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Report



Supplemental Remedial Investigation (SRI) NYSEG Cortland/Homer Former MGP Cortland County, New York

Revised March 2003

Stearns & Wheler
Companies

SUPPLEMENTAL REMEDIAL INVESTIGATION (SRI)
NYSEG CORTLAND/HOMER FORMER MGP SITE
CORTLAND COUNTY, NEW YORK

Prepared for

NYSEG
(NEW YORK STATE ELECTRIC AND GAS)



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EXECUTIVE SUMMARY

NYSEG (New York State Electric & Gas) selected Stearns & Wheler to complete a supplemental remedial investigation (SRI) at a former manufactured gas plant (MGP) site in Homer, NY. The SRI was completed under NYSEG's Order on Consent (#D0-0002-9309) with the New York State Department of Environmental Conservation (NYSDEC) in order to fill data gaps from previous site investigations (E.C. Jordan Co., 1987, 1989).

The study area includes the former MGP site located on the west side of U.S. Route 11. The site is currently occupied by I.D. Booth and Verizon, which occupy different areas of a single site building. I.D. Booth, a general plumbing and electrical supplier, owns the building. Verizon operates a service center on the premises as a tenant of I.D. Booth. The site building is situated over the remains of former MGP structure foundations, including two former gasholders and a purifying house, which are buried below the surface. East of the I.D. Booth building, on the opposite side of Route 11, NYSEG owns a small parcel that includes a small storage building. The Tioughnioga River bounds this area to the east and flows from north to south. South of the NYSEG parcel, and east of Route 11, is a motel (Budget Inn). In general, the area west of the Tioughnioga River and along Route 11 is predominantly commercial property that includes retail/convenience stores, automotive repair shops, gasoline service stations, and a motel. East of the river is a recreational park that is primarily athletic fields.

The objectives of the SRI are to determine the nature and extent of MGP residuals in area soils, groundwater, surface water, and sediments; to delineate the extent of MGP-related coal tar in the subsurface; and to determine whether those impacts expose the public including site occupants and the surrounding environment to negative effects. This was accomplished by a comprehensive air, soil, sediment, groundwater, and surface water sampling program, plus a qualitative human health risk assessment and a fish and wildlife impact analysis. In addition, historical data from previous site investigations (E.C. Jordan, Task 2 and 3 Investigations, 1985 through 1989) was reviewed and incorporated into the SRI findings. The field sampling program completed as part of this SRI, plus the referenced prior site investigations, included test borings (55 locations), test pits (5 locations), surface soil sampling (9 site locations), river sediment sampling (97 samples from 35 locations), surface water (9 samples) and groundwater sampling (2 SRI events involving 31 wells, plus historical data), indoor/ambient air sampling (12 samples), and a passive soil gas survey (11 samples). The sampling area included both on-site (I.D Booth

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building and grounds) and off-site areas, including the Tioughnioga River (east of the site), the Budget Inn (motel southeast of the site), and a small parcel held by NYSEG (east of the site). In addition, a water well survey targeted residences and businesses surrounding the site, and an independent background surface soil sampling program was completed across the Cortland area to provide an indication of ambient surface soil conditions for certain MGP related compounds.

Among the findings of the SRI are the following:

1. MGP residuals, as evidenced by visible tar and detectable VOCs and SVOCs, are present in soils below the ground surface, directly under the I.D. Booth building (within and near the former MGP structures), and immediately adjacent to the building's exterior walls. The area in which this impact is most apparent and most frequently observed is below and along the eastern edge of the building. Some MGP impact is also evident in soils along the western edge of the building. Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and cyanide were detected by laboratory analysis of soils in these areas.

2. Farther away from the building, the degree of impact in soils is lower than near the building and the former MGP structures, as evidenced by less frequent observation of visible tar and generally lower levels of VOCs and SVOCs in collected samples. There is no indication of significant impact in soils or groundwater west of the building. East of the building near Route 11 there is visible evidence of impacted soils in certain areas.

3. There is a groundwater plume of MGP residuals east (downgradient) of the building. The level of groundwater impact declines by orders of magnitude away from the building toward the Tioughnioga River.

4. Coal tar was observed in more than half of the 21 soil borings within and immediately adjacent to the building. Most of the visible tar had a semi-solid, putty-like appearance, as opposed to a more fluid liquid-like tar, and was thoroughly intermixed with soils. Visible tar in a more fluid-like state was observed primarily in the form of a sheen on sampling equipment, and generally only at boring locations very near the MGP structures themselves. Within the MGP structures themselves (primarily the former relief holder below the building), tar was present generally between 6 to 20

feet below ground, and was less apparent at greater depths. Away from the building toward Route 11 tar seams/sheens were less frequently observed in soil borings (in only 8 of 34 locations) compared to near the I.D. Booth building, although odors were more common. Field observations and chemical data suggest a combination of petroleum and coal tar impacts.

5. Borings east of the Tioughnioga River, opposite the site, did not reveal evidence of subsurface soil impacts. Groundwater east of the river likewise did not show evidence of MGP impact.

6. Groundwater data indicate that two dissolved phase plumes are present. The first plume originates near the I.D. Booth building, near the former relief holder area, and extends eastward in a downgradient direction towards Route 11 and the Tioughnioga River. The second plume is south of the building, and extends towards the southeast. The second plume appears to include marginal coal tar impacts mixed with petroleum impacts. This characterization is based on chemical fingerprints of groundwater from the southern plume that indicate a lower degree of coal tar impacts compared to east of the site. The distribution of dissolved organic compounds in groundwater indicates that most of the residual tar occurs near and east of the MGP.

7. Tar-like DNAPL has been observed in MW-24, adjacent to the relief holder, since that well was installed in the fall of 1999. Subsequent recovery efforts in 2000 removed approximately 20 gallons of DNAPL from MW-24. The data indicates that the recoverable amounts of DNAPL declined substantially throughout 2000. Other site wells have reportedly contained varying amounts of visible NAPL on a more occasional and less consistent basis, sometimes as sheen or globules, and including both LNAPL and DNAPL. In addition, DNAPL tar appeared in well MW-16 (east of MGP on east side of Route 11), which was installed in 1987, for the first time in November 2002.

8. The chemical characteristics of coal tar, in soils and in a dissolved state in groundwater, were used to develop chemical fingerprints that delineate the most probable area of coal tar presence in the subsurface. This technique enabled tar presence to be verfied where visual identification became too speculative (e.g. where tar was less visible), and where compound concentrations in the samples was lower.

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The chemical fingerprints are in general agreement with field observations of coal tar occurrence, and indicate the main source area is near and immediately east of the former relief holders. The main tar impact in soils apparently extends east of the holders towards Route 11, and continues past Route 11 along a finger-like band to the southeast toward the northern end of the Budget Inn ("motel"). The main area of groundwater impact corresponds to this same general area east of the MGP. North and south of this impacted area the chemical fingerprints indicate a decline coal tar impacts that corresponds to increasing distance from the tar source, and consequently the impacts become less severe.

9. River water does not appear to be impacted by MGP residuals based on surface water analytical data. Impacts are evident in river sediments in the segment of river adjacent to the study area, in the form of highly weathered coal tar and SVOCs in the upper one to two feet of sediments. In contrast, very little tar was actually observed in sediment samples retrieved at depth from cores (up to 8 feet deep), except for occasional sheens and globules. Visible impacts (traces of liquid tar and sheen) were apparent in water when surface sediments were disturbed on deposit banks during the sampling program. Tar was observed in river sediment borings adjacent to the site much more frequently and across a wider area (including upstream) than was observed in soil borings along the adjacent riverbank, which suggests that much of the sediment impact represents prior deposition as opposed to ongoing, active transport from the bank.

10. For most of the river downstream of the site, there is evidence of relatively minor and isolated MGP impacts compared to near the site. However, in a sediment trap approximately 5,000 feet downstream of the site where sediments accumulate, there is indication of MGP impact that is comparable to conditions near the site. Generally, where MGP impacts are apparent, they are most noticeable in the upper 2 feet of sediments. Below that depth the level of impact generally declines.

11. Indoor air quality at the I.D. Booth facility does not appear to have been significantly affected by MGP residuals. Although various organic compounds were detected in indoor air samples, all were below NIOSH guidance, and the detected compounds are potentially derived from materials and equipment inside the building. The passive soil gas survey, conducted adjacent to I.D. Booth and across Route 11 adjacent to the

motel, did not indicate transport of gas phase VOCs from the former MGP site to the motel. Although VOCs were detected in soil gas adjacent to the motel southeast of the MGP, the pattern indicates it is not connected with the MGP.

12. The fish and wildlife impact analysis determined that there is likely to be a complete exposure route between the river sediments and the benthic aquatic community within the river. The effects of exposure are probably limited to specifc areas near the site and upstream of the southern sediment trap, where MGP impacts are most apparent.

13. Exposure risk to humans is considered to be limited because soils are covered by either grass or pavement in the area; except for the motel, the area is non-residential. The risk of exposure to groundwater impacts is considered to be small, since the areal extent of groundwater impact is limited, and the site is supplied by municipal water. Extensive area development has reduced, but not eliminated, the recreational exposure potential for the river. There is some exposure potential related to river sediments, and future exposure potential related to subsurface soils in connection with utility and construction work.

The SRI indicates that coal tar was mobile in the past, as evidenced by the visible impacts in soils near Route 11 and river sediments adjacent to the site. The recent detection of tar in well MW-16, on the east side of Route 11, indicates that the tar is still potentially mobile to some degree. Chemical fingerprints for soil and groundwater samples help to delineate the probable extent of tar in the subsurface, which appears to be primarily east of the MGP. Indications of tar become less frequent with distance from the MGP, and soil borings along the western riverbank revealed little tar relative to the widespread tar impacts close to the MGP and in the adjacent river sediments. This pattern suggests that most of the tar observed in the river sediments is likely to be from past discharge as opposed to active, ongoing migration.

Some form of remedial action appears to be necessary at the site. A feasibility study should be completed to determine the proper course of remediation.

CHAPTER 1

INTRODUCTION

1.1 GENERAL

In 1985, NYSEG (the New York State Electric and Gas Corporation) began a study to evaluate the environmental impacts related to a former manufactured gas plant (MGP) site in Homer, NY (Cortland/Homer site). The site is located in a commercial area on U.S. Route 11 in the Village of Homer, Cortland County, NY (Figure 1-1).

Between 1985 and 1989, NYSEG's consultant conducted two remedial investigations at the Cortland/Homer former MGP site (the site). The first investigation was conducted between 1985 and 1987 (E.C. Jordan Co., 1987), and the second was conducted between 1987 and 1989 (E.C. Jordan Co., 1989). Results of those investigations generally identified elevated levels of volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) in soils near the existing site building. The VOCs and PAHs identified are ubiquitous in the environment, with many sources including former MGP sites. Soil borings suggested that site contaminants appeared to follow the surface contour of a subsurface silt layer, which might indicate that contaminants could migrate away from the site towards the West Branch of the Tioughnioga River. Groundwater data from the investigations were consistent with this general migration pattern.

Although the previous site investigations were fairly thorough in their approach, a number of data gaps remained to be filled in order to determine the potential risk of exposure to site residuals and appropriate cleanup needs. Pursuant to NYSDEC Order on Consent # D0-0002-9309, NYSEG selected Stearns & Wheler to complete a Supplemental Remedial Investigation (SRI) at the Cortland/Homer former MGP site. The objective of the SRI was to fill data gaps identified in the previous site investigations.

The SRI was carried out in separate field mobilizations. The first field effort (SRI Phase 1) occurred in 1999, and included a passive soil gas survey, test pits, soil borings, monitoring well installation, and a comprehensive water and sediment sampling effort in the site-adjacent

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Tioughnioga River. The results of Phase 1 of the SRI were summarized in a draft SRI Report (Stearns & Wheler, March 2000).

Although the 1999 SRI generally fulfilled the requirements of the approved Work Plan for that project, after reviewing the draft SRI Report NYSDEC identified a number of issues that would require further site investigation to address. Subsequently, NYSEG and Stearns & Wheler, LLC jointly prepared an addendum to the original work plan to define the second phase scope of work. Following NYSDEC's approval to the work plan addendum, the SRI Phase 2 field work was completed primarily during 2001. This SRI Report presents the findings of both SRI phases (1 and 2), as well as results of investigations that occurred prior to the SRI.

1.2 SITE DESCRIPTION

The study area includes a site currently occupied by I.D. Booth and Verizon (formerly Bell Atlantic), which share a single building west of Route 11 (Figure 1-2). I.D. Booth owns the building, and is a general plumbing and electrical supplier, while Verizon operates a service center. The building houses a combination of offices, general storage, garage space, a show room, and a sales counter.

The I.D. Booth building is situated over former MGP structure foundations, including former gasholders and a purifying house, which are believed to be buried below the surface. A large holder is believed to be located under the southern portion of the I.D. Booth facility, primarily under the main warehouse area and extending out into the exterior storage yard. A smaller holder is believed to have been located just north of the large holder, completely within the existing building's footprint.

East of the I.D. Booth building, on the opposite side of Route 11, NYSEG owns a small parcel that includes a small storage building. The Tioughnioga River bounds this area to the east and flows from north to south. South of the NYSEG parcel, and east of Route 11, is a motel (Budget Inn). In general, the area west of the Tioughnioga River and along Route 11 is predominantly commercial property. East of the river is a recreational park that is primarily athletic fields.

1.3 SRI OBJECTIVES

The purpose of the 1999 SRI (Phase 1) was to:

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1. Evaluate the potential for MGP impact on indoor air quality at the I.D. Booth building.

2. Assess the likelihood that site occupants could be exposed to MGP-related impacts via direct contact with surface soil.

3. Investigate the possibility of MGP residuals in the area of the former gas purifying house and former gasholders.

4. Complete additional groundwater sampling to supplement past data in order to update the level of understanding of site groundwater conditions, and the potential impact of groundwater contamination to the river.

5. Assess the potential impacts of the MGP site on river water and sediment.

6. Conduct a Fish and Wildlife Impact Analysis (FWIA) through Step IIA, following the guidance cited in NYSDEC's Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites dated October 1994.

7. Conduct a survey to determine the presence of private drinking wells in the area.

8. Further investigate the presence of dense non-aqueous phase liquid (DNAPL) in the subsurface near existing monitoring well MW-3, as well as within the river bed.

9. Investigate the possible presence of site-related organic vapors in the soil in close proximity to the Budget Inn.

The objectives of the 2001 SRI (Phase 2) were to:

1. Complete an expanded river sediment probing/sampling investigation to further determine the possibility of site-related impacts to the first observable sediment trap downstream of the site;

2. Improve understanding of chemical conditions of site groundwater as they relate to natural attenuation and the extent of groundwater impacts upgradient and cross gradient;

3. Further investigate the source area, near the I.D. Booth building, for the possible presence of residual NAPL;

4. Better define the underlying silty clay layer, which behaves as a confining unit;

5. Complete the determination of nature and extent of site related residuals;

6. Conduct a Fish and Wildlife Impact Analysis (FWIA) Steps IIB and IIC, following the guidance cited in NYSDEC's Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites dated October 1994;

7. Provide a comprehensive historical account of past site use and previous site investigations prior to the SRI, and provide a data interpretation that includes both SRI and previously collected analytical data.

CHAPTER 2

SITE BACKGROUND

2.1 GENERAL SITE HISTORY

Stearns & Wheler completed an historical records search as part of initial 1999 (Phase 1) SRI. The search was completed to supplement NYSEG's previous efforts in this regard. Stearns & Wheler reviewed the following sources of information:

1. E.C. Jordan "Investigation of the Former Coal Gasification Site, Cortland/Homer, NY," Task 3 report.
2. Town of Homer Assessor's Department.
3. Cortland County Clerk's Office.
4. Cortland County Real Property Tax Services.
5. Cortland County Planning Department.
6. Cortland County Historical Society.
7. Phillip's Free Library, Homer, NY.
8. EcoSearch Environmental Resources, Inc., Sanborn™ Fire Insurance Map Search.

In general, the findings of Stearns & Wheler's records review supported those of NYSEG's previous review and previous findings summarized by E.C. Jordan.

Prior to completing field work for Phase 2 of the SRI, Stearns & Wheler again reviewed historical data in order to determine whether there was historical evidence of previous events or activities that might affect the course of Phase 2 SRI work. Several resources were utilized in gathering information as part of this historical component of the Cortland/Homer MGP site

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historical review. Historical site information gathered for NYSEG from prior investigative phases was reviewed, and is appropriately referenced in this report. In addition, the following agencies were queried for information relevant to the subject site: Cortland County Planning Dept., Cortland County Health Dept., Cortland County Assessor, Cortland Free Library, USDA Natural Resources Conservation Service, USDA Farm Service Agency, Town of Cortlandville Clerk, Town of Cortlandville Assessor, Town of Cortlandville Water & Sewer Depts., Cortland County Historical Society, Village of Homer Clerk, and the Town of Homer Clerk.

The information gathering also included a physical reconnaissance of the study area, specifically the Tioughnioga River located adjacent to the site. As noted previously, the principal objective of the historical assessment was to provide information that might affect the way in which a future site investigation is carried out. An important element of future investigation is an evaluation of possible site-related impacts to the sediments of the Tioughnioga River. In order to establish an appropriate area of potential concern within the river, Stearns & Wheler completed a reconnaissance to identify physical barriers or dams that serve as downstream sediment traps. Future investigative efforts would only need to extend downstream to the closest verified trap.

The Homer/Cortland MGP was constructed in 1858 and began supplying coal gas to the Village of Homer that same year under the name "Homer & Cortland Gas Light Company (HCGL)". HCGL incorporated in 1860 and added the City of Cortland to its distribution network that year. The August 3, 1883 edition of the Cortland newspaper, *The Democrat,* reported that a recent leak in the gas main near the gas house resulted in a loss of approximately 10,000 cu. ft. of coal gas. The September 9, 1887 edition of *The Democrat* reported that HCGL was constructing two buildings: a 124' x 29' and a 75' x 25' building to be used for storing coal, coke, etc. According to *Grip's Historical Souvenir of Cortland* (Welch, Edgar, 1899), the MGP burned and was rebuilt in 1890.

