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INVESTIGATION OF FORMER COAL GASIFICATION SITES
CORTLAND/HOMER
HOMER, NEW YORK

TASK 1 REPORT
PRELIMINARY SITE EVALUATION

Prepared for

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CORTLAND/HOMER
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1.0 INTRODUCTION

1.1 Purpose

The Cortland/Homer former coal gasification site is currently being investigated by the E.C. Jordan Co. under contract to the New York State Electric and Gas Corporation (NYSEG). The investigation is divided into five tasks which will be conducted using a phased approach: (1) preliminary site evaluation; (2) initial boring program/well installation/sample analysis; (3) expanded problem definition program; (4) risk assessment; and (5) conceptual design. The purpose of Task 1 is to develop an understanding of the site's history, environmental setting, and current condition based on available information and direct observation. The information gathered in Task 1 is then used to better define the nature and scope of Task 2 activities. This report summarizes the findings of Task 1 of the investigation.

1.2 Scope

The scope of work completed for Task 1 included:

1. A historical review of the site to develop an understanding of the former gasification plant layout, operations, and surrounding land uses.

2. A preliminary assessment of air quality including expected airborne contaminant concentrations (if any) prior to and during the site investigation.

3. A detailed site reconnaissance to become familiar with the area and identify locations for explorations, access requirements, and potential conflicts with above and below ground utilities.

4. Preparation of a report presenting the findings of Task 1 including a plan showing significant natural and man-made features at the site. Recommendations to address any suspected problems and to proceed with the Task 2 investigation are provided.

The geophysical investigation originally proposed for Task 1 will be completed in Task 2. If any subsurface coal tar deposits are identified, their location and areal extent will be described in the Task 2 report.

Task 1 activities included a detailed site reconnaissance, interviews, and file searches. The site was visited by E.C. Jordan personnel on July 11, August 6, and August 7, 1985. The current conditions of the site were documented with field notes and photographs. Interviews were scheduled by NYSEG on August 6 and 7, 1985 with the following persons:

- Larry Mastin, former employee of NYSEG at the Cortland/Homer gas plant.
- Paul Boyce and Dick Matson, current employees of NYSEG in Cortland.
- Jack Sweet, manager of I.D. Booth, Inc.
- Jim Emm, foreman at New York Telephone Co.
- Brian Grinter, employee of E.F. Hayward Construction (Mr. Grinter was not available; in his absence we spoke with Joanne Mazonne, administrative assistant).
- John Galeotti, Village of Homer Water and Sewer Department. (Mr. Galeotti was unavailable; in his absence we spoke with the foreman, Gary Palladino.)

The following people were also contacted for information about the site and surrounding area:

- Jon D. Haight, Cortland surveyor.
- John MacNeill, engineer for the Village of Homer.
- Ray Randolph, employee of Randolph Well and Pump Co., Inc.
- Pat Ferraro, employee of the New York State Department of Transportation, Syracuse, NY.
- Dale Volmer, Director of Air Quality Section, New York State Department of Conservation Region 7.
- Jim Buh, Geologist, State University of New York at Cortland, NY.
- John Richardson, National Weather Service Office, Broome County Airport, Binghamton, NY.
- Receptionist, Cortland County Airport.

Records and documents on file at the following offices were also reviewed:

- NYSEG, corporate headquarters in Binghamton and the Cortland regional office (James Marean and Richard Cute)
- Cortland County Planning Department (Ron Slotkin)
- Real Property Tax Service Department for Cortland County (William Cinquanti)
- Division of Environmental Health of the Cortland County Health Department (Eric Johnson)
- New York State Department of Transportation in Cortland (Marty Hodgson)

- o Cortland County Historical Society (Anita Wright)
- o U.S. Department of Agriculture, Soil Conservation Service, Cortland County Office
- o Agricultural Stabilization and Conservation Service, Cortland County Office

2.0 SITE DESCRIPTION

2.1 Location

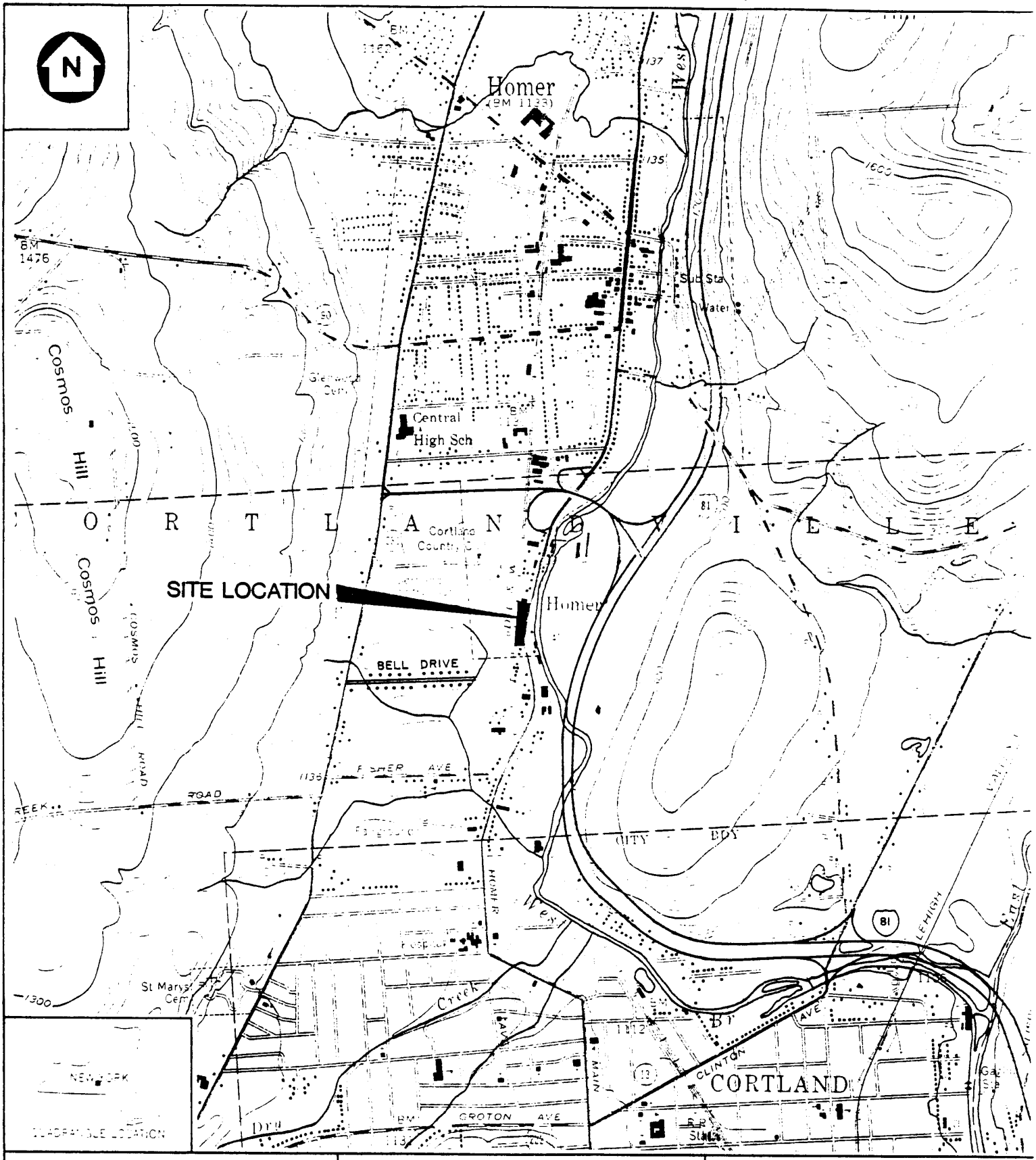
The Cortland/Homer site is located in Cortland County in the Village of Homer, NY, just north of the City of Cortland (Figure 1). The coal gasification plant occupied approximately 2.2 acres bounded by the Delaware Lackawanna & Western Railroad on the west and South Main Street (Route 11) on the east. The gas work structures have been replaced by a single building presently owned by I.D. Booth, Inc. and occupied by I.D. Booth and the New York Telephone Co.

