NYSEG

April 6 , 1987

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Mr. Paul F. Schmied
Director of Environmental Quality
Engineering
New York State Department of
Environmental Conservation
6274 East Avon-Lima Road
Avon, NY 14414

Subject: Penn Yan Coal Gasification Site
Task 1 Report

Dear Mr. Schmied:

Enclosed is a Task 1 Report for the Penn Yan coal gasification site investigation. This preliminary site evaluation report contains a site description, plus information on the site history, environmental setting and a summary of available data.

Should you have any questions regarding this investigation, please contact Mr. James Marean of my staff at (607) 729-2551, extension 4305.

Very truly yours,

Peter G Carney

P.G. Carney
Manager, Environmental Matters

PGC/KLS/kgt

Enclosure

cc: W. Demick (NYSDEC - Albany) - w/o enclosure
M. Mehta (NYSDEC - Avon) - w/enclosure

New York State Electric & Gas Corporation 4500 Vestal Parkway East, Binghamton, New York 13903 (607) 729-2574

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

TASK 1 FINAL REPORT
PRELIMINARY SITE EVALUATION

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TRC Project No. 3437-N61

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1.0 INTRODUCTION

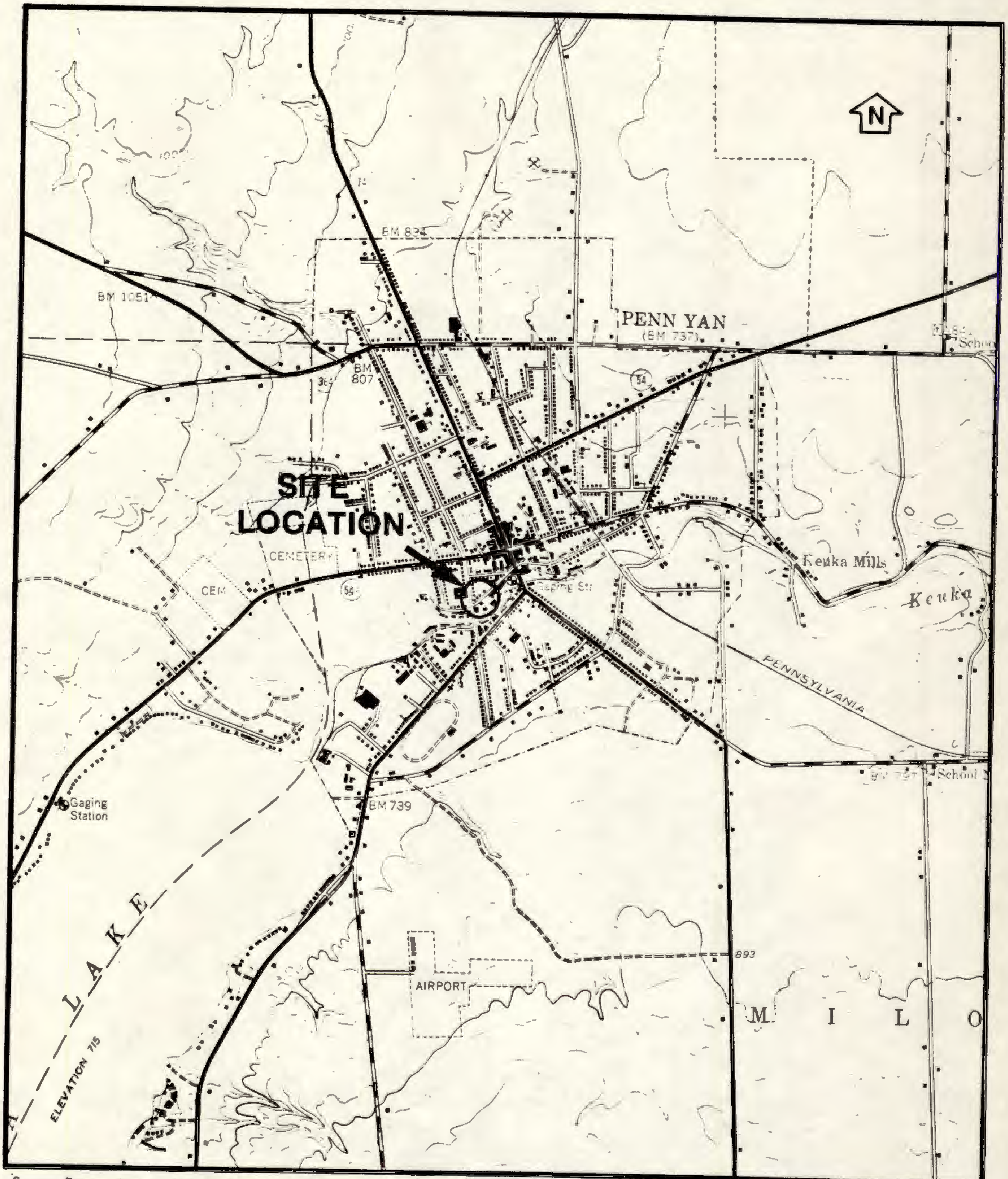
On August 13, 1986, TRC Environmental Consultants, Inc. (TRC) under contract to the New York State Electric and Gas Corporation (NYSEG), initiated the investigation of the former coal gasification site on Water Street, Penn Yan, New York (see Figure 1-1). Under the terms of the contract, TRC is to provide NYSEG with an investigation consisting of 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, 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 thirty years of operation, and to identify those areas of the property which may be contaminated by waste products. This information has been used to develop an investigative strategy that is documented in the attached Task 2 Sampling Plan (see Appendix A), which on approval from NYSEG will be implemented to initiate Task 2 activities.

The information collected for the Penn Yan site history was gathered during three visits to the area by TRC staff. During August 13 through 15, 1986, TRC personnel made a preliminary site visit with the NYSEG district manager and collected preliminary information on the Penn Yan site. A literature search was conducted for local history and old maps at the Penn Yan and Keuka College Libraries. The Penn Yan County Historian and the Oliver House Historical Society and Museum were contacted as well. Between August 20 through 22, 1986, TRC conducted three interviews with Penn Yan residents,



from Penn Yan, NY 7.5' USGS Topographic Map

Figure 1-1. Penn Yan Site Location Map

including a Penn Yan native (born 1906), a retired NYSEG employee and a former Penn Yan Gas Light Company employee. TRC also visited the Yates County Planning and Development Office and conducted a deed search at the Yates County Clerk's office in Penn Yan. On September 9 through 12, 1986, a third site visit was made to perform an electromagnetic survey (EM-31), and an Organic Vapor Analysis (OVA) survey of the site. During this visit TRC also visited the Penn Yan Municipal Building to obtain information on the sewer and water systems within the vicinity of the site. The information gathered during the Task 1 activities 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 - Discussion of Findings
- Section 6.0 - Recommendations

The Sampling Plan for Task 2 is presented in Appendix A.

2.0 SITE HISTORY

As part of Task 1, information was gathered regarding the history of the former coal gasification plant. The references found regarding the former coal gasification plant contained very limited information on the plant's operation. Local history books (Aldrich, 1892 and Stork, 1898) were reviewed by TRC, however, no information was found for the Water Street plant in these references. Several newspaper articles from the Yates County Chronicle contained some information on the Penn Yan Gas Light Company located on Water Street. Other historical information was provided from NYSEG files which contained a 1930 photograph of the site and a 1934 map of the site which was representative of an August 1925 deed description. In addition, two historical maps were found in the 1886 and 1931 atlas of Yates County. Information on the gas plant's operation was obtained through interviews.

The Penn Yan Gas Light Plant ceased gas manufacturing during early 1930. Therefore, it was difficult to locate former NYSEG employees with knowledge of plant operations. Personal interviews were conducted with the following individuals to develop a more complete plant history: 1) Mr. Dan Clements, a retired NYSEG employee who began working in Penn Yan more than ten years after plant closure during 1941, 2) Mr. Thomas Wetmore, a former Penn Yan Gas Light employee who started as a stoker and was familiar with plant operations, and 3) Mr. John Bailey, a retired employee from Yates Blodgett (property located adjacent to the gas plant). However, Mr. Bailey's plant process knowledge was very limited. The information used for the plant operations section of this report was primarily derived from Mr. Wetmore's interview.

The information collected from all sources was reviewed and is summarized as follows:

- Site chronology

- Plant operations
- Plant closure and present conditions

2.1 Site Chronology

Industrial activity at the Water Street site began with the H. Tuttle and Son Malt House and Wool Storage. The malt house existed until July 1899, when Mr. William T. Morris (president of the Penn Yan Gas Light Company) purchased the property. The coal gasification plant was constructed on the southeastern portion of the property, and gas production began shortly thereafter. Following the initial purchase of land in 1899, several land acquisitions were made and are summarized in Table 2-1.

The operations at the Water Street location consisted of a two-story brick, stone and cement gas house (approximate dimensions were 51 feet by 59 feet) and a 40,000 cubic foot (ft^3) capacity gas relief holder located approximately 20 feet from the northwest corner of the gas house building. A September 1930 property photograph shows the gas house with the gas relief holder in the foreground (see Figure 2-1). For unknown reasons, the Penn Yan Gas Light Company purchased additional land (west of the gas works) adjacent to the existing property during February of 1914. Four years later, in November of 1919, the western portion of the land purchased in 1914 was sold to the Lake Keuka Fruit Sales Company, Inc. (see Figure 2-2).

On April 1, 1926, the Penn Yan Gas Light Company was purchased by New York Central Electric Corporation, and the plant continued to produce gas for approximately four more years, until early 1930. The completion of the gas main from the Empire Gas and Electric Plant at Geneva coincided with the closure of the Water Street gas plant. Between 1930 and 1931, New York Central Electric converted the gas relief holder into a garage and storage area. The gas relief holder was later removed; however, the date of removal

TABLE 2-1

CHRONOLOGICAL SEQUENCE OF EVENTS
AT THE PENN YAN SITE

July 1, 1899	Penn Yan Gas Light Company purchased property from Mary A. Conklin and plant construction commences.
February 12, 1914	Penn Yan Gas Light Company purchased property from Thomas Christian Thomsen.
November 15, 1919	Penn Yan Gas Light Company sold property to Lake Keuka Fruit Sales Company, Inc.
April 1, 1926	Penn Yan Gas Light Company purchased by New York Central Electric Corporation.
Early 1930	A new gas main from Empire Gas and Electric plant at Geneva is completed. Gas production ceases at plant. Gas house building remains intact.
April 20, 1937	New York Central Electric Corporation merged with New York State Electric & Gas Corporation.
August 16, 1943	New York State Electric & Gas Corporation sold property to Penn Yan Wine Cellar, Inc.. Old gas house building remains on-site. NYSEG retains parcel of property (approximate dimensions 20 feet by 20 feet) located in the northeast corner for a gas regulator house.
July 7, 1954	Penn Yan Wine Cellars, Inc. was sold to Mr. Bert R. Latz.
November 1, 1978	Mr. Bert R. Latz sold the property and Penn Yan Wine Cellars, Inc. to Stanley Levinson, Maurice W. Isner, and Julian Lee. Old gas house present on-site.

PENN YAN GAS PLANT

Figure 2-1. Penn Yan Gas Light Company, 1930

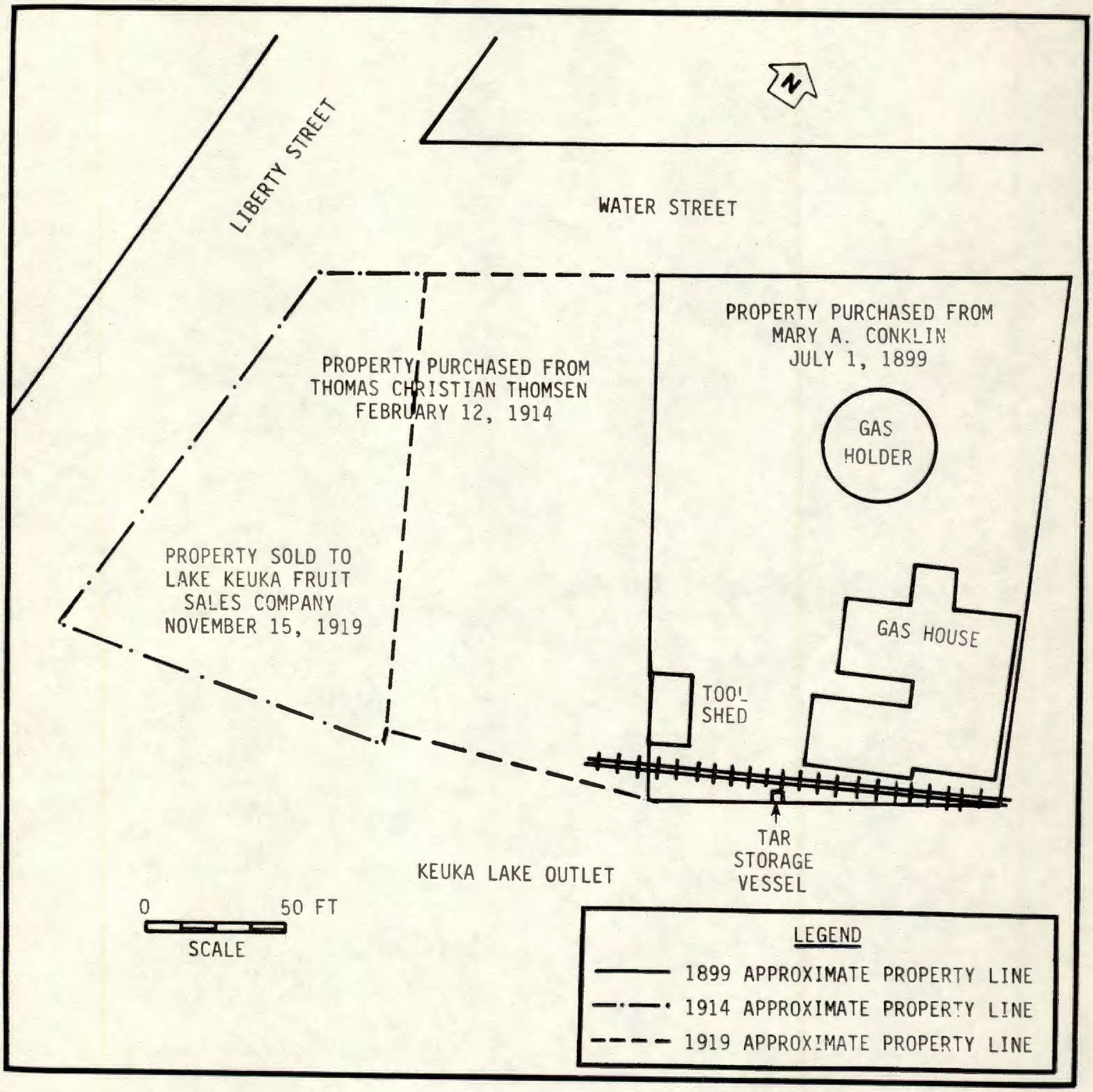


Figure 2-2. Penn Yan Gas Light Company Property Conveyances (1899 through 1919).

is unknown. In 1937, New York Central Electric Company merged with New York State Electric and Gas Corporation (NYSEG). The old gas house building was occupied by Penn Yan Wine Cellars, Inc. in 1931 (Yates County, 1931), and on August 16, 1943, NYSEG sold the former Penn Yan Gas Light Company gas house and property to Penn Yan Wine Cellars, Inc. A parcel of property (approximate dimensions 20 feet by 20 feet) located in northeast corner was retained for a gas regulator house.

2.2 Plant Operations

As previously mentioned, Mr. Wetmore worked at the Water Street gas plant from 1925 through 1929, and explained the process used at the gas plant. Mr. Wetmore had a thorough understanding of the gas plant's operation and described these processes to TRC.

The Water Street coal gasification process consisted of fifteen horizontal retort ovens (300 to 450 pounds feed fuel capacity per retort). The plant lay-out in Figure 2-3 shows the approximate locations of the retorts, exhauster, condenser, scrubber, purifiers and gas relief holder. The retorts were divided into groups of four, five, and six, with each group called a "bench."

During gas production, only two benches would be in operation. Each retort was approximately ten feet long, two feet high and thirty inches wide and were filled with coal from back to front until the coal was level inside. Coke fires provided the necessary heat required to pyrolize the coal. The operation used approximately 30 to 50 tons of "good grade" coal per week. "Good grade" coal was low in sulfur and produced large quantities of gas.