Historic Sanborn fire insurance maps for the years 1902, 1908 and 1915 were on file at the Cortland County Historical Society (CCHS) and reviewed as part of this investigation (Figure 2-1). The 1902 Sanborn map shows the subject MGP site developed with coal and coke sheds, an iron gas holder (labeled 50,000 cu. ft. capacity with a reported 45,000 cu. ft. capacity), purifying house, retorts, an exterior platform, as well as several other unidentified rooms within the building. Between 1902 and 1908, the Sanborn maps depict the addition of a 100,000 cubic feet capacity gas holder to the south side of the existing gas holder, and the addition of a two-story brick purifying house to the north side of the building. It appears that the former purifying house

was converted to storage space between 1902 and 1908. The purifying house has since been dismantled, along with all other related above ground MGP structures. In addition, the exterior platform was removed. The 1915 Sanborn map shows the same general building design with the addition of a second iron chimney along the west side of the site building, and the identification of all areas/rooms to include a coke shed, coal shed, retorts, engine room, governor room, storage area, tar pump and wash room. An undated photograph on file at the CCHS shows the MGP as it stood some point in time between the years 1915 and 1940, before dismantling commenced (Figure 2-2). Both the relief and distribution holders are evident.

In 1908, HCGL was renamed Barstow and Co. of New York. New York State Gas & Electric Corporation later purchased Barstow and Co. in 1911. New York State Gas & Electric Corporation merged with Ithaca Gas & Electric Company in 1918 and became New York State Electric & Gas (NYSEG). While in operation, coal gas and carburetted water gas were produced on site from 1858 to 1932. According to the *Preliminary Work Plan to Conduct Onsite Pilot-Scale Testing of Pumped Groundwater Treatment Technologies At NYSEG's Cortland/Homer MGP Site* (Remediation Technologies, Inc., April 1992), coal gas was produced on site until 1921 and carburetted gas replaced coal gas production from 1921 to 1932. The gas holder was used until early 1935 for storing natural gas.

According to a September 4, 1940 newspaper article on file at the CCHS, NYSEG dismantled the 45,000 cu. ft. (41'7" diameter x 19' deep) gas holder in 1940. NYSEG reportedly commissioned Otsego Iron Co. of Oneonta to cut down the steel structure. Brockway Motor Company, Inc. (Brockway) purchased the subject property in 1944 and razed the remaining MGP structures. Brockway began constructing a truck sales and service building in 1947. Remediation Technologies, Inc. (RETEC) reported that Brockway utilized two rooms in the northeast corner of the current I.D. Booth building for painting and paint and oil storage, according to a 1948 floor plan. In addition, RETEC reported the apparent presence of a funnel located in the aforementioned room that discharged to a 500-gallon tank, labeled "spent oil", located outside the building. Irving D. Booth purchased the property in 1971 and renovated the building to its current configuration. RETEC reported that the aforementioned 500-gallon "spent oil" storage tank had been removed.

According to the Cortland County Clerk's Office, the land parcel that comprises the north section of the subject site was owned by Mr. and Mrs. Arthur Call prior to 1928. Mr. and Mrs. Call sold the property to R.E. Bucklin, Inc. in 1928. Clipper Service Station purchased the property from

Bucklin in 1929. According to *Investigation of the Former Coal Gasification Site Cortland/Homer, Homer, New York - Task 3* (E.C. Jordan Co., May 1989), a fuel service station was present on the aforementioned property from the 1920's until 1972. Ithaca Propane purchased the site in 1969, and Randolph Well & Pump Company purchased the property in 1971. On May 9, 1972, Irving D. Booth, Inc. purchased the property from Randolph Well & Pump Company and demolished the on-site gasoline service station. New York Telephone occupied the north end of the Booth building, and utilized the parking lot adjoining the Booth building to the north, for company vehicles. A 1,000-gallon gasoline UST and associated fuel dispensing pump were located in the north parking lot and used by New York Telephone company fleet until they were decommissioned in 1984. Today, Verizon (formerly known as New York Telephone and Bell Atlantic) still occupies the northern building.

2.2 HISTORICAL MGP PROCESSES & PRODUCTION

MGP-related processes and production were investigated to identify whether there are specific areas at the subject site and adjacent properties that may require additional investigation, based on evidence of former structures, operations, spills, etc.

Mr. Alfred Beers, NYSEG representative, was interviewed via telephone on January 29, 2001. Mr. Beers had conducted research on the subject site at the NYS Public Service Commission Archive. According to Mr. Beers, the following information was compiled from *Electrical Corporation and Gas Corporations Classes A, B &C for NYSG&E Corporation and Its Predecessors* (1905 through December 31, 1924). Partial records existed for the years 1905 through 1924. A lime scrubber was used in the early reporting years, from 1905 to 1913. On site coal tar production ranged from 19,528 gallons during 1907 to 51,347 gallons during 1913. After 1913, annual gas production rates for the Cortland Homer MGP were combined with three other MGPs making the production rates for the subject site indistinguishable from the total for all four MGPs. Mr. Beers indicated that the median tar production rate for the years 1919 through 1924 was in the 45,000 gallons per year range, based on annual gas production rates. Mr. Beers reported that part of an existing tar well was partitioned off and abandoned in 1907, and a concrete tar well was constructed in its place, however, there was no reference to the location of this well. Figure 2-3 depicts the site circa 1920, based on a tax map for the village of Homer dated July 31, 1920 (E.C. Jordan, 1987).

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The following information was compiled from the previously referenced RETEC report (April 1992). RETEC reportedly obtained much of their information from prior site investigation reports, as well as daily plant operation details provided by Mr. Larry Mastin, former MGP employee (1927 to 1935). RETEC reported that coal used for on site production was shipped by railcar from Scranton, Pennsylvania. Anthracite coal was reportedly used as a fuel source in the generators, and bituminous coal was used in the retorts. Condensed gas was piped to the relief gas holder, then onto the purifying house, and finally to the distribution holder. Carburetted water gas production consisted of injecting oil onto the gas as it passed through a carburetor. The oil used for this process was light brown in color, and delivered to the site by railcar. This oil was stored in an aboveground storage tank located north of the generator house. Wood chips were used to scrub hydrogen sulfide from the gas in the purifiers. The sulfide saturated wood chips were aerated in outdoor piles, and later reused. Low areas across the property were occasionally filled with small amounts of residual coal and ash from the generator.

RETEC reported that 20,179,500 cubic feet of gas was sold to 1,385 customers in 1907 and approximately 600,000 cubic feet of gas was produced per day by carburetted water gas processes in 1928. By-product tar was stored in mortared stone-lined tar wells on site. According to previously referenced Sanborn maps reviewed at the CCHS, a single tar pump existed along the north exterior wall of the subject MGP, adjacent to the condensers. In addition, a coal tar storage vessel was located north of the main MGP building, adjacent to the condensers depicted in the 1915 Sanborn map (RETEC, 1992). According to the RETEC report, Mr. Mastin reported the location of a tar well between the relief gas holder and the coalhouse. He also reported the possibility of other on-site tar wells, although he did not provide definitive locations. Mr. Mastin was present during decommissioning and dismantling of the subject MGP and reported that tar residuals had accumulated in the relief gas holder, but not in the distribution gas holder. At closing, the relief gas holder was reportedly pumped free of tar, which in turn was dehydrated before being shipped off site. The relief holder walls were then flushed with water and the walls of the holder were pushed into the base, along with soil and unidentified debris to bring the surface up to grade. The tar wells were reportedly decommissioned in the same manner as the gas holders. While the relief holder foundation (unknown construction) was sunken several feet below grade, Mr. Mastin reported that the distribution holder base was constructed of concrete, and was built above grade. The distribution holder did not contain any residues at the time of dismantling (RETEC, April 1992).

According to *Draft Summary Document (Scoping Effort) for the Former Coal Gasification Site Cortland/Homer, Homer, NY* (Groundwater Technology, Inc., March 1993), on-site MGP operations produced coal tar, coke, ash and purification waste (including spent oxide) as process by-products. Groundwater Technology, Inc. (GT) reported that wood chips coated with iron oxide, coal, and ash was spread around the property to fill in low areas. Components of ash included organics (from incomplete burning of the coal), various heavy metals, and salts. Oxide wastes (most chemically bound with iron) included sulfur, cyanide and ammonia compounds. Coal tar consisted of a complex mixture of organic compounds including PAHs as well as smaller amounts of phenolics and light aromatic compounds (GT, March 1993).

A former drainage culvert is evident north of the existing site building, which conveyed storm water to the river in the past. There is no specific documentation of its period of service, and it is noted that Stearns & Wheler personnel observed the river out-fall to be dry during recent previous site investigations. It is not known how site runoff may have been conveyed to this former drain. There is no apparent tie-in to the site.

2.3 SUMMARY OF PREVIOUS (PRE-SRI) INVESTIGATIONS

Prior to the current SRI, two remedial investigations were completed at the Cortland/Homer former MGP site between 1985 and 1989. The first investigation was conducted between 1985 and 1987 (E.C. Jordan Co., 1987). Results of that investigation identified an apparent source area of coal tar-related compounds in subsurface soils near the I.D. Booth building. Coal tar-related VOCs and PAHs were found in shallow soils at a number of soil boring locations. Groundwater from monitoring wells downgradient of the site contained detectable quantities of VOCs and PAHs. Surface water samples from the Tioughnioga River east of the site generally did not contain MGP-related substances, although downstream sediment samples did contain PAHs. In addition, amenable cyanide was detected in a seep sample collected in the basement of a building located east of the site across Route 11. Two air samples collected in the basement of the Hayward Construction building and 4 exterior locations across the site indicated the presence of low levels of coal tar-related substances in ambient air. NYSEG subsequently purchased the building and razed it. Analytical data are tabulated in the Task 2 Report Appendix A-6 (attached).

A second investigation was conducted between 1987 and 1989 (E.C. Jordan Co., 1989). Results of that investigation generally verified the findings of the first investigation. The most elevated

levels of VOCs and PAHs were in soils near the site building, which was identified as a source area in the first investigation. Soil borings suggested that site contaminants appeared to follow the surface contour of a subsurface silt layer, which was causing contaminants to migrate eastward away from the site towards the West Branch of the Tioughnioga River. Groundwater data were consistent with this general eastward migration pattern.

Figures 2-4 through 2-8 depict geologic cross sections for the site, based on data from the Task 2 and 3 investigations, as well as data from the SRI. The top of the silt/clay unit is defined. The results of the prior site investigations are presented in further detail in the results section (Chapter 4) of this comprehensive SRI Report. In Chapter 5, results of the SRI are presented, and Chapter 6 provides a discussion and interpretation of results. From the SRI data, it is apparent that the silt/clay confining unit does not control the direction of the migration of site-related contaminants as was previously suggested. This interpretation is based on the fact that Phase 2 SRI soil borings advanced down to the silt/clay layer did not indicate tar was preferentially pooling there. Rather, it appears that tar presence and migration is controlled primarily by more subtle and smaller scale heterogeneities in the soil/fill that overlies the silt/clay unit, which potentially results in amore complicated and spatially random pattern of occurrence. Chapters 5 and 6 discuss the visible pattern of tar at the site, and data evaluation techniques based on the chemical fingerprints of tar to determine where it is most likely to occur.

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CHAPTER 3

SRI METHODS

All field work conformed to the guidance set forth in the Site Analytical Plan (SAP). All analytical methodology and data deliverables met the requirements of ASP Category B. Field work for the SRI included the following components:

- indoor air sampling
- surface soil sampling
- test pit investigation
- subsurface soil boring investigation
- groundwater monitoring well installation and groundwater sampling
- passive soil gas survey
- Tioughnioga River: bank reconnaissance, sediment probing and sampling, surface water sampling
- residential well survey
- fish and wildlife impact study

The sample locations of the various media that were collected during the multiple phases of the SRI are identified on Figures 3-1 through 3-5. Laboratory reports for the field sampling program are included as Appendix A.

3.1 SURFACE SOIL INVESTIGATION

Six surface soil samples were collected during the Phase 1 SRI on October 5 and 6, 1999. Most of the property in and around the site is developed and paved, so soil samples were collected from accessible areas of open ground (Figure 3-1).

Surface soil samples were collected from the following locations: sample SSS-1 was collected from the center of the lawn on the NYSEG property on the east side of Route 11; sample SSS-2 was collected from the center of the front lawn of I. D. Booth; sample SSS-3 was collected from the center of the west side of the Budget Inn front lawn; and sample SS-4 was collected from the center of the gravel lot in front of I. D. Booth's paved storage area. Two background samples

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were collected: sample SSS-5 was from north of the site, at the athletic fields on the east bank of the river, and SS-6 was collected from south of the site near Route 11.

Surface soil samples were collected by establishing a 1-meter by 1-meter square grid (3.5 feet by 3.5 feet) at each of the designated sampling locations. Five grab samples were collected from the first inch of topsoil from in the square. One sample was collected from each corner of the square and one from the center, and placed in a stainless steel bowl. The five grab samples were then composited into one sample. Any vegetation present was carefully removed from the sample prior to placing it in the designated sample container.

The surface soil samples were analyzed for target compound list (TCL) semi-volatile organic compounds (SVOCs), target analyte list (TAL) metals, total organic carbon (TOC), total petroleum hydrocarbons (TPHs), total and reactive cyanide, and reactive sulfide.

3.2 TEST PITS

Test pits were excavated during the Phase 1 SRI. Two test pits were originally proposed -- one to explore the gasholder area at the south end of the I.D. Booth building, and one to investigate the purifying house area along the east wall of I.D. Booth. However, NYSEG and NYSDEC representatives determined that no excavation would be needed at the gasholder location because soil boring information from earlier investigations had adequately characterized that area.

Two test pit soil samples were collected from a single test pit in the former purifying house area from depths of 5 feet (TP-1) and 8 feet (TP-1A). The test pit samples were analyzed for TAL metals, TCL VOCs and SVOCs, TOC, reactivity, TPH, and total and reactive cyanide. TP-1A was also analyzed for Toxicity Characteristic Leaching Procedure (TCLP) benzene (Tables 5-3, 5-4, and 5-5). The Phase 1 SRI test pit location is shown on Figure 3-2.

3.3 SOIL BORINGS

Soil borings were completed during both SRI phases. Three soil borings were advanced as part of the first phase of work (SB-22, -23, -24, see Figure 3-2), and an additional 34 borings were advanced during the second phase (see Figure 3-3). Four of the 34 boring locations for the second phase of SRI were actually paired with other borings, and became well couplets, so effectively the 34 soil borings were at 30 locations. In all, 14 of the 34 borings were completed

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as monitoring wells. Three of these monitoring wells (MW-22, MW-23, and MW–24) were installed during the first phase, and 11 more monitoring wells (MW-25 through MW-32) were installed during the second phase. Boring logs for the monitoring wells are included as Appendix B.

A. PHASE 1 SOIL BORINGS

One soil boring (Boring MW-24) was located near the eastern edge of the I.D. Booth building in proximity to Boring B-3 from a previous investigation. This was done to confirm or refute the presence of dense non-aqueous phase liquid (DNAPL) at this location. This boring was extended 2 feet into the top of the lacustrine silt unit to determine whether the unit can be regarded as a confining unit. The soil boring was installed using 4-1/4-inch diameter hollow-stem augers. Continuous sampling was performed using 2-inch diameter split-spoon samplers. A Stearns & Wheler geologist examined and logged all samples and performed visual, olfactory, and field equipment (PID) screening of all split-spoon samples. The borings were advanced through a sheet of plywood through which a hole had been cut. Additionally, a large plastic sheet was placed under the plywood and around the drill rig to act as a barrier to control the spread of contamination, if any was encountered. This combination allowed for effective collection of auger cuttings. All cuttings were containerized and stored on NYSEG's property on the east side of Route 11, across from the I.D. Booth building.

A laboratory sample was collected from the soil interval exhibiting the highest PID reading. The sample was analyzed for TCL VOCs, TCL SVOCs, TAL metals, total and reactive cyanide, reactive sulfide, and TOC.

The soil boring adjacent to the I.D Booth building was completed as a monitoring well (MW-24). This well was constructed of stainless steel riser and a 10-foot length of 0.020-inch slot screen with a 2-foot DNAPL collection sump at the bottom. The screen was set at the surface of the lacustrine silt unit, with the DNAPL sump extending into this unit. Upon completion, this well was developed and sampled as described in the Site Analytical Plan (SAP).

The two soil borings located east of the river were completed and finished as PVC monitoring wells without DNAPL sumps. These two wells were placed to determine if MGP residuals are migrating under the river. One of these two monitoring wells (MW-22) was installed directly across from the location of previous soil boring 20 (B-20). The other monitoring well was

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installed directly across from existing Monitoring Well MW-16. Both wells extended to the top of the lacustrine silt unit. The drilling process and soil sampling program for these two well borings was the same as was employed for Well MW-24, discussed above.

B. PHASE 2 SOIL BORINGS

The second phase of SRI work included a more comprehensive soil boring program to provide better characterization of the subsurface conditions on site and adjoining areas. Specific areas of investigation included:

1. Inside the I.D Booth/Verizon building;
2. Along the outside perimeter of the building;
3. Along the riverbank east of the site;
4. Locations north and south of the site.

A total of 34 soil borings were advanced during the second phase of the SRI (borings SB-1 through SB-22, MW-25, MW-26S, MW-26D, MW-27S, MW-27D, MW-28S, MW-28D, MW-29S, MW-29D, MW-30S, MW-30D, SB-31, MW-32). As indicated by the "MW" designation, 12 of the borings were completed as monitoring wells.

The soil borings were completed in the same manner as in Phase 1, except for the seven soil borings that were drilled inside the I.D. Booth building. Five of the inside borings were drilled using a portable skid-mounted rig. Two others needed to be advanced at an angle to enable the former relief holder to be penetrated. A discussion of these specialized methods is provided in Chapter 5.

One objective of the Phase 2 SRI soil boring program was to determine the occurrence of coal tar as NAPL in site soils. According to the approved Work Plan, in cases where NAPL was observed, an observation well was installed in the soil boring to determine the NAPL thickness and recoverability.

Phase 2 soil borings were advanced down to the confining silt/clay unit to verify its continuity across the site, and also to assess whether there appeared to be DNAPL accumulating at the top of it. The results of this assessment are provided in Chapter 5.

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3.4 GROUNDWATER

Two rounds of groundwater samples were collected from a total of 31 monitoring wells (Figures 3-2 and 3-3). These wells included all 15 that were installed during the two SRI phases, plus 16 other wells that were installed during previous (Task 2 and 3) investigations. One of the wells that was installed during the Task 3 investigation prior to the SRI, MW-10, was no longer present at the time of the SRI. The first sampling event occurred during Phase 1 of the SRI, and included the three wells that were installed during Phase 1, along with 16 other wells that were installed prior to the SRI. The second sampling event occurred during Phase 2 of the SRI, and included the nine new wells that were installed during Phase 2, plus all other existing site wells (including the three Phase 1 wells). All of the wells were redeveloped prior to sampling to remove sediments and other debris that may have accumulated in the wells to assure good hydraulic communication with the aquifer. Prior to redeveloping, a NAPL (LNAPL and DNAPL) level measurement was taken in each well using an interface probe. After redeveloping the wells, in situ hydraulic conductivity tests were completed in each well using the rising head test method.