2.2 History of Gas Production

Old newspaper articles on file at the Cortland County Historical Society Library describe the history of gas production at the site (Reference 1). The Homer and Cortland Gas Light Company constructed a coal gasification plant at the site in 1857. The company began distributing coal gas to the Village of Homer in 1858 and to Cortland in 1860. The plant was partially burned and rebuilt in 1890. In 1908, the gas plant was taken over by Barstow and Co. of New York and in 1911 it was sold to the New York State Gas and Electric Corporation, then part of the Associated Gas and Electric System. There was a merger in 1918 with the Ithaca Gas and Electric Company and the name was subsequently changed to the New York State Electric and Gas Company (NYSEG). Coal gas production continued at the site until 1921 when carburetted water gas production began. The availability of natural gas contributed to the closure of the water gas operation in December 1932. The gas holders continued to be used until early 1935 for storage of natural gas.

The layout of the gas plant as it was in 1920 is depicted in Figure 2 (Ref. 2). There was little information in the files reviewed about the coal gas production process or day-to-day operations at the Cortland/Homer site. Most of the information which follows was supplied by Mr. Larry Mastin, who worked at the gas plant from 1927-1935 (Ref. 3).

During the 74 years of gas production, coal was shipped in from Scranton, Pennsylvania by rail car. There was a rail siding for unloading on the west side of the plant. The coal and coke storage buildings were constructed in 1887 (Ref. 1). It is possible that coal and coke were stored outside for the first 30 years of operation. Anthracite coal was used in the generators and bituminous coal in the boilers. Gas was produced by carbonizing coal in retorts in the generator building. The gas was condensed and piped to the small gas holder, then to the purifying house, and back to the large gas



BASE MAP SOURCE: CORTLAND (1955)
HOMER (1978)

E.C. JORDAN CO.
CONSULTING ENGINEERS

TITLE

CORTLAND/HOMER SITE LOCATION MAP

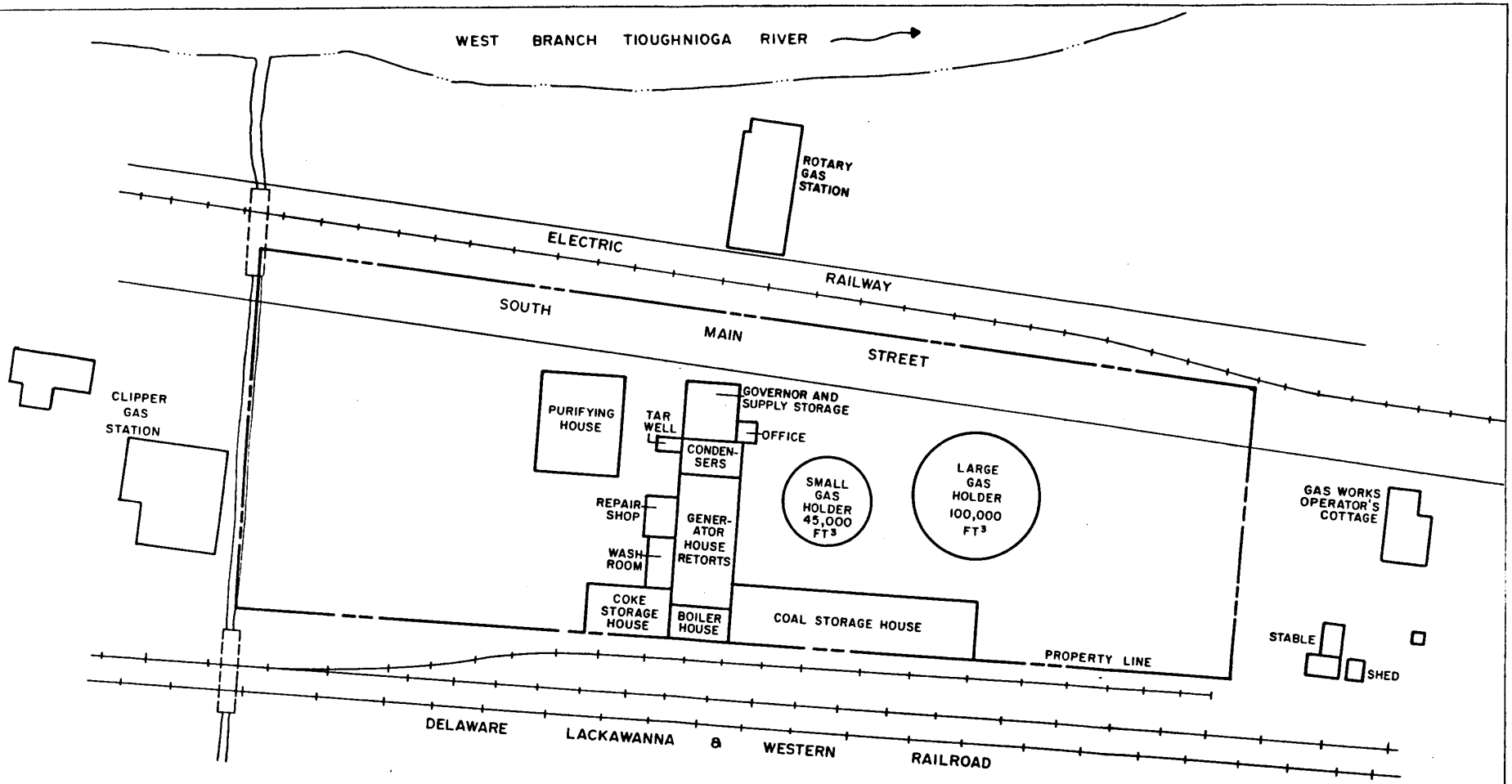
0 2000 4000 FEET

CLIENT

NEW YORK STATE
ELECTRIC AND GAS CORP.
BINGHAMTON, NEW YORK

INVESTIGATION OF FORMER
COAL GASIFICATION SITES

PROJECT NO. 4813-01 FIGURE 1



BASE MAP PREPARED FROM A TAX MAP FOR THE VILLAGE OF HOMER, NY, DATED JULY 31, 1920 (ON FILE AT NYSEG, BINGHAMTON, NY)