The retorts were changed every six to eight hours and spent coke was raked onto the floor with an L-shaped shovel and cooled with buckets of water. The

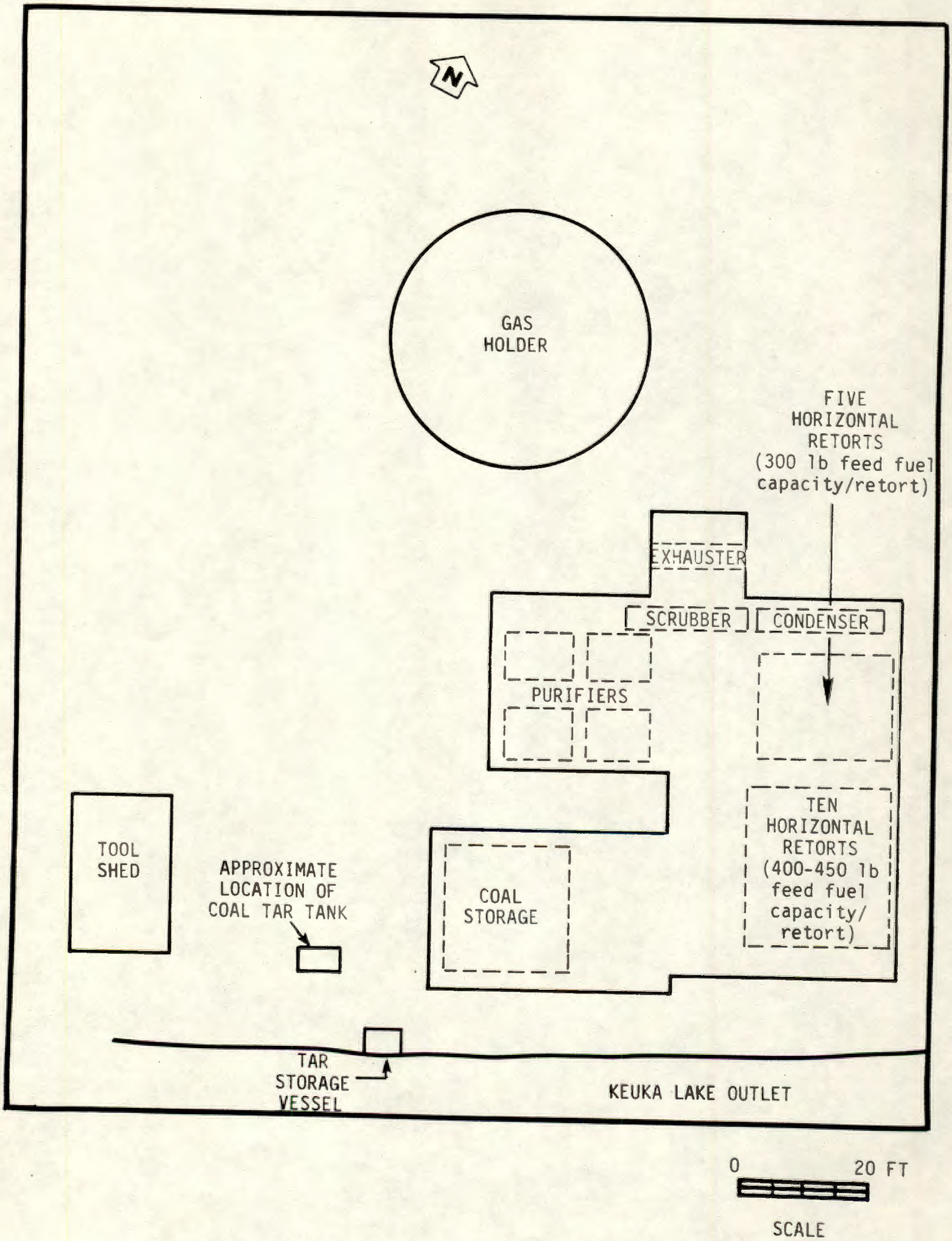


Figure 2-3. Penn Yan Gas Light Company Plant Lay-out (circa 1926).

gas facilities close proximity to Keuka Lake Outlet allowed for the discharge of the cooling wastewater through floor-drains. After the coke was cooled, it was removed to a waste pile located outside the gas works building. Figure 2-4 shows approximate locations of the coke and ash piles and the storage areas for coal and tar.

The "exhauster" or steam boiler would "pump" the gas, together with entrained liquid particles upward through a cast-iron gooseneck into a horizontal steel pipe, which was connected to all the retorts in series. The pipe was alternately known as the collecting or hydraulic main. As the gas left the retorts, it was sprayed with weak ammonia water. This condensed some of the tar and ammonia from the gas into liquid. The liquids moved through the main with the gases until reaching a settling tank where density separation occurred.

Coal tar drained from the settling tank into the first of two tar storage vessels. The first tar storage vessel of unknown dimensions was constructed of cement and brick (see Figure 2-4). A drain from the storage vessel allowed the coal tar to overflow into the second tar storage vessel located near Keuka Lake Outlet. The second tar storage vessel was essentially an old boiler that had been buried approximately 12 feet underground. A drain from the tar storage vessel would allow the coal tar to discharge into Keuka Lake Outlet if the level became excessively high. A hand-pump was occasionally used to remove coal tar from the storage vessel. The coal tar was loaded into drums and sold for 10 to 20 cents per gallon. The plant produced approximately 100 gallons of coal tar per week.

After venting through the hydraulic main and into the settling tank, the gas was directed into the condenser where it was cooled with water. During this process naphthalene separated from the gas and any residual coal tars drained into the tar storage vessel. Additional cooling of the gas was

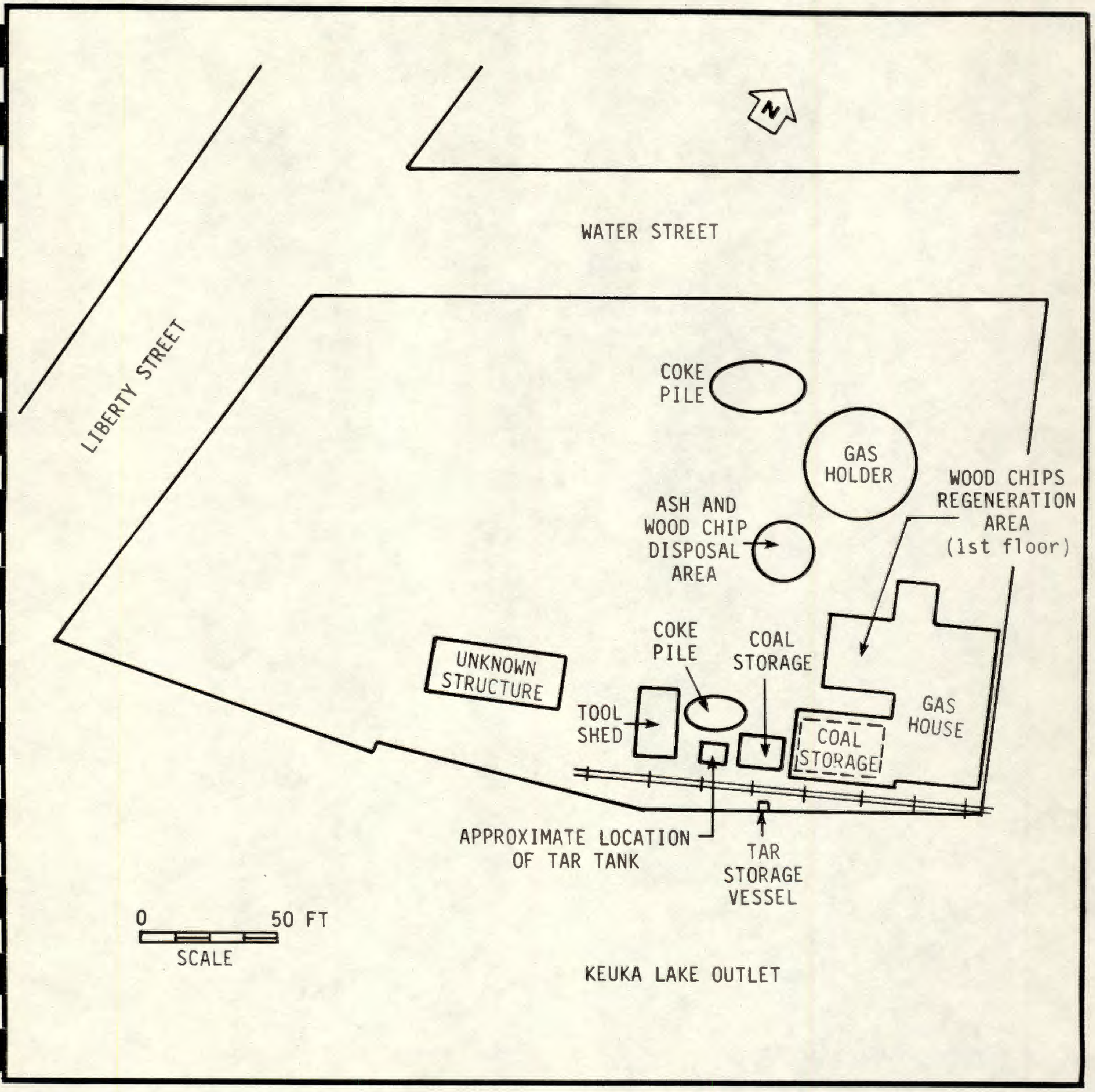


Figure 2-4. Penn Yan Gas Light Company Storage and Disposal Areas (circa 1926).

achieved in the scrubber. The scrubber was approximately four feet long by five feet wide by twelve feet high and contained horizontal baffles. Mr. Wetmore stated that the wastewater generated from the scrubber was discharged into Keuka Lake Outlet.

The final step in readying the coal gas for consumer use was purification. Although the plant contained four purifiers, only three were used during gas production. The purifiers consisted of boxes that were approximately 10 feet long by 7 or 8 feet wide filled to a 3 foot depth with iron oxide impregnated wood chips. The wood chips reacted with and removed hydrogen sulfide and sulfur from the gas. The chips were regenerated and "dried" once per week. Regeneration involved spreading the chips on the basement floor and turning them hourly. Eventually, the iron oxide could not be regenerated and the wood chips were replaced. Approximately 6 to 8 bushels of "exhausted" chips were removed during the drying process and were added to the ash pile for disposal. The ash/chip pile was spread on local roads during the winter to improve vehicle traction.

Purified retort gas was held in the 40,000 ft^3 gas relief holder prior to distribution. The gas relief holder consisted of a telescoping adjustable-volume tank 40 feet in diameter that could be elevated to a height of 23 feet. The gas reached the consumer through buried mains that ran from the streets to the basements of houses.

2.3 Plant Closure and Present Conditions

Few details are known about the plant closure other than it coincided with the completion of a gas main from the Empire Gas and Electric plant at Geneva. Based on gas production records, the Water Street plant ceased operating in early 1930 (see Table 2-2). The following activities have occurred at the site since 1930 (see Figure 2-5):

TABLE 2-2

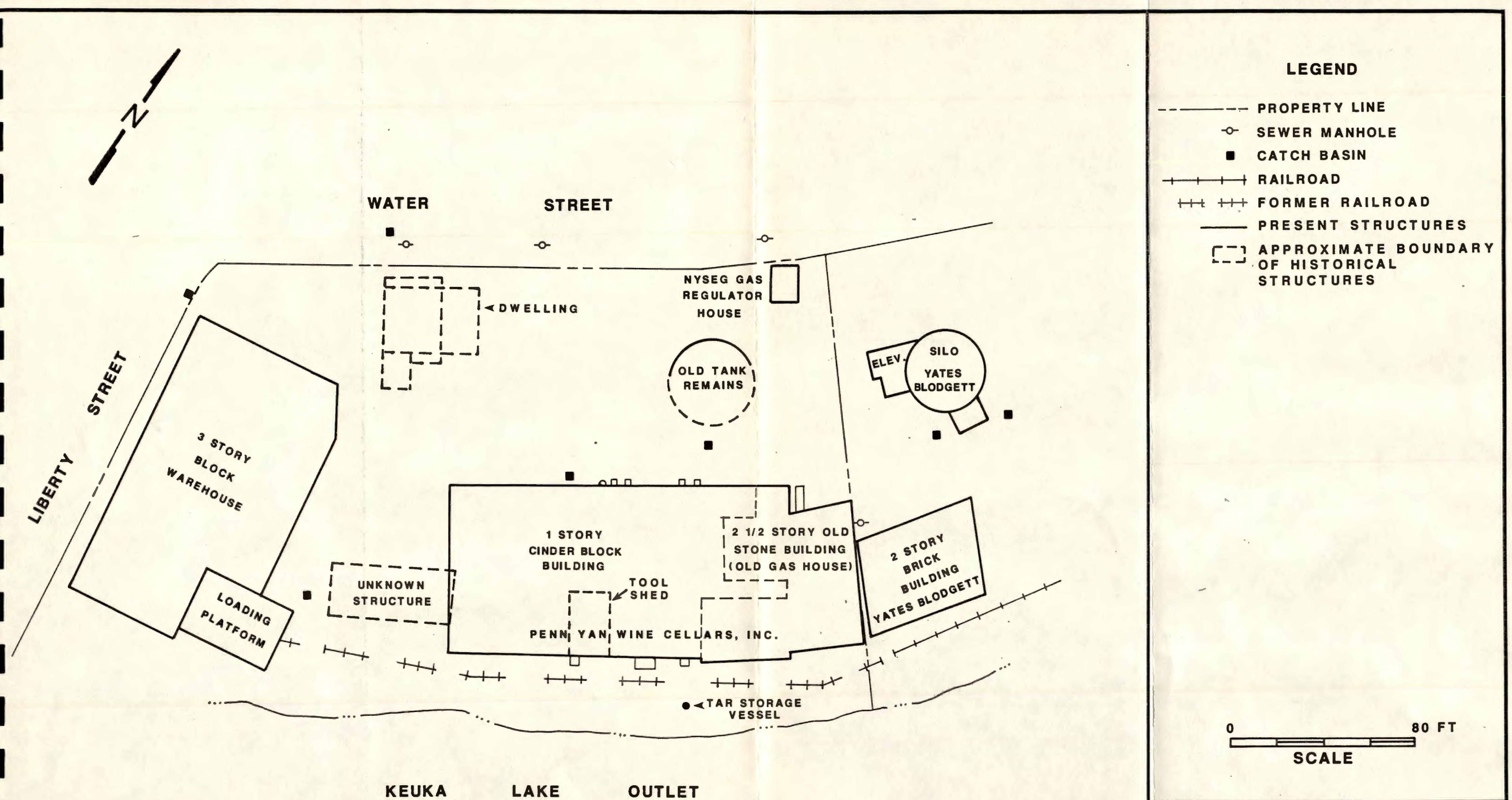
OPERATING STATISTICS FOR THE PENN YAN GAS PLANT ON WATER STREET

Year	Total Gas Manufactures (MCF)	Number of of Customers	Length of Main (miles)
1907	9092	525	6.20
1908	(1)	(1)	(1)
1909	9030	(1)	(1)
1910	9063	601	6.83
1911	9065	607	7.23
1912	9380	597	7.39
1913	9076	625	7.12
1914	9221	643	7.14
1915	9070	661	7.52
1916	8707	680	7.61
1917	9173	682	7.62
1918	9624	633	7.64
1919	(2)	(2)	(2)
1920	(2)	(2)	(2)
1921	13,725	704	7.68
1922	15,035	716	7.81
1923	16,647	768	8.00
1924	17,385	807	8.57
1925	17,638	833	(1)
1926	17,528	(1)	(1)
1927	20,185	(1)	(1)
1928	21,107	(1)	(1)
1929	846	(1)	(1)
1930	Penn Yan Gas Service Discontinued		

Notes: Data is from Annual Report of the N.Y. Public Service Commission Report 1907 through 1930.

(1) Data not reported

(2) Report not available



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NYSEG PENN YAN, NY

FIGURE 2-5
LOCATIONS OF HISTORICAL
STRUCTURES AND PRESENT
SITE CONDITIONS

- The tool shed and a structure west of the former coal gasification works building were dismantled.

- Two additions were added to the western portion of the old gas works building. These additions covered the old storage areas for coal and coke and one of the tar storage vessels. These additions still exist.

- A house along the south side of Water Street was dismantled and removed. Evidence of the house was seen in an 1886 and 1931 Atlas Map of Yates County, and a 1952 photograph of Penn Yan located at the Penn Yan Municipal Building. The reason for the house being on-site is unknown. It was explained that the foundation was collapsed and filled with earth after the house was removed.

- A NYSEG owned gas regulator house which still exists, was constructed on the south side of Water Street.

- The gas relief holder was removed, however, a portion of its brick foundation still exists.

The gas works building, gas relief holder foundation and the tar storage vessel are the only visible remains of the coal gasification operation. The only visible evidence of surficial contamination around the site was observed near the old tar storage vessel. Keuka Lake Outlet did not appear to be contaminated, but will be investigated for potential contaminants during Task 2 activities.

3.0 SITE SETTING

The objectives of the following sections are to describe both the regional as well as site specific geological and hydrological settings for the Penn Yan site. The regional and site specific characteristics, as currently understood, are presented in separate sections detailing the geology, surficial soils and hydrology. This is followed by a discussion of current land use adjacent to the site.

3.1 Geology

The geology of the Penn Yan site is presented in discussions of physiography, bedrock geology, unconsolidated deposits and surficial soils. There is very limited site specific information available. Therefore, the information presented in the following sections is brief and tends to be regional in nature.

3.1.1 Physiography

The Village of Penn Yan is situated on the boundary of two physiographic provinces. To the north is the Central Lowland Physiographic Province, a relatively flat region characterized by poor drainage and north dipping landforms composed of unconsolidated glacial deposits. To the south is the Allegheny Plateau Physiographic Province, a region of rolling uplands cut by broad streams and lake valleys and is shown in Figure 3-1 (Crain, 1974). Topographic features in both provinces have been heavily modified by intensive continental glaciation.