Purged groundwater that appeared unimpacted was disposed of to the east of U.S. Route 11 in a groundwater recharge pit maintained by NYSEG. All purge water containing NAPL was disposed of in a liquid waste storage tank for later disposal.

One week was allowed to pass after redevelopment before in situ conductivity tests and groundwater sampling were begun (Appendix C). Groundwater samples for the first round of sampling (Phase 1) were analyzed for TCL VOCs and SVOCs, TAL metals, TPH, total sulfur, and total cyanide. For the second (Phase 2) sampling round the analytical program was amended to include a number of inorganic natural attenuation parameters, including dissolved oxygen, dissolved carbon dioxide, iron, manganese, nitrate, pH, ammonia, total kjehdal nitrogen, Eh, alkalinity, COD, BOD, and sulfate.

3.5 TIOUGHNIOGA RIVER

A comprehensive surface water and sediment sampling program was completed for the Tioughnioga River (Figures 3-1 and 3-4). Table 3-1 summarizes the location descriptions for the

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comprehensive river reconnaissance and sampling program. Sediment sampling and evaluation of analytical results follow the guidance in NYSDEC's Division of Fish, Wildlife and Marine Resources Technical Guidance for Screening Contaminated Sediments, dated March 1998. Work in the river was conducted during both phases of the SRI. Phase 1 work was completed during a period of low flow conditions, in October 1999. Phase 2 work was completed in May 2001, during which flow conditions were somewhat higher.

A. PHASE 1 SRI RIVER INVESTIGATION

1. **Reconnaissance.** The initial phase of the river investigation included a riverbank reconnaissance. The reconnaissance consisted of making visual observations of the west bank of the Tioughnioga River from a distance 400 feet upstream of Monitoring Well MW-18 to a location 600 feet downstream. Field personnel looked for evidence of impacts to the river, such as oily sheens, tarry seeps, stained soils or sediments, etc. Also noted were the locations of any outfall pipes or other structures that could represent potential preferential pathways, which could facilitate pollutant transport to the river. Additionally, transects were constructed crossing the river at 25-foot intervals extending 400 feet upstream of Monitoring Well MW-18 to 600 feet downstream.

2. **Sediment Probing.** Upon completing the riverbank reconnaissance, a sediment probing investigation was conducted. Probing was completed in 25-foot intervals with the locations coinciding with the aforementioned transects. A stainless steel hand auger was advanced through sediments until refusal. It was then removed from the boring and signs of impacts were noted. The locations of any impacted areas relative to a fixed point of reference were recorded in the field book. This process was repeated three times along each transect that crossed the river: on the west bank, in the center, and on the east bank. The probing covered a 1,000-foot stretch of river.

In locations where manual probing revealed physical signs of coal tar in stream sediments, it was necessary to expand the probing investigation to determine both the depth and areal extent of the coal tar. A raft-mounted boring tripod was used to advance borings in these locations until the depth of coal tar was identified. Seven of these borings were completed over a 300-foot stretch of the river.

3. **Surface Water and Sediment Sampling.** Surface water and sediment samples were collected following the completion of the probing investigation. A total of nine surface water and nine sediment samples were collected and located as follows:

- Two of the sample collection locations were upstream of the site at minimum distances of 100 and 200 feet, respectively, from the furthest upstream area at which impacts were identified from the sediment probing investigation (SW/SED-7 and –8)

- One sample was collected downstream of the site in an area 200 feet downstream of the furthest downstream area at which impacts were identified from the sediment probes (SW/SED-1)

- Six other samples were collected from various locations that were biased toward the most impacted areas of sediment based on visual observations made during the river bank reconnaissance and the probing investigation. Samples SW/SED-2 and -3 were upstream of SW/SED-1, but generally downstream of the site. Samples SW/SED-4, -5, and -9 were adjacent to the site, and Sample SW/SED-6 was slightly upstream. See Figure 3-1 for the Phase 1 SRI river sample locations.

The river sampling program for the first phase of the SRI was conducted by wading into the river and sampling in a downstream to upstream direction. Surface water samples were collected by facing the mouth of the bottle in an upstream direction until the bottle was completely filled. Sediment samples were collected immediately following surface water sampling and from the same general area. Sediments were collected by hand, from the top 3 inches of fine grain sediments in the river bed.

All surface water samples were analyzed for TCL volatile and semi-volatile compounds, TAL metals, TPH, and total cyanide. If total cyanide was detected, amenable cyanide was quantified. All sediment samples were analyzed for TCL volatile and semi-volatile organic compounds, TAL metals, TOC, TPH (using NYSDOH Method 311.13), and total cyanide. If total cyanide was detected, amenable cyanide was quantified. Surface water and sediment sample analytical methodology and data deliverables met the requirements of the ASP Category B requirements.

B. PHASE 2 SRI RIVER INVESTIGATION

B. PHASE 2 SRI RIVER INVESTIGATION

The second SRI phase expanded the coverage of the river investigation to a downstream location that was determined to be the most probable limit of sediment transport from the site.

Prior to beginning the sampling program, a stream walk and probing with hand auger was conducted along approximately 5,000 feet of the riverbank downstream of the site, between the southern end of the site and a breakwater north of the junction of Dry Creek and the Tioughnioga River. NYSDEC field representatives observed the probing. The breakwater was identified as a sediment trap downstream of the site, and as such it represents the maximum distance that near-site sediments could be transported downstream.

Sediment borings were completed using a tripod mounted on a floating wooden sectional platform with a rope and cathead pulley to drive a 2-foot long 3-inch split spoon with a 140-pound weight. Four inch casing was driven to prevent cave-in and allow for representative sampling at discrete depth intervals. Sediment borings were advanced at 35 locations in the river, encompassing approximately 5,500 feet. Twenty (20) borings were upstream and near the site, and the remaining 15 borings were at downstream locations from the site. For the boring locations upstream and downstream of the site, the objective was to collect samples approximately every 300 feet.

3.6 FISH AND WILDLIFE IMPACT ANALYSIS

A Fish and Wildlife Impact Analysis (FWIA) was completed through Step IIC (NYSDEC 1994). Phase 1 of the SRI included a FWIA through Step IIA, and Steps IIB and C were completed as part of the second phase.

The objectives of Step IIA are to:

1. Identify fish and wildlife resources that presently exist, and which existed before contaminant introduction.

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2. Provide information necessary for the design of additional remedial investigation, if necessary.

3. Identify pathways along which site-related impacts might affect fish and wildlife resources.

Steps IIB and IIC were the criteria specific and toxic effects analyses. The objectives were to:

1. Compare site-specific contaminant levels with numerical criteria to provide an assessment of potential site-related impact.

2. Determine the potential degree to which contaminants may affect the productivity and diversity of populations, species assemblages, communities, or ecosystems.

The FWIA was completed by reviewing available published maps and reports, obtaining information from state and local regulatory agencies, and from field investigation of the site and surrounding areas. Information acquired for the FWIA is included as Appendix D.

3.7 WATER WELL SURVEY

An information survey was completed to identify possible supply wells in the general study area. A questionnaire was distributed to area businesses and residents regarding supply well use. Returned surveys are included as Appendix E. Table 3-2 summarizes the survey distribution.

3.8 INDOOR AIR INVESTIGATION

Air samples were collected from within the I.D. Booth building during both phases of SRI to determine potential impacts from MGP residuals. The initial step of the indoor air sampling program was an inspection of the premises to determine potential sources of airborne contaminants from operations specific to the I.D. Booth facility such as adhesives, paint, solvents, off gassing from plastics and resins, and forklifts and delivery trucks, and also possible entrance pathways for MGP-related airborne contaminants.

Based on that inspection, an air sampling program was developed, and submitted to NYSDEC and NYSDOH for approval. Following state approval, the sampling plan was carried out.

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Air samples were collected during the first phase of the SRI using Suma canisters and were analyzed for VOCs by USEPA Method TO-14. Suma canisters are evacuated cylinders with a valve attachment and regulator that, when opened, draw in a controlled volume of air over the duration of the sampling interval. At the end of the test period, which can range from several hours to several days, the valve is closed and the canisters are shipped to a certified laboratory for analysis. A total of six air samples were collected over a 24-hour sampling period during Phase 1 (Figure 3-2).

Phase 2 of the SRI included a similar evacuated canister approach, but the samples were collected as grab samples from shallow borings that penetrated the floor of the building. As a precursor to the inside boring sampling effort [see Section 3.3(B)], a Teflon tube connected to a Suma canister was lowered into the loose soil/fill to a depth of 1.5 to 2 feet under the floor slab. The opening through the floor slab was covered with plastic around the tube to prevent air from being drawn into the hole. When the canister valve was opened, air from the material below the floor slab was drawn into the Suma canister. The valve was closed after the canister was filled (usually within 10 seconds of opening the valve), and the canisters were sent to a laboratory for analysis for TO-14 volatiles. Three grab air samples were collected in this manner, at locations shown on Figure 3-5.

3.9 PASSIVE SOIL GAS SURVEY

A passive soil gas survey was completed around the northwest portion of the Budget Inn during Phase 1 of the SRI, east of Route 11. This area was specifically targeted because it represents the off-site area closest to the former MGP site at which the general public might be exposed to airborne MGP impacts. Passive soil gas survey devices were buried at 11 locations around the perimeter of the Budget Inn's west wing. They were left in place for several days, according to manufacturer's requirements, and then retrieved and shipped to an analytical laboratory. The detectors utilize a sorbent medium within a glass vial. A screened opening in the vial allows soil vapors to enter the vial, and organic compounds within the vapor sorb to the medium. The medium is then analyzed for volatile organic compounds, which are reported in mass units (nanograms) of compounds that sorbed to the medium.

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In addition to the 11 locations around the Budget Inn, two passive gas detectors were deployed along the eastern edge of the I.D. Booth building to determine the soil vapor levels near the presumed MGP source area (Figure 3-2).

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CHAPTER 4

PREVIOUS INVESTIGATION RESULTS

In 1985, NYSEG initiated study to evaluate possible environmental impact at the former MGP site. EC Jordan was retained by NYSEG under contract 85-159 to complete the initial site investigation. Work was carried out as multiple tasks, including a Preliminary Site Evaluation (Task 1), followed by an Initial field Investigation Program (Task 2), and finally an Expanded Problem Definition (Task 3). The Task 1, 2, and 3 Reports prepared by EC Jordan (1985, 1986, 1989) provided an initial basis of understanding the nature and extent of impact at the former MGP site. This chapter presents the findings of those investigations.

4.1 OBJECTIVES AND SCOPE

The Preliminary Site Evaluation (Task) presented a summary of the site's history, environmental setting, and general site conditions based on then-available information and direct observation during site reconnaissance. Task 1 findings were presented in the Task 1 Report (EC Jordan, 1985).

The findings of Task 1 were used to develop a scope of work for Task 2, which represented the initial field investigation at the site. The Task 2 program was aimed at:

1. developing an understanding of the site's hydrogeologic setting;
2. determining the presence, identity, and concentration of chemicals present in soils, sediment, surface water, groundwater, and air;
3. completing a preliminary assessment of potential risks to human health and the environment

The scope of the Task 2 investigation included the following elements:

- A geophysical survey to investigate shallow geologic conditions. Information was used for boring and monitoring well placement;
- Installing 9 soil boring and 6 monitoring wells;
- In-situ permeability testing;

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- Groundwater sampling of monitoring wells, and surface water sampling from the Tioghnioga River;
- Sediment sampling from the Tioughnioga River;
- Sampling at a seep in the basement of the Hayward Construction Company basement;
- Collecting air samples at locations across the site;
- A preliminary assessment of health and environmental risks.

The Task 2 Investigation results were used to develop a scope of work for an expanded problem definition program, to be completed as Task 3. Task 3 included many of the same basic scope elements as Task 2, but was carried out to target specific areas at the site that required further investigation. For Task 3, thirteen (13) additional soil borings and 6 additional monitoring wells were installed, additional permeability tests were completed, test pits were dug, an additional round of river sediment and water sampling was completed, additional seep samples were collected from the Hayward Construction building, and a utility survey was done to identify potential transport routes for chemicals from the MGP site.

Some of the background and historical information that was presented in the Task 1 Report has been presented in this SRI Report as Chapter 2. The following sections present the findings of the Task 2 and 3 investigation programs.

4.2 INVESTIGATION FINDINGS

Conclusions presented in the Task 2 and 3 Investigation Reports include the following:

- The site is underlain by 30 to 40 feet of unconsolidated outwash sand and gravel deposits, over a confining silt/clay unit.

- Groundwater flow beneath the site varies from easterly to southeasterly.

- Hydraulic conductivity tests indicated that the deeper outwash deposits are more permeable than the shallower deposits.

- Land use surrounding the site is primarily commercial, including gas stations and motor vehicle service stations, which are potential contributors of contaminants.

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- Constituents common in coal tar were identified in the vicinity of soil borings B-2 and B-3, at the east edge of the building, and near former MGP structures. A shallow source of impact was also identified in TP-4, south of the building.

- VOC's and PAH's were detected at various depths in the sand and gravel deposits downgradient of the site. The off-site soil samples with the highest total VOC concentrations were the shallow sample from B-5 (4 to 6 feet) and the deep sample from B-16 (36 to 38 feet). Both of these samples are east of Route 11. The deep soil samples collected in the sand and gravel deposits just above the silt/clay layer interface from B-16 and B-20 had the greatest total PAH concentrations of all the soil samples collected off site.

- VOC's and PAH's were not detected in the silt/clay unit, indicating it acts as an impermeable barrier.

- VOC's and PAH's were detected in the groundwater in most of the monitoring wells sampled downgradient of the site. Among deep wells, MW-16 contained the highest levels of VOC's and PAH's. Among the shallow wells, MW-3 had the highest levels.

- Groundwater contaminants appear to migrate to the east, and also towards the southeast.

- A sediment sample collected from the river adjacent to the site contained low concentrations of benzene and total xylene. Total PAH's were detected at a concentration of 177 mg/kg (ppm). The concentrations may be the result of reported fuel spills and gasoline leaks associated with a former gasoline station at the site.

- Ferrous-ferric cyanide was present at concentrations ranging from 2.5 ppm to 16 ppm in sediment samples collected from the Hayward building basement.

Below is a more detailed account of the findings as reported in the Task 2 and 3 Investigation Reports.

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A. HYDROGEOLOGIC SETTING

Initial (Task 2) site investigation determined that groundwater flow beneath the site is due east, towards the Tioughnioga River. The average groundwater depth is 5 feet, with a very modest gradient of 0.006. The Task 3 Investigation determined that groundwater had a southeasterly component. From recent SRI groundwater data (see Chapter 5) it appears that groundwater flow fluctuates between primarily due east to east/southeast.

Site stratigraphy was reported in the Task 3 report as consisting of silty, sand and gravel fill (upper 5 to 10 feet), underlain by silty, sand and gravel glacial outwash, underlain by what was referred to as "fine sandy silt". The thickness of the fill and outwash above the sandy silt was reported to be between 20 to 40 feet across the site.

The Task 3 Report described the underlying silt unit as the bottom boundary, or confining unit, of the upper groundwater flow system. The finding was later confirmed by more recent investigation completed during the SRI; the silt unit was found to be continuous across the site, and was also found to contain enough clay to be more aptly described as a silt/clay unit as opposed to a sandy silt. A slight morphologic depression in the silt/clay unit that was identified in the Task 3 Report east of the I.D. Booth building was also confirmed in the SRI (see Chapter 5).

It was determined that there are subtle upward gradients in monitoring well clusters near the river, which indicates that the river is a hydrogeologic flow divide. Groundwater flows towards the river from both sides.

B. SOIL BORING RESULTS

During the Task 2 (July 1987) and 3 (May 1989) investigations carried out by E. C. Jordan, 22 soil borings were completed across the site. Eight (8) soil samples from Task 2 and 14 soil samples from Task 3 were analyzed for VOC's, PAH's, metals, cyanide, phenols, and TOC. Samples were collected from 6 near or onsite borings B-2 (8-10, 35-37, & 50-54 feet), B-3 (8-10 & 40-42 feet), B-4 (8.5-10.5 feet), B-5 (4-6 feet), B-7 (5-7 feet), B-10 (5-7 feet), B-11 (10-12 feet), B-12 (8-10 feet), B-13 (40-42 feet), B-14 (8-10 feet), B-15 (8-10 feet), B-16 (36-38 feet), B-17 (5-7 feet), B-18 (6-8 & 28-30 feet), B-19 (41-43 feet), B-20 (22-24 feet), B-21 (30-32 feet), and B-22 (30-32 feet).

Of the 22 soil borings there were obvious indications of visible NAPL at number of locations, including B-2, -3, -4, -11, -15, -16, -19, and -20. Some locations (e.g. B-5, B-22) indicated a petroleum-type impact. Test pit logs are included in Appendix B.

A discussion of NAPL/tar occurrence is included in Chapter 6. The following presents laboratory results of the Task 2 & 3 samples.

1. Volatile Organic Compounds (VOC's). VOC's were detected in 13 samples from 18 of the soil borings (Tables 4-1). VOC's were most prevalent in shallow soils (4 -11 feet). The highest levels of total VOC's in soils were from borings adjacent to historical MGP structures (Figure 4-1, borings B-2 – 177 ppm, B-3 – 51.9 ppm, and B-4 – 18.2 ppm). Aside from these borings adjacent to MGP structures, and also boring B-5 (31.7 ppm total VOC's) east of Route 11, all other shallow borings produced soils with less than 1 ppm total VOC's.

For deep soils, VOC's were detected in only one near site boring (B-3 – 8.37 ppm) and 2 other soil borings east of Route 11 (B-16 – 40.2 ppm & B-20 - .834 ppm).

2. Polycyclic Aromatic Hydrocarbons (PAH's). PAH's were detected in 10 samples from 18 borings (Figure 4-2). Eight shallow soil samples had detectable levels of PAH's, with borings along the east edge of the I.D. Booth building containing the highest levels: B-2 (13200 ppm), B-3 (3940 ppm), B-4 (185 ppm). Relatively low levels of PAH's were found in soils south of the building: B-7 (16.3 ppm), and B-10 (0.47 ppm). Otherwise, only three shallow soil samples, from borings east of Route 11, contained PAH's: B-5 (7.4 ppm), B-14 (.22 ppm), and B-18 (.18 ppm).

Four deep soil samples contained PAH's: B-3 (166.6 ppm), B-16 (160.3 ppm), B-18 (1.3 ppm), and B-20 (116.4 ppm).

New York State soil cleanup criteria (TAGM 4046) were exceeded for SVOCs in samples from borings B-2, B-3, B-4, B-10, B-16, and B-20.