0 50 100 FEET

E.C. JORDAN CO.
CONSULTING ENGINEERS

PLAN OF CORTLAND/HOMER COAL GASIFICATION PLANT CIRCA 1920
AUGUST 1985

NEW YORK STATE ELECTRIC AND GAS CORP.
BINGHAMTON, NEW YORK

INVESTIGATION OF FORMER COAL GASIFICATION SITES

JOB NO. 4813-01 FIGURE 2

holder for storage. In 1907, the plant sold 20,179,500 cubic feet of gas to 1,385 customers (Ref. 2).

Records from 1907 also show that 1,702 net tons of residual coke and 33,082 gallons of coal tar were produced (Ref. 2). The coke produced as a by-product was stored outside and later sold as fuel for home heating and cooking stoves. Small amounts of residual coal and ash from the generator were spread on the ground to fill in low areas (Ref. 3). Tars produced were held in one or more tar wells on the site which were lined with mortared stone (Ref. 3). A plan of the site dated July 1920 (see Figure 2) shows a tar well next to the condensers near the purifying house (Ref. 2). Mr. Mastin remembered a different tar well located between the small gas holder and the coal house and said there may have been others. He also noted that tar residues accumulated in the small gas holder which was used to store unpurified gas (Ref. 3).

Wood chips mixed with iron oxide were used to scrub hydrogen sulfide from the gas in the purifying house. Saturated chips were aerated in piles outside of the building and then reused. Spent chips were reportedly spread on the ground (Ref. 3).

Carburetted water gas was produced by injecting air and steam into the retort and then spraying oil on the gas as it passed through a carburetor (Ref. 3). Approximately 600,000 cubic feet of gas per day were produced by this method in 1928 (Ref. 1). The light brown oil used to make water gas was delivered by rail car and stored in an above-ground tank north of the generator house (Ref. 3).

Mr. Mastin was at the plant when the gas holders and tar wells were decommissioned in 1935. It was his recollection that the foundation of the small holder was several feet below the ground surface (foundation construction unknown). The tar which had accumulated in the bottom of the holder was pumped out and dehydrated before it was shipped off-site for reuse. The walls of the holder were flushed with water before dismantling and the wash water was reportedly hauled away. The sidewall blocks were then pushed into the hole along with enough soil and debris to bring the surface up to grade. The large gas holder was built entirely above ground on a concrete base. There was no reported residue in this tank at the time it was dismantled. The tar in the tar wells was also pumped out, dehydrated, and hauled off-site (Ref. 3).

2.3 Recent Site Use History

After closure of the gas plant in 1935, the site remained idle for a number of years. Brockway Motor Co., Inc. purchased the property in 1944, razed the remaining gas plant buildings (including the purifying house), and began construction of a truck sales, service, and refinishing building at the site in 1947 (Ref. 3). Brockway Motors remained in operation until 1971 when the property was purchased by I.D. Booth, Inc., the current owner. I.D. Booth purchased the lot adjacent to Brockway on the north in 1972. A gas station on that lot was torn down soon thereafter (Ref. 4). The ownership history of the site after it was sold by NYSEG was pieced together from the interviews. There may have been owners other than those mentioned above.

The Brockway Motor building was renovated by I.D. Booth: two-thirds of the building is now used for the storage and sale of plumbing supplies and the remaining one-third is leased to the New York Telephone Co. The Telephone Company has some offices in the building but most of the space is used as a garage and equipment storage area (Refs. 4, 5). The building is served by public water, sewer, and gas utilities. Figure 3 shows the site and adjacent areas as they appear today with the approximate location of the gas plant and other former structures superimposed.

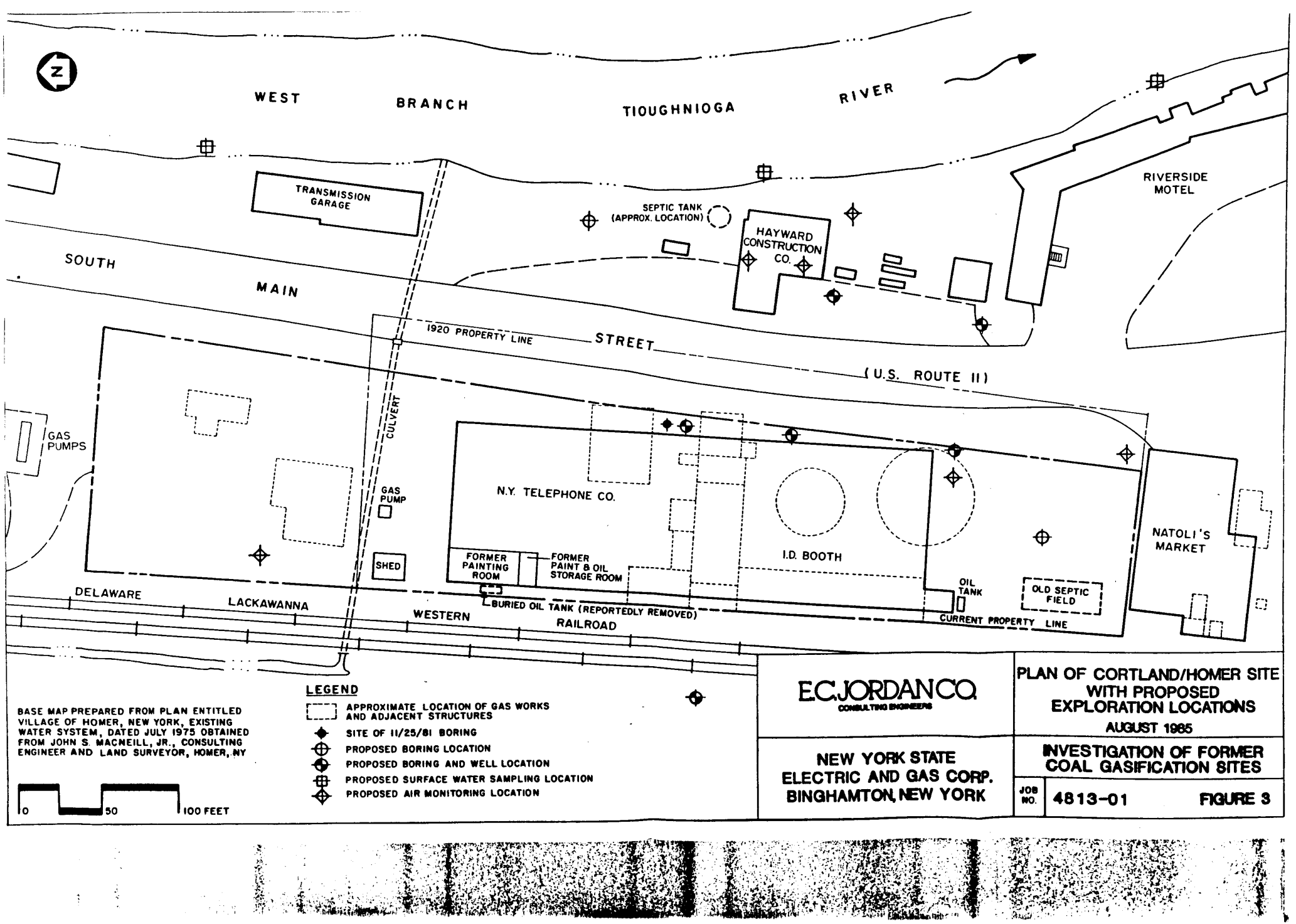
There are open areas both north and south of the I.D. Booth building. The yard on the south side is used by I.D. Booth for equipment storage. At the time of the site visits, the yard contained stacks of piping, pallets of pipe fittings, and a few empty pallets and boxes. There is a fuel tank adjacent to the southwest corner of the building which is no longer used. The ground beneath the tank has oil stains.