The Finger Lakes, such as Keuka Lake, are the most dominating geographical features in the Penn Yan region. These lakes are located in deep preglacial stream valleys. The narrow valleys were scoured and deepened by advancing

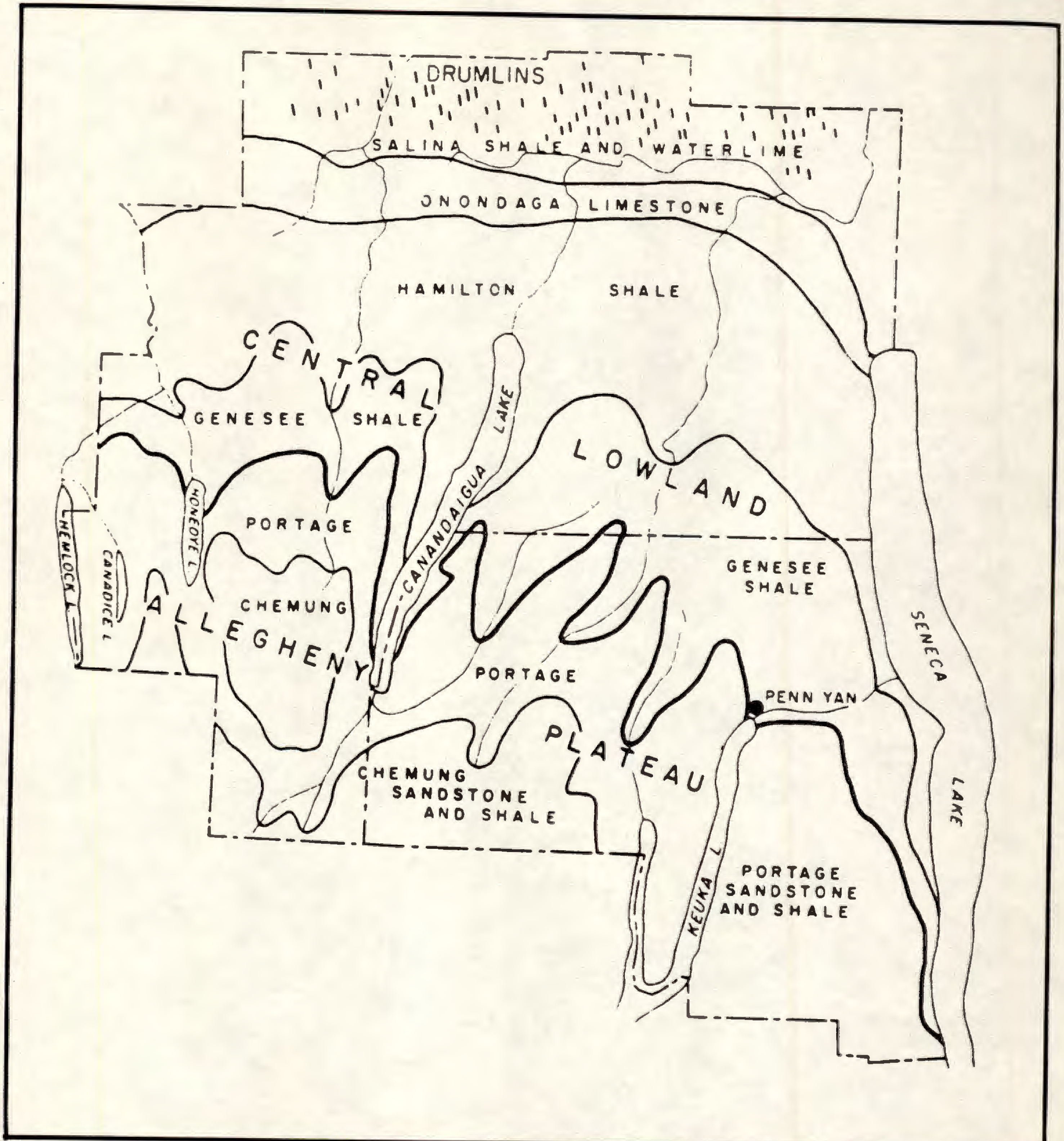


Figure 3-1. Physiography and bedrock geology of Ontario and Yates Counties, New York. The heavy black line between the Central Lowland and the Allegheny Plateau marks the Portage Escarpment. (from Soil Survey Series 1949, No. 5)

glaciers and later partially filled with sediment as the glaciers retreated northward (Fairchild, 1926). The stream and glacial erosion in these valleys have resulted in great relief of the bedrock surface, in some areas as much as 3000 feet (Crain, 1974). Bedrock is exposed along valley walls but is deeply buried by unconsolidated glacial sediments in the major valleys.

3.1.2 Bedrock Geology

The bedrock in the Northern Allegheny Plateau/Southern Central Lowlands consists of Devonian and Silurian (350-440 million years old) marine sedimentary sequences. Rock types include shales, siltstones, sandstones, and carbonates. In general, the bedrock is generally flat with a slight dip (50 feet/mile) to the south (Crain, 1974). A stratigraphic column of the regional bedrock with physical descriptions is given in Figure 3-2.

The bedrock in the Penn Yan area is the Penn Yan shale member of the Devonian Genesee Formation. The bedrock is characterized by weak, thinly bedded black shales and interbedded mudstones. Limestone nodules are abundant in the upper 100 feet of the member (Bergin, 1964).

The bedrock in the area is generally flat lying. However, gentle northeast plunging folds disturb the southwest dipping (25 feet/mile) bedrock (Bergin, 1964). The dominant joint pattern cutting the Penn Yan shale is fold related, with an average trend of N 26°W. This joint set is curved with dip angles ranging greater than 45° (Bergin, 1964). The openings along joint surfaces in the shale tend to be minute. At depth, the weight of overlaying rock closes the openings. Near the surface however, the openings are wider and are capable of transmitting ground water. A northeast trending fault (with a throw of 40 feet down on the west side) is inferred along the west side of Keuka Lake, 4000 feet west of the site (see Figure 3-3). The fault trace cannot be seen at the surface (Bergin, 1964).

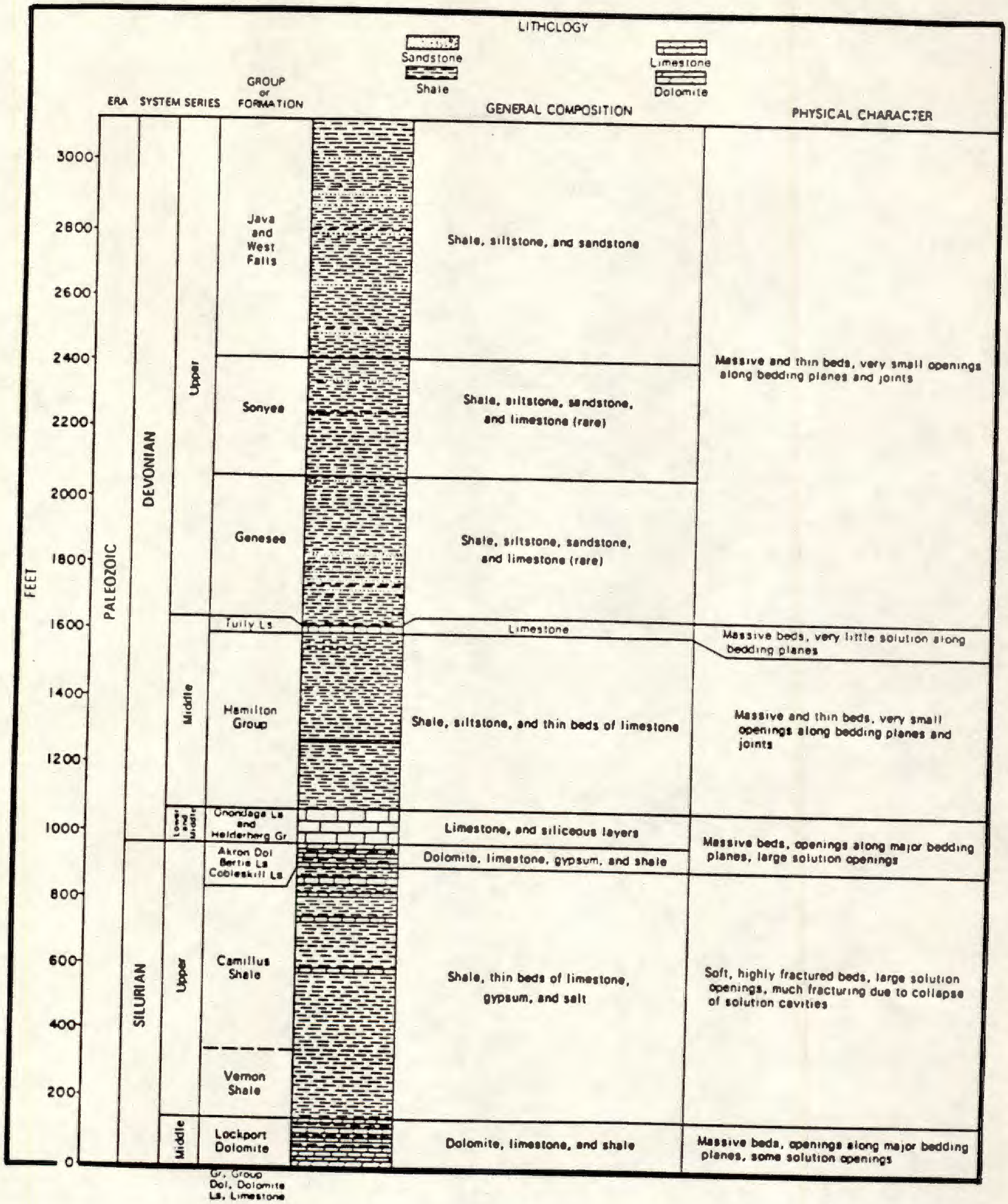


Figure 3-2. Generalized Stratigraphic Column of Bedrock in the Western Oswego River Basin. (from Crain, 1974).

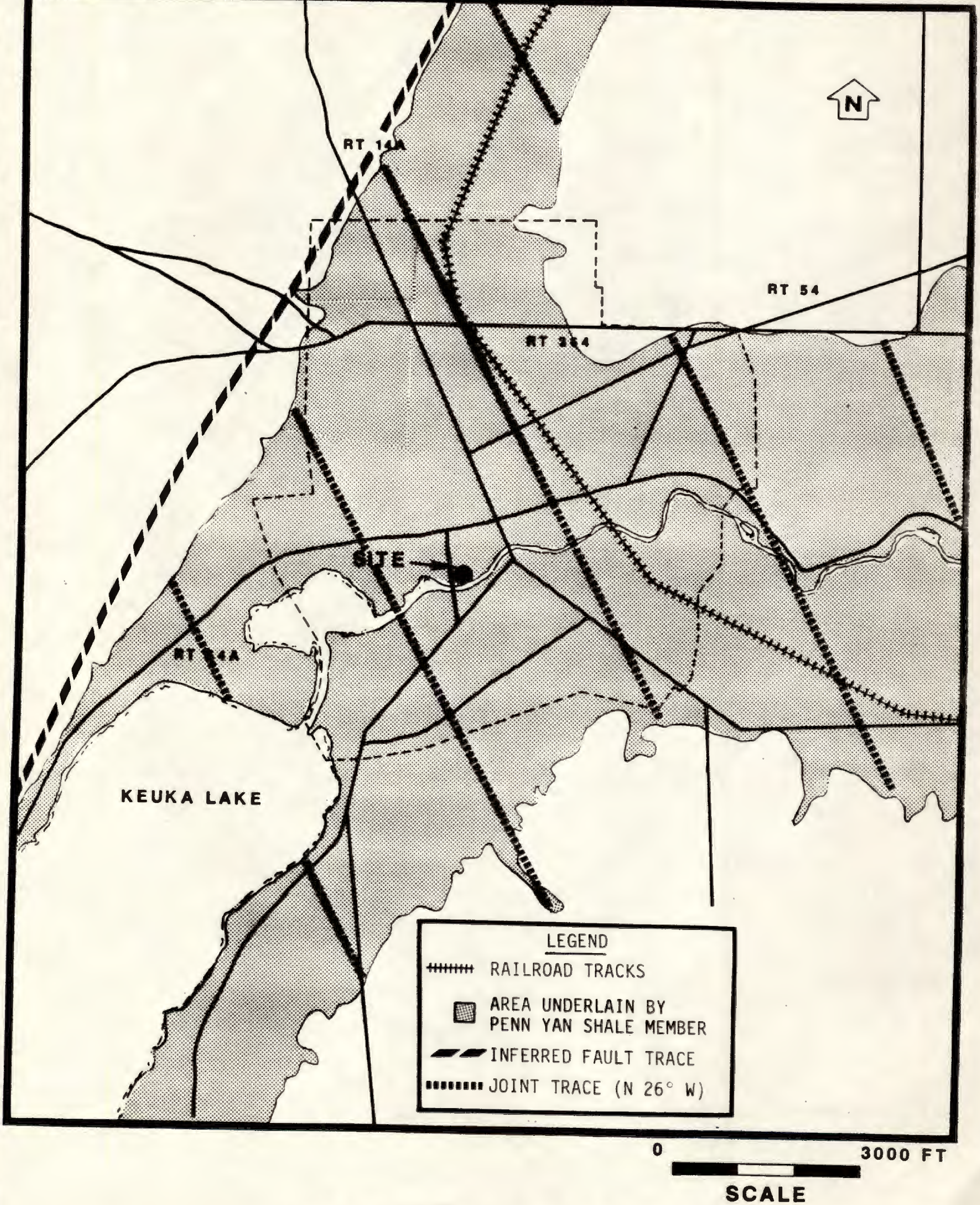


Figure 3-3. Bedrock Geology of Penn Yan

3.1.3 Unconsolidated Deposits

The bedrock in the Penn Yan region is overlain by thick unconsolidated Quaternary glacial deposits. The glacial material was deposited during the northward retreat of the last glaciation episode. When the retreating glacier blocked the northward stream drainage out of the Keuka Lake Valley, a large proglacial lake formed (Fairchild, 1926). As a result, interbedded clays and silts were deposited over the bedrock. Fast running meltwater from the egressing glacier also deposited thick layers of sorted sand and gravel over the area. Along Keuka Lake Outlet, a thin layer of post-glacial alluvium overlays the glacial deposits (Bergin, 1964). No available information was located on depths of unconsolidated deposits and depth to bedrock.

3.1.4 Soils

The site is in an area mapped as the Ontario fine sandy loam (Soil Survey, Yates County, 1916). Its description is as follows:

0-10" Surface soil - brown, fine sandy loam, with rounded limestone and sandstone fragments.

10-36" Subsurface soil - yellowish-brown, fine sandy loam containing limestone boulders.

3.2 Hydrology

Site specific hydrological information for the Penn Yan site is limited. Regional data are presented in the following sections on surface water hydrology and ground water hydrology.

3.2.1 Surface Water Hydrology

The former coal gasification plant lies in a low, flat area on the north bank of Keuka Lake Outlet. A USGS gaging station 1/4 mile upstream of the site recorded data from 1965 to 1984. The average discharge recorded at the station is 206 cubic feet per second (cfs). A minimum discharge of 3.2 cfs was recorded on September 6 through 10, 1982 (U.S.G.S., 1984). Flow into Keuka Lake Outlet is controlled by the Village of Penn Yan. The greatest percentage of annual surface runoff occurs during the months of March and April, when the spring thaw occurs. September is usually the low flow month contributing little to the annual run-off. The relative contribution of ground water to stream flow is greatest during low flow periods.

Average annual precipitation in the Penn Yan area is 32 inches. The highest average precipitation (17 inches) occurs during the months of May through October. From November to April, most of the precipitation (15 inches) occurs as ice or snow. The average midsummer temperature is 71°F, while the average mid-winter temperature is 25°F (Crain, 1974).

The annual mean evapotranspiration (computed) is 22.1 inches with the highest rate occurring during the months of April through October (see Table 3.1) (Crain, 1974).

3.2.2 Ground Water Hydrology

The major aquifer of the Penn Yan area is the thick layer of unconsolidated Quaternary glacial deposits. The ability of these deposits to transmit water is closely related to their mode of deposition. The fine grain lacustrine clay deposits are relatively impermeable layers and will yield only small quantities of ground water. The alluvium and gravel deposits are more permeable and will yield higher amounts of ground water.

In the vicinity of the site, three private wells located along the Keuka Lake Outlet are screened in two different types of material. The closest well to the site is located approximately 270 feet southwest of the site on the southern bank of Keuka Lake Oulet. The well is completed in a sand and gravel

TABLE 3-1

PRECIPITATION, EVAPOTRANSPIRATION, AND WATER SURPLUS FOR PENN YAN, N.Y.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
T°F	25	26	34	46	57	67	72	69	63	52	40	29	48
P	2.0	1.9	2.7	2.9	3.2	3.0	3.5	3.0	2.2	2.8	2.4	1.9	31.5
PE	0	0	.1	1.3	3.1	4.7	5.8	5.0	3.3	1.4	.5	0	25.2
AE	0	0	.1	1.3	3.1	4.7	5.8	3.0	2.2	1.4	.5	0	22.1
SM	4.0	4.0	4.0	4.0	4.0	2.3	0	0	0	1.4	3.3	4.0	
SP	2.0	1.9	2.6	1.6	.1	0	0	0	0	0	0	1.2	9.1

NOTE:

(Altitude 720 ft)

T°F - Mean air temperature, in degrees Fahrenheit (long-term average).

P - Mean precipitation, in inches (long-term average).

PE - Mean potential evapotranspiration, in inches (computed).

AE - Mean actual evaportranspiration, in inches (computed).

SM - Available soil moisture, in inches.