3. Inorganic Constituents. Other analysis for soil samples included; total cyanide, phenols, total organic carbon, iron, zinc (Tasks 2 & 3), and lead (Task 3). Iron and zinc, which are common natural elements, were detected in all samples. Iron ranged from 9900 ppm in B-22 to

32000 ppm in B-11. Zinc levels ranged from 32 ppm in B-22 to 120 ppm in B-5. Lead levels were generally low considering the extensively developed nature of the site and surrounding areas. Lead in soils ranged from non detect in samples from borings B-16, -17, -21, and -22 to a high of 16 ppm at B-10.

Cyanide was only detected in 6 borings, primarily adjacent to historic MGP structures. The highest detected total cyanide levels were 14 ppm (B-12, north of purifier box) and 12.4 ppm (B-12, south of purifier box). Otherwise, 6.88 ppm total cyanide was detected at B-3 (shallow), 1.39 ppm at B-4, 0.96 ppm at B-5, and 3.11 ppm at B-7.

Phenols were detected at 7 samples; B-2 at 9.65 ppm, B-3 shallow at 1.47 ppm, B-3 deep at 0.37 ppm, B-4 at 0.25, B-5 at 0.28 ppm, B-7 at 0.23 ppm, and B-19 at 1.3 ppm.

Total organic carbon levels ranged from non-detect in B-11 to 90,000 ppm at B-21.

C. TEST PIT RESULTS

Four test pits were excavated with a backhoe as part of the Task 3 field investigation. Test pits TP-1, TP-2, and TP-3 were excavated to depths of 7 to 8 feet. The water table was found to be approximately 5 feet below the surface in each test pit. Backfill material including brown/black stained soil, ash, brick, gravel, and coke was encountered in the upper 2.5 to 4 feet of each test pit. TP-4 was excavated inside the I.D. Booth paved storage area to a depth of 9 feet. The water table was not encountered during excavation. As expected, the concrete gasholder foundation was encountered below the asphalt paving. Approximately 1.5 feet of black sandy fill and 0.5 feet of hard, black sandy charred material were encountered directly above the foundation. Brown sandy fill and stained silty sand were recovered below the concrete foundation to 9 feet below the surface.

A PID was used to monitor the VOC content in the soil as it was removed from the ground. Sample headspace measurements ranged from 5 ppm total VOC's in TP-1/S-1 and TP-3/S-1; to 10 to 12 ppm total VOC's in TP-2/S-1. One sample each was collected from TP-1, TP-2, and TP-3 for chemical analysis; two samples were collected from TP-4. Analytical results for the test pit soils are presented in Table 4-2.

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1. Volatile Organics Compounds (VOC's). A sample of the hard, black sandy charred material from TP-4/S-1 (taken at 2.0 –2.5 feet) contained the highest total VOC concentration (346 ppm). The total VOC concentration in TP-4/S-2 (taken at 7 – 8 feet) was 21.1 ppm. The VOC concentration in the sample from TP-2/S-1 (taken at 4 – 5 feet) was 15.7 ppm. Total VOC concentrations were lowest in TP-1/S-1 (0.16 ppm) and TP-3/S-1 (0.35 ppm).

2. Poly Aromatic Hydrocarbons (PAH). PAH's were much more concentrated in the test pit samples compared to VOC's. Similar to VOC's, however, the concentration of PAH's appeared to decrease with depth. For example, the total PAH concentration of the hard, black sandy charred material from TP-4/S-1 was 60,300 ppm, whereas the deeper sample at TP-4 contained 113 ppm. TP-2/S-1 and TP-3S-1 contained 330 ppm and 69.8 ppm total PAH's respectively. The sample TP-1/S-1 contained concentrations below quantifiable reporting limits.

3. Inorganic Constituents. Iron concentrations ranged from 1,800 ppm (in TP-4/S-2) to 15,000 ppm (TP-2/S-1). Lead concentrations in the test pit samples range from 51 ppm in TP-1/S-1 to 76 ppm in TP-4/S-2, except in the sample of charred material collected from above the gas holder foundation (190 ppm).

Zinc concentrations ranged from below the detection limit in TP-1/S-1 to 12 ppm in TP-3/S-1 for soils and 280 ppm for the charred material.

Cyanide was detected in TP-2/S-1 (9.2 ppm), TP-3/S-1 (3.3 ppm), and TP-4/S-1 (29.0 ppm). The primary cyanide form was ferro-ferri with a little amenable in TP-4/S-1.

Total recoverable phenols were detected in TP-2/S-1 (3.0 ppm), TP-3/S-1 (1.0 ppm), and TP-4/S-1 (8.6 ppm).

Total organic carbon (TOC) concentrations ranged from 2,500 ppm in TP-1/S-1 to 330,000 ppm in TP-4/S-1.

D. GROUNDWATER

Groundwater samples were collected for analysis as part of both Task 2 & 3. Three rounds of samples were collected during Task 2 (Jan. 86, April 86, and Aug. 86) for monitoring wells MW – 1 thru 6. Two rounds of sampling were completed during Task 3 for monitoring wells MW –

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1, thru 6, 10 thru 19, and 21. Analytical results and field parameters for groundwater are presented on table 4-3.

1. Volatile Organic Compounds. Generally, total VOC levels in groundwater are relatively low from Task 2 and 3 data. For the January 1986 (Task 2) sampling event, VOC's ranged from non-detect (ND) in groundwater from upgradient well MW – 1 and downgradient well MW-6, to 5.3 ppm in MW – 3 located near the former relief holder. In April 1986, VOC's were below detection limits in groundwater from wells MW-1, -2, and –4, with a maximum concentration of 4.5 ppm in MW – 3. In August 1986, total VOC's ranged from below detection limits in MW – 1 to 7.3 ppm in MW – 3.

Task 3 VOC concentrations ranged from non-detect in groundwater from wells MW – 1, -2, -10, -12, -13, and -21 to 3.8 ppm in MW – 3, with a maximum of 7.7 ppm in MW – 16. The concentrations in the groundwater from other site wells (MW – 4, -5, -6, -11, -14, -15, -17, -18, and -19 ranged between 0.07 ppm to 0.95 ppm.

2. Polycyclic Aromatic Hydrocarbons. For the first round of sampling (January 1986 - Task 2) PAH's were below detection limits in groundwater from wells MW – 1, -5, and -6. There were detectable concentrations in MW – 2 (0.5 ppm), MW – 3 (19.9 ppm), and MW – 4 (0.076 ppm).

Second round (April 1986) PAH concentrations were below detection in groundwater from MW – 1 and -4. Detectable concentrations were found in MW – 2 (35.8 ppm), MW – 3 (59.9 ppm), MW – 5 (0.55 ppm), and MW – 6 (8.8 ppm).

For the final round of Task 2 sampling (August 1986), total PAH's were below detection limits in groundwater from MW – 1 and MW – 4. Detectable concentrations were 1.52 ppm (MW – 2), 43.2 ppm (MW – 3), 1.7 ppm (MW – 5), and 0.76 ppm (MW – 6).

Task 3 total PAH concentrations were below detection limits in groundwater from MW – 1, -4, and -12. Total PAH concentrations in MW – 2, -5, -6, -10, -11, -13, -14, -15, -18, and -21 were less than 1 ppm. High total PAH concentrations were detected in groundwater from MW – 16 (499 ppm), and MW-3 (139.8 ppm).

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3. Inorganic constituents. Iron was found in all Task 2 wells, and concentrations ranged from non-detect to 0.51 ppm over the 3 sampling events. Lead was not detected in groundwater samples. Zinc was not detected in the first round, but was detected twice in the second round (MW - 5 at 0.021 ppm and MW – 6 at 0.012 ppm), and three times in the third round (MW – 1 at 0.021 ppm, MW – 3 at 0.011 ppm, and MW – 4 at 0.017 ppm).

Cyanide was only detected in MW – 2 (0.96 ppm, 0.30 ppm, and 0.13 ppm in the three sampling rounds) and MW – 3 (0.12 ppm, 0.11 ppm, and 0.14 ppm).

In January 1986, phenol concentrations ranged from non-detect (MW- 1, 4, 5, and 6) to 0.38 ppm in MW – 2. April 1986 phenol concentrations ranged from 0.026 ppm (MW – 5) to 0.22 ppm (MW – 2). August 1986 phenol concentrations ranged from non-detect (MW – 4 and 6) to 0.23 ppm (MW – 3).

Total organic carbon ranged from a low of 1.1 ppm at MW – 4 (Jan. '86) to 72 ppm at MW – 1 (January 1986).

In Task 3 wells, iron ranged from 0.05 ppm (MW – 1) to 9.3 (MW – 11). Lead was not detected in MW – 3 and -4, but otherwise ranged from 0.002 ppm (MW – 1, -2, -13, -15, -17, -19, and -21) to 0.011 ppm at MW – 14.

Total cyanide was not detected in MW – 1, -5, -6, -17, -18, and -21. Otherwise, cyanide ranged from 0.01 ppm (MW – 4 and 19) to 1.5 ppm (MW – 12).

Phenol concentrations ranged from non-detect (MW – 13) to 0.48 ppm (MW – 3).

Total organic carbon concentrations ranged from 1.1 ppm (MW – 18) to 8.9 ppm (MW – 10).

E. SURFACE WATER QUALITY

The Task 3 Report noted a number of water quality studies based on biological sampling of fish and macroinvertebrates in the Tioughnioga River. In general, the biological sampling programs revealed that the river was affected by multiple sources of impact in the area around the former MGP site.

A study of organic chemicals in fish tissue from the river was completed by the Cortland County Environmental Management Council in 1985. The study consisted of analysis for aromatic hydrocarbons in fish. Fish collected from the West Branch of the river showed no evidence of aromatic hydrocarbons. At other locations along the East Branch and also downstream of the City of Cortland, aromatic compounds were identified in fish tissue, and researchers concluded that they were due to discharge from the Cortland sewage treatment plant. An unidentified source was also implicated, between the sewage treatment plant and Blodgett Mills.

A macroinvertebrate study in 1972 (Cooper and Neuderfer) was also discussed in the Task 3 Report. Three river locations were targeted: (1) upstream of the village of homer, (2) in the village, but upstream of the site, and (3) downstream of the site. At the sampling station upstream of the village, water quality was reported to be in "excellent condition". The samp[ling station in the village of Homer (upstream of site) was reportedly "at least moderately polluted". Downstream of the site, the diversity index of macroinvertebrates was indicative of clean water, but there was reportedly evidence of petroleum product or solvent impacts, and overall high nutrient levels.

The Task 2 and 3 programs included sampling and analysis of water samples from the river adjacent to the site. Surface water samples taken from locations upstream, adjacent to, and downstream of the site during Task 2 were analyzed for VOC's, PAH's, metals, and other chemicals. Task 2 and 3 surface water analytical results are presented on Table 4 -4.

1. **Volatile Organic Compounds**. No VOC's were detected in surface water samples.

2. **Polycyclic Aromatic Hydrocarbons**. No PAH's were detected in surface water samples.

3. **Inorganic Constituents.** Iron concentrations in surface water ranged from 0.15 ppm at SW – 2 (January 1986) to 1.1 ppm at SW – 3 (April 1986). Lead was not detected. Zinc was only detected at SW – 1 during the August '1986 sampling event (0.011 ppm).

Cyanide was not detected in surface water samples.

Phenols were detected at SW – 1 (0.099 ppm – April '86) and SW – 3 (0.054 ppm – April '86).

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Total organic carbon was not detected at SW – 1 and 2 for January 1986. Organic carbon concentrations in other samples ranged from 1.6 ppm at SW – 3 (August 1986) to 5.3 ppm at SW – 2 (April 1986).

F. SEDIMENT QUALITY

Sediment samples collected from the Tioughnioga River upstream (SED-1), adjacent to (SED-2), and downstream (SED-3) of the site during both Task 2 and Task 3 (Task 3: VOC's and PAH's only) were analyzed for VOC's, PAH's, and inorganic constituents. Sediment analytical results are presented on Table 4 – 4.

1. Volatile Organic Compounds (VOC's). Total VOC's were detected in the sediment sample adjacent to the site during each of the 2 investigations: Task 2 - 0.826 ppm, and Task 3 – 2 ppm.

2. Polycyclic Aromatic Hydrocarbons. Task 2 total PAH concentrations were 13.2 ppm (SED – 1), 12.5 ppm (SED – 2), and 20.3 ppm (SED – 3). Task 3 total PAH's were non-detect for SED – 1 and 3, and 177 ppm for SED – 2.

3. Inorganic Constituents. Iron concentrations ranged from 1200 ppm (SED – 1 and 2) to 1500 ppm (SED – 3). Lead was detected at 25 ppm (SED – 2), 27 ppm (SED – 3), and 55 ppm (SED – 1). Zinc concentrations were 61 ppm (SED – 1), 66 ppm (SED – 2), and 260 ppm (SED – 3).

Cyanide concentrations were non-detect for SED – 1 and 3. The cyanide concentration for SED - 2 was 0.35 ppm.

Phenol analysis results were non-detect for SED – 2 and 3, and 0.16 ppm for SED – 1.

Total organic carbon concentrations were 13000 ppm for SED – 1, 24000 ppm for SED – 2, and 2700 ppm for SED – 3.

G. BASEMENT SEEPAGE

One (1) seepage sample for Task 2, and 4 seepage samples for Task 3 were taken from the floor of the Hayward Construction Co. basement. The Task 2 sample was analyzed for VOC's,

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PAH's, metals, and other constituents. Task 3 samples were analyzed for cyanide only. Seepage analytical results are presented on Table 4-4.

1. Volatile Organic Compounds and Poly Aromatic Hydrocarbons. No VOC's or PAH's were detected in the seep samples.

2. Inorganic Constituents. Task 2 analysis results indicated 4470 ppm for iron and 150 ppm for zinc. Phenols were non-detect, and total organic carbon was 59,000 ppm. The high levels of TOC, in the absence of detectable VOC's or PAH's, indicates that organic contaminants in the seep are probably unrelated to the MGP.

Results for total cyanide analysis were 390 ppm (Task 2), 7.6 ppm (Task 3, FL1), 3.6 ppm (Task 3, FL2), 2.5 ppm (Task 3, FL3), and 16 ppm (Task 3, FL4).

H. AMBIENT AIR SAMPLING

Six air samples were collected as part of the Task 2 scope of work. Four samples (A-1, -2, -3, -6) were collected outdoors and 2 (A-4 and -5) were indoor samples, from the basement of the former Hayward Construction building. Outdoor samples were analyzed for PAH's, iron, and zinc. Indoor samples were analyzed for PAH's only. Air sampling analytical results are presented on Table 4-5.

1. Polycyclic Aromatic Hydrocarbons. Naphthalene was the only PAH detected in the outdoor air samples: upwind - 0.17 ppb, onsite - 0.29 ppb, and downwind - 0.25 and 0.27 ppb. No PAH's were detected in the indoor samples.

2. Iron and Zinc. Iron concentrations were 3.5 ppb (upwind), 3.7 ppb (onsite), and 2.5 and 3.8 ppb (downwind).

Zinc was detected in only 2 samples: 0.36 ppb onsite and 0.27 ppb downwind.

CHAPTER 5
SRI INVESTIGATION RESULTS

5.1 SURFACE SOILS

Six (6) surface soil samples were collected during the first phase of the SRI, including four surface soil samples collected at various locations across the study area and two background surface soil samples (SSS-5 and SSS-6) collected from areas that are believed unlikely to have been affected by MGP operations.

Concentrations of SVOCs were highest in the sample collected in the center of the I.D. Booth front lawn (SSS-2), and were only somewhat lower across Route 11 in the front lawn of the motel (SSS-3). A second sample from I.D. Booth property, collected in the gravel lot southeast of the I.D. Booth building (SSS-4), had two-thirds less impact from SVOCs than the sample from the I.D. Booth front lawn. The difference in SVOC levels between Sample SSS-2 and the background samples was less than an order of magnitude. This finding, along with the fairly uniform chemical signature for SVOCs among all the samples, suggests at least some degree of background influence in the analytical results.

Data for metals did not indicate that former MGP operations have had a noticeable impact on surface soil quality; metals concentrations across the study area did not appear to be significantly higher in the former MGP area compared to background. No cyanide was detected in surface soils.

In addition to the surface soil sampling completed during the SRI, NYSEG completed an independent background soil sampling program in November 2000 that included surface soil samples at 35 locations across the Cortland area. The results of the background sampling program provide a baseline of ambient conditions against which the SRI data can be compared. Analytical results for the background program are included in Appendix A.

The following discusses the specific findings of the SRI and background sampling and analytical programs.

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A. SEMIVOLATILE ORGANICS

Analytical results for SVOCs in surface soils are summarized on Table 5-1. Of the six surface soil samples that were collected, Samples SSS-3 and SSS-4 contained the greatest number of different SVOCs (27 different compounds). Sample SSS-2 contained the highest total concentration of SVOCs (35.7 ppm), and the highest average concentration[1] of individual SVOCs (1.27 ppm). Sample SSS-2 was collected from the lawn along the eastern edge of the I.D. Booth building. Pyrene was the compound detected at the highest concentration in SSS-2, at 4.9 ppm. Sample SSS-3, located in the lawn west of the Budget Inn, had a total SVOC concentration of 25 ppm, and the average concentration for each detected SVOC was 0.926 ppm. The compound detected at the highest level in SSS-3 was pyrene, at 3.6 ppm. Sample SSS-4, collected from the center of the gravel lot southeast of the I.D. Booth building, contained a total SVOC level of 11.28 ppm. The average concentration for detected SVOCs was 0.42 ppm, and the compound present at the highest concentration was pyrene.

Among the remaining samples, the detected levels were significantly lower. The background samples (SSS-5 and SSS-6) contained 6.15 ppm and 7.9 ppm total SVOCs, respectively, with average individual SVOC concentrations of 0.24 ppm and 0.3 ppm, respectively. According to analytical results for the background samples, 23 different SVOCs are present in ambient soil samples in the greater Cortland area. There are 4 other SVOCs that were commonly found in laboratory method blanks (diethylphthalate, di-n-butylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate), so their detection in the soil samples is considered to be a laboratory artifact. Sample SSS-1, collected on NYSEG property east of Route 11, contained the fewest number of compounds (18) and had the lowest total SVOC concentration (1.71 ppm). The average SVOC concentration for sample SSS-1 was 0.081 ppm.

All of the 24 SVOCs detected in Sample SSS-2 were above the levels in at least one of the background samples SSS-5 and SSS-6. Samples SSS-1, -3, and -4 had 2, 25, and 23 compounds, respectively, above the levels in at least one of the background samples.