A sewage disposal and plot plan drawn for Brockway Motors in April 1948 shows an interior drainage gutter covered with steel grating running the length of the building. The central catch basin is connected to a 4-inch drain pipe, but it is unclear from the plan where the pipe discharged. The plan also shows a septic tank beneath the above-mentioned oil tank and a subsurface tile disposal field in the southwest corner of the lot (Figure 3) (Ref. 4). Use of the septic system was discontinued in July 1972 when a connection to the Village of Homer sewer system was made. According to the manager of I.D. Booth, workers encountered concrete under the southeast corner of the building during the sewer connection installation and had to divert the pipe around it. Black tar-like residues were noted in the soils on the east side of the building (Ref. 6). The obstacle may have been part of the large gas holder foundation. The manager also said that the south lot was covered with blacktop around 1975 (Ref. 4).

In November 1981, NYSEG collected two soil samples from a test hole located on the east side of the I.D. Booth Building (Figure 3). Broken brick, a slight petroleum odor, and heavy tar materials were observed in the test hole (Ref. 6). The results of analysis of the soil samples are shown in Table 1.

The north yard is used by N.Y. Telephone for equipment storage and parking and has a gravel surface. The foreman of N.Y. Telephone reported that a gas pump and buried tank in the yard were installed prior to their occupancy. They are most likely remnants of the years when a gas station occupied the lot (discussed further in Section 2.4). The buried gas tank, which has a 1,000 gallon capacity, probably contained gasoline as opposed to diesel fuel. N.Y. Telephone used the fuel to service trucks until the summer of 1984. The foreman did not know whether or not the contents of the the tank had been pumped out when its use was discontinued (Ref. 5). A culvert crosses the yard and discharges to the West Branch of the Tioughnioga River. The locations of these features are shown in Figure 3.

A 1948 floor plan of Brockway Motor Co. shows two rooms in the northeast corner of the building designated for painting and paint and oil storage. The plan depicts a funnel in the storage room with a pipe connection to a buried 500-gallon tank (see Figure 3). The label on the plan says that the tank was



E.C. JORDAN CO.
CONSULTING ENGINEERS

PLAN OF CORTLAND/HOMER SITE WITH PROPOSED EXPLORATION LOCATIONS

AUGUST 1985

NEW YORK STATE ELECTRIC AND GAS CORP. BINGHAMTON, NEW YORK

INVESTIGATION OF FORMER COAL GASIFICATION SITES

JOB NO. 4813-01 FIGURE 3

TABLE 1
SOIL ANALYSIS RESULTS AT THE CORTLAND/HOMER
COAL GASIFICATION SITE[1]

PARAMETER	Soil Sample 1[2] 4½ to 6 feet deep	Soil Sample 2[2] 8 to 10 feet deep
Corrosivity - pH	9.4	9.0
Ignitability °C	>170	>170
Reactivity		
Cyanide mg/kg	<1	<1
Sulfide mg/kg	4.2	540
EP Toxicity Leachate mg/ℓ		
Arsenic	<0.025	<0.025
Barium	<0.200	<0.200
Cadmium	<0.002	<0.002
Chromium	<0.010	<0.010
Lead	<0.010	0.05
Mercury	<0.0004	<0.0004
Selenium	<0.040	<0.040
Silver	<0.05	<0.05
Copper	<0.05	<0.05
Zinc	<0.050	<0.050
Total Phenols mg/kg	<0.004	<0.004
o-Cresol mg/kg	<0.001	<0.001
p-Cresol mg/kg	<0.001	0.119
Naphthalene mg/kg	<0.001	0.119
Quinoline mg/kg	<0.0035	0.615

[1] Reference 2

[2] Sample Date 11/25/81

for spent oil. According to the manager of I.D. Booth, this oil tank has since been removed (Ref. 4).

2.4 Surrounding Land Use

2.4.1 Gas Production Years. The NYSEG files contained a tax map dated July 31, 1920 which shows the Cortland/Homer site (Figure 2). The operator's residence was located just south of the gas works. The operator's house was replaced by a food market called Kniffens sometime in the late 1920's or early 1930's. The 1920 map also shows an electric railway running along the east side of South Main Street. Mr. Mastin recalled that the Clipper Gas Station bordered the site on the north and the Rotary Gas Station was due east of the plant on the riverbank. The gasoline tanks at Rotary were above ground, presumably because of the proximity of the station to the river (Ref. 2).

In 1966 and 1968, NYSEG investigated possible natural gas leaks at the Rotary gas station. The investigations indicated that gasoline, and not natural gas, may have been leaking from buried pipes connecting the storage tanks and the pumps. This theory was substantiated when an attendant reported 900 gallons of gas unaccounted-for. The period of time over which gas leaks may have occurred was not recorded (Ref. 2).

The Cortland Country Club, which is northwest of the site, is visible on a 1938 air photo of the area (Ref. 7). The photo also shows farmland due west of the site and along the east shore of the West Branch of the Tioughnioga River. A cleared area adjacent to the site on the west side of the railroad tracks was reportedly a private air strip with a hanger (Ref. 8).