SP - Mean water surplus (surplus precipitation), in inches (computed).

aquifer to a depth of 118 feet and has a reported yield of 230 gallons per minute (gpm). The water level in the well is unknown (Crain, 1974). The second well is located at the northern tip of Keuka Lake, approximately 800 feet southwest of the site. This well is completed in a sand and gravel deposit to a depth of 25 feet with a reported yield of 2 gpm. The recorded water level in the well is 24 feet (Crain, 1974). The third well is located on the northern bank of Keuka Lake Outlet, approximately 2,640 feet east of the site. The well is screened in till to a depth of 31 feet. The reported yield from the well is less than 1 gpm, with a recorded water level of 16 feet below the ground surface (Crain, 1974).

Water level data for wells in the area of Penn Yan suggest a water table with a relatively steep gradient (1.2 percent) to the northeast. The well data also suggests that the water table closely follows the topography of the area. The depth to the water table in the vicinity of the site is represented by the water level (24 feet) in the well located at the northern end of Keuka Lake. The water elevation in this well is 720 feet above mean sea level. The elevation of the site is also 720 feet above mean sea level, as a result it is reasonable to assume that the water table below the site is also 24 feet below ground surface.

Penn Yan's municipal water supply is acquired from Keuka Lake. The intake for the municipal water supply is located approximately 7,200 feet to the southwest of the site on West Lake Road. Due to the exclusive use of the municipal water supply, none of the wells in the vicinity are being used as a domestic or industrial water source.

3.3 Site Area Land Use

An analysis of land use within a one-mile radius of the former Penn Yan coal gasification site was performed on a tax map of the Village of Penn Yan and the U.S.G.S. Penn Yan quadrangle topographic map. These areas were also field verified by driving around the one-mile radius of the site. The land use evaluation identifies sensitive areas, such as schools, hospitals and public recreation areas, and will aid in the evaluation of risk assessment. A generalized land use map was constructed from these sources and is presented in Figure 3-4.

Within a one-mile radius of the site, land use is roughly divided into 40 percent residential, 20 percent commercial, 20 percent agricultural, 15 percent open land, and 5 percent industrial. Immediately surrounding the site, land use is approximately 98 percent commercial and 2 percent residential. The site is bordered on the west by Liberty Street and on the east by the Yates-Blodgett Grainery. Water Street forms the northern border of the site with a car dealership located on the north side of the street directly across from the site. On the north side of the corner of Water and Liberty Streets are two residential homes. Keuka Lake Outlet forms the southern boundary of the site.

Five schools are located within a one-mile radius of the site area. All of the schools are located to the north and northwest of the site. The closest school is the Emmanuel Christian School, located approximately 1400 feet to the northwest (see Table 3-2). One hospital, Soldiers' and Sailors' Memorial Hospital, is located approximately one mile to the north of the site.

The Penn Yan Water and Sewer Department provided information on the location of sewers near the site. The two streets bordering the site, Water and Liberty Streets, are included in the village sewer system. The flow direction through the sewers is north on Liberty Street to Water Street, then east along Water Street. Gravity is used as the driving force of the system. As a result, the sewers are situated approximately twenty-five feet below Liberty Street and approximately thirty feet under Water Street.

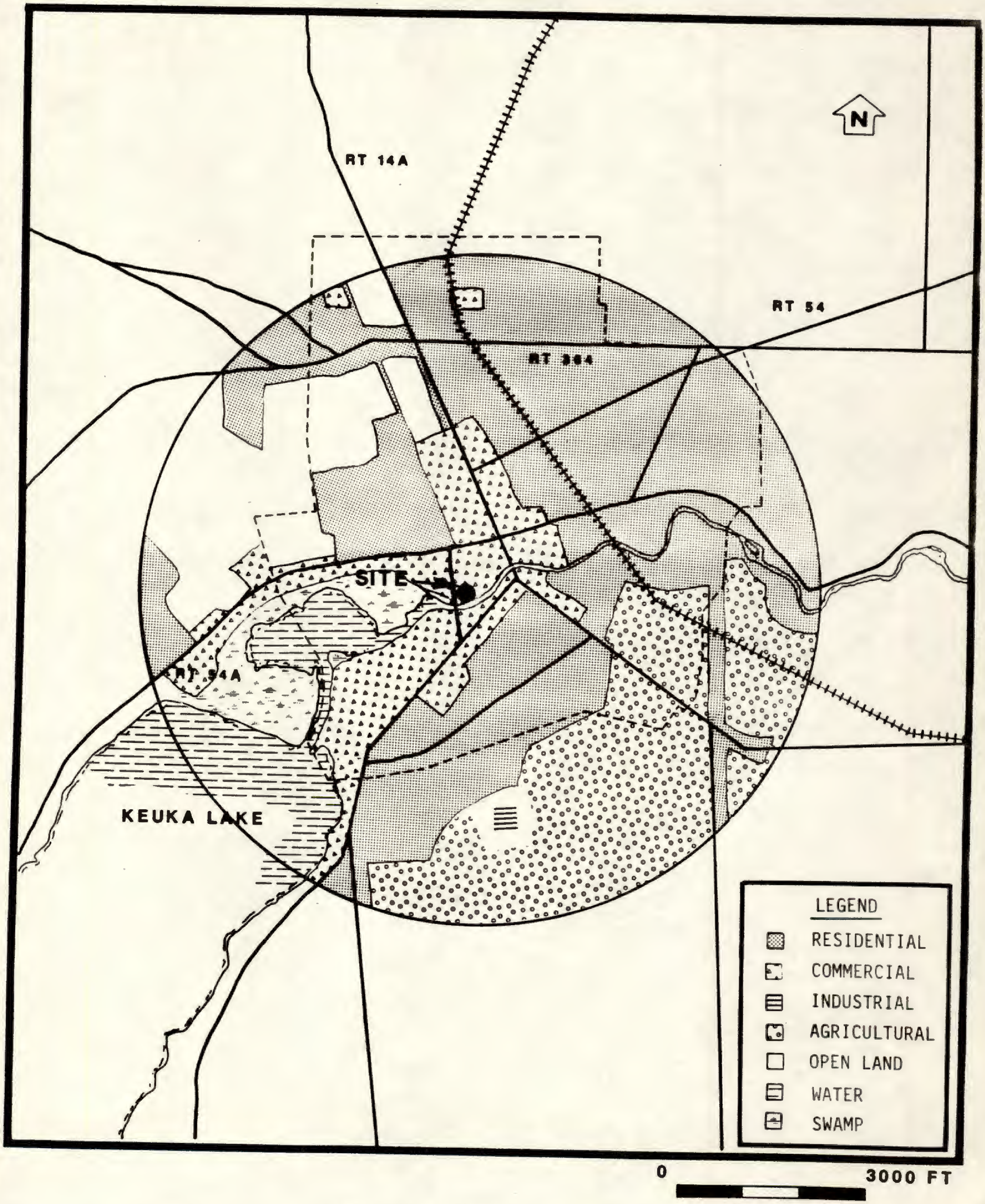


Figure 3-4. Land Use Map

TABLE 3-2

DISTANCE OF SCHOOLS WITHIN ONE-MILE
RADIUS FROM SITE AREA

SCHOOL	Distance	Direction
Emmanuel Christian School	1400 feet	Northwest
Saint Michael's Church School	1600 feet	Northwest
Penn Yan Junior High School	2800 feet	North
Penn Yan Senior High School (Penn Yan Academy)	2800 feet	North
Penn Yan Elementary School	3500 feet	North

4.0 PRELIMINARY SITE DATA

Preliminary site information was used to develop an investigative strategy that is documented in the Sampling Plan (see Appendix A). The preliminary data consists of geophysical information (EM-31), a site air quality survey completed with an Organic Vapor Analyzer (OVA), and a review of tar sludge quality data previously collected by NYSEG.

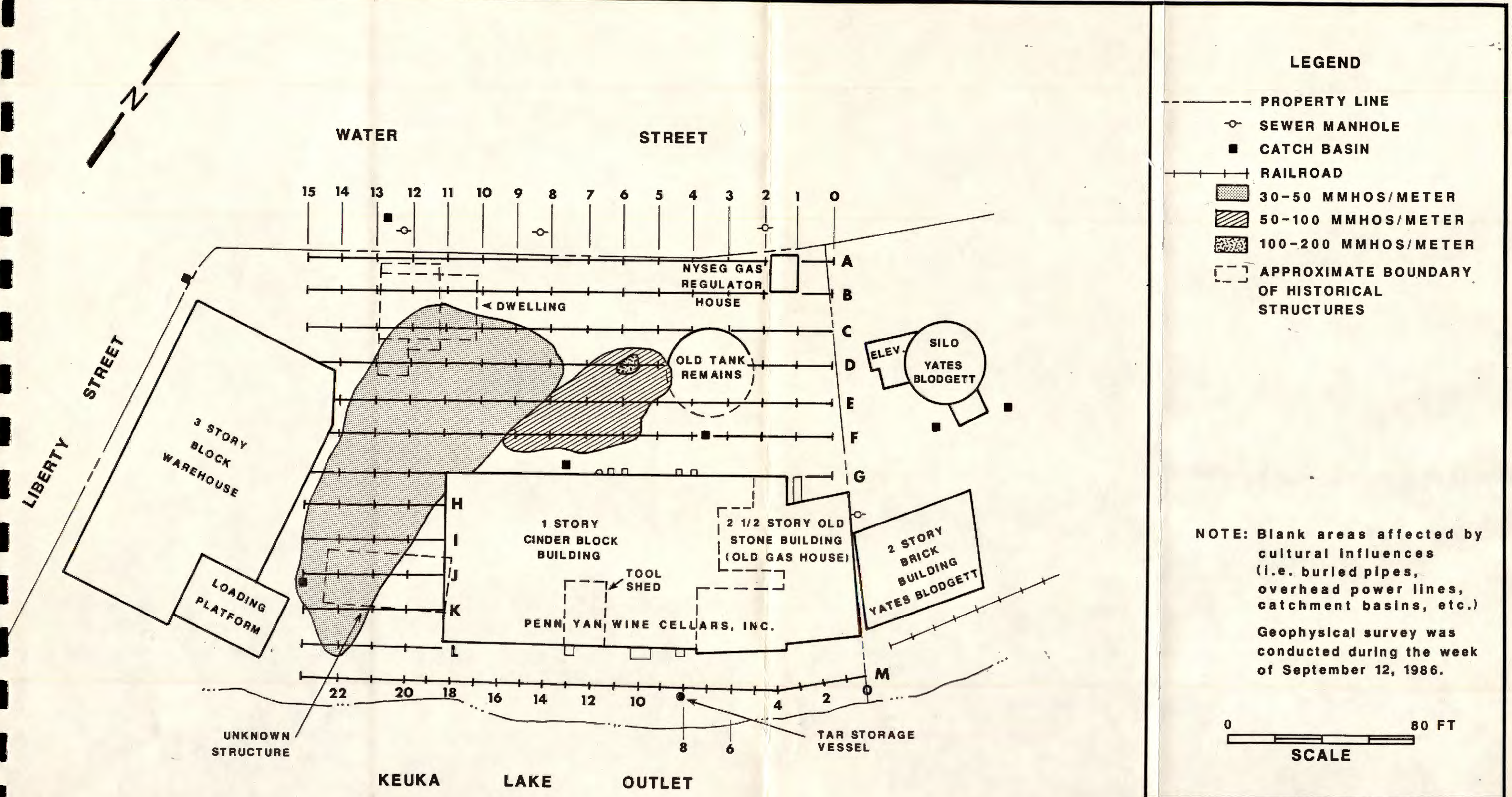
4.1 Geophysical Survey

During the week of September 12, 1986, TRC conducted an electromagnetic survey using the Geonics Limited EM-31 at the Penn Yan site. A grid system was laid out with 15 feet between each point, except in the area along the outlet where the grid points were placed 10 feet apart (see Figure 4-1). At each grid point, the conductivity was measured with the boom oriented in an east-west direction and then in a north-south direction. A large difference between these two values indicates interference from nearby objects. Some of the grid points were modified slightly to avoid interferences. Appendix B lists the conductivity values measured at each grid point.

The EM-31 was highly affected by the overhead power lines, rails, automobiles and other metal structures on-site. Presented in Figure 4-1 are contours showing the EM-31 conductivity readings. An area of high conductivity was located west of the gas relief holder. This area is suspected of containing ash/chip wastes. Readings observed in areas of known conductive interferences were omitted while constructing the contour areas.

4.2 Site Air Quality

On September 11, 1986, TRC performed an air quality survey of the Penn Yan site using the Century Organic Vapor Analyzer (OVA). Ambient air



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NYSEG PENN YAN, NY

FIGURE 4-1
ELECTROMAGNETIC SURVEY LOCATION PLAN

concentration of total organic vapors were measured at each grid point used for the EM-31 survey (see Figure 4-1). During the site survey, the temperature was 68 to 72°F with a moderate northwest breeze and overcast skies. The moderate breeze experienced during the survey may have decreased the possibility of detecting organic vapors.

The OVA was calibrated for the survey with hydrocarbon free air (Total Hydrocarbon [THC] less than 1 ppm) and 19.1 ppm benzene in air. The readings for the survey ranged between 0.6 ppm and 1 ppm total organic vapors (as benzene). Measurements taken at a depth of one foot in the tar storage vessel ranged from 0.8 to 1.7 ppm. At three other points along the survey, (M-13, H-13, and B-13) values slightly greater than 1 ppm were measured. However, at two of these locations, TRC personnel detected odors from the winery, which may have influenced ambient concentrations.

4.3 Tar Sludge Quality

On November 4, 1981, NYSEG collected one sludge sample from the tar storage vessel at the Penn Yan site. The sample was taken from material near the bottom of the tar storage vessel, located next to the Keuka Lake Outlet (see Figure 4-2). The sample was leached following the Extraction Procedure Toxicity Method*, and analyzed for the eight EP Toxicity metals as well as copper, zinc, total phenols, ortho- and para-cresol, naphthalene and quinoline. In addition, the sample was analyzed for cyanide, sulfide, pH and flash point. The analytical results are tabulated and summarized in Table 4-1. The detection of cresols, naphthalene, and quinoline in the leachate indicates the presence of coal tar or coal gasification products in the sludge.

* Federal Register, Vol. 45, No. 98, May 19, 1980.

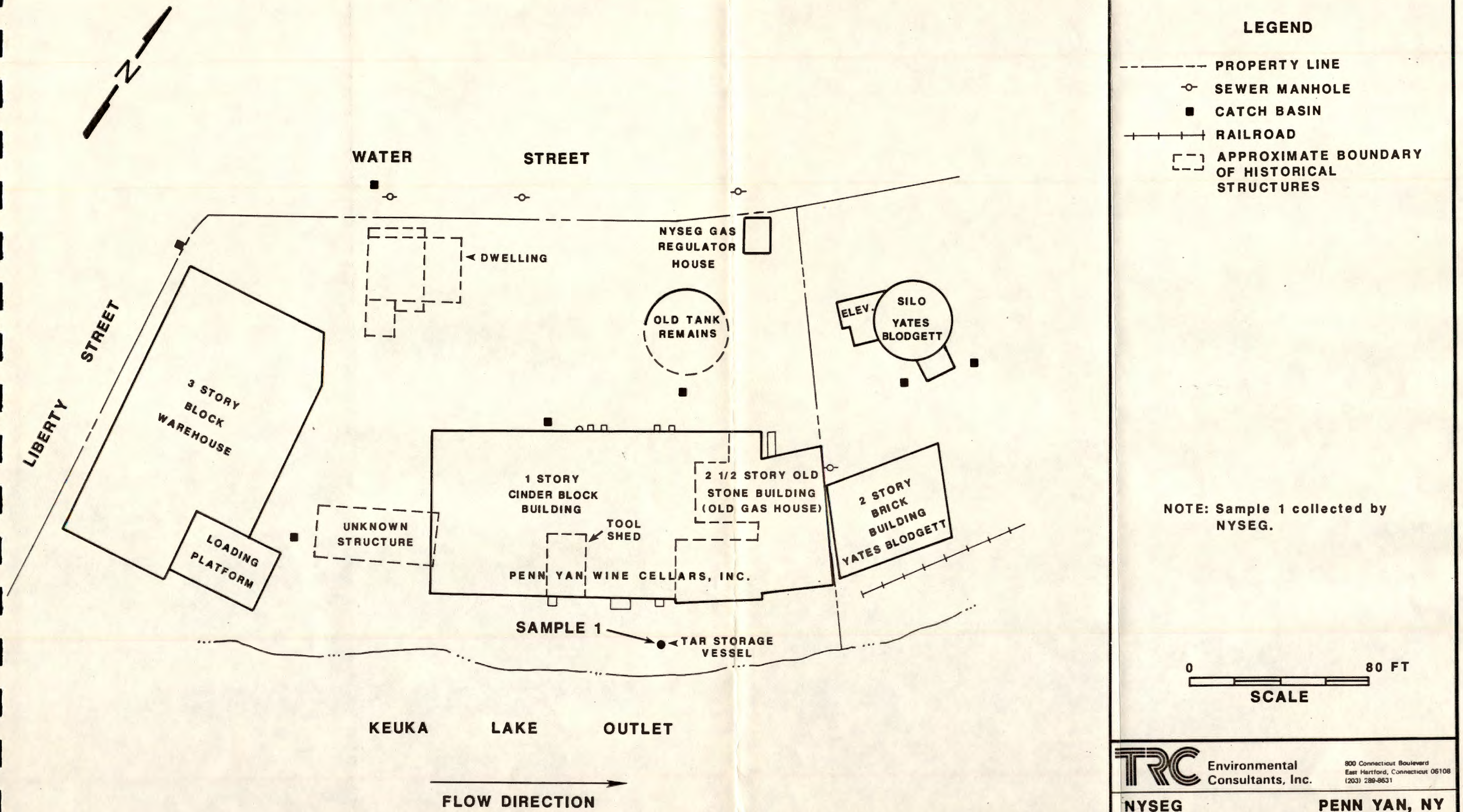

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FIGURE 4-2
1981 SOIL SAMPLE LOCATION

TABLE 4-1

SUMMARY TABLE OF CHEMICAL DATA FOR THE PENN YAN COAL GASIFICATION SITE - PENN YAN, NEW YORK[1]

Compound	Sample ID Date Lab No. Units	PEN-01 11/04/81 81-1821
Arsenic	mg/l	ND<0.025[2]
Barium	mg/l	0.43
Cadmium	mg/l	ND<0.002
Chromium	mg/l	ND<0.010
Copper	mg/l	ND<0.05
Lead	mg/l	ND<0.05
Mercury	mg/l	ND<0.0004
Selenium	mg/l	ND<0.002
Silver	mg/l	ND<0.05
Zinc	mg/l	0.24
Phenols, total	mg/l	175
o-Cresol	mg/l	24.18
p-Cresol	mg/l	45.82
Naphthalene	mg/l	5.76
Quinoline	mg/l	7.18
pH	-	7.4
Flashpoint	°F	>170
Cyanide	mg/kg	ND<1
Sulfide	mg/kg	95

[1] Data supplied by New York State Electric and Gas Corporation.
[2] ND = None Detected.