Among the SVOCs are PAHs, which are a subclass of compounds common in MGP wastes. PAHs are also common in fuel oil and coal residues, and so they are common environmental

[1] The average concentration includes only those compounds that were detected, such that non-detects are not considered an "event" in the averaging process. Averages are computed for each sample and represent the typical concentration for an individual detected compound in that sample.

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contaminants in developed areas. Table 5-1 identifies PAHs among the analyzed SVOCs. In the surface soil samples, total PAH concentrations ranged from 34.7 ppm near the I.D. Booth building (SSS-2) to 1.52 ppm east of Route 11 (SSS-1). The most concentrated PAH in the surface soils was pyrene, as discussed above. The background surface soil samples SSS-5 and SSS-6 contained 5.94 ppm and 7.18 ppm of PAHs, respectively. From the analytical results, PAHs account for more than 90 percent of the detected SVOCs.

Figures 5-1 through 5-3 show the general distribution of the detected SVOCs in the surface soil samples. Each SVOC is expressed as a percentage of the total concentration of SVOCs at each sample location. Overall, the detection patterns are similar in terms of the relative concentrations of SVOCs within individual samples. The prevailing chemical signature shows relatively high levels of phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, and chrysene compared to other SVOCs detected at each location, plus benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and isomers of benzofluoranthene. The more volatile and lighter SVOCs are relatively absent in the surface soil samples, as is expected, since those compounds would tend to volatilize over time in shallow samples exposed to air.

B. PETROLEUM HYDROCARBONS AND ORGANIC CARBON

The surface soil samples were analyzed for total petroleum hydrocarbons per Method NYSDOH 310.13. Gas chromatography elution patterns were compared to a number of standard patterns, including those for gasoline, kerosene, #2 fuel oil, #4 fuel oil, and #6 fuel oil. A coal tar standard was also prepared. All of the surface soil samples, including the background samples, produced elution patterns that matched the coal tar standard fairly well. However, the fact that the background samples were collected from more than 1,000 feet from the site makes it unlikely that they have been affected by coal tar from the site. Rather, the elution pattern of the coal tar standard may actually resemble other anthropogenic sources such as coal ash and other coal related byproducts, or highly weathered petroleum products unrelated to coal tar. The total petroleum hydrocarbon (TPH) analysis is a process in which the elution patterns of the samples are visually compared to prepared standard patterns. It is possible that what is viewed as a coal tar match may, in fact, be a weathered product of a different petroleum-based chemical, that is chemically similar to coal tar. The background data suggest this may be the case. Future discussion of TPH analytical results in this report is based on the interpretations reported by the analytical laboratory.

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Concentrations of total organic carbon (TOC) in the surface soils (Table 5-2) ranged from 39,600 ppm at SSS-3 (Budget Inn) to 17,500 ppm at SSS-5 (background, east of river). Sample SSS-6 located south of the site along Route 11 (considered to be background), contained 38,600 ppm of TOC, indicating that TOC in surface soils across the area is probably affected by area roadways. In general, comparing the TOC results from one location to the next did not suggest any apparent correlation between TOC levels and the location of the former MGP.

C. METALS, CYANIDE, AND SULFIDE

Analytical results for metals are included on Table 5-2. The TAL metals can all be found naturally in soils in various amounts. Among the most concentrated and usual natural metals in soil are calcium, magnesium, sodium, potassium, aluminum, iron, and manganese. Based on the two background samples (SSS-5 and SSS-6), it is apparent that calcium, iron, aluminum, magnesium, and potassium are the most concentrated metals in area surface soils.

If ambient soil quality is based on the analytical results for the background samples, then Sample SSS-3 (Budget Inn) had the most detections above background levels (20), followed by SSS-2 (10), SSS-4 (6), and SSS-1 (5). Samples SSS-2 and SSS-4 were the two samples collected on I.D. Booth property. By examining the concentrations of various metals at locations SSS-2 and SSS-4 with other sampling sites, there is no clear pattern that suggests MGP-related impacts have produced elevated metals in surface soils.

No cyanide was detected in surface soil samples. Sulfide was detected at SSS-4, at 13.8 ppm, but not at any other location.

D. BACKGROUND SAMPLING PROGRAM

In November 2000 Meta Environmental Inc. (Meta) completed a comprehensive background sampling program for the Cortland area. This work was done as part of a nation-wide study of PAHs in surface soils conducted by the Electric Power Research Institue (EPRI). NYSEG, and EPRI member, co-funded the study. A total of 35 locations were sampled, and soil was collected at 2 distinct depths at each location, 0 to 1 inch and 1 to 6 inches. The sample locations included schools, parks, commercial and industrial properties, city rights-of-way, and vacant lots. A mix of residential sites (4), municipal/public sites (18), commercial/industrial sites (12) and

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undeveloped sites (1) were included. The soil samples were analyzed for TOC and PAHs. Analytical results reported by Meta are included as Appendix A.

The average total PAH concentration for the 35 background locations was 9.91 ppm. However, background detections greater than the highest on-site soil sample concentration (3.47 ppm total PAH) were observed at two background locations: in a grassy area in a residential setting approximately 2 miles southeast of the site (sample S-21 – 63.7 ppm), and near an athletic field approximately 2 miles south of the site (sample S-32 – 134 ppm). The detections of total PAHs in surface soils near the I.D. Booth building and on immediately adjacent properties are evidently within the range of ambient variability of PAHs in soils across the Cortland area.

Additional soil samples were derived from the Route 11 rebuild project that occurred in 2000. Two samples of excavated soils in connection with the roadwork indicated that north and south of the former MGP site, there are sources of petroleum impacts, primarily gasoline and diesel. The chemical quality of the background samples in comparison with on-site soil samples will be discussed further in later sections.

5.2 TEST PIT – PURIFYING HOUSE

Test pits were dug during the first phase of the SRI. A test pit at the purifying house area was dug on October 5, 1999. A backhoe was used to open a hole 12 feet long by 4 feet wide by 8 feet deep, and a PID was used to monitor the air and screen for VOCs. The soil near the surface was generally fill that contained construction debris (wood, pipe, concrete fragments, and brick). At 2 feet below the surface, a tar odor was encountered but quickly dissipated. A viscous tar-like sample registered 1.4 ppm when screened with a PID. At 3.5 feet below grade, a concrete slab was encountered. A section of 2-inch diameter pipe was found at about 4 feet deep. Material from inside the pipe registered 3 ppm on the PID. A soil sample taken from a black silty layer at a depth of 5 feet registered at 2 ppm (TP-1). Another section of 2-inch diameter pipe was found at this level and registered 273 ppm. Digging stopped at 8 feet. A brick wall was identified on the eastern side of the excavation and a layer of tar-like NAPL was identified at the bottom. It was difficult to determine whether the excavation was primarily inside or outside of the brick wall. A soil sample was collected from the bottom of the excavation (TP-1A). The bottom sample appeared to be a mixture of soil and a tar-like NAPL, with the consistency of putty.

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Volatile and semi-volatile organic compounds were present in soil samples collected from 5 feet deep and from the bottom of the pit. Iron and cyanide were also detected in the samples. MGP-related cyanide wastes often occur as ferro-cyanide species that are stable compounds. Cyanide in this form is non-reactive and biologically unavailable. The fact that iron is the most concentrated of all metals detected in soils, and that it is found with cyanide, suggests it is potentially, although not necessarily, related to the MGP. The TPH scan, which produced a fairly good match with coal tar, further suggests an MGP-related source. Petroleum residual might also be present at the bottom of the pit, since the early portion of the elution pattern did not resemble any of the TPH standards, including coal tar.

By examining histograms that reflect the relative concentrations of the SVOCs in each sample, it is apparent that Sample TP-1A contains a concentrated fraction of the lighter end compounds such as naphthalene, 2-methylnaphthalene, acenaphthene, and acenaphthylene (Figure 5-4). Although these compounds were present in other surface and subsurface soil samples, they were at much lower concentrations in comparison to the other SVOCs detected. Thus, the chemical SVOC signature for Sample TP-1A is markedly different from the other shallower test pit sample, and also the surface soil fingerprints that were discussed above. This suggests that a petroleum source may be present in the deeper sample. Possible sources include the former waste oil tank reportedly used by Brockway (see Chapter 2), but it is also noted that the MGP facility utilized carburetion oil in its process. The deeper sample may also have undergone less chemical weathering than shallower soil and surface soil samples, which might also account for the observed chemical difference.

A. VOLATILE ORGANICS

VOC data for test pit soil samples are summarized on Table 5-3. A total of 11 different VOCs were detected among the two soil samples collected from the test pit. Sample TP-1, collected at a depth of 5 feet within a dark silty layer, contained a total VOC concentration of 0.653 ppm. A total of nine different VOCs were detected in this sample. It is noted that of the 0.653 ppm of total VOCs detected in this sample, acetone accounted for 0.51 ppm. The next highest concentration for a single compound was 0.074 ppm for 2-butanone. Neither of these two compounds is typically associated with MGP wastes. No other detected compound exceeded 0.05 ppm. The "BTEX" compounds (benzene, toluene, ethylbenzene, xylenes) were present at a combined concentration of 0.028 ppm. For all the detected VOCs, the average concentration was 0.072 ppm.

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The soil sample collected from the bottom of the test pit (TP-1A) contained seven different VOCs, at concentrations that were one to two orders of magnitude higher than the sample collected from above. The total VOC concentration in Sample TP-1A was 11.4 ppm. The most concentrated single compound was 2-butanone at 4.1 ppm, followed by total xylenes at 2.8 ppm. Acetone was next at 2.2 ppm. The "BTEX" compounds were present at a combined concentration of 4.8 ppm. For all the detected VOCs, the average concentration was 1.6 ppm.

B. SEMIVOLATILE ORGANICS

SVOC data for test pit soils are summarized on Table 5-4. Similar to the VOCs, the levels of SVOCs were noticeably higher in the sample collected from the bottom of the pit compared to the sample collected from 5 feet deep. The total concentration of SVOCs from the 5-foot sample (TP-1) was 58.2 ppm. For the bottom sample (TP-1A), the total SVOC level was 673.7 ppm. The average concentration of detected individual SVOCs for the 5-foot sample was approximately 2.5 ppm, whereas the average concentration for the bottom sample was roughly 10 times higher, at approximately 35 ppm.

In all, a total of 23 different SVOCs were detected among the two test pit soil samples. The compound detected at the highest concentration was naphthalene, at 210 ppm in Sample TP-1A. Phenanthrene was detected at the next highest level, in TP-1A at 100 ppm. In the sample from 5 feet deep (TP-1), the highest detected compound was pyrene, at 11 ppm.

A total of 16 different PAHs were detected in the test pit soils. In Sample TP-1, the total PAH concentration was 56.2 ppm, which is greater than 96 percent of the total SVOC concentration. In Sample TP-1A, the total PAH concentration was 625.1 ppm, or approximately 92 percent of the total SVOC concentration. Naphthalene was the PAH detected in the highest concentration in the test pit, in Sample TP-1A as noted above. Pyrene was the PAH present in the highest concentration in Sample TP-1, as noted above. The relatively high concentration of naphthalene in Sample TP-1A compared to the other compounds in that sample is in contrast to the comparatively low levels of naphthalene in Sample TP-1 and the surface soil samples. For example, naphthalene represents 34 percent of the total PAH concentration in Sample TP-1A collected from 8 feet below ground. In Sample TP-1, collected at 5 feet below ground, naphthalene represented only 4 percent of the total PAHs detected. For the surface soil samples, naphthalene represented only about 0.4 percent of the total PAHs. Thus, there appears to be a

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decrease in the relative proportion of naphthalene closer to the ground surface. This observation was noted above, based on Figures 5-1 through 5-4, and may reflect a greater degree of chemical weathering for shallower soils compared to deeper soils. However, it is also possible that the material from the bottom of the pit is a distinct source.

C. PETROLEUM HYDROCARBONS AND ORGANIC CARBON

Soil samples from the test pit were analyzed per method NYSDOH 310.13. Gas chromatography elution patterns were compared to a number of standard patterns, including those for gasoline, kerosene, #2 fuel oil, #4 fuel oil, and #6 fuel oil. A coal tar standard was also prepared by the laboratory, from it's own analytical library.

The sample from 5 feet deep (TP-1) was a good match for coal tar. For the sample from the bottom of the pit, the early part of the chromatogram did not resemble any of the prepared standards, although the later part of the chromatogram was a good coal tar match. This suggests that the NAPL found at the bottom of the pit was likely a mixture of coal tar residuals and some other unidentifiable petroleum-based compound.

There was actually more organic carbon in the shallower sample (28,200 ppm) than the deeper sample (17,400 ppm) despite the detection of greater levels of SVOCs and VOCs at depth (Table 5-5). The TOC in the shallower sample was generally consistent with levels detected in the background surface soil samples. The relatively lower levels of TOC at the bottom of the pit probably reflects a greater proportion of inorganic fill material at depth.

D. METALS, CYANIDE, AND SULFIDE

Among the metals detected in both soil samples, iron was at the highest concentration, at 21,800 ppm and 27,200 ppm in samples TP-1 and TP-1A, respectively (Table 5-5). Calcium, aluminum, magnesium, and potassium were among the other metals detected at the highest concentrations. All of these metals are common natural elements in soils.

Total cyanide was detected in both soil samples, at 39.8 ppm in TP-1, and 82.3 ppm in TP-1A. No reactive cyanide was detected in either sample. As noted before, cyanide associated with MGP material is typically complexed with iron as a stable, non-reactive compound. Sulfide was

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detected in the sample from the bottom of the pit (TP-1A) at 16.1 ppm, but none was detected in the shallower sample.

E. TCLP BENZENE

Soil sample TP-1A was analyzed for TCLP benzene. Analytical results were non-detect.

5.3 EXTERIOR SOIL BORING INVESTIGATION

Soil borings completed for the SRI targeted both the interior and exterior of the I.D. Booth building. This section discusses the exterior borings that were advanced outside the building and across the study area. The following section (Section 5.4) discusses the interior borings that targeted the inside of the building.

Previous investigations, and borings advanced during both phases of this SRI, have revealed the subsurface to be comprised of a varying mixture of fine to coarse sand, intermixed with silt and gravel. Surficial deposits near the site are generally considered to be pro-glacial fluvial sands and gravels, and occur primarily along the Homer-Preble valley floor, adjacent to the Tioughnioga River. In the Village of Homer, it is estimated that surficial deposits are as much as 200 feet thick, overlaying shale, siltstone, and sandstone (E.C. Jordan, 1987).

Previous studies have described surficial deposits in the uppermost 50 feet below grade to fall into three categories. From shallow to deep, a silty sandy gravel occurs in the uppermost 10 to 20 feet. These deposits are underlain by approximately 10 to 25 feet of coarse sandy gravel. A fine sandy silt unit occurs below the sandy gravel and is more than 20 feet thick in some areas (E.C. Jordan, 1987). The borings completed for the SRI verified that the lower unit, previously described as a "lacustrine sandy silt", contains primarily silt and clay. This lower silt/clay unit was identified in SRI borings at depths generally ranging from between 30 and 40 feet, and is apparently continuous across the study area. The fine-grained and continuous silt/clay layer represents a confining unit for the site.

Figure 5-5 shows the top of the silt/clay unit based on both previous soil borings and borings advanced during the two SRI phases. The SRI included borings directly under the I.D. Booth building, and to the west of it, which enabled a more thorough evaluation of the surface of the silt/clay unit than was previously possible. Some of the basic topographic elements that were

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depicted for the top of the silt/clay unit based on previous studies (Task 3 Investigation, EC Jordan 1989) are confirmed by the SRI data, most notably a slight depression in the silt/clay in proximity to borings B-16 and B-19, east of the I.D. Booth building and Route 11. However, the expanded database directly under the building and to the west, as well as east of the river, reveals more of the unit's undulating surface. It will be discussed later in this report that non-aqueous phase coal tar does not appear to be migrating along the top of the confining layer.

Soil borings were advanced at three locations during Phase 1 of the SRI (October 6 to 8, 1999), and 30 additional locations (including 4 boring couplets) during Phase 2 of the SRI (October 2001) (Figure 5-6). Three of these locations were east of the Tioughnioga River (Borings MW-22, -23, and -32). The remaining borings were advanced on the west side of the river and provide thorough coverage of subsurface conditions across the study area.

Soil samples were collected continuously during the drilling. Selected soil samples were collected from the borings based on visual observation, odor, and PID field screening results, and were submitted for laboratory analysis.

Boring logs are included in Appendix B, and describe the soils encountered during the SRI. Appendix B also includes boring logs from the previous Task 2 and 3 investigations. Based on boring log information, there were 21 borings (out of 55 total boring locations) that encountered visible evidence of tar. Of these 21 borings, 13 were either adjacent to the I.D. Booth building or inside of it. Visible tar impact observed during the SRI was either a putty-like NAPL, or more subtle staining or sheen. There were 13 SRI soil boring locations with such visible impact, and 10 were either immediately adjacent to the I.D. Booth building, or directly under it. (A discussion of impacts directly below the building is provided in Section 5.4). In all, there were only 8 borings from the Task 2 and 3 and SRI investigations with visible evidence of tar-related impact that were not immediately adjacent to or under the building: B-15, B-16, B-19 (all three located along east side of Route 11, directly east of MGP), SB-16 (east of the MGP near the northern edge of the motel and on west river bank), B-20 (adjacent to SB-16), MW-27 (south of SB-16 and adjacent to the motel), B-11 (south of MGP and west of MW-27D), and SB-31 (southern edge of the motel). Soil samples at various depth intervals from these 8 borings had varying amounts of visible NAPL and/or sheens, and odors associated with them. Laboratory analysis of soil samples at these locations (see Chapter 4 and SRI results below) indicate that the degree of impact is minor at certain of these borings, for example B-15, B-19, SB-31 at which no target organic compounds were detected in the soil sample.

There was impact at SB-16 that had an odor similar to fuel oil. Evidence of petroleum-type impact was also apparent in soil borings located adjacent to the I.D. Booth building. Borings SB-1 and SB-2, along the southwest exterior wall of the I.D. Booth building, produced soils with a fuel oil-type odor, and Task 2 borings B-5 and B-7 reportedly produced soils with evidence of petroleum as well.

The magnitude of visible tar impact is differentiated between SRI soil samples that contained an easily recognized viscous tar-like NAPL/soil mixture with a putty-like consistency, and those that had only traces of impact in the form of sheens or staining limited to discrete seams. Among the 13 SRI borings with visible impact, 6 borings had only minor staining or sheens, at discrete depth intervals, usually in very thin seams of visible impact. Thus only 7 SRI borings produced soil samples that had an obvious presence of putty-like tar. Of these 7 impacted borings, 3 were immediately adjacent to the I.D. Booth building (SB-3, SB-21, MW-24), and 3 were directly under it (SB-11, SB-12, SB-13). Another soil boring not immediately adjacent to the building, MW-27, also appeared to have the more obvious type of tar-like impact, southeast of the former MGP and adjacent to the motel. Soil from this boring from 20 to 24 feet deep had a sheen with specks or tar-like material intermixed with the soil. However, laboratory analysis identified only 3.1 ppm total SVOCs in that soil sample.