2.4.2 Present Day. The section of Route 11 near the I.D. Booth building is presently lined with service-oriented businesses. There is no heavy industry in the vicinity of the site. Kniffen's market is now Natoli's market and there is a fuel oil business just south of the market. The site of the old Clipper Gas Station is part of New York Telephone's storage and parking lot. To the north of this parking lot is the Minit Car Wash. NYSEG was called in to investigate a possible gas leak at the car wash in March 1967 (Ref. 2). At that time there were nine petroleum bulk tanks between the car wash and the Clipper gas station. However, NYSEG concluded that the source of the problem was marsh gas. The past or present use of the gas pumps in this area, depicted in Figure 3, has not been confirmed.

The Rotary Gas Station building was renovated in 1974 to house the Hayward Construction Company. The four above ground gasoline tanks and the gas pumps have been removed. Hayward added on to the south side of the building in 1976 and 1981 and replaced the septic tank field on the north side of the building in 1984 (Ref. 9). There is a service garage north of Hayward and a motel to the south (Figure 3).

A large open field on the west side of the railroad tracks lies between the site and the Cortland Country Club. A residential development was proposed for the open area in 1973 but was never constructed (Ref. 7). The land east of the West Branch of the Tioughnioga River is still farmed except for a large automobile junkyard adjacent to the Route 81 interchange (Figure 1).

3.0 ENVIRONMENTAL SETTING

3.1 Climate

In the Soil Survey for Cortland County, New York, the climate is described as cool and humid with long, cold winters and warm summers (Ref. 10). The average annual temperature in Cortland is around 46°F, ranging from an average of 24°F in the winter (December through February) to 66°F in the summer (June through August). Average annual precipitation is 40 inches and precipitation is fairly evenly distributed throughout the year with the winters being slightly drier than the summers.

Meteorological conditions are recorded at three stations in the region: the Cortland County Airport, the Broome County Airport in Binghamton, NY, and the State University of New York (SUNY) - Cortland Geological Department.

Officials at the Cortland County Airport stated that the predominant wind conditions are from the north-northwest at around 10 miles per hour (Ref. 11). This implies that air passing the Cortland/Homer site would move south generally paralleling the West Branch of the Tioughnioga River. However, no actual records of wind data are maintained at the airport which is located approximately 2.5 miles southwest of the site.

The National Weather Service station at the Broome County Airport in Binghamton, NY provided data that are considered to be representative of the regional wind pattern, i.e., west-southwest at 10 miles per hour (Ref. 12). This station is approximately 35 to 40 miles from the Cortland site.

The station that collects data which are likely to be most representative of the site is the SUNY-Cortland Geological Department (Ref. 13). Meteorological data have been requested from this station.

3.2 Physiography

Cortland County is in the Allegheny Plateau, which is characterized by narrow, flat valleys (1/2 to 3/4-mile wide) with hills rising steeply for about 500 feet above the valley floors. The hills represent caps of more resistance rock and are covered with a thin deposit of glacial till. The valley floors are covered predominantly with gravelly deposits. The topography of this area was shaped by the movement of ice and water during periods of glaciation (Refs. 10, 14).

The Cortland/Homer site is located in the Homer-Preble valley at an elevation of approximately 1,120 feet above mean sea level (MSL). The adjacent hills which run in a north-south direction rise to around 1,600 feet above MSL. At the site, the valley floor is just over a mile wide (see Figure 1).

3.3 Geology

The bedrock formation in Cortland County consists predominantly of nearly flat-lying gray shales and siltstones with a few beds of sandstone and limestone. Depth to bedrock near the site is approximately 190 feet. Glacial

deposits overlie the bedrock. The upper 35 to 40 feet consist of coarse gravel and sand overlying a stratum of fine sand and silt. The sand and silt stratum is reported at some locations to consist of clay at a depth equal to and greater than 75 feet. This clay is likely to be a continuation of the sand and silt stratum which becomes finer with depth (Ref. 15).

3.4 Groundwater

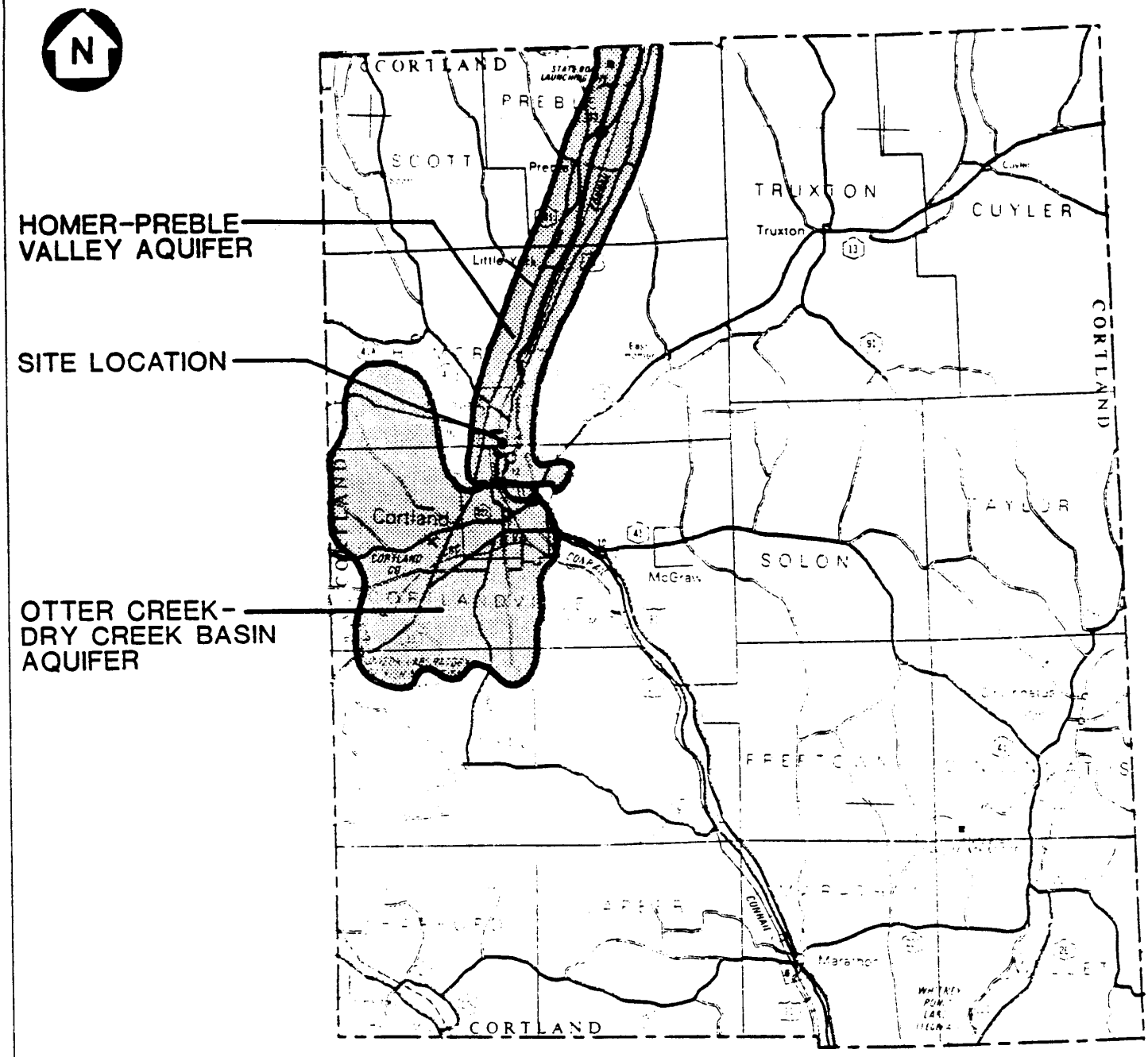
The U.S. Geological Survey (USGS), in cooperation with Cortland County, has prepared detailed studies of two aquifers in the vicinity of the Cortland/Homer site (Refs. 16, 17). These aquifers, shown in Figure 4, are the Homer-Preble Valley aquifer and the Otter Creek-Dry Creek Basin aquifer. The Homer-Preble is a shallow glacial outwash aquifer which extends along the West Branch of the Tioughnioga River from the Village of Homer north to the Cortland County line (Ref. 16). The Otter Creek-Dry Creek aquifer, also in glacial deposits, encompasses the valley floor areas of Otter and Dry Creeks and includes the City of Cortland and the surrounding Town of Cortlandville (Ref. 17).