5.0 DISCUSSION OF FINDINGS

The purpose of this section is to summarize the findings of the Task 1 report and to determine the data necessary for investigating the site. This includes summarizing and evaluating the potential environmental problems identified in the preinvestigative findings.

5.1 Summary of Findings

Based on the preliminary data gathered in Task 1, the following observations were made regarding the former Penn Yan Gas Plant:

- Subsurface manufacturing wastes have been identified on-site (tar storage vessel). The extent of contamination has not yet been determined.

- Potential sources of contaminants have been identified as:

  - tar storage vessel
  - waste materials disposed or discharged into Keuka Lake Outlet
  - material storage areas (i.e., ash, cinder, wood chips, and coke waste piles)

- No surface contamination was observed with the exception of the tar storage vessel.

- Absence of coal tar odors and low OVA readings indicate no immediate on-site respiratory hazards. Further air quality monitoring will be conducted during test pit operations to asess potential risks during excavation.

- The depth to ground water as well as the flow direction and velocity need to be measured in order to assess the potential for contaminant migration off-site.

- The anomalous values measured during the EM-31 survey are primarily the result of interferences from power lines, metal rails, pipes, and other metal objects. However, there is the possibility that some readings were indicative of the presence of buried pipes or mains associated with the coal gasification process.

5.2 Preinvestigative Evaluation

The purpose of the preinvestigation evaluation is as follows:

- To summarize the existing potential environmental problems at the site.

- To identify remedial alternatives applicable to the potential problems.

- To determine the data requirements necessary to verify if the problems do exist.

The evaluation of these subtasks provides the basis for designing and implementing the field investigation program required in Task 2. The major portion of the investigative program involves site characterization and the collection of site specific data. Additional requirements that also need to be satisfied in Task 2 are the following:

- Determination of the health risk potential.

- Definition of potential remedial alternatives.

- Identification of additional data requirements necessary to better define the health risk potential and remedial alternatives.

Data needs which may be identified as a result of Task 2 will be satisified in Task 3.

Table 5-1 summarizes the potential environmental problems at the Penn Yan site. The media addressed in Table 5-1 are soils, sewer, ground water, surface water and air. The table is based on a number of factors including chemicals potentially present on-site, transport mechanisms, the persistence of chemicals in the environment, and existing or potential receptors of these chemicals.

Based upon the potential problems identified at the site, several remedial alternatives have been considered for each media. These technologies are summarized in Table 5-2.

TABLE 5-1

SUMMARY OF POTENTIAL FOR ENVIRONMENTAL PROBLEMS AT THE PENN YAN SITE

Technical Factors	On-Site Soils	Ground Water	Sewers	Surface Water	Air
Chemicals Present	No soil samples have been collected on-site. However, one sludge sample has been collected at the site and contains the following: • barium • zinc • o-cresol • p-cresol • naphthalene • quinoline • sulfide • total 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 disposed on site are: • benzene • toluene • ethylbenzene • xylenes • naphthalene • phenols • cyanide	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. Sewer sampling will be evaluated after the collection and analysis of the first round of ground water sampling	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.	An OVA air quality reconnaissance has been conducted on-site. However, no air quality samples have been collected or analyzed.
	The following chemicals may also be present in the soils: • benzene • toluene • ethylbenzene • xylenes • polynuclear aromatic hydrocarbons • heavy metals • cyanides	Low concentrations of polynuclear aromatic hydrocarbons may also be detected in the ground water.	Low concentrations of polynuclear aromatic hydrocarbons may also be detected in sewer samples.	Low concentrations of polynuclear aromatic hydrocarbons may also be detected in the surface water and sediment samples.	
Chemical Transport Mechanism	Volatilization to air and/or seepage and leaching of soluble or free liquid wastes to ground water.	Based on water level information from wells approximately 800 feet upgradient and 2,700 feet downgradient of the site, the depth to ground water ranges from 16 to 24 feet. Installation of the monitoring wells will provide actual ground water levels for the site. Shallow ground water movement is anticipated to be to the southeast and discharge into Keuka Lake Outlet.	The combined sanitary and storm sewer parallels Water Street. There are several storm sewer catchment basins on-site. The sewers and catchment basins and their bedding material may serve as a conduit for migration of contaminants off site.	Volatile constituents will volatilize while non-volatile constituents will move downstream. The coal tar fraction, which is heavier than water, immiscible, and viscous will migrate relatively slowly compared to the other coal tar fractions.	Volatilization and particulate migration occur via wind scour; however, most of the site is paved or covered with gravel. Volatilezation is the primary route when materials are exposed. Winds in the area are generally from the northwest.

TABLE 5-1
(CONTINUED)

SUMMARY OF POTENTIAL FOR ENVIRONMENTAL PROBLEMS AT THE PENN YAN SITE

Technical Factors	On-Site Soils	Ground Water	Sewers	Surface Water	Air
Expected Persistence of Chemicals in the Environment	Natural biodegradation of coal tar present in the soils is very slow or nonexistent with the exception of phenols. The volatile fractions of coal tar (benzene, toluene, ethylbenzene, and xylenes) are expected to leach moderately into ground water and volatilize rapidly into the air with exposed surfaces. Naphthalene, and cyanides are also expected to leach into the ground water slowly. The polynuclear aromatic hydrocarbons and the heavy metals are not expected to volatilize or leach into the ground water at any significant rate. Phenols are expected to volatilize very slowly in air, however, phenols are extremely soluble and will leach very rapidly into the ground water.	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 volatilization of the more volatile fraction will eventually occur.	Any constituent which enters the sewer, and remains in it, will reach the sewage treatment plant. However, constituents may leave the sewer prior to reaching the treatment plant. The volatile constituents will volatilize in the sewer. The persistence of the constituent would then be as described for on-site soils or ground water.	The volatile constituents will volatilize into the air and/or decrease due to bio-degradation. Some constituents will persist either in a free state or sorbed to particulates.	Volatile 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 Keuka Lake Outlet. There are no domestic water and industrial wells in a one-mile radius of 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 low through recreation related activities along Keuka Lake Outlet and Seneca Lake. Dilution and dispersion effects will bring constituent concentrations down to trace levels.	Humans, vegetation and animals in the vicinity of the site are potential receptors of any chemicals present in the air.

TABLE 5-2

PRELIMINARY IDENTIFICATION OF POTENTIAL REMEDIAL ALTERNATIVES
FOR THE PENN YAN 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.
		In-situ	Biological and chemical treatment of soils.
		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 Restrictions	May not be applicable for a complete remedial action plan, but may be used as an element of a comprehensive plan. Will be considered in conjunction with other technologies.
Ground Water	Removal/Treatment	Extraction of Ground Water via Pumping	If large volumes of water are to be extracted, on-site treatment may be appropriate. May include recharge or discharge to surface drainage. Extent of contamination and required operating period is not known. May require years of operation.
		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.
	Containment	Slurry Wall	Generally used in conjunction with extraction and treatment of ground water.
		Capping	See Soils.

TABLE 5-2
(Continued)

PRELIMINARY IDENTIFICATION OF POTENTIAL REMEDIAL ALTERNATIVES
FOR THE PENN YAN SITE

Medium	Conceptual Action	Remedial Measure	Remarks
Ground Water (Continued)	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 as well as from fugitive dust during excavation.
	Control	Capping • clay liner • synthetic liner	The addition of a cover will considerably reduce the release of volatilized constituents.
	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	If large volumes of water are to be removed, on-site treatment may be appropriate. Extent of contamination and required operating period is unknown.
		Plugging and Relocation of Sewers	Avoids the air quality concerns of excavation. However, the sewer's pipes 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 Adsorption	Stripping of sewage wastewater from the sewers may cause air contamination without proper and expensive controls applicable to organic constituents; contaminated carbon filters require appropriate disposal or regeneration.
	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.

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 5-3 lists specific data requirements in each of these categories for the Penn Yan site.

5.2.2 Data Quality Requirements

In order to investigate for the presence of coal gasification wastes at the Penn Yan site, the following parameters will be included in the analytical program: selected volatile organics and polynuclear aromatic hydrocarbons, total cyanide, ferro-ferric cyanide, total organic carbon (water samples only), nonchlorinated phenolics, iron, zinc, ammonia and sulfate. In addition, a number of soil and ground water samples will be analyzed for the U.S. EPA priority pollutants, minus the PCB/pesticide fraction. The U.S. EPA priority pollutants analysis includes volatile organics, acid and base/neutral extractable compounds and 12 trace metal and inorganic parameters. The proposed analytical program will provide quantitative and qualitative chemical analyses on surface and subsurface soils, ground water, surface water, and stream sediments at the Penn Yan site. The analytical results will be compared to the New York State Ambient Water Quality Standards and Guidance Values to determine if action levels have been exceeded. The analytical results of the sludge sample collected from the tar storage vessel detected

TABLE 5-3

TASK 2 DATA REQUIREMENTS
PENN YAN SITE

General Data Requirement	Specific Data Requirement	Related Task 2 Activity
A. Establishment of Background Conditions	Analytical data from soil, ground water, 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 1, monitoring wells 1S and 1D, stream sediment sampling point 1, surface water sampling point 1, surface soil sampling point 2 and an upwind air sample (to be determined in the field). Specific locations are shown in the figures in Appendix A, Task 2 Sampling Plan.
B. Characterization of Contaminant Sources		
1. Location	Confirmation of location of ash and wood chip disposal areas.	Test pits 5 and 6
	Confirmation of location of gas holder foundations.	Test pits 7, 8, and 9.
	Soil conditions adjacent to former coal gasification structures.	Test pits 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18,
2. Chemical nature	Analytical data from soil, ground water,stream sediment, surface water, and air samples collected from areas adjacent to former coal gasification structures.	Analyses of samples from test pits 2 through 18, stream sediment samples 2 and 3, monitoring wells 2S, 3S, 4S and 4D, surface water samples 2 and 3, surface soil sample 1 and up to 12 dosimeters and 28 tenax tubes and glass fiber cartridges.

TABLE 5-3
(CONTINUED)

TASK 2 DATA REQUIREMENTS
PENN YAN SITE

General Data Requirement	Specific Data Requirement	Related Task 2 Activity
	Chemical data which will allow differentiation between coal gasification related contamination and other contaminant sources. GC/MS analysis will provide confirmation of the GC analysis.	Two ground water samples and two test pit soil samples will be analyzed by GC/MS.
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, 3S, 4S, and 4D.
3. Sewer transport	Quality of sewage water upgradient and downgradient of the site.	The need for sampling and analysis of sewer samples will be evaluated after the first round of ground water sampling.
	Proximity of the water table to the sewers.	Water level measurements in monitoring wells and peizometers.

TABLE 5-3
(CONTINUED)

TASK 2 DATA REQUIREMENTS
PENN YAN SITE

General Data Requirement	Specific Data Requirement	Related Task 2 Activity
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.
5. Surface Soil Transport	Quality of surface soil on-site.	Surface soil samples 1 and 2.
D. Identification of Potential Receptors	Evaluation of ground water discharge points and potentially impacted surface water bodies (Keuka Lake Outlet).	Water level measurements in wells and plotting of ground water contours; surface water studies of impacted streams, including water use.
	Evaluation of potentially sensitive receptors within one-half mile of the site.	A reconnaissance survey will be carried out to determine receptor locations. Hospitals, nursing homes, schools and recreation areas will be located.

concentrations of quinoline, o-cresol and p-cresol. These compounds will not be analyzed for because no standard or guidance values have been determined by the New York State Department of Environmental Conservation. RCRA disposal parameters are not included in Task 2, but may be added later if the need for off-site disposal alternatives arises. Air samples will also be collected and analyzed for polynuclear aromatic hydrocarbons and volatile organic compounds.

The primary use of the data generated during Task 2 is for problem identification, preliminary risk assessment and preliminary (conceptual) engineering rather than final engineering determination. Therefore, it is important that the analytical methods used for determining these parameters be selected with consideration given to these requirements. In addition, analytical methods for air, soil, and water samples must provide results that are accurate and defensible. The data must be of a quality which will allow a comparison to regulatory criteria. Finally, the analytical methods selected must also be sensitive in determining whether the contamination detected is related to wastes generated from coal gasification.

6.0 RECOMMENDATIONS

The following activities recommended for Task 2 are designed to meet the data requirements described in Table 5-3. Recommended activities involve subsurface investigations, sampling of on-site surface and subsurface soils, ground water, surface water, sediments and air.

Surface investigations will involve collecting surface soil samples from undisturbed areas on-site. The surface soil samples will provide chemical data that will be utilized for the risk assessment.

Subsurface investigations will involve test pits, borings, and the installation of monitoring wells. Test pits will allow for discovery and investigation of buried structures and past disposal practices. Soil borings will allow for determination of the stratigraphy of the unconsolidated sediments and will delineate any potential aquifers on-site. TRC anticipates that the proposed monitoring well locations represent upgradient and downgradient conditions on-site. The following six monitoring wells will be installed on-site:

- Two monitoring well clusters, which will have a deep and shallow well. One monitoring well cluster will be upgradient and one monitoring well cluster will be downgradient of the anticipated ground water flow direction on-site.
- Two, single shallow monitoring wells will be installed downgradient of the anticipated ground water flow direction on-site.

The wells will provide hydrologic information, such as vertical and horizontal hydraulic gradients, aquifer hydraulic conductivities, and seasonal fluctuations of water levels.

Various soil, water and air samples will be collected and analyzed for potential contaminants. 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 and analyzed from different levels (i.e., not composited) 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 along the test pit, in order to develop data for risk assessment and remedial activities involving excavation. Air samples will be collected using two different techniques. One technique will collect volatile organic compounds for GC/MS analysis while the other will be focused on polynuclear aromatic hydrocarbons. A complete description of the air monitoring program is provided in Task 2 Sampling Plan (see Appendix A).

After the drilled formation has stabilized, ground water, surface water and sediment samples will be collected and analyzed. The proposed test pit, boring/monitoring well, surface soil, surface water, sediment and air sampling locations are discussed in detail in the Task 2 Sampling Plan (see Appendix A).

The analytical program is designed to fulfill the data quality requirements discussed in Section 5.0. The organic analyses for soil, ground water, surface water, sediment, and air will be done by GC/FID, with GC/MS confirmation on two soil samples collected from the test pits and two samples from each of the first two ground water sampling rounds. This program will allow comparison of analytical data from the soil, water and air analyses and will provide trace level detection limits of compounds 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 completed and recommendations for continued investigation (Task 3), monitoring the existing situation, or discontinuing the program will be provided where appropriate.

7.0 REFERENCES

Aldrich, L.C., 1892, History of Yates County, p. 335, 1892.

Bergin, M.J., 1964, "Bedrock Geology of the Penn Yan and Keuka Park Quadrangles." U.S.G.S. Bull.1161-G.

Crain, L., 1974, "Ground Water Resources of the Western Oswego River Basin, New York." U.S.G.S. Report.

Environmental Research & Technology, Inc., and Koppers Company, Inc., 1984, "Handbook on Manufactured Gas Plant Sites," prepared for: Utility Solid Waste Activities Group, Superfund Committee, Washington, D.C., 1984.

Fairchild, H.L., 1926, "The Dansville Valley and Drainage History of Western New York," Rochester Academy of Science Proceedings, Vol. 6, Oct, p. 217-242.

Historical Atlas of Yates County, New York, 1886, by Sanborn Map Company, Pelham, New York, 1886.

Insurance Map of Penn Yan, New York, 1931, by Sanborn Map Company, Pelham, New York, 1931.

Lappala, E.G., and G.M. Thompson, 1984, "Detection of Ground Water Contamination by Shallow Soil Gas Sampling in the Vadose Zone," 1984.

Maxon, E.T., 1918, "Soil Survey of Yates County, New York, U.S. Department of Agriculture.

Soil Survey, Yates County, New York, U.S.D.A., Soil Conservation Service, 1916.

Stork, W.V., 1898, Students Handbook of Yates County, Express Book and Job Printing House, 1898, p. 34-35.

Tax Map of Penn Yan Village Park, 1962.