Soil from eleven of the 22 soil borings from the Task 2 and 3 investigations reportedly had visible signs of impact, based on the boring logs provided in the Task 2 and 3 reports (E.C. Jordan, 1987 and 1989). The type of impact ranged from what is described as "heavy, viscous tar and petroleum material" at one soil boring (B-3, adjacent to the former relief holder) to sheens on the soil samples in several other borings. From the descriptions, it appears that the greatest degree of impact in soils resides near the I.D. Booth building, as evidenced by descriptions for borings B-2, -3, and –4.

Borings east of the Tioughnioga River (MW-22, MW-23, MW-32) encountered wet coarse-grained sand and silt, and no indication of MGP-related impacts.

Among the impacted borings noted above, stains and odors were observed in soils at various depth intervals, with no indication of a preferential horizon of impact. Analytical results from the borings immediately adjacent to the I.D. Booth building indicate the presence of VOCs and SVOCs in soil, along with a TPH signature that suggests a coal tar presence.

A. VOLATILE ORGANICS

Analytical results for VOCs in soil borings are presented on Tables 5-6 and 5-7. Figure 5-7 presents the total VOC concentrations at each boring location. A total of ten different VOCs were detected from the 32 soil boring samples submitted for laboratory analysis during the two SRI phases. Except for 3 locations (SB-3, SB-16 and SB/MW-24) the soil samples collected outside the I.D. Booth building usually contained less than 0.1 ppm total VOCs. SB-16B (depth of 22-24 ft), located on the east side of Route 11 near the west bank of the river, contained five different VOC analytes, with a total VOC concentration of 30.9 ppm. The average concentration for each detected VOC analyte was 6.19 ppm. However, methylene chloride (2.9 ppm) was detected in the laboratory quality control (QC) blanks, and appears to be laboratory contamination. Acetone, detected in SB-16B at 8.7 ppm, is also a common laboratory contaminant. Accordingly, the VOC level at SB-16B is estimated to be 19.3 ppm. Boring MW-24 (38-30 ft), located adjacent to the east side of the I.D. Booth building and near the former relief holder, produced a soil sample that contained 16.3 ppm VOCs. SB-3 is located adjacent to the west wall of the building, and contained 115.2 ppm total VOCs.

The impacts at SB-16 concur with those observed in Task 3 investigation boring B-20, completed adjacent to SB-16. Other SRI borings completed along the west riverbank (SB-15, -17, -18, MW-28S/D) produced soil samples that contained only low levels of VOCs (< 0.1 ppm total VOCs, and no TAGM exceedances). Likewise, aside from boring B-20, the other Task 3 soil boring along the western riverbank (B-22) indicated no detectable VOCs. The soil boring data indicate the principal area of soils impact along the west bank of the river is near soil borings SB-16 and B-20.

Soil samples from borings MW-22 and -23 (located on the east side of the river) contained 4 and 2 different VOCs, respectively, and total VOC concentrations of .0094 ppm for MW-22 and 0.0018 ppm for MW-23. At boring MW-22, 0.009 ppm of the 0.0094 ppm total VOC concentration was from compounds not associated with MGP wastes. At boring MW-23, total VOC concentrations were lower than MW-22 (0.0018 ppm). Soil samples from boring MW-32 contained six VOCs, including acetone and methylene chloride, which are probably laboratory contaminants. Excluding these two compounds, 0.012 ppm total VOCs were detected. The data generally indicate that there is only minor VOC impact to subsurface soil east of the river, and the low levels detected do not appear to be MGP-related. In terms of the BTEX compounds

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(benzene, toluene, ethylbenzene, and xylenes), boring MW-22 contained only a trace (0.0004 ppm) of benzene, and boring MW-23 contained no BTEX compounds. Soil from boring MW-32 contained 0.002 ppm of benzene and toluene, respectively, and 0.005 ppm xylenes. Soil from borings SB-19 and SB-20, west of the I.D. Booth building, in a wet area west of the railroad tracks, contained no VOCs except for acetone and methylene chloride, which were detected in laboratory blanks.

Soil borings east of the river contained among the lowest levels of VOCs that were found at any location. However, there were comparably low detections of VOCs in many of the soil samples collected on the MGP-side of the river. Generally, the data indicate that VOC impacts in subsurface soils are limited to areas close to the building, most notably near MW-24, with minor detections elsewhere.

B. SEMIVOLATILE ORGANICS

Tables 5-8 and 5-9 summarize the analytical results for SVOCs in the soil boring samples. Figure 5-7 presents the total SVOC concentration at each soil boring location. Concentration contours for SVOCs (see Sheets 1 through 3) indicate the distribution of total SVOCs in discrete subsurface intervals (0-10 feet, 10-20 feet, > 20 feet).

Soil samples from boring SB-2A (located adjacent to the west exterior wall of the I.D. Booth building) contained the greatest number of SVOC analytes (27). The soil samples with the highest total SVOC concentration (6,060 ppm) and the highest average individual SVOC concentration (336.7 ppm) came from boring SB-3A (8-10 feet), located near the west exterior wall of the I.D. Booth building. Among the borings that were advanced along the outside of the building's west wall, the average total SVOC concentration was 980.7 ppm. Boring MW-24, along the east wall of the building near the former relief holder, contained 2,966 ppm total SVOCs. In contrast, the average total SVOC concentration for all other SRI borings outside the building was 7.27 ppm. In comparison, it is recalled that the average total SVOC concentration in background surface soils was 9.91 ppm (Section 5.1.D). The vast majority of impacts to subsurface soils are in close proximity to the building itself.

Soil borings located on the east side of the river (MW-22, -23 and -32) had relatively low SVOC levels of 1.54 ppm, 0.32 ppm, and 0.1 ppm, respectively. Except for the detection of bis (2-ethylhexyl)phthalate (0.1 ppm), no SVOCs were detected in soil from boring MW-32. As was

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the case with VOCs, it is apparent that SVOC impacts are minor on the east side of the river. The detected levels of SVOCs east of the river are below the background range for the site and surrounding area, and do not appear to be related to the MGP.

West of the site, in the wet area west of the railroad tracks, there were generally no SVOCs detected above a few parts per billion, expect for compounds that were also detected in laboratory blanks.

PAHs were detected in all but two of the 37 soil borings. The exterior soil borings that did not contain PAHs were SB-31 (south of the motel, sampled from 12-14 feet and 42-44 feet), and MW-32 (east side of river, sampled from 34-36 feet). At these locations, only bis (2-ethylhexyl)phthalate was detected. The soil borings that produced soil samples with the highest total PAH concentrations were SB-3 (4,960 ppm), and SB-4 (3,580 ppm) which are both located adjacent to the west exterior wall of the ID Booth building. Boring MW-24, near the former relief holder, contained 2,446 ppm total SVOCs.

Only one PAH was detected in the soil borings east of the river -- phenanthrene (0.005 ppm) found in Boring MW-22.

Overall, the most concentrated PAH detected in the soil samples was naphthalene. Similar to the deep soil sample from the test pit (TP-1A) that was dug during the Phase I of the SRI, naphthalene accounted for 30 percent of the total PAH concentration in the soil sample from Boring MW-24. For soil boring SB-3 along the west wall of the building, naphthalene comprised 23 percent and 17 percent, respectively, of the PAHs detected in samples from 8-10 feet, and 26-28 feet, respectively. In noticeable contrast are samples from SB-2, in which naphthalene comprised only 10 percent and 7 percent of total PAHs (at 14-16 feet and 30-32 feet, respectively). It was noted previously that odors at SB-1 and SB-2 suggested fuel oil impacts. The difference in the relative proportion of naphthalene among the soil samples reflects that there are apparently multiple sources of impact at the site and surrounding areas, as suggested by historical information for the area and the current property usage for the area. The relative proportions of other PAH compounds will be evaluated and discussed in Chapter 6 to further demonstrate the effects of multiple contaminant sources.

C. PETROLEUM HYDROCARBONS AND ORGANIC CARBON

Soil samples from the borings were analyzed per Method NYSDOH 310.13. Gas chromatography elution patterns were compared to a number of standard patterns, including those for gasoline, kerosene, #2 fuel oil, #4 fuel oil, and #6 fuel oil. A coal tar standard was also prepared. A TPH soil sample from Boring MW-23 was inadvertently not collected. There were no significant peaks in boring Sample MW-22. Boring Sample MW-24 contained peaks similar to a weathered coal tar.

A diesel range organics (DRO) scan was completed on samples from borings SB-1, -2, and –16, (Table 5-11) to help verify the source of a diesel-like odor in soils from those borings. Analysis identified 6,100 ppm, 1.9 ppm, and 90 ppm of diesel range compounds in soils from those respective borings, raising the possibility that there may be diesel type impacts are also present.

Levels of organic carbon in the subsurface soils (Tables 5-10 and 5-11) were two to three times less than in the surface soil samples. This is likely due to an absence of organic-rich natural material found in topsoil, and more of a prevalence of inorganic fill material.

D. METALS, CYANIDE, AND SULFIDE

Similar to the surface soil analytical results, the most concentrated metals in the soil boring samples were aluminum, calcium, iron, magnesium, and potassium (Table 5-10). Unlike the organics analytical results, the concentrations of various metals were uniform among the three soil boring samples and fairly similar to the background values found in the surface soil samples. Former MGP operations apparently have not had an effect on the detected metals levels.

Total cyanide was detected in a number of the SRI soil borings inside the I.D. Booth building (see below, and Table 5-11). However, only 2 of the SRI soil borings outside the building produced soil samples with detectable cyanide: boring SB-17, 24 to 28 feet (2.64 ppm) and boring MW-28D, 10 to 12 feet (1.32 ppm). The presence of cyanide in soils appears to be confined to areas in close proximity to the former MGP structures.

Sheet 4 delineates the presence of cyanide in soils from 0 to 10 feet deep, including data from previous investigations (Task 2 and 3). The majority of detetected cyanide is in near the former purfier area, at which there were 2 locations with more than 10 ppm total cyanide (MW/B-2, SB-21). A surface soil sample at TP-4 (2.5 feet deep) also contained more than 10 ppm total cyanide.

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Sulfide was detected only at boring Sample MW-22, east of the river, at 13.8 ppm.

5.4 INTERIOR SOIL BORING INVESTIGATION

A total of seven (7) soil borings were advanced inside the I.D. Booth building as part of the second (2001) SRI phase. Each boring targeted a former MGP area in need of further investigation. Single borings (a total of five in all) were advanced near the former coal storage area (SB-11), a former tar storage vessel (SB-12), the former retorts (SB-13), a former wash room (SB-14), and the former condenser (SB-22, Figure 5-6). In addition, two borings were advanced through the former relief holder (SB-9 and –10).

Continuous soil samples were collected from each of the interior borings. Drilling was completed for the five borings described above by a portable skid-mounted rig that was used to drive standard split spoons. Three of these borings penetrated down to the silt/clay confining layer (SB-12, -14, and –21). In the case of the two borings adjacent to the relief holder, the building layout required directional drilling using a standard truck-mounted drilling rig with an angled derrick. The drill derrick was angled 30 degrees from vertical, and hollow stem augers were used to drill through the former holder walls, and penetrate into the holder itself.

Soil sample analytical results indicate that relatively elevated levels of VOCs and SVOCs are associated with soils in and around the former relief holder, the former retorts area, and the former coal storage area. Other potential source areas (tar storage vessel, wash room, condenser area) produced soil samples with relatively lower concentrations of VOCs and SVOCs.

A. VOLATILE ORGANICS

Analytical results for VOCs in soil borings are presented on Table 5-7. Soil samples collected from under the I.D. Booth building contained relatively higher concentrations of VOCs than soils from the exterior soil borings. The interior sample containing the highest concentration of VOC analytes was SB-13A located in the retorts area of the former MGP site, collected at a depth of 8-11 feet. SB-13A contained six different VOC compounds, with a total concentration of 330.6 ppm. The majority of this concentration was due to BTEX. The average concentration for each detected VOC analyte was 55.1 ppm. Sample SB-10A (depth of 14-16 feet) contained five different VOC's with total and average VOC concentrations of 1,273, ppm and 212 ppm,

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respectively. Boring SB-10 penetrated the relief holder of the former MGP. Sample SB-10B, from 22 to 24 feet, contained lower levels of VOCs, by 2 orders of magnitude (62.6 ppm total VOCs). Boring SB-9 also penetrated the relief holder. Sample SB-9B, from 26 to 28 feet, contained 14.1 ppm total VOCs. However, 5.24 ppm of the detected VOCs was due to acetone and methylene chloride, which are common laboratory artifacts and not typical MGP residuals. Excluding these 2 compounds, the total VOC level in sample SB-9B was 8.88 ppm, most of it BTEX. It appears that residual VOC impact remains within the former holder area, but based on the higher detection in the shallower soil sample (SB-10A), the impacts appear to be bound to soils at specific intervals, rather than pooled near the bottom of where the holder was. This is consistent with previous descriptions of NAPL as being thoroughly mixed with soils, with a semi-solid, putty-like consistency.

The soil boring near the coal storage area produced a soil sample (SB-11A, 10-12 ft) that contained 16.8 ppm total VOCs, primarily BTEX. Soil samples from the tar storage vessel, washroom, and condenser areas contained only low amounts of VOCs, on the order of 0.01 to 0.1 ppm.

B. SEMIVOLATILE ORGANICS

Table 5-9 summarizes the analytical results for SVOCs in the soil boring samples. Of all of the soil borings advanced during the SRI, the borings inside the I.D. Booth building had the highest SVOC concentrations. Boring SB-9B (26-28 feet), installed through the relief holder, contained the most (23) SVOC analytes. Similar to the VOC results, SB-13A (8-11 feet) was again the location with the highest total SVOC concentration (3,393 ppm) and the highest average individual SVOC concentration (169 ppm) of the seven interior soil boring samples.

Within the relief holder, a higher level of impact was identified in the shallow soil sample (SB-10A) compared to the deeper soil samples (SB-9B, SB-10B), as was observed for VOCs. SB-10A contained 2,668 ppm (0.26 percent) SVOCs, and is believed to represent a fairly even mixture of residual coal tar and soil. As was noted for the VOCs, the fact that higher levels of impact were identified in the shallower sample indicates that the coal tar tends to adhere to soils rather than settle to the bottom of the holder.

Aside from the relief holder soil samples and the retorts area, the coal storage area boring (SB-11) produced a sample that contained 672 ppm total SVOCs. The other interior samples generally contained relatively minor amounts of SVOCs.

C. TOTAL CYANIDE

Total cyanide (Table 5-11) was detected in soil borings associated with the former relief holder (SB-9, SB-10), the coal storage area (SB-11), the retorts (SB-13), and the condenser area (SB-22). Total cyanide was detected in soil from 14 to 16 feet deep at SB-10 (13.8 ppm) and from 10 to 12 feet deep at SB-11 (6.07 ppm). The deeper soil samples collected in these borings contained an order of magnitude less of cyanide (2.71 ppm and 0.622 ppm, respectively). At boring SB-22 (8 to 11 feet), near the former condenser area, 37.3 ppm of total cyanide was detected. At other interior boring locations there was less cyanide in the soil samples. Soil from the northern-most interior borings (SB-12, -14) did not contain detectable cyanide. Overall, cyanide concentrations are highest in the area near the relief holder and condenser areas. As noted in the previous section, only traces of cyanide were found in soils outside of the building footprint.

D. TCLP

A soil sample from boring SB-9, within the relief holder, was analyzed for TCLP volatiles, semivolatiles, and metals. Only 3 organic compounds (benzene – 8.3 ppm, 2-methylphenol – 0.021 ppm, 4-methylphenol – 0.069 ppm), and 3 metals (arsenic- 0.028 ppm, barium – 0.791 ppm, lead – 0.098 ppm) were detected. The sample represented a mixture of semi-solid tar and soil, and is believed to provide a good indication of the TCLP characteristics of waste material within the holder. The sample failed hazardous waste criteria for benzene (regulatory level of 0.5 ppm).

5.5 GROUNDWATER INVESTIGATION

Groundwater occurs in all soil strata underlying the site. The depth to groundwater under the study area ranges from 5 to 10 feet. Groundwater flows from west to east across the site, discharging to the Tioughnioga River (Figure 5-8). The total travel distance for groundwater from the I.D. Booth building to the river is less than 200 feet, so the groundwater flow field within the study area is both short and well defined.

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In situ permeability tests completed as part of the Phase 1 SRI indicate hydraulic conductivity values ranging from 0.18 ft/day to 82.17 ft/day (Table 5-12). Considering that the hydraulic gradient across the site is 0.005, and assuming an effective soil porosity of 20 percent (0.20), the following equation was used to estimate groundwater seepage velocity:

$$V = KI/n$$

where:

v = Groundwater seepage velocity
K = Hydraulic conductivity
I = Hydraulic gradient
n = Effective soil porosity

Based on this equation, the average groundwater seepage velocity across the site is estimated to be 0.3 feet per day (113 feet per year).

A total of three rounds of groundwater sampling and analysis were completed during both Phases of the SRI to assess the degree of groundwater impacts that might be attributable to former MGP activities, and also to investigate the occurrence of natural attenuation at the site. The groundwater investigation program included the redevelopment of existing monitoring wells (Task 2 & 3 Investigations, E.C. Jordan); installation of new monitoring wells across the site to provide supplemental data concerning groundwater quality and groundwater flow; and installation of observation wells to determine the presence of NAPL.

In all, a total of 15 new monitoring wells were installed and sampled during Phase 1 and 2 of the SRI. Results of the sampling and analysis program for the SRI are presented in the following sections.