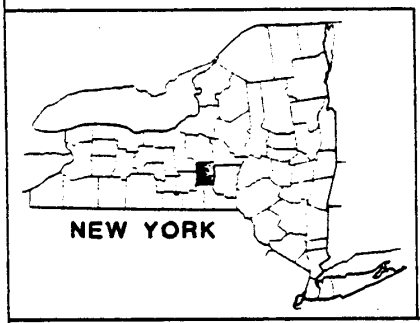
The Cortland/Homer site lies over the southern end of the Homer-Preble Valley aquifer just outside of the Otter Creek-Dry Creek basin study area. Groundwater movement in the area is generally across the valley from the uplands to the streams and lakes, and then southward as surface flow in the West Branch of the Tioughnioga. This pattern is reversed during periods of very high flow when the stream discharges to the aquifer (Ref. 16).

The saturated thickness of the Homer-Preble aquifer averages 40 feet or approximately one-fifth of the total thickness of glacial deposits in the area. Well yields of up to 500 gallons per minute (gpm) are common in the area (Refs. 14, 16). The Homer-Preble aquifer is the primary water supply source in the valley. In 1980, the Village of Homer water utility served a population of 4,242 and pumped an average of 0.885 million gallons per day (MGD) from three wells located 1.5 miles northwest of the site. These wells are 60 to 80 feet deep (Ref. 16). The City of Cortland wellfield is located two miles southwest of the site (Ref. 17).

The businesses along Route 11, including I.D. Booth and N.Y. Telephone, are connected to the Village of Homer water distribution system (Refs. 18, 19). There is reportedly a dug well at the site near the entrance to the culvert on the west side of the railroad tracks (Figure 3). Information on the past and present use of this well was not available. The Cortland Country Club has two wells which are used primarily to water the golf course. Residents along Bell Drive and Fisher Avenue, just south of the country club (see Figure 1), have private wells (Ref. 18). Many of these wells were drilled by Randolph Well and Pump Co., Inc. (Ref. 20).

The water from the Homer-Preble aquifer is high in calcium and magnesium and is consequently high in hardness (generally greater than 200 mg/ℓ). Both nitrate and chloride concentrations in the groundwater have been increasing in recent years. Agricultural fertilizers, septic systems, and road salt are cited as possible sources of these chemicals (Refs. 14, 16).





BASE MAP SOURCE:
NEW YORK STATE DEPARTMENT
OF TRANSPORTATION
ALBANY, NEW YORK

E.C. JORDAN CO.
CONSULTING ENGINEERS

TITLE
LOCATION OF HOMER-PREBLE VALLEY AND OTTER CREEK-DRY CREEK BASIN AQUIFERS

0 5 MILES

CLIENT
NEW YORK STATE
ELECTRIC AND GAS CORP.
BINGHAMTON, NEW YORK

INVESTIGATION OF FORMER COAL GASIFICATION SITES

PROJECT NO. 4813-01 FIGURE 4

3.5 Surface Water

The West Branch of the Tioughnioga River flows in a southerly direction about 200 feet east of the Cortland/Homer site. Drainage from the north side of the I.D. Booth building is discharged to the river via a culvert. Runoff from the paved south side flows to street drains on Route 11.

There is a small dam across the river one-quarter mile upstream of the site. Factory Brook flows into the West Branch about one and one-half miles upstream of the site and the confluence of the West and East Branches of the Tioughnioga River is approximately three miles downstream on the eastern boundary of Cortland (see Figure 1).

The U.S. Geological Survey (USGS) maintains a gauging station on the West Branch one mile north of the site in Homer. Data from this station collected in 1968 and 1973 to 1983 show the average discharge to be 131 cubic feet per second (cfs) (Ref. 21). The 7-day, 10-year low flow at this site is estimated to be 10 cfs (Ref. 16). The river has a history of frequent flooding during the spring (Refs. 3, 9). However, the problem has been alleviated in recent years by dredging of the river downstream of the site (Ref. 3).

The water quality of the West Branch appears to be good. Local residents reported seeing trout and waterfowl on the river near the Cortland/Homer site (Ref. 9). Buller reported in 1978 that dissolved oxygen concentrations at the Homer USGS gauging station were at or above saturation. There was a slight increase in chloride concentration at that location from 1971 to 1976 but no significant change in nitrate concentration (Ref. 16).

3.6 Soil

The soil at the Cortland/Homer site has been mapped in the Phelps Series by the Soil Conservation Service (Ref. 10). More specifically, the soil is a gravelly silt loam characterized as moderately well-drained with good moisture-holding capacity. A typical profile consists of gravelly silty clay loam to 21 inches and stratified sand and gravel to 40 inches. The soil has a seasonally high water table which may occur within 1.5 feet of the ground surface (Ref. 10).

3.7 Air

Cortland was formerly used as an experimental control area for the State of New York when ambient total suspended particulate (TSP) sampling was conducted in the area (Ref. 12). High-volume air samplers are still located at the Cortland sewage treatment plant, City Hall, and at the nearby town of Truxton, NY and local air monitoring is now conducted intermittently (Ref. 22). In recent years, the increased use of wood burning stoves has resulted in higher TSP levels, although, in general the air quality in the Cortland area is still considered to be good.