U.S.G.S. 1984, Water Resources Data Report New York, Water Year 1984, Volume 3, Western New York.

Wetmore, T., 1986, Personal Communication with Mr. Thomas Wetmore, former employee of Penn Yan Gas Light Company, August 1986.

Yates County Chronicle, 1930, William T. Morris, Obituary, 1930.

APPENDIX A

TASK 2 FIELD SAMPLING PLAN - PENN YAN SITE

TASK 2 SAMPLING PLAN
FOR THE SITE INVESTIGATION
AT THE FORMER PENN YAN COAL
GASIFICATION PLANT

FOR
NEW YORK STATE ELECTRIC & GAS
CORPORATION

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TRC Project No. 3437-N61

December 19, 1986

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1.0 INTRODUCTION

The purpose of the field sampling plan at the site is to determine the following:

- The presence of contamination on-site.
- The approximate horizontal and vertical extent of contamination.
- General impacts of contaminants on ground water quality.
- The routes of contaminant migration.
- The extent to which on-site and/or off-site receptors may be exposed to contamination.
- Potential public health and environmental impacts.

The field sampling plan describes in detail the procedures and methodologies to be used during the various field tasks necessary for the Task 2 investigation at Penn Yan. In particular, samples obtained during the course of the field investigation must be representative of the site and free of contaminants from sources other than the immediate environment being sampled. The equipment and techniques that will be employed to obtain representative, unbiased samples will be in accordance with the procedures discussed herein. The sampling plan also includes the projected schedules, locations of samples, and procedures to be employed in sampling site soils, test pits, ambient air, surface water, sediment and ground water. Where a specific TRC quality assurance procedure is incorporated, the procedure is referenced. The sampling plan is organized according to the chronological order of events starting with field mobilization and ending with sample shipment and documentation. The program schedules and costs are presented in Sections 11.0 and 12.0.

A number of maps are also included to illustrate the various sampling locations; the maps are based on a site map (see Exhibit A). The site map was developed by Weiler Mapping, Inc. of Horseheads, N.Y. and has a scale of 1 inch equals 40 feet.

2.0 FIELD MOBILIZATION

Upon approval of the sampling plan by NYSEG, TRC will mobilize to the Penn Yan site. It is estimated that one day will be required to prepare the site prior to initiation of subsurface activities. Field mobilization will include the following work elements:

- Establish the decon area.
- Mobilize backhoe and drilling equipment.
- Set up meteorological monitoring station.
- Identify sampling locations.

These elements are discussed in detail in the following sections.

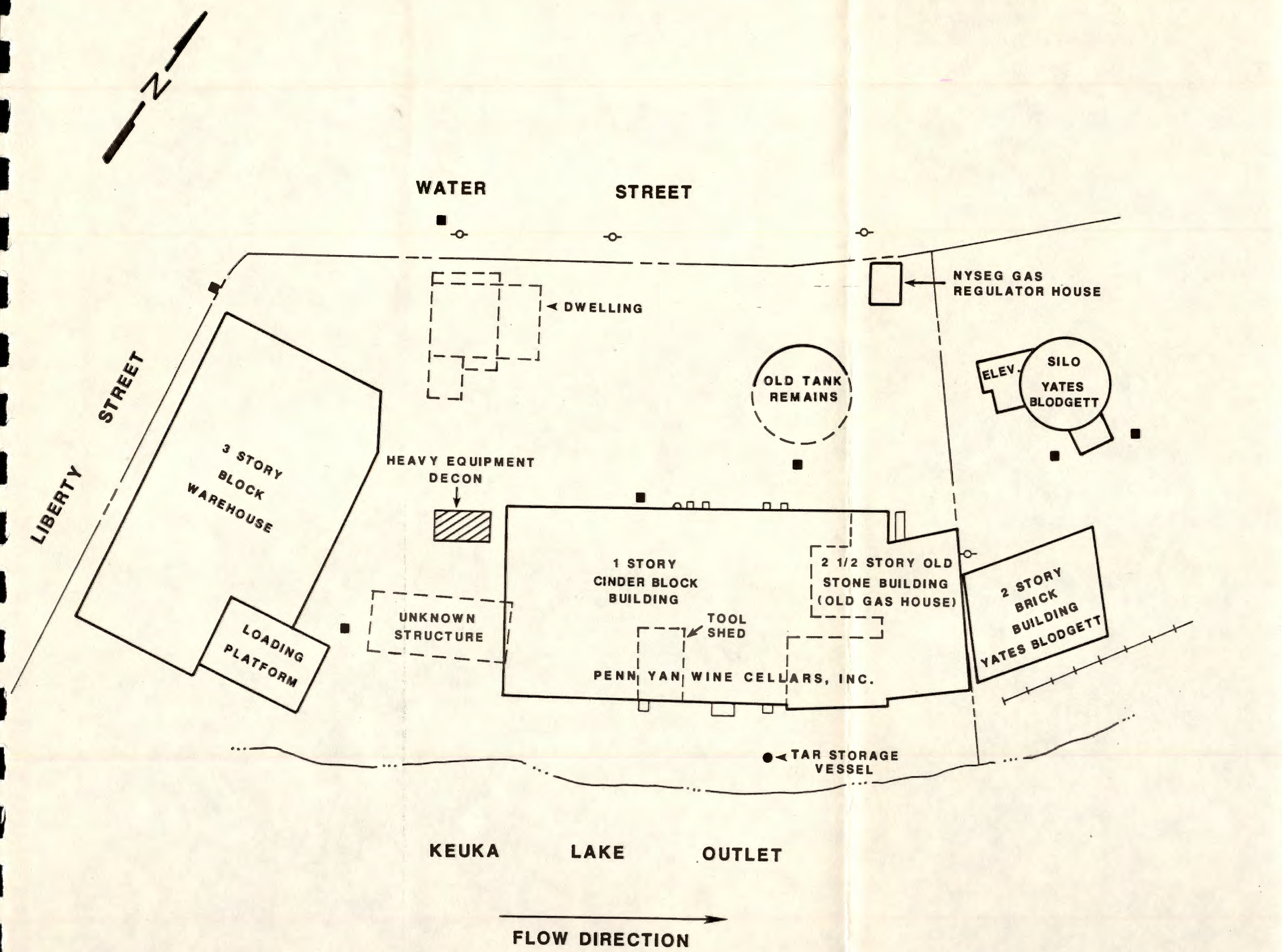
2.1 Establish Decontamination Area

A heavy equipment decontamination (decon) area used primarily for steam cleaning backhoes and drilling rigs will be located on the southeastern portion of the site. Wastes (i.e., wash and wastewater, soil, etc.) generated during steam cleaning will not be collected. The location of the decon area was selected because it is outside the area of concentrated subsurface investigations. The location of the equipment decon area shown in Figure SP-1.

2.2 Backhoe and Drilling Equipment Mobilization

A backhoe and drill rig will be delivered to the site by Empire Soils Investigation, Inc., and parked in the heavy equipment decon area (see Figure SP-1).

Prior to any test pit work, the backhoe will be utilized to create a decontamination area. It will scrape approximately one foot of material from the top of a 10 foot by 20 foot area into which about four to six inches of coarse gravel will be laid. The gravel will allow the decon fluids to drain below the heavy equipment.



LEGEND

- PROPERTY LINE
- SEWER MANHOLE
- CATCH BASIN
- RAILROAD
- APPROXIMATE BOUNDARY OF HISTORICAL STRUCTURES

0 80 FT
SCALE

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FIGURE SP-1
PROPOSED LOCATION OF HEAVY EQUIPMENT DECONTAMINATION STATION

2.3 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 will be on top of the Penn Yan Winery building (see Figure SP-1). The 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 test pit and drilling operations.

2.4 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 areas are covered by asphalt or gravel, orange spray paint will be used as a marker. After the locations for test pits and monitoring wells have been identified, the driller and backhoe operator will be shown the sequence of sampling so that they can prepare for any contingencies.

3.0 SURFACE SOIL SAMPLING

Surface soil samples will be collected from a minimum of two locations 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 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 on the same day prior to any test pit excavations. A hand auger will be used to collect the surface soils and will be thoroughly cleaned with laboratory detergent, tap water, dilute acetone and distilled water between each sample.

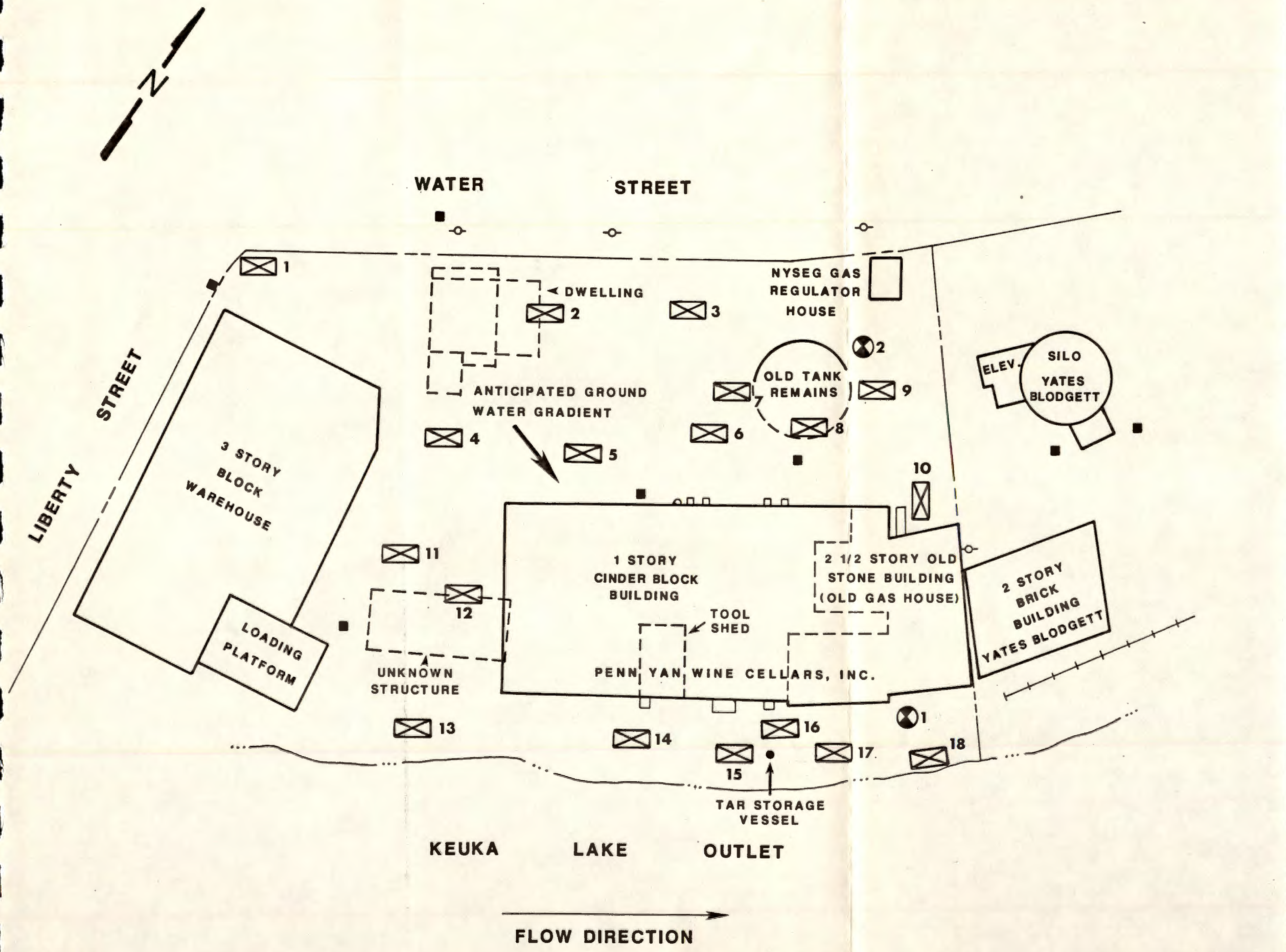
Refering to Figure SP-2, the following is a summary of the location and purpose for each sample:

Sample Number	Description
1	South side of old gas house building where reported floor drains discharged wastewater to the outside.
2	Background soil sample in apparently clean area.

The surface soils will be analyzed for the parameters listed in Table SP-1. The following QA/QC samples will also be collected during the surface soil sampling event:

- One field blank
- One blind duplicate

Based on NYSEG protocol, each sample will be logged and numbered according to the following:



LEGEND

- PROPERTY LINE
- SEWER MANHOLE
- CATCH BASIN
- RAILROAD
- 4 PROPOSED TEST PIT LOCATIONS
- 1 PROPOSED SURFACE SOIL LOCATIONS
- APPROXIMATE BOUNDARY OF HISTORICAL STRUCTURES

0 80 FT
SCALE

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FIGURE SP-2

PROPOSED TEST PIT AND SURFACE SOIL LOCATIONS

TABLE SP-1

SOIL AND SEDIMENT SAMPLE ANALYSIS PARAMETERS

LABORATORY PARAMETERS

Metal and Inorganics

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

Method 602 (Aromatics)

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

Method 604

Phenols (non-chlorinated)

Method 610 (Polynuclear Aromatic Hydrocarbons)

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(ghi)perylene
Chrysene
Fluoranthene
Fluorene
Indeno (1,2,3-cd) Pyrene
Naphthalene
Pyrene

Example: PYEXS8601 11/06/86

where: PY - Penn Yan
E - Soil Sample
X - Rloc, N/A
S - Loc, N/A
86 - Year
01 - Soil sample location number 1

11/06/86 - Date of Collection

4.0 SUBSURFACE INVESTIGATIONS

The objectives of the subsurface investigations (test pits and borings) are to define the presence, nature, and extent of potential contaminants, including possible contaminant migration rates and directions. As part of the subsurface investigation, a ground water monitoring system will be established to define the effects that potential site contamination has had on area ground water.

4.1 Test Pits

In TRC's Work Plan for the Penn Yan Site (June 30, 1986), one of the program options discussed was the use of test pits to locate areas of contamination. Test pits are an efficient method for providing the following information:

- Identifying visible soil contamination.
- Screening of subsurface soils with the OVA/HNu for volatile organic emissions.
- Delineating the near surface geology.
- Defining potential migration of contaminants.
- Locating former tank foundations and associated structures.

At least 18 test pits will be excavated at the site and the number of test pits may be increased to 20 or more. The approximate locations of the test pits are shown in Figure SP-2. The majority of the test pits will be in the vicinity of former plant operations and along the Keuka Lake Outlet where suspected wastes may have been disposed. Particular emphasis will be placed on areas near the tar storage vessel, waste disposal piles and the gas relief holder. The test pits have been located to determine the extent of soil contamination, characterize the waste products, and determine the pathways of contaminant migration.

Refering to Figure SP-2, the following is a summary of the location and purpose of each test pit:

Test Pit Number	Description
1	To determine background soil conditions.
2 and 4	To investigate the high conductance area that was delineated during the geophysical survey.
3	To investigate coke pile storage area.
5	To investigate high conductance area delineated during the geophysical survey.
6, 7	To investigate ash and wood chip disposal area.
8 and 9	Location of gas relief holder.
10	Downgradient of gas relief holder.
11, 12, 13, and 14	To investigate the area around the unknown structure.
15, 16, and 17	To verify location of tar storage vessel and to determine the extent of contamination surrounding the storage vessel.
18	To investigate the area near the floor drains of the gas house.

The test pit activities will begin immediately after the field mobilization tasks are completed.

Test pits will be excavated in a sequence starting from the areas suspected to have the heaviest contamination to areas expected to have little or no contamination. Thus, in the most efficient manner possible, TRC should be able to identify the limits of contamination on-site. Test pits will be excavated by backhoe to a maximum depth of approximately 12 feet. The top 2 feet of soil will be stockpiled on a tarp on the right side of the test pit. The remaining soil will be piled on a tarp on the left side of the test pit. The soils, waste products, and ground water encountered in the pit will be logged and photographed according to TRC Technical Standard T/S-973, Procedures for Logging and Collecting Subsurface Soils in Test Pit Excavations. Site personnel will not be allowed to enter the test pits during sample collection. Samples will be collected with a long-reach sampling tool. Upon collection, the samples will be placed in air-tight jars and taken to the field laboratory for headspace analysis with the OVA or HNu 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 also control the depth of excavation. Excavation will be terminated if any of the following occurs:

- A gross show of contamination that may endanger the health and safety of the field team, NYSEG employees, or nearby public.
- A confining layer (lense) is encountered at an elevation lower 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 TRC field 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, Procedures for Logging and Collecting Subsurface Soils in Test Pit Excavations. After the test pit has been excavated to its maximum depth, the potentially contaminated soil on the left side of the pit will be returned to the pit first in 1 foot layers with compacting of each layer. Subsequently, the clean soil on the right side will be used to fill the pit to grade, and the area will be reclaimed. After backfilling, the test pit locations will be marked with a stake and flagging or spray paint.

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.

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 at the personnel decon area at all times and will be used as required by 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.

4.2 Drilling, Installation and Development of Monitoring Wells

A total of 6 borings will be drilled and completed as monitoring wells at the locations shown on Figure SP-3. The following is a summary of the purpose for each boring/monitoring well:

Well Number	Description
1S and 1D	Upgradient wells based on ground surface topography found during Task 1 reconnaisance. These monitoring wells will supply background data for shallow and deep ground-water conditions.
2S	Located downgradient of the site to define the ground water quality and to determine the ground water gradient.