A. VOLATILE ORGANICS

A summary of the Phase 1 analytical data for volatile organic compounds in groundwater is presented as Tables 5-13. A total of 14 different VOCs were detected in site groundwater samples during the Phase 1 investigation. Of these compounds, seven were detected above NYSDEC Class GA groundwater standards (TOGS, June 1998):

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- benzene (exceeded standards in 12 monitoring wells)
- total xylenes (10)
- ethylbenzene (9)
- toluene (7)
- styrene (3)
- 1,1,2-trichloroethane (2)
- methylene chloride (1)

Among the 19 wells sampled as part of the Phase 1 SRI, Wells MW-3 and MW-24 contained the most VOCs in terms of both total VOC concentration and the number of separate compounds detected. These two wells are immediately downgradient of the former relief holder, east of the I.D. Booth building. The groundwater sample from Well MW-3 contained benzene, toluene, ethylbenzene, xylenes, styrene, and 1,1,2-trichloroethane, and had a total VOC concentration of 5.75 ppm. The groundwater sample from MW-24 contained benzene, toluene, ethylbenzene, xylenes, acetone, styrene, and methylene chloride, and had a total VOC concentration of 3.75 ppm. Of the remaining 17 wells, only 2 had a total VOC concentration greater than 0.5 ppm during Phase 1: MW-17 (0.89 ppm) and MW-19 (0.655 ppm). The upgradient Monitoring Well MW-1 and the wells installed east of the Tioughnioga River (MW-22 and MW-23) all contained less than 0.005 ppm total VOCs.

For the four monitoring wells that contained more than 0.5 ppm total VOCs, the average concentration of each detected compound ranged from 0.719 ppm in MW-3 to 0.131 ppm in MW-19. For the remaining 15 wells, the average concentration for individual compounds ranged from 0.079 ppm (MW-5) to less than 0.001 ppm (MW-1, -2, -21). The compounds benzene, toluene, ethylbenzene, and xylenes (BTEX) were by far the most commonly detected in site groundwater wells.

A total of 31 groundwater samples (plus two duplicates) were collected and analyzed for VOCs as part the second phase of the SRI. A summary of the analytical data is presented under Table 5-14. A total of nine different VOCs were detected in site groundwater samples. Of these compounds, five were detected above NYSDEC Class GA groundwater standards (TOGS, June 1998):

- benzene (exceeded standards in 11 monitoring wells).

- toluene (8)
- ethylbenzene (7)
- styrene (2)
- total xylene (10)

Among the 31 wells sampled as part of the Phase 2 SRI, wells MW-3 and MW-24 contained the most VOCs in terms of both total and average VOC concentrations, the same as for Phase 1. Benzene; toluene; ethylbenzene; xylenes; styrene; 1,2,3-trichloroethane; and methylene chloride were the compounds detected above Class GA standards in wells MW-3 and –24.

Although wells MW-3 and -24 have consistently higher VOC levels than the rest of the monitoring wells, the concentrations of the above compounds have declined by an average of more than 60 percent between the first and second phases of SRI sampling.

Figures 5-9 and 5-10 show the concentration contours for total VOCs based on groundwater analytical data. From the figures, it is apparent that the greatest impacts from VOCs are largely confined to west of Route 11, along the eastern edge of the I.D. Booth building near Wells MW-3 and MW-24. The levels of VOCs appear to decrease by an order of magnitude within approximately 100 feet of Wells MW-3 and MW-24.

Phase 1 SRI groundwater data suggested that there was some degree of lateral spreading of impacts adjacent to Route 11, perhaps along the bedding of utility conduits. However, the additional Phase 2 monitoring wells indicate that a relatively minor, secondary plume exists south of the main relief holder plume area. Impacts at well MW-11, south of the MGP area, indicate a petroleum related source, recalling that petroleum odors were noted during the Phase 2 sampling round. The petroleum hydrocarbon scan (Section C) suggests a fuel oil mixture at MW-11, as well as gasoline and diesel impacts in other wells (MW-3, -5, and -7). A number of current and former area businesses, including gasoline service stations, and automotive sales and repair shops, could have contributed to these impacts, but MGP operations that utilized a carbureted water gas process could have produced petroleum-type impacts as well. In any case, impacts related to coal tar can be differentiated from those due to other sources, including petroleum, which helps to differentiate tar-related impacts from petroleum impacts.

Both the shallow (Figure 5-9) and deep (Figure 5-10) isoconcentration contours for VOCs indicate a southern plume separate from the main MGP area. In addition, for deeper

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groundwater (Figure 5-10) the primary groundwater plume east of the MGP appears to have two sub-plumes, one centered at MW-24, and the second centered at MW-16. This may reflect two separate areas of tar near the MGP structures, which a main area of impact connected with the former relief holder, and a second area possibly in connection with the former gas storage vessel. Deep groundwater isoconcentrations for SVOCs (see Figure 5-12) also indicates this sub-plume feature.

Analytical results for samples from upgradient wells MW-1, MW-25, and MW-26 for the second round of SRI groundwater sampling indicated no detections for TCL VOCs and SVOCs. However, upgradient groundwater quality is somewhat variable, based on previous samples from MW-1, which have contained organic compounds in previous sampling events.

B. SEMIVOLATILE ORGANICS

Summaries of analytical data for semi-volatile organic compounds in Phase 1 and 2 of the SRI are presented as Tables 5-15 and 5-16. During Phase I of the SRI, a total of 28 different SVOCs were detected in groundwater samples. Of these, 17 compounds were detected above Class GA groundwater standards:

- naphthalene [exceeded standards in 11 wells]
- benzo(a)anthracene [9]
- chrysene [9]
- acenaphthene [7]
- benzo(a)pyrene [7]
- benzo(b)fluoranthene [6]
- benzo(k)fluoranthene [6]
- indeno(1,2,3-cd)pyrene [6]
- phenanthrene [3]
- fluorene, anthracene, and fluoranthene [two wells each]
- pyrene, phenol, 2 methylphenol, 4 methylphenol, and 2,4 dimethylphenol [one well each]

Well MW-24 had the greatest total SVOC concentration (9.39 ppm), and contained 20 different compounds. Well MW-2, which contained a relatively low concentration of total SVOCs (0.057 ppm total SVOCs), contained 19 different compounds. Well MW-3 contained 18 different

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compounds, with a total SVOC concentration of 8.44 ppm. Only three other monitoring wells had total SVOC concentrations greater than 0.5 ppm: MW-17 (2.87 ppm); MW-15 (1.19 ppm); and MW-16 (0.632 ppm). The upgradient Well MW-1 contained nine different SVOCs, with a total SVOC concentration of 0.039 ppm. Aside from laboratory blank contaminants, the two wells east of the river (MW-22, MW-23) each contained only one SVOC (diethylphthalate) at concentrations of 0.002 ppm and 0.001 ppm, respectively. This compound, and phthalates in general, are not associated with MGP operations but are commonly used as plasticizers, and may be associated with sample collection equipment and bottles.

A total of 19 different SVOCs were detected in groundwater samples in the second SRI phase. Of these, 9 compounds were detected above Class GA groundwater standards:

- naphthalene [exceeded standards in 9 wells]
- acenaphthene [8]
- phenanthrene [5]
- fluorene[4]
- chrysene, benzo(a)anthracene, anthracene, flouranthene, and 2,4 dimethylphenol [one well each]

Results of the second SRI sampling phase indicate fewer compounds exceeded standards, in fewer wells. This is despite that fact that more wells were sampled in Phase 2 compared to Phase 1.

Similar to the Phase 1 SRI findings, Well MW-24 had the greatest total SVOC concentration among the Phase 2 groundwater samples (6.36 ppm), and contained six different compounds. However, the SVOC concentration in groundwater from MW-24 was 32 percent lower in Phase 2 compared to Phase 1. Well MW-3 contained 11 different compounds, with a total SVOC concentration of 5.795 ppm, which is 31 percent lower than the previous phase.

Only four other monitoring wells had total SVOC concentrations greater than 0.5 ppm during Phase 2: MW-17 (3.28 ppm), MW-15 (1 ppm), MW-16 (0.95 ppm), and MW-27D (0.857 ppm). Although this area downgradient of the site is within a groundwater plume of MGP impacts, there was visual and olfactory evidence at MW-17 during sampling that suggested a petroleum presence. This field observation is supported by the petroleum hydrocarbon scan (Section C),

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which suggests a fuel oil mixture at MW-17. The three wells located on the east side of the river (MW-22, -23, and -32) contained no detectable SVOC concentrations.

Figures 5-11 and 5-12 show the concentration contours for total SVOCs in groundwater. There is a general similarity between the pattern of SVOC and VOC impacts in site groundwater. The secondary plume south of the MGP site is apparent. The main area of impact, defined primarily by wells MW-3 and MW-24, extends eastward towards Route 11, and the southern plume extends from a source area that is separate from the main MGP area. In addition, the SVOC sub-plume east of the building near MW-16 is even more apparent than the VOC sub-plume, which supports the multi-plume interpretation. For example, the impacted area east of the MGP were interpreted as a single plume, then the SVOC isoconcentration contour for 1,000 ppb would need to contort around MW-24 and MW-16 in a manner that defies the prevailing direction of groundwater flow, creating an amoeboid pattern that is uncharacteristic of plumes in a groundwater flow field.

C. PETROLEUM HYDROCARBONS

Groundwater samples were extracted and analyzed per Method NYSDOH 310.13. Gas chromatography elution patterns were compared to a number of standard patterns, including those for gasoline, kerosene, #2 fuel oil, #4 fuel oil, and #6 fuel oil. A coal tar standard was also prepared.

The TPH analysis did not identify any significant peaks in samples from Wells MW-1, -12, -13, -21, -22, and -23. The elution patterns for samples from Wells MW-6, -14, -15, -16, -18, and -19 were suggestive of diesel. The patterns for samples from Wells MW-3, -5, and -17 were suggestive of a gasoline and diesel mixture. The pattern for MW-2 was suggestive of #6 fuel oil, and the pattern for MW-11 was a fuel oil mixture. Only MW-24 produced a sample that had a pattern similar to the coal tar standard.

D. METALS, CYANIDE, AND SULFIDE

The full suite of TAL metals was included in the Phase 1 analytical program, plus cyanide and sulfide. The following parameters were detected in Phase 1 groundwater samples at concentrations above Class GA groundwater standards or guidance values: iron (exceeded standards in 19 wells), sodium (19), manganese (16), cyanide (3), sulfide (3), magnesium (3),

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lead (2), nickel (2), arsenic (1), and barium (1) (Table 5-17). Among the 19 wells that were sampled, Well MW-24 had the most parameters (six) above water quality standards, followed by MW-5 (five parameters). Five wells (MW-3, -6, -11, -15, and -23) had four parameters above standards. Of the remaining 12 wells, 10 contained 3 parameters above water quality standards and 2 contained 2 parameters above standards (MW-1, MW-21). Thus, all of the 19 wells that were sampled contained at least 2 parameters above water quality standards.

The two parameters that were detected in all wells were iron and sodium. These elements are very common in natural groundwater, and their presence at the project site is largely attributed to natural minerals in area soils. The concentration of iron in the upgradient well (MW-1) was 5.01 ppm. However, the concentration of iron is relatively high in Wells MW-3 and MW-24 (Figure 5-13), suggesting an additional iron source there. These two wells are at the eastern edge of the I.D. Booth building, so the iron in this area may be related to either MGP residuals or current site activities. Excluding Wells MW-3 and MW-24, detected iron is probably a natural groundwater characteristic.

There are a number of observations that indicate the presence of iron in ambient groundwater. Most notable is the fact that Well MW-23, located east of the river, contains the third highest dissolved iron concentration in the study area. The concentration contours for iron clearly show that iron levels in groundwater decline rapidly away from the I.D. Booth building towards the north (Figure 5-13) and approach water quality standards near the river. Within the river itself, iron concentrations did not exceed water quality standards at any location (Section 5.6). Thus, the iron concentration contours in groundwater support the notion that the river is a hydrogeologic boundary, and the iron in MW-23 is unrelated to the MGP site.

Elevated iron near the I.D. Booth building corresponds to the same area in which elevated organic compounds were identified. As indicated above, the dissolved organic compounds have undergone only limited migration in groundwater, indicating natural attenuation has occurred. The elevated iron in groundwater is consistent with a biodegradation process, by which aerobic degradation of organics creates reducing conditions that liberate iron from the soil. Thus, the elevated iron in site groundwater provides additional indication that aerobic degradation is restricting the migration of organic contaminants.

There are some isolated areas where sodium is relatively elevated, but it is not apparent that the sodium is due to the MGP site, nor would it be expected to be. It is more likely that elevated

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sodium is an artifact of road de-icing, since the isolated high sodium areas are along the downgradient (eastern) edge of Route 11.

Cyanide is a potential parameter of interest at MGP sites because it can occur in MGP process wastes. From the Phase 1 SRI, cyanide was detected in a total of eight wells (MW-3, -11, -12, -14, -15, -16, -17, and -24), and above water quality standards in three wells (MW-3, -11, and -12). The groundwater data indicate an isolated area adjacent to the I.D. Booth building, near Wells MW-3 and MW-24, which has relatively high levels of cyanide compared to the rest of the study area. This observation correlates with the elevated iron in that same area, discussed above. Although some of this iron is probably being released from the soil due to aerobic degradation of organic parameters, it is recalled that MGP-related cyanide wastes often occur as ferro-cyanide species. It is possible then, that at least some of the iron in the area near MW-2 and –24 may be related to cyanide. From Figure 5-13, it is clear that there is limited migration of iron and cyanide away from the I.D. Booth building. The concentrations of both iron and cyanide approach their respective water quality standards by the time groundwater reaches the east edge of Route 11. It is expected that the chemical stability of ferro-cyanide compounds, coupled with the natural attenuation capacity of site groundwater, will limit future migration.

Sulfide was detected in only three wells: MW-2, MW-11, and MW-18. In each case, it was detected above water quality standards. However, sulfide's infrequent detection and its absence in Wells MW-3 and MW-24 indicate there is no significant MGP residual that is releasing sulfide to area groundwater.

Manganese, like iron and sodium, is a common natural element in soils and groundwater. The detection of manganese in all 19 wells, and the fact that it was above standards in 16 of 19 wells, indicates a natural origin. However, the relatively high concentrations of manganese in Well MW-12, adjacent to the I.D. Booth building, suggest an additional source of dissolved manganese in that area (Figure 5-14). This correlates with the data for cyanide and iron, which suggest the possibility of a relatively minor source area for MGP residuals near MW-12 (Figure 5-13). Manganese will behave similarly to iron as organic compounds degrade aerobically, dissolving in groundwater as oxygen is consumed.

Metals analysis included only iron and manganese for the second phase of the SRI, primarily to assess the redox state of the groundwater to enable a geochemical evaluation. Iron concentrations exceeded Class GA groundwater standards in 28 of the 31 wells sampled (Table

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5-18). Iron was detected in all wells during Phase 1 of the SRI. Iron is a common element in natural groundwater, and its presence at the project site is largely attributed to natural minerals in area soils. It's detection above Class GA standards across the majority of the site indicates that area groundwater may be slightly anaerobic, which is probably due to dissolved organic matter in the groundwater, which stimulates biological activity that consumes oxygen.

Elevated iron near the I.D. Booth building corresponds to the same area in which elevated organic compounds were identified. The elevated iron in groundwater is consistent with a biodegradation process, by which aerobic degradation of organics creates reducing conditions that liberate iron from the soil. Thus, the elevated iron in site groundwater provides additional indication that aerobic degradation is restricting the migration of organic contaminants.

Manganese, like iron, is a common natural element in soils and groundwater. The detection of manganese in all 28 wells, and the fact that it was above standards in 21 of 28 wells, is further evidence of the generally anaerobic state of area groundwater.

In the Phase 2 SRI, cyanide (Table 5-18) was detected in a total of 12 wells (MW-3, -11, -12, -14, -15, -16, -17, -28s, -28d, -29s, and -30s) and was above water quality standards in three wells (MW-3, -11, and –12). These are the same 3 wells that contained cyanide above water quality standards in the previous round of sampling. MW-3 and -12 are located adjacent to the east side of the I.D. Booth building and MW-11 is located further south near Natoli's Market. As indicated in the Phase 1 SRI section of this report, cyanide is a potential parameter of interest at MGP sites because it can occur in MGP process wastes. Adjacent to the I.D. Booth building, cyanide impacts are apparently limited to near wells MW-2 and MW-3, which is near the former purifier box. The source for cyanide at MW-11, which is within the secondary plume, is less clear. Based on the detection of cyanide, there appears to be a minor amount MGP impact within the second plume. However, the overall impacts with respect to cyanide are limited in extent. The secondary plume is better defined by petroleum-like characteristics.

Figure 5-15 presents cyanide groundwater data for Phase 2, along with ammonia and chemical oxygen demand (COD). Cyanide appears to be a potential issue only for the shallow groundwater zone; except for 2 trace detections, cyanide was not present in groundwater from the deeper wells. Ammonia and COD were also detected less frequently, and at lower concentrations, in the deep wells.

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Other inorganic parameters were detected in groundwater samples at concentrations that exceeded Class GA groundwater standards or guidance values are: sulfate at MW-12 (1,400 ppm) and sulfide at MW-28S (2 ppm). Sulfate was included in the Phase 2 analytical program to help define the redox state of groundwater (Table 5-18). In reducing environments, as would develop under an ongoing condition of aerobic degradation of organic compounds, sulfate levels will decrease. The presence of sulfate in wells MW-12 indicates that the groundwater at that location is fairly well oxygenated, which indicates little biological activity has occurred. This is consistent with the trace amounts of dissolved organic compounds in groundwater samples from MW-12; because of the low organic content, there is little biological activity to consume oxygen. At other locations, the absence of sulfate is consistent with an anaerobic condition.

Where groundwater is anaerobic, sulfide can occur. At the site, there is actually little sulfide present, probably because of the relatively high levels of iron. Iron can easily complex with sulfide to form iron sulfide, an insoluble mineral that precipitates from solution.

5.6 RIVER INVESTIGATION

An investigation of Tioughnioga River water and sediments was carried out during both phases of the SRI. The first phase (1999) included river reconnaissance and sediment probing programs, and focused on areas in the river in proximity to the site. The second phase (2001) expanded the magnitude of the investigation, extending approximately 1,000 feet upstream of the site and 7,000 feet downstream of the site.

Field methods and observations are described below, and are followed in the subsequent section by the analytical results of the sediment sampling program.

A. RECONNAISSANCE AND PROBING OBSERVATIONS

The river reconnaissance during the first phase of the SRI identified four areas of potential concern that were subsequently investigated as part of Phase 1. These areas were (relative to MW-18):

1. An area approximately 60 feet upstream in a small area with wetland-type vegetation. In this area, there were floating iridescent "chips" that appeared when the sediments were agitated. (These chips usually indicate the presence of natural humic substances, as

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opposed to petroleum-based compounds that typically form a sheen lacking solid cohesiveness.)

2. An area just 30 feet south of the area mentioned above. Here, a distinctive opalescent sheen was observed that resembled petroleum.

3. An area approximately 50 feet north of MW-18, where there was visual and olfactory evidence of petroleum-type impacts when sediments were stirred.

4. Approximately 200 feet south of MW-18 behind the hotel, there is a discharge pipe that might provide a preferential pathway for contaminant migration.