The most significant airborne migration pathway for coal gasification residues would be as adsorbed organics on particulate material. Although these compounds have a low odor threshold, their low vapor pressure suggests that volatilization is not a major concern. In addition, the existing site

conditions minimize wind transport of particulates and volatilization since most of the site is covered by a building or paved surfaces. Limited trench excavations in the past 10 to 15 years for the sewer line and other underground utilities is not known to have resulted in any significant release of contaminants into the air.

The existing land uses in the vicinity of the site are not expected to result in any significant release of contaminants into the air. Heavy industrial operations do not exist near the site. Two nylon line manufacturing companies are located to the north of the site and gas stations, an auto repair garage, and fuel oil storage facilities are present in the vicinity. However, air emissions are not considered to be significant due to the small size of these operations. No odor complaints in the area of the site have been reported to the local New York Department of Health office in the past 13 years (Ref. 23). The Department of Health did report a few odor complaints related to paint/enamel shop exhausts at other locations in Cortland (Ref. 23). Discussions with the New York State Department of Environmental Conservation (NYSDEC) were consistent with these findings (Ref. 22).

4.0 NEED FOR FURTHER INVESTIGATIONS

4.1 Summary of Available Data on Coal Gasification Wastes

Jordan recommends that further investigations into possible environmental contamination problems at the Cortland/Homer site be conducted. This recommendation is based on the following historical information and direct observations. The information suggests that coal gasification related residues are likely to be present in the subsurface environment at the site. From the site reconnaissance, interviews and file reviews, it was learned that:

1. Coal gas and carburetted water gas were produced at the site for a period of 74 years, from 1858 until 1932.

2. Coal tar residues were held in stone-lined tar well(s) located below ground at the site.

3. Coal tar residues accumulated in the small gas holder (foundation conditions unknown).

4. Residual coke and ash were spread over low spots on site.

5. Oxide wastes from the purifying house were piled outside for regeneration (final disposal method unknown).

6. The tar well(s) and gas holders were dismantled in 1935. Accumulated tars were reportedly removed at that time, however the extent of removal is not known.

7. In recent years, there have been several observations which may be related to the former coal gasification plant:

- During a 1972 excavation for a sewer connection, black tar-like residues were noted in soils on the east side of the I.D. Booth Building (Ref. 6).

- In November 1981, NYSEG collected two soil samples from a test hole located on the east side of the I.D. Booth Building. Broken brick, petroleum odors, and a heavy tar material were observed in the test hole (Ref. 6). Analysis of the soil samples showed the presence of coal-tar related chemicals.

- A visible sheen and detectable petroleum-like odors were reported along the Tioughnioga River bank near E.F. Hayward Construction Co., Inc., in June 1982 (Ref. 24).

- Seepage of tar-like materials and petroleum-like odors were observed by Jordan in the basement of the Hayward Construction Building in August 1985. The seepage occurred about two feet above the floor at two locations.

4.2 Task 2 Activities

The explorations for Task 2 will consist of geophysics, soil borings, monitoring well installation, elevation survey, air, soil, surface water and groundwater sampling, and laboratory chemical analysis. The boring and well locations are shown in Figure 3. In addition, a preliminary land use investigation and surface water investigation will be completed to identify potential receptors and environmentally sensitive land uses in the vicinity of the site. A report will be prepared to assess the data obtained in Task 2 in conjunction with the site information developed in Task 1. On the basis of the Task 2 findings, a preliminary risk assessment will be performed and recommendations for continued investigation (Task 3) and/or monitoring will be provided to the extent that these activities may be justified.

The geophysical investigation will consist of a terrain conductivity survey and ground penetrating radar (GPR) survey to detect the presence of coal tar deposits in the subsurface. As shown in Figure 3, eight borings will be completed and split-spoon samples will be obtained at 5-foot intervals. The locations of these borings are subject to change depending on results of the geophysical investigation. Up to 5 soil samples from the borings will be collected for laboratory chemical analysis to identify any sources of coal tar residues. Groundwater monitoring wells will be installed at six of the boring locations to obtain water quality samples and to interpret groundwater flow on the basis of water level observations. Surface water samples will be collected at three locations on the West Branch of the Tioughnioga River: upstream of the site, adjacent to Hayward Construction, and downstream of the site. Similarly, air monitoring stations will be set up at four locations: one upwind of the site, one onsite, and two downwind. The air monitoring locations shown in Figure 3 are based on the assumption that the prevailing winds are from the north-northwest. The locations will be revised, if necessary, upon receipt of data from SUNY-Cortland Geological Department (Ref. 21). In addition, air quality will be monitored with an HNU photoionization meter during drilling activities. No significant release of volatile chemicals is

expected because of the limited disturbance of the subsurface environment at each boring location.

Air, surface water, and groundwater samples will be collected to evaluate any present or future impact of former coal gasification activities on human health and the environment. An addition of air and soil sampling in the basement of the Hayward Construction building is recommended since the property is anticipated to be downgradient with respect to groundwater flow from the former gasification plant and is a potential receptor of migrating coal tar residues.

The scope of work included in Task 2 is described in the July 2, 1985 Contract (No. 85S-159) between NYSEG and Jordan. A more detailed description of the activities in Task 2 was presented in Jordan's January 1985 Proposal, Investigation of Former Coal Gasification Sites (Ref. 25). Additions to the scope of work are recommended based on the information developed in Task 1. The additions are described below with a brief discussion of the rationale for this work.

1. Increase the drilling footage, if observed field conditions warrant, on up to 3 of the 8 borings. The increase in depth at these 3 borings will be from 40 to 80 feet below ground surface. This represents a total of 120 linear feet of additional drilling. The depth of the remaining 5 borings will not change (previously estimated at 40 feet below ground surface).

   Rationale: The soil descriptions for borings and wells located in the vicinity of the site suggest that the fine sand and silt stratum existing at a depth of about 40 feet will tend to limit vertical movement of any coal tar residues present in the subsurface. The extent of vertical migration can be confirmed during the drilling program. The addition of up to 40 feet to the borings at three locations is proposed to document the depth of vertical penetration of coal tars into this stratum. The deeper borings will be located as close as possible to the location of the former gas holders. The borings may be terminated at a shallower depth if coal tar deposits are not present above the sand and silt stratum, and if field observations show little or no vertical penetration of coal tar into these soils. The lower portion of the boring which is not used for the monitoring well installation will be backfilled and sealed with bentonite. It should be noted that the depth of all borings is subject to change based on observation during drilling, and hence the total footage of borings may be less than the estimated maximum total footage indicated herein.

2. Collect up to 5 subsurface soil samples (selected by field screening) from the borings for laboratory chemical analysis. The analyses will include GC/MS for volatile organics and semi-volatile organics; total phenols; total cyanide; ferro-ferricyanide; iron; and zinc. In addition, one duplicate sample will be collected as a QA/QC sample.