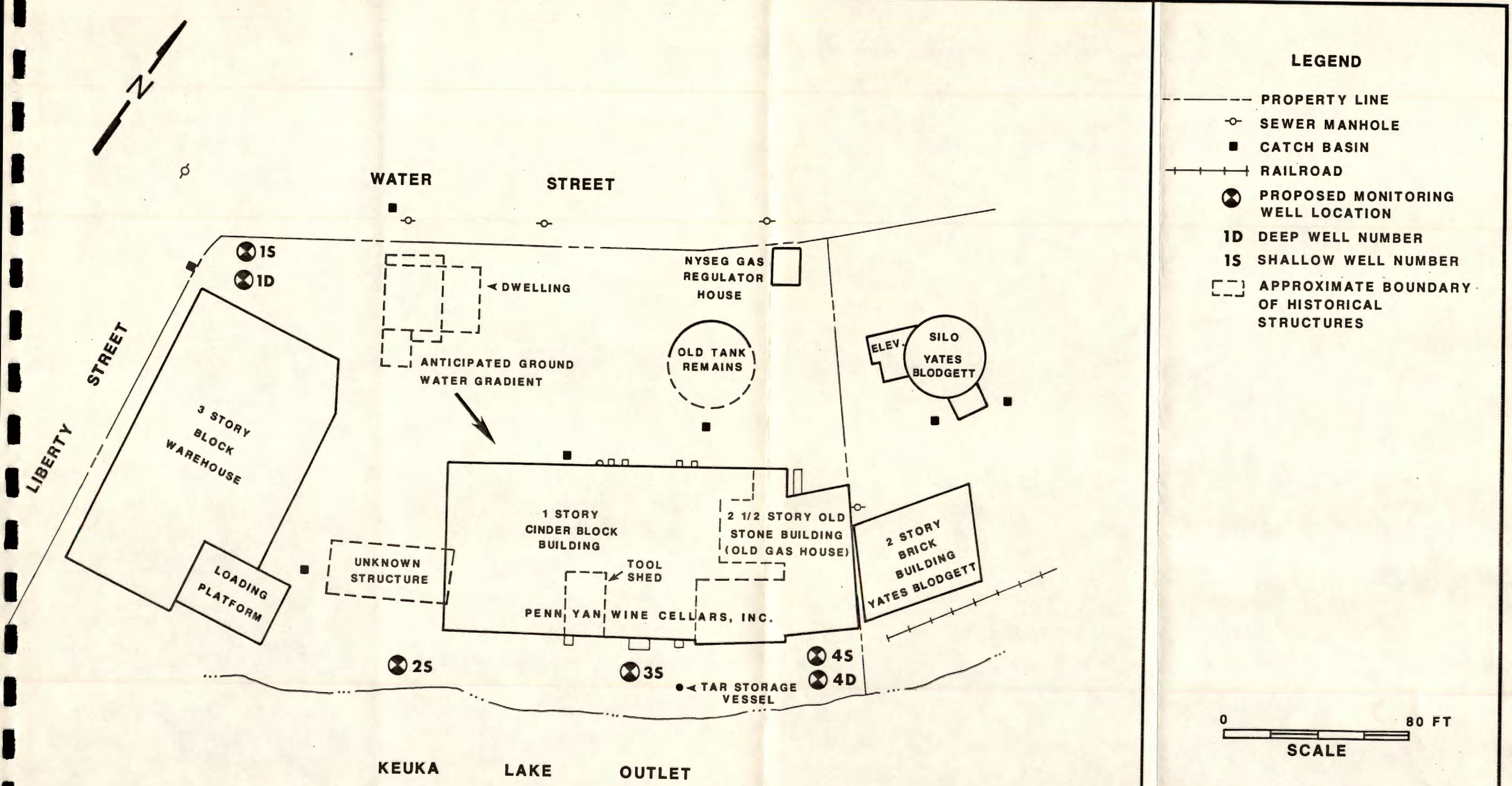

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FIGURE SP-3
PROPOSED MONITORING WELL SAMPLE LOCATIONS

3S	Located downgradient of the coal and coke storage piles and tar storage vessel.
4S and 4D	Located downgradient of the site and of the tar storage vessel and to define the ground water quality leaving the site.

Each monitoring well cluster pair will consist of a shallow and a deep well. The deep monitoring well will be completed to a depth of approximately 60 feet and will be representative of the deep bedrock on-site. The drilling of the boreholes will provide geologic information beneath the site and indicate any potential downward migration of contamination. If contamination is detected at 60 feet, deeper borings may be considered in Task 3. Final depths for all monitoring wells will be decided in the field after installation of the first deep boring. The depth of the other deep borings may be adjusted depending on the stratigraphy encountered. The deep wells will be screened in a permeable zone which is at least 5 feet thick. The shallow monitoring wells (no greater than 30 feet) will be placed above any intermediate confining layer. These wells are designed to detect any "immiscible" compounds and any soluble ground water contamination.

During the Task 1 investigation, a literature search was conducted to determine the depth of ground water at the Penn Yan site. The amount of available literature was limited, however, depths to ground water range from 16 to 24 feet. It is anticipated that approximately 15 feet of screen will be used in each of the shallow wells.

At each of the three shallow monitoring well locations, the borings will be advanced using an 8-inch outside diameter (4-inch inside diameter) hollow stem auger. The two deep wells will be installed using casing and grouting techniques that will prevent possible contaminant migration into the deeper permeable geologic formation. All borings and well installations will be supervised by the TRC 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 Borings and Well Drilling. The site geologist will be assisted by a field technician who will collect, label, and deliver the soil samples to the site chemist for screening. 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 if required (based on organic vapor levels exceeding background by 10 ppm).

Split spoon samples will be collected continuously from the deep borings at each monitoring well cluster. 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 while the other will be retained for possible chemical analysis. All headspace samples will be analyzed when equilibrium conditions have been achieved. 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 a collection container in a secure area.

The monitoring wells will consist of 2-inch stainless steel casing and stainless steel screen (0.020-inch 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 the water table, and any noted zones of contamination. The well screen will be packed in a clean sand/gravel. A three-foot thick bentonite clay seal will be placed above the sand pack. The annular space will then be backfilled to the ground surface with a cement/bentonite slurry. 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. Finally, a concrete apron, pitched to drain, will be placed around the well. Deep wells will be completed in a similar manner. Drill rods and casing will be steam cleaned after each boring is completed. The drill rig will be steam cleaned when the investigation is completed.

All wells will be developed after installation 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 each well is pumped.

After development of each well, a permeability test will be performed using the procedures listed in Table SP-2. The particular procedure used 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.

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

TABLE SP-2

PERMEABILITY TEST METHODS

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

5.0 SUBSURFACE SOIL SAMPLING

Soil samples will be collected from the test pits for laboratory analysis to identify all potential site contaminants. During test pit operations, continuous organic vapor monitoring will be conducted on the test pits as follows:

- On exposed soil surfaces along the walls of the test pits.
- On the soil excavated from the test pit.
- On the air just above the test pit (for health risk purposes).

In addition, duplicate soil samples will be collected from each test pit. As previously mentioned, one sample will be used for headspace analysis and the other sample for possible chemical analysis. Based on the headspace analysis and soil emissions measurements, excavated soils exhibiting the highest concentrations of volatile organic emissions will be analyzed. Where test pits are "clustered" (i.e., near potentially contaminated areas), the depth of selected soil samples will be varied from each test pit. This will provide a vertical concentration profile of the contamination zone. This will also provide information on migration potential and risk assessment data, relative to direct contact with surface soils. Sampling intervals will be determined in the field by the TRC geologist. At test pit locations which are not "clustered," the sample selected for analysis will be the deepest soil sample exhibiting the highest organic emissions. At test pit locations where no significant variation in organic emissions is noted, a composite sample will be collected and analyzed. The soil 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 excavation. All samples will be collected in the appropriate sample containers and preserved in accordance with TRC Technical Standard T/S-959, Soil and Water Sampling Preservation Procedures. A total number of 18 samples will be selected for chemical analysis. Soil samples will be analyzed for the parameters presented in Table SP-1. In addition, at two different test pit locations, two visibly contaminated soil samples will be analyzed for priority pollutants, excluding the PCB/pesticide fraction. The samples will be kept cool with ice and shipped to the analytical laboratory within 24 hours of collection as specified in TRC Technical Standard T/S-980, Shipping Procedures for Water and Soil Samples. To minimize the potential for cross contamination between samples, all sampling equipment will be thoroughly decontaminated between each use. The general decontamination procedures which will be observed are as follows:

- Scrub with non-phosphate detergent.
- 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.
- Allow to air dry.

Stainless steel bowls used to composite soil samples (if necessary) will also be decontaminated between samples. The acetone used during the decontamination process will be collected in plastic containers and allowed to evaporate in a secure area.

The following QA/QC samples will be taken during the test pit operations at the frequency specified:

- Per each day of sampling
  - one field blank consisting of organic-free water poured over the decontaminated sampling instrument.

- one blind duplicate per every 10 samples (at a minimum, one blind duplicate per sampling round)

Based on NYSEG protocol, each sample will be logged and numbered according to the following:

Example: PYEITP8606 10/15/86

Where:

PY = Penn Yan Site
E = Soil Sample
I = In source
TP = Test Pit
86 = Year
06 = Test pit #6
10/15/86 = Date of Collection

The sample number may be further defined with the following:

- Location (LOC, gas relief holder vs. oil storage area)

6.0 GROUND WATER SAMPLING

A one-year, quarterly sampling program for the monitoring wells will be initiated approximately four weeks after the last monitoring well has been installed. All ground water sampling will be collected in accordance with TRC Technical Standard T/S-975, Field Procedures for Collection of Ground Water Samples. Prior to sampling, the water levels in each well will be measured to within 0.01 feet and recorded. Four well volumes from each well will be evacuated by using either a hand operated bailer or a peristaltic pump. Bailers or suction lines from the pump will be dedicated to each well to prevent cross-contamination. Determination of temperature, pH and specific conductance will be performed in the field during well evacuation and immediately after sample collection. The pH will be measured to the nearest tenth of a standard unit following TRC Technical Standard T/S-961, Calibration of and Operating Procedures for Determining pH. Specific conductance will be measured with a "YSI" conductivity meter. All samples will be collected in the appropriate sample containers and preserved in accordance with TRC Technical Standard T/S-959, Soil and Water Sampling Preservation Procedures. Water samples that require dissolved metals analysis will be field filtered, prior to preservation, through a 0.45 micron filter, in accordance with TRC Technical Standard T/S-976, Filtering of Water Samples for Dissolved Metals Analysis. All water samples will be analyzed for the parameters listed in Table SP-3. In addition to the parameters listed above, one sample from the shallow upgradient well and one sample from the shallow downgradient well will be analyzed for the U.S. EPA priority pollutants, excluding the PCB/pesticide fraction. During subsequent sampling events, the two wells being analyzed for priority pollutants will not necessarily be the same. Also, the parameters listed in Table SP-3 may change on the basis of laboratory results of the

TABLE SP-3

GROUND WATER AND SURFACE WATER SAMPLE ANALYSIS PARAMETERS

FIELD PARAMETERS:
- pH
- Specific Conductance
- Temperature

LABORATORY PARAMETERS:

Metals and Inorganics

- Ferro-Ferric Cyanide
- Total Cyanide
- Iron*
- Zinc*
- Sulfate
- Ammonia (organic nitrogen)
- TOC

Method 602 (Aromatics)
- Benzene
- Toluene
- Ethyl Benzene
- Chlorobenzene
- 1,2-Dichlorobenzene
- 1,3-Dichlorobenzene
- 1,4-Dichlorobenzene

Method 604
- Phenols (non-chlorinated)

Method 610 (Polyaromatic Hydrocarbons)
- Acenaphthene
- Acenaphthylene
- Anthracene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Benzo(ghi)perylene
- Chrysene
- Fluoranthene
- Fluorene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Pyrene

NOTE:

* Dissolved metal concentrations will be measured on all ground water samples. Total metal concentrations will be measured on all surface water samples.

first sampling period, and discussions with NYSEG. Samples will be kept cool with ice and shipped to the analytical laboratory within 24 hours of collection in accordance with TRC Technical Standard T/S-980, Shipping Procedures for Water and Soil Samples.

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

- Per each day of sampling:
  - one field blank
  - one blind duplicate per every 10 samples (one blind duplicate per sampling round as a minimum)

Based on NYSEG protocol, each ground water sample will be labeled and numbered according to the following:

Example: PYGUMW8601 11/15/86

Where:

PY - Penn Yan Site
G - Ground water sample
U - Upgradient
MW - Monitoring well
86 - Year
01 - Monitoring well #1
11/15/86 - Date of collection

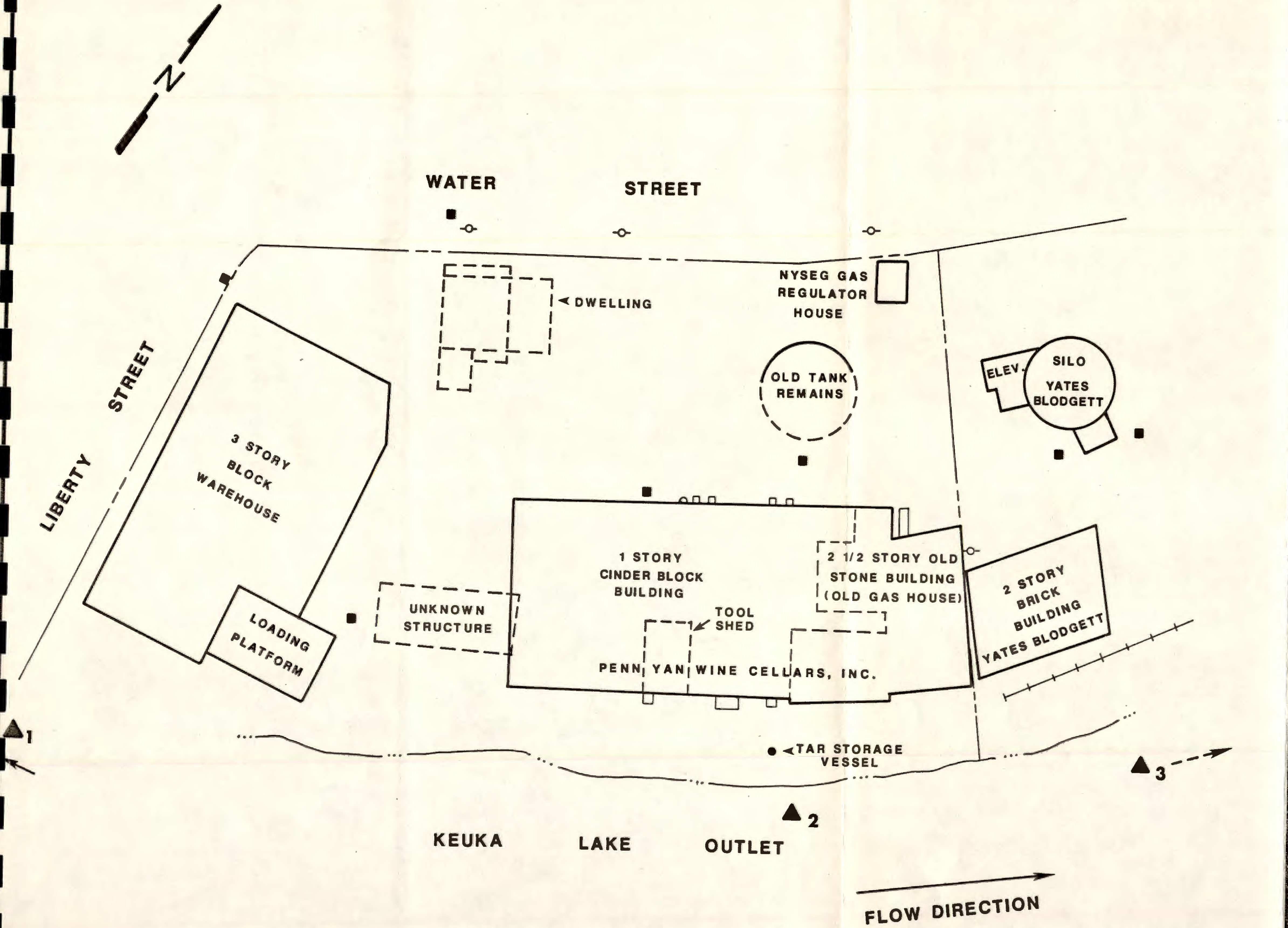
The sample number may be further defined as follows:

- Reason no sample (RNS, equipment failure vs. not enough water, etc.).

7.0 SURFACE WATER/SEDIMENT SAMPLING

Surface water sampling will be performed on a quarterly basis. The local ground water gradient appears to flow generally in a southeasterly direction, according to information generated during the Task 1 investigation. Since the Penn Yan Gas Plant is located in close proximity to Keuka Lake Outlet, potential contamination may have entered the Outlet sediments and surface water through surface runoff and ground water flow.

