of hours over which a sample was composited);
- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory).

10.0 RECORD KEEPING AND DOCUMENTATION

Due to the numbers of soil and water samples being collected at the site, the number of field staff involved in sampling, and the inclusion of TRC QA/QC procedures for document control, a specific recordkeeping and site documentation plan is required. TRC will use the following 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 Record	To track the possession of all samples from field to lab.
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, Employer's First Report of Injury, and OSHA 100 Forms	Data sheets attached to the Health and Safety Plan, located in the site command post, that will document any accident occurring at the 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.

11.0 SCHEDULE

11.1 Operations Schedule

Site operations are planned to commence within two weeks from receipt of a written authorization to proceed from NYSEG. The project schedule is as follows:

Week	Task
0	Written authorization to proceed.
2	Site setup.
3,4	Drilling, test pit and well installation. Air quality sampling.
5	Surveyors locate all new excavations and wells.
9	First quarterly sampling of monitoring wells, sewers, surface water, and stream sediments.
10-13	Analyze priority pollutant and indicator parameters on wells and sewer samples.
22,35,48	Quarterly well and sewer sampling.
23,36,49	Begin analysis of quarterly samples.
52	Draft Task 2 report.
57	Final Task 2 report.

11.2 Sample Schedule

Table SP-4 presents the sample schedule which shows the weeks in which samples will be taken in 1986 and 1987. On this schedule are indicated all prime samples plus QA/QC samples. The schedule will be used by the site investigation team to plan for sample shipping activities.

TABLE SP-4

SAMPLE SCHEDULE

Week from Authorization	Location or Media	No. of Samples	QA Field Blanks	QA Duplicate	Total
3	Surface Soils	4	1	1	6
3	Test Pit Soils	20	5	2	27
3,4	Tenax	12	1		13
9	8 Monitoring Wells	8	3	1	12
9	4 Sewer Samples	4	1	1	6
9	3 Water and Stream Sediment	6	2	2	10
22	Quarterly G.W., Sewer Samples, and surface water	15	5	3	23
35	Quarterly G.W., Sewer Samples, and surface water	15	5	3	23
48	Quarterly G.W., Sewer Samples, and surface water	15	5	3	23
Total of Task 2 Samples					143

NOTE: G.W. = Ground Water

12.0 COSTING

The costs for the Task 2 work efforts are presented in Table SP-5. The drilling costs included in the table are based on completing all the deep borings with flush jointed casing.

TABLE SP-5

TASK 2 - INITIAL FIELD PROGRAM
TASK COSTS
ONEONTA SITE

Discipline/Task	Task Total Hours	Amount
Manpower		
Project Management	416.0	30372.16
Data Anal./Report Prep	394.0	18210.68
Field Work	1008.0	35965.44
Drafting	60.0	1409.40
Secretarial	288.0	5703.00
Total Manpower	2166.0	91660.68
Direct Costs		
Mobiliz./Demob.		1770.00
Borings/wells		29900.00
Permeability Tests		1800.00
Test Pits		8325.00
Surveyor		500.00
Laboratory Analyses		70754.00
Equipment + Supplies		7400.00
Travel		3888.00
Per Diem		9075.00
Computer + Graphics		700.00
Telephone		400.00
Shipping and Postage		1250.00
Reprographics		1800.00
Total Direct Costs		137562.00
Total Cost		229222.68