   Rationale: If coal tar residues are present in the soil, the sampling and analysis will identify the location and concentration of these residues. A source of coal tar residues in the ground should be identified to

understand its relationship to groundwater quality and movement beneath the site and to effectively complete the Risk Assessment and Conceptual Design Tasks.

3. Collect one soil sample from the basement of the Hayward Construction Building at the location of a seep in the foundation wall and analyze for the parameters specified above for the soil samples obtained from the borings.

   Rationale: A tar-like substance was observed at a water seep in the basement of this building. Analysis of the soil sample will provide data to indicate any presence of coal tar residues in the basement seepage and, if present, to evaluate whether or not any risk is posed to the people working in the building.

4. Monitor air quality at two locations in the basement of the Hayward Construction Building for volatile organics and particulate/vapor phase PAHs using a portable photoionization detector (or alternatively a flame ionization detector) and low-flow PUF sorbent samplers. Monitor for two 4 to 8 hour runs over a one-week sampling period, and analyze both runs.

   Rationale: Although no odor complaints have been reported by employees in the building, an unidentified odor was noted in the basement by Jordan. This odor is similar to that produced by petroleum products. As in item 3, the air data will be useful in assessing health risks to the people in the Hayward Building.

5.0 SCHEDULE

Jordan is prepared to begin the Task 2 investigation program within one week of authorization to proceed following NYSEG's review and acceptance of the Task 1 report. Initial activities in Task 2 will include preparation of a site-specific Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP). Since Jordan continually updates and maintains a generic QAPP and HASP, a limited amount of effort will be required to prepare these documents. Allowing time for NYSEG to review the report and for Jordan to complete the above plans and schedule field activities with its subcontractors, it is anticipated that Jordan staff will be able to mobilize to the Cortland/Homer site during the first week in October 1985, and a tentative schedule for field activities is shown in Table 2. This schedule is based on receiving Task 2 authorization and access to the proposed exploration locations by mid-September.

Jordan intends to keep NYSEG informed of findings and progress of the drilling program at least twice per week and immediately if any unexpected conditions are encountered. During other field activities, Jordan plans at least weekly contact with NYSEG.

TABLE 2

TENTATIVE SCHEDULE FOR TASK 2 FIELD ACTIVITIES AT THE CORTLAND/HOMER SITE

Activity	1985 Schedule
Geophysical Exploration	Oct. 14-Oct. 18
Exploratory Borings/Monitoring Well Installation	Nov. 4-Nov. 15
Air Sampling	Nov. 4-Nov. 15
Elevation Survey	Nov. 18-Nov. 22
Groundwater/Surface Water Sampling	Dec. 16-Dec. 20

REFERENCES

1. Records on file at the Cortland County Historical Society, 25 Homer Avenue, Cortland, New York, 13045.

2. Records and site plans (1920 and 1944) on file at the New York State Electric and Gas Corporation, 4500 Vestal Parkway East, Binghamton, New York 13903-1082.

3. Interview on August 6, 1985 with Larry Mastin, former employee of New York State Electric and Gas, 15 East Main Street, Cortland, NY 13045; (607-756-7003).

4. Interview on August 6, 1985 with Jack Sweet, Manager of I.D. Booth, 216 South Main Street, Homer, NY 13077 (607-753-9606).

5. Interview on August 6, 1985 with Jim Emm, Foreman at New York Telephone Co., 218 South Main Street, Homer, NY 13077 (607-749-7278).

6. Interview on August 6, 1985 with Paul Boyce and Dick Matson, employees of New York State Electric and Gas, 26 Court Street, Cortland, NY 13045 (607-756-2816).

7. Records, site plans, and aerial photo (1938) on file at the office of John MacNeill, Engineer for the Village of Homer, 74 North West Street, Homer, NY 13077.

8. Interview on August 7, 1985 with Jon D. Haight, Surveyor, 12 Central Avenue, Cortland, NY 13045 (607-753-0222).

9. Interview on August 6, 1985 with Joanne Mazonne of E.F. Hayward Construction, Inc., 217 South Main Street, Homer, NY 13077 (607-749-2622).

10. U.S. Department of Agriculture, Soil Conservation Service, 1961. Soil Survey for Cortland County, New York, in cooperation with Cornell University Agricultural Experiment Station, Series 1957, No. 10. Sheets 17 and 22.

11. Telephone inquiry on August 20, 1985 between Douglas Seely, GCA and the Cortland County Airport receptionist (607-753-0250).

12. Telephone inquiry on August 20, 1985 between Douglas Seely, GCA and John Richardson, Meteorologist, National Weather Service Office at Broome County Airport in Binghamton, NY (607-729-1597).

13. Telephone inquiry on August 28, 1985 between Douglas Seely of GCA Corporation (Jordan Subcontractor) and Jim Buh, State University of New York at Cortland, NY (607-753-2815).

14. McFarland-Johnson Engineers, Inc., 1982. Central New York Groundwater Management Program: Task I Report, Groundwater Resources, 171 Front Street, Binghamton, NY 13905.

15. Randall, A.D., 1972. Records of Wells and Test Borings in the Susquehanna River Basin, New York. Prepared by the USGS in cooperation with the N.Y. State Department of Environmental Conservation, Bulletin 69.

16. Buller, William, 1978. Hydrologic Appraisal of the Water Resources of the Homer-Preble Valley, New York. U.S. Geological Survey Water Resources Investigations 78-94, Albany, New York.

17. Cosner, Oliver J., and John F. Harsh, 1978. Digital-Model Simulation of the Glacial Outwash Aquifer, Otter Creek-Dry Creek Basin, Cortland, New York. USGS Water Resources Investigations 78-71, Albany, New York.

18. Records on file at the Division of Environmental Health of the Cortland County Health Department, 60 Central Avenue, Cortland, NY 13045.

19. Telephone inquiry on August 13, 1985 with Gary Palladino, Foreman of the Village of Homer Water and Sewer Department, Town Hall Building, Homer, NY 13077 (607-749-2511).

20. Telephone inquiry on August 7, 1985 with Ray Randolph of the Randolph Well and Pump Co., Inc., 41 Gulf Hill Road, McLean, NY (607-838-3550).

21. USGS, 1979. Water Resources Data for New York: Water Year 1983, Volume 3, Western New York. USGS Water-Data Report NY-83-3, Albany, New York.

22. Telephone inquiry on August 28, 1985 between Douglas Seely, GCA and Dale Volmer, Director, Air Quality Section, Region 7, New York State Department of Environmental Conservation, Syracuse, NY (315-428-4484).

23. Telephone inquiry on August 26, 1985 between Douglas Seely, GCA and Eric Johnson, New York Department of Health, Cortland, NY (607-753-5035).

24. NYSEG, 1984. Specification for Investigations of Former Coal Gasification Sites, Section 3.1, page 4.

25. E.C. Jordan, 1985. Proposal to NYSEG on Coal Gasification Investigation, Earth Resources Division, Portland, ME.