Locations for surface water and sediment sampling will be determined in the field during Task 2 activities by inspecting the watercourse. The watercourse will be completely inspected by TRC field personnel (wearing waders) for any visible contamination. During the inspection bottom sediments will be disturbed to check for coal tar globules. The inspection will provide the basis for selecting the sample locations. It is anticipated that three sample locations will be selected, one upstream of the site, a second downstream of the site, and a third located at the area of the highest contamination observed during the inspection. If no contamination is observed during the watercourse inspection, a sample will be collected adjacent to the site, as shown in Figure SP-4. During the first sampling period, stream sediment samples will also be collected at each surface water sample location. All surface water and sediment sampling will be collected in accordance with TRC Technical Standard T/S-972, <u>Field Procedures for Collection of Surface Water and Sediment Samples</u>. Sampling will begin with the furthest downstream location and will continue progressively upstream. All sampling will be performed in relatively slow-moving areas of the stream where contaminated water may collect. All surface water and sediment samples will be collected in the appropriate sample containers and preserved in accordance with TRC Technical Standard T/S-959, <u>Soil and Water Sampling</u>



NOTE: Surface water and sediment sample location 1 will be collected west of Liberty Street. Surface water and sediment sample location 3 will be collected approximately 150 to 200 feet east of PENN YAN site eastern boundary.

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FIGURE SP-4
PROPOSED SURFACE WATER/ SEDIMENT SAMPLE LOCATIONS

Preservation Procedures. Samples for metal analysis will be preserved immediately so that only total metals will be analyzed for surface waters. The samples will be cooled with ice and shipped to the analytical laboratory within 24 hours of collection following TRC Technical Standard T/S-980, Shipping Procedures for Water and Soil Samples. Immediately after sample collection, measurement of pH, temperature and specific conductivity will be performed at each sampling location. The pH will be measured to the nearest tenth of a standard unit following TRC Technical Standard T/S-961, Calibration of and Operating Procedures for Determining pH. The sediment and surface water samples will be analyzed for parameters tabulated in Tables SP-1 and SP-3.

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.)

Based on NYSEG protocol, each stream sediment and surface water sample will be labeled and numbered according to the following:

Example: PYSUSS8602 11/15/86

Where:

PY	- Penn Yan Site
S,T	- Surface water, Sediment
U	- Upgradient
SS	- Stream sediment, Surface water
86	- Year
02	- Fourth sample collected
11/15/86	- Date of collection

The sample number may be further defined with the following:

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

TRC will also measure the stream flow with a Teledyne Gurley Pygmy flow meter and will determine MA7CD10 and MA7CD30.

8.0 SEWER SAMPLING

After evaluation of the ground water gradient and the analytical results of the first ground water sampling event, TRC will evaluate the possibility of collecting sewer samples during the second round of sampling.

9.0 AIR QUALITY SAMPLING

The are three types of ambient air monitoring systems that will be utilized at the Penn Yan site. The first type involves the use of portable instrumentation that gives "real-time" results. The portable air samples are used primarily for screening the samples as part of the worker protection program. TRC will use either of two portable air samplers, the HNu or the OVA, for this purpose.

The HNu employs 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. Operation of the HNu will be in accordance with TRC Technical Standard T/S-993, Operation and Calibration of the HNu PI-101 Photoionizer Analyzer.

The Century OVA is a flame ionization detection (FID) used to measure the concentration of organic compounds. The principle of the detector is based upon the formation of highly conducting fragments (ionized species) when organic compounds are introduced to hydrogen/air flame. Application of a potential gradient across the flame results in a small current that is proportional to the concentration of the ionized species. The detection limit may be as low as 0.1 ppm, with an operating range extending to 1,000 ppm. Like the HNu, the OVA will not distinguish between different compounds. Operation of the OVA will be in accordance with TRC Technical Standard T/S-990, Operation and Calibration of the Century Organic Vapor Analyzer Model OVA-128.

The second type of ambient air monitoring system that will be utilized involves the use of stationary sampling equipment to obtain longer duration, or time-averaged results. The stationary sampling equipment will be used primarily to characterize and quantify the on-site air quality.

The methods for the air quality investigations will be the equivalent to those described in the following 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)

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. It has been TRC's experience that the level of particulates at most sites is not significant and, therefore, samples will be collected with low flow portable pumps. If the level of particulates is significant, a high volume pump will be used to collect the particulates. The collected particulates will be analyzed in addition to the tubes and filters. The stationary ambient air monitoring samples will be collected to determine background (upwind), downwind and source contaminant concentrations.

A total of 24 samples will be collected on both Tenax tubes (12 samples) and glass fiber filters backed with silver membrane (12 samples). Tenax tubes will be used to collect both polynuclear aromatic hydrocarbons (PAHs) and purgeable aromatic compounds. However, the detection limits of the PAHs will be several orders of magnitude greater. The glass fiber filters backed with silver membranes will also collect PAHs, and the detection limits will be equal to those of the purgeable aromatic compounds collected by the Tenax tubes. During each day of test pit excavation operations, 3 pairs of Tenax tubes and glass fiber filters will be collected. One pair will be deployed along the upwind property line, one pair will be collected immediately downwind of the test pit being excavated and one pair will be collected along the downwind edge of the site. In addition, 2 pairs will be used as blind duplicates and 1 pair as a field blank.

At the analytical laboratory, the samples will be thermally desorbed and qualitatively screened by 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. The analysis will include a semi-quantitative determination of the concentrations of up to 10 compounds. The quantitative determination will consist of the concentration of each compound relative to other compounds present in the sample.

To determine the effect of the test pit excavations on the air quality of the site, additional samples will be collected concurrently with the tube and filter samples during one day and analyzed for indicator parameters. Approximately 10 samples will be collected on 3M® dosimeters for analysis with a GC to assess air quality across the site. 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 a gas chromatograph equipped with a flame ionization detector (FID). The dosimeters consist of a charcoal based badge-like device which absorbs the organic compounds.

10.0 RECORD KEEPING AND DOCUMENTATION

Due to the number of soil and water samples that will be collected at the site, the number of field staff that will be involved in sampling, and the inclusion of TRC QA/QC procedures for document control, a specific record keeping and site documentation procedure 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 field office 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 field office 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 round of field sampling, the site field logs, master sample log and site laboratory notebook will be copied and filed in the project file at TRC in East Hartford, CT.

11.0 SCHEDULE

This section presents the projected field operations and sample schedules for Task 2 field activities.

11.1 Operations Schedule

Site operations are planned to commence within two weeks after TRC receives authorization from NYSEG. The project schedule is as follows:

Week	Task
0	Written authorization to proceed
2	Site Setup
3,4	Drilling, test pit and monitoring well installation. Air quality sampling.
5	Surveyors locate new excavations and wells.
9	First quarterly sampling of monitoring wells, surface water, and stream sediments.
10-13	Analyze priority pollutant and indicator parameters on shallow monitoring wells.
22,35,48	Quarterly ground water, and surface water 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 for 1986 and 1987. The total number of QA/QC samples are listed in addition to the total number of samples required during Task 2 activities. The total number of field blanks may vary slightly in accordance with the actual number of days required for sampling.

TABLE SP-4

SAMPLE SCHEDULE

Week from Authorization	Location or Media	No.	QA Field Blanks	QA Duplicate	Total
3	Test Pits Soil	18	4	2	24
3	Surface Soils	2	1	1	4
3,4	Dosimeters	12	2	-	14
3,4	Tenax	12	2	-	14
3,4	Glass fiber cartridge	12	2	-	14
9	Monitoring Wells	6	2	1	9
9	Surface Water	3	1	1	5
9	Stream Sediment	3	1	1	5
22*	Quarterly G.W. and Surface Water	9	4	2	14
35*	Quarterly G.W. and Surface Water	9	4	2	14
48*	Quarterly G.W. and Surface Water	9	4	2	14
Total of Task 2 Samples					131

NOTE

* After the evaluation of the ground water gradient and chemical analyses, sewer samples may be added into the sampling schedule.

12.0 COSTING

The costs for the Task 2 work effort are presented in Table SP-5. The cost for drilling and well installation was based on a per foot rate.

APPENDIX B

EM-31 FIELD CONDUCTIVITY VALUES

PENN YAN SITE

Location	East/West Conductivity (mmhos/meter)	North/South Conductivity (mmhos/meter)	Remarks
<u>Line A</u>:			
A-0	98	140	East/West and North/South Overhead Power Lines
A-1	--	--	Regulator House
A-2	22	37	Overhead Power Lines East/West Orientation
A-3	180	36	Overhead Power Lines East/West Orientation
A-4	200	34	Overhead Power Lines East/West Orientation
A-5	170	56	Overhead Power Lines East/West Orientation
A-6	110	72	Overhead Power Lines East/West Orientation
A-7	230	34	Overhead Power Lines East/West Orientation
A-8	280	18	Overhead Power Lines East/West Orientation
A-9	280	0	Overhead Power Lines East/West Orientation
A-10	300	0	Overhead Power Lines East/West Orientation
A-11	340	0	Overhead Power Lines East/West Orientation
A-12	320	0	Overhead Power Lines East/West Orientation
<u>Line B</u>:			
B-0	0	360	North/South Overhead Power Lines
B-1	--	--	Regulator House
B-2	52	70	Regulator House
B-3	57	52	

Location	East/West Conductivity (mmhos/meter)	North/South Conductivity (mmhos/meter)	Remarks
B-4	64	54	
B-5	78	68	
B-6	42	75	
B-7	80	92	Parked Car
B-8	38	105	Parked Car
B-9	62	55	Parked Car
B-10	64	72	
B-11	64	68	
B-12	84	88	Overhead Power Lines
B-13	95	130	Overhead Power Lines
Line C:			
C-0	0	440	Overhead Power Lines North/South Orientation
C-1	36	170	Overhead Power Lines North/South Orientation
C-2	42	40	
C-3	32	27	
C-4	--	--	End of Hill
C-5	32	44	
C-6	38	52	
C-7	50	65	
C-8	72	70	Parked Car
C-9	90	--	Parked Car
C-10	130	--	Parked Car
C-11	74	150	Parked Car
C-12	32	32	Parked Car

Location	East/West Conductivity (mmhos/meter)	North/South Conductivity (mmhos/meter)	Remarks
<u>Line D</u>:			
D-0	0	240	Overhead Powerlines North/South Orientation
D-1	56	280	Overhead Powerlines North/South Orientation
D-2	38	78	Overhead Powerlines North/South Orientation
D-3	60	96	Trash Dumpster
D-4	42	40	
D-5	3	110	
D-6	110	110	
D-7	45	100	Overhead Power Lines North/South Orientation
D-8	36	40	
D-9	28	30	
D-10	27	30	
D-11	--	--	
D-12	--	--	
D-13	36	36	Overhead Power Lines
<u>Line E</u>:			
E-0	14	150	Overhead Power Lines North/South Orientation
E-1	180	300	Overhead Power Lines North/South Orientation
E-2	8	170	Overhead Power Lines North/South Orientation
E-3	68	--	Trash Dumpster

Location	East/West Conductivity (mmhos/meter)	North/South Conductivity (mmhos/meter)	Remarks
E-4	42	42	
E-5	0	37	Overhead Power Lines
E-6	90	80	Overhead Power Lines
E-7	0	170	
E-8	50	50	
E-9	36	38	
E-10	32	34	
E-11	30	32	
E-12	32	34	
E-13	34	34	
E-14	42	38	
<u>Line F</u>			
F-0	28	140	North/South Oriented Overhead Power Lines
F-1	130	190	North/South Oriented Overhead Power Lines
F-2	40	140	North/South Oriented Overhead Power Lines
F-3	58	68	Storm Runnoff drain
F-4	34	54	Storm Runoff drain
F-5	30	32	
F-6	75	74	
F-7	0	110	North/South Oriented Overhead Power Lines
F-8	72	69	
F-9	48	52	
F-10	40	42	

Location	East/West Conductivity (mmhos/meter)	North/South Conductivity (mmhos/meter)	Remarks
F-11	36	36	
F-12	32	32	
F-13	35	34	
F-14	24	32	
Line G:			
G-0	5	64	North/South Oriented Overhead Power Lines
G-1	300	300	North/South Oriented Overhead Power Lines; Metal Railings
G-12	--	--	Parked Truck
G-13	100	50	Parked Truck
G-14	29	34	
Line H:			
H-12	--	--	Parked Truck
H-13	48	32	
H-14	36	33	
H-15	--	80	Building
Line I:			
I-12	64	52	Parked Truck
I-13	40	40	
I-14	36	36	
I-15	52	90	Parked Truck
Line J:			
J-12	54	52	
J-13	44	46	
J-14	44	42	

Location	East/West Conductivity (mmhos/meter)	North/South Conductivity (mmhos/meter)	Remarks
Line K:			
K-12	49	38	
K-13	62	36	
K-14	28	36	
K-15	0	0	Parked Truck, Wine Barrels and Storm Drain
Line L:			
L-12	34	30	Overhead Power Lines
L-13	36	42	Overhead Power Lines
L-14	44	44	Overhead Power Lines
L-15	--	--	Overhead Power Lines and Wine Barrels
Line M:			
M-0	36	28	
M-1	48	36	
M-2	30	30	
M-3	68	55	Abandoned Railroad Rails
M-4	110	72	Abandoned Railroad Rails
M-5	90	56	Abandoned Railroad Rails
M-6	68	52	Abandoned Railroad Rails
M-7	86	24	Abandoned Railroad Rails
M-8	330	30	Tar Pit
M-9	0	48	Tar Pit, Sewage Holding Tank
M-10	52	72	Sewage Holding Tank
M-11	62	46	Sewage Holding Tank
M-12	48	37	

Location	East/West Conductivity (mmhos/meter)	North/South Conductivity (mmhos/meter)	Remarks
M-13	44	32	Abandoned Railroad Rails
M-14	48	28	Abandoned Railroad Rails
M-15	50	30	Abandoned Railroad Rails
M-16	42	30	Abandoned Railroad Rails
M-17	40	28	
M-18	34	28	
M-19	28	26	Abandoned Railroad Rails and Pipes
M-20	32	18	Abandoned Railroad Rals and Pipes
M-21	18	15	Abandoned Railroad Rals and Pipes
M-22	23	18	Abandoned Railroad Rals and Pipes
M-23	0	66	Abandoned Railroad Rals and Pipes

APPENDIX C

OVA SITE AIR QUALITY VALUES

PENN YAN SITE

Location	OVA Measurements (ppm as benzene)	Remarks
Line A:		
A-0	0.86	
A-1	0.86	
A-2	0.96	
A-3	0.86	
A-4	0.76	
A-5	0.76	
A-6	0.86	
A-7	0.76	
A-8	0.86	
A-9	0.76	
A-10	0.86	
A-11	0.96	
A-12	0.86	
Line B:		
B-0	0.86	
B-1	--	Gas Regulator House
B-2	0.96	
B-3	0.76	
B-4	0.76	
B-5	0.76	
B-6	0.76	
B-7	0.76	
B-8	0.76	
B-9	0.76	
B-10	0.76	
B-11	0.86	
B-12	0.76	
B-13	1.05	
Line C:		
C-0	0.76	
C-1	0.67	
C-2	0.76	
C-3	0.76	
C-4	0.76	
C-5	0.67	
C-6	0.67	
C-7	0.76	
C-8	0.57	
C-9	0.76	
C-10	0.76	
C-11	0.76	
C-12	0.57	

Location	OVA Measurements (ppm as benzene)	Remarks
Line D:		
D-0	0.86	
D-1	0.76	
D-2	0.96	
D-3	0.96	
D-4	0.96	
D-5	0.76	
D-6	0.76	
D-7	0.86	
D-8	0.67	
D-9	0.76	
D-10	0.96	
D-11	0.86	
D-12	0.76	
D-13	0.76	
Line E:		
E-0	0.96	
E-1	0.96	
E-2	0.86	
E-3	0.96	
E-4	0.86	
E-5	0.76	
E-6	0.86	
E-7	0.76	
E-8	0.76	
E-9	0.57	
E-10	0.57	
E-11	0.57	
E-12	0.57	
E-13	0.67	
E-14	0.57	
Line F:		
F-0	0.96	
F-1	0.86	
F-2	0.76	
F-3	0.96	
F-4	0.86	
F-5	0.86	
F-6	0.86	
F-7	0.86	
F-8	0.86	
F-9	0.76	
F-10	0.76	
F-11	0.86	
F-12	0.96	
F-13	0.76	
F-14	0.76	

Location	OVA Measurements (ppm as benzene)	Remarks
Line G:		
G-0	0.86	
G-1	0.76	
G-12	0.76	
G-13	0.76	
G-14	0.86	
Line H:		
H-12	0.57	
H-13	1.34	Smell of Wine from Winery
H-14	0.86	
H-15	0.96	
Line I:		
I-12	0.76	
I-13	0.76	
I-14	0.76	
I-15	0.76	
Line J:		
J-12	0.76	
J-13	0.96	
J-14	0.96	
J-15	0.76	
Line K:		
K-12	0.76	
K-13	0.86	
K-14	0.76	
K-15	0.86	
Line L:		
L-12	0.76	
L-13	0.76	
L-14	0.76	
L-15	0.67	
Line M:		
M-0	0.57	
M-1	0.76	
M-2	0.76	
M-3	0.76	
M-4	0.76	
M-5	0.76	

Location	OVA Measurements (ppm as benzene)	Remarks
M-6	0.76 to 0.96	
M-7	0.96	
M-8	0.96	
M-9	0.76	
M-10	0.76	
M-11	0.96	
M-12	0.96 to 2.29	High Value Due to Odor from Winery
M-13	0.76	
M-14	0.76	
M-15	0.76	
M-16	0.76	
M-17	0.76	
M-18	0.76	
M-19	0.76	
M-20	0.76	
M-21	0.76	
M-22	0.67	
M-23	0.57	
Inside Tar Well	0.76 to 1.72	Approximately 1 foot Down into well