Once the above areas were established as potentially of concern, a sediment probing investigation was begun to further define possible impacts.

Locations where probing occurred during the Phase 1 SRI coincide with the transects identified in Figure 5-16. Transects were labeled from upstream to downstream, with transect 1 being the furthest upstream and transect 38 being the furthest downstream. Either two or three probes were completed along each transect, with probe A near the west bank, B near the center of the transect, and C near the east bank. Transect 1 was located behind a red building which houses a local vehicle towing business and garage (on the western bank). Transect 38, the most downstream transect, was located approximately 1,300 feet downstream of transect 1.

The first observation of a slight sheen occurred at transect 2, location A (near west bank), approximately 450 feet upstream of the site (Figure 5-16). Field personnel observed a sheen along the west bank (location A) until transect 20 (approximately 150 feet downstream of the site). At transects 10, 11, and 12, a petroleum-type odor was encountered as well as an opalescent sheen.

Other observations made during probing include the presence of a solid, yet pliable tar cover in the streambed. From transects 10 to 19, there was a layer of black tar-like material with a strong odor. In order to delineate the horizontal and vertical extent of the tar, a raft-mounted geoprobe device was used to bore downward. In seven locations (RB-1 to RB-7), borings were advanced to a depth of 4 feet (Table 5-19). The borings began at transect 10 (RB-1, furthest upstream) and ended at transect 21 (RB-7, furthest downstream). Of these locations, a thin layer of tar (less

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than 0.5 feet) was observed at locations RB-1 through RB-3. Locations RB-4 through RB-7 displayed no evidence of tar impacts. Overall, the area in which tar-like material was identified during Phase 1 included approximately 150 linear feet, along the segment of the river adjacent to the investigation area, and extending only a few inches into the sediment. The width of the impacted area appeared to be quite variable, as tar was encountered in a generally "hit or miss" fashion along the transects.

The river sediment investigation that was completed during Phase 2 of the SRI further delineated the extent of coal tar impacts in the Tioughnioga River. Prior to beginning the sampling program, a stream walk and probing with hand auger was conducted along approximately 5,000 feet of the riverbank downstream of the site, between the southern end of the site and a breakwater north of the junction of Dry Creek and the Tioughnioga River. NYSDEC field representatives observed the probing. The breakwater was identified as a sediment trap downstream of the site, and as such it represents the maximum distance that near-site sediments could be transported downstream.

During the probing reconnaissance, impacts were visible at four probe locations downstream of the site, primarily in deposit banks where sediment had accumulated. These areas included just north and south of a bridge crossing, approximately 950 feet south of the site (samples SED-27 and –29, and SED-30, respectively); and two locations in a meander bend approximately 4,000 feet south of the site (SED-38 and SED-41, respectively). Generally, only sheens were observed, except at locations SED-27 and –29, where a tar like substance was observed along the west bank. The tar became apparent as the drill crew traversed the area entering and exiting the river. The two borings that were subsequently placed in this area (SED-27 and –29) produced sediment samples with no visible impacts, and total PAH concentrations that ranged from non-detect to 4 ppm. The tar in the west bank is apparently an isolated pocket. Aside from the above referenced locations, the probing reconnaissance did not reveal visible signs of impact downstream of the site.

Figures 5-16 through 5-19 show the 35 locations at which sediment sample borings were completed. Twenty (20) borings were near the site, and the remaining 15 borings were at downstream locations. For the upstream and downstream boring locations, the objective was to collect samples approximately every 300 feet. In reality, there were segments of the riverbed where there was very little sediment present. Thus, some of the locations had to be adjusted

based on where sediments had accumulated. Close to the site, sediments were present at most locations, and a zigzag sampling pattern was followed.

The borings were completed using a tripod mounted on a floating wooden sectional platform with a rope and cathead pulley to drive a 2-foot long 3-inch split spoon with a 140-pound weight. Four inch casing was driven to prevent cave-in and allow for representative sampling at discrete depth intervals.

Where present, the river sediments consisted primarily of fine – coarse sand and gravel with cobbles and boulders. Along much of the riverbed, fine grained sediment was sparse, and gravel and cobbles were present. This was particularly the case for the river segment beginning approximately 1,000 feet south of the site and extending to around 4,000 feet south of the site. However, near the site it was also difficult at times to collect enough sediment to create representative samples. The scarcity of fine grained sediment made boring difficult and contributed to poor sample recovery.

Of the near site borings, 5 were upstream from the site (10 thru 14), 8 were adjacent to the site (15 thru 22), and 7 were downstream of the site (23 thru 29). Near site borings were completed to supplement the results of the previous river probing, and were advanced to a depth of 8 feet. Samples were collected from the 0-1 ft, 2-4 ft, and the 6-8 ft intervals. Samples were described (for boring logs), and screened visually and with a PID for evidence of coal tar. Samples from these intervals were sent for laboratory analysis for VOC's (method 8260), polycyclic aromatic hydrocarbons (PAH's, method 8270), total organic carbon (TOC), total petroleum hydrocarbons (TPH), and total cyanide.

During the sediment boring program, there were a number of locations at which impacts were observed. Two borings (SED-28 & SED-29) were located near the west bank of the river, approximately 10 ft downstream of locations where sheen and free product had been observed along the shoreline sediments. The product was noticed when the sediments were disturbed by the sampling crew as it entered and existed the river.

Faint odors were noticed at near-site locations SED-17, -18, -19, -21, and –22. The odor was not associated with any particular sample depth, but varied from boring to boring. No free product or tar was observed in sediment samples collected from these borings. However, a sheen was occasionally observed in the water as the sediments were disturbed during near-site sample

operations. At location SED-18, traces of a tar-like substance were visible in the water during sediment sample collection, but it did not appear that there was tar specifically associated with the sediment samples collected from the boring.

In most of the borings, significant recovery was an issue. Due to the rocky nature of the sediments, there was very little fine (silt and clay) sediment to be had. Also, cobbles would often block the spoon preventing recovery.

One of the objectives of the sediment sampling program was to collect samples of tar-impacted sediments near the site, for TCLP analysis. However, TCLP samples could not be collected. First, as noted above, the sediment samples collected from the borings contained only traces of visible tar, if any. Based on visual examination, there were no specific sediment samples that appeared to be heavily impacted based on visible tar. In addition, the rocky nature of the river bottom made it difficult to assemble a sample of fine-grained material suitable for such an analysis. Much of the riverbed, even several feet below the surface, contained a majority of gravel and cobble-sized material.

Fourteen (14) downstream borings (SED-30 thru -44) were completed to a depth of 3 ft. Samples were taken from the 0 – 2 ft and 2-3 ft intervals. Samples were analyzed for VOC's, TPH, PAH, TOC, and Total Cyanide.

Two borings (SED-38 and -43) were advanced to a depth of 5 ft because sheens were observed at the shallower intervals. The borings were advanced farther to determine the depth of the impact.

Generally, borings were placed every 300 ft along the center of the stream. Borings SED-30 and -38 thru -41 were positioned where sheens were observed during the reconnaissance probing, as noted before. SED-38 thru -40 were near two sediment deposit banks.

Only one boring downstream of the site produced sediment that contained visible material that resembled tar. At SED-43 a material that resemble roofing cement was found in a sediment samples from 2 to 3 feet. This material was not observed in the shallower or deeper sample from that boring. The sample from 2-3 feet at SED-38 contained a sheen, and had a noticeable tar-like odor. The boring was advanced to 5 feet deep, at which point there was no evidence of impact. At the 2-3 feet interval was creosote soaked wood, which indicates that the impacts are derived

from a source other than the MGP. Boring SED-40 was positioned to further delineate this portion of the bank. There was no visible impact at SED-40.

B. SEDIMENT QUALITY

A total of 97 sediment samples were collected during the two phases of the SRI, from areas upstream, adjoining, and downstream of the site. Nine sediment samples were collected during the first SRI phase, and 88 additional samples were collected as part of the second SRI phase. Sediment quality standards are described in the Technical Guidance for Screening Contaminated Sediments (NYSDEC 1999).

1. **Volatile Organic Compounds**. A total of 14 different VOC's were detected in the sediment samples from the Tioughnioga River (Table 5-20). Two of the detected VOC's were methylene chloride and acetone, which are common laboratory artifacts that were frequently detected in laboratory method blanks. Aside from these 2 compounds, 43 of the 97 sediment samples contained detectable VOC's. The maximum total VOC concentration was 1.42 ppm (1.04 ppm, excluding acetone and methylene chloride) at SED-5, adjacent to the site.

The average concentration of total VOC's from the sediment samples collected near the site (including borings SED-4, -5, -9, and –13 through –25) is 0.074 ppm. For the upstream samples (SED-7, -8, and SED-10 through 12), the average total VOC concentration is 0.033 ppm. For the downstream borings (SED-1, -2, -3, and –26 through –44), the average concentration was 0.043 ppm. However, among a subgroup of downstream borings closest to the sediment trap (SED-36 through –44) the average is 0.068 ppm, which is similar to the near-site area. Between the near site area and the far downstream subgroup (SED-26 through SED-34), the average total VOC concentration is 0.029 ppm, comparable to upstream. Immediately downstream of the site, and continuing downstream approximately 3,000 feet, there is little evidence of site related impact with respect to visual observations and analytical results. Further downstream, near the sediment trap, impact becomes apparent.

2. **Polycyclic Aromatic Hydrocarbons (PAH's)**. Seventeen (17) different PAH compounds were detected in the river sediments (Table 5-21). Eighty three (83) of the sediment samples contained detectable PAH's. As noted above, the 88 total sediment

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samples from the Phase 2 SRI were collected at 35 sediment boring locations. At all 35 locations, at least one sediment sample was collected that contained detectable PAH's.

The highest total PAH concentration during the Phase 1 program was in Sample SED-5 (181.8 ppm), while the lowest total SVOC concentration was in Sample SED-7 (5.37 ppm). The upstream sample (SED-8) contained 6.22 ppm total PAH's, and the downstream sample (SED-1) contained 6.54 ppm. Thus, the Phase 1 data indicated no significant difference in SVOC concentrations upstream of the site compared to downstream.

The expanded program for Phase 2 produced a sediment sample at boring SED-17, adjacent to the site, with over 3,500 ppm total PAH's (0-1 foot). The next highest total PAH concentration was at boring SED-41, from 2 to 3 feet deep (296 ppm total PAH's).

In general, the sediment analysis indicates two areas with relatively high levels of PAH impacts: (1) adjacent to the site, between boring locations RB-1 and RB-6 (Phase 1 borings) and (2) downstream of the site, beginning with boring SED-37 (Phase 2 boring) near the railroad bridge crossing, extending downstream to the sediment trap. Between these areas, the levels of PAH were relatively low. This same observation was made based on the VOC analytical results.

The mid-stream area has less sediment cover than areas near the site and further downstream. The relatively straight water channel in this section of the river would tend to produce an erosional environment, as evidences by relatively thin sediment cover that was observed. This section of the river also tends to have a narrower channel, so higher flow velocities will occur there. The end result is that sediments do not accumulate between the site and the railroad crossing, so there is limited indication of site-related impact.

Further downstream, near the sediment trap, sediments are deposited from upstream areas. It was noted that creosote-soaked wood was found at soil boring SB-38, which indicates that impacts near the sediment trap are likely to be an assemblage of impacts from multiple upstream sources.

3. **Metals and Cyanide**. Table 5-22 summarizes the Phase 1 SRI analytical results for inorganics in river sediments. Sediment standards for metals are based on empirical evidence of the metals' effects on organisms. The standards are expressed as a Lowest

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Effect Level (LEL) and a Severe Effects Level (SEL). "Moderate" impacts are reflected by exceeding the LEL, while serious impacts are reflected by exceeding the SEL.

Of the metals analyzed during Phase 1, twelve are subject to sediment standard criteria. The analytical data indicate seven metals exceeded an LEL in the Phase 1 sediment samples: chromium (SED-2); copper (all locations); iron (SED-1, -2, -5, -6, and -9); lead (all locations); mercury (SED-2, -3, -4, -5); nickel (all locations): and zinc (all locations), but none exceed an SEL. Thus, according to the sediment screening guidance, the river sediments are said to be "moderately" impacted with respect to those seven metals. However, it is noted that for each of those metals, the upstream sample (SED-8) did not contain significantly higher concentrations of metals than the downstream sample (SED-1). In some cases, the concentrations between upstream and downstream were nearly identical (mercury, nickel); in other cases, the upstream level was actually higher than the downstream level (copper). Overall, there was no apparent difference between study area concentrations and upstream or downstream locations. No cyanide was detected in the river sediment samples from Phase 1 of the SRI.

Among the 35 sediment boring locations for Phase 2 of the SRI, only 2 locations produced samples with detectable cyanide: SED-19 (6.69 ppm, 10.8 ppm, and 8.06 ppm for samples 19A, B, and C, respectively) and SED-21 (1.67 ppm and 1.3 ppm for samples 21B and C, respectively). Both of these boring locations are in the portion of the river near the site. Overall, the cyanide data from the 2 SRI phases indicates minimal cyanide presence in river sediments (Table 5-23).

4. **Petroleum Hydrocarbons and Sulfide**. The elution patterns for Phase 1 samples SED-1, -3, -4, ,-5, -7, -8, and -9 were reasonably good matches to the coal tar standard, recalling the inherent limitations of the TPH method that were discussed previously. Sample SED-2 may have contained small amounts of coal tar, but the elution pattern did not match any of the TPH standards very well. Sample SED-6 did not contain any significant peaks.

The Phase 2 sediment samples underwent TPH analysis as well, and the sediment samples contained what is considered to be a reasonable match for weathered coal tar. Some general observations are noted in connection with the TPH analysis results. First, the majority of 44 sediment samples that contained detectable TPH were from the shallow (0-2

feet) interval. There were a total of 31 shallow sediment samples ("A" samples), and 24 of them contained detectable TPH that resembled weather coal tar. The majority of the samples collected from deeper intervals (55 deeper samples in all, "B", "C", and "D" samples) did not contain detectable TPH. The preponderance of data indicates that weathered coal tar is most evident in the upper 1 to 2 feet of sediment, and is less frequently detected, and at lower concentrations, in deeper sediments.

Among the sediment borings closest to the site (SED-14 through 24), a total of 32 sediment samples were analyzed for TPH, and 15 had measurable concentrations. Of the 15 near-site sediment samples that contained TPH, 10 were from the shallowest interval. Only one of the 11 shallow sediment samples did not contain TPH. In contrast, among the 21 deeper samples from near the site, only 5 contained detectable TPH (at locations SED-15, -19, -22, and –23). Even close to the site, there is a clear indication that coal tar impacts are only prevalent in the upper 1 to 2 feet of sediments. This finding supports that coal tar is probably not entering the river from below; if it were, there would be more evidence of substantial TPH in the deeper sediment zones (Table 5-23).

Sulfide was detected in seven of the nine sediment samples (no sulfide was detected at SED-3 or SED-8). Sulfide concentrations ranged from 284 ppm at SED-5, to 20.3 ppm at SED-7.

5. **Summary.** Evidence of possible MGP impacts in river sediments is in the form of PAH's. Impacts specifically related to MGP residuals are most apparent near the site, specifically at sediment boring locations SED-17, -19, and -23. Total PAH levels decline downstream of the site, beginning at the southern edge of the motel. At 12 boring locations between the motel and the railroad bridge river crossing, 6 borings produced sediment samples with approximately 4 ppm or less total PAH's.

Overall, the riverbed is rocky between the site and the first downstream sediment trap. At most boring locations, it was very challenging to assemble enough fine-grained sediment to prepare a sample. It appears that the pattern of PAH distribution in river sediments is a function of the erosional/depositional environments at work in the river.

From the upstream locations, it is apparent that several ppm of PAH's are present as background impacts. For a river which drains a significantly developed watershed, it is

expected that PAH's from a variety of sources will have impacted sediments. In close proximity to the site are an automobile junkyard, auto repair shops, gas stations, and a highway, all of which detract from river quality via direct runoff or groundwater discharge. For such rivers, it is generally true that the overall chemical character of the sediments reflects the bulk of impacts transported from the watershed into the river, such that specific sites exert only a very localized chemical influence.

Data for VOC's and metals indicate no significant MGP-related impacts.

In relation to the adjoining west riverbank, tar was observed in a much more widespread pattern in river sediment boring locations adjacent to the site (at 8 of 12 transects adjacent to the site) than was observed for soil borings along the western bank. For example, the area of impact in site-adjacent river sediments extends farther north than the area in which impacts were observed in soil borings. Although there was no visible NAPL tar is soil borings MW-28D, SB-18, SB-17, B-17, and B-18, there was frequent observation of tar in the adjacent river sediments. Analytical results for soil from these borings indicate fairly low total VOC and SVOC concentrations (e.g. below TAGM guidance) that suggest significant amounts of free phase tar is not present along this portion of the bank. This suggests that the west riverbank along this area is presently an unlikely source of the tar in the adjacent area of river sediments. Overall, the existing pattern of NAPL occurrence west of the river indicates a potentially narrow corridor of NAPL migration to the river that cannot account for the existing widespread pattern of impact in the river.

C. SURFACE WATER QUALITY

Tables 5-24 through 5-26 summarize the analytical results of the water sampling program for the Tioughnioga River. Water samples were collected during the Phase 1 SRI from downstream (SW-1) to upstream (SW-8) (Figure 3-1). Surface water samples SW-1 and SW-2 were collected at transects 38 and 25, location A (200 feet and 100 feet downstream of MW-18, respectively). Samples SW-3 and SW-9 were located at transects 22 and 14, location C (east bank). Surface water samples SW-4, SW-5, and SW-6 were located at transects 14, 16, and 7, location A (just upstream of MW-18), respectively. SW-7 and SW-8 were collected at transects 2 and 1, respectively (west bank, approximately 400 feet upstream of MW-18). For the second SRI phase, plans were made to collect additional water samples biased to specific locations, based on the outcome of the river boring program. The objective was to collect water samples at

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specific boring locations at which tar was present in sediments, or where it otherwise appeared tar or other site-related impact might be entering the river. No specific preferential entry point locations were identified during the Phase 2 river boring program, so no additional water samples were collected.

1. **Volatile Organic Compounds**. Only one VOC, methylene chloride, was detected in the surface water samples (Table 5-24). Methylene chloride was not detected above water quality standards and is not regarded as a compound related to MGP wastes. Although 2-butanone and acetone were detected by the laboratory in some of the river water samples, these compounds were also detected in quality control blanks, such that their presence in the water samples is considered to be a laboratory artifact.

The upstream sample, SW-8, did not contain detectable levels of VOC's. Moving downstream in sequence, Samples SW-6, SW-4, SW-2, and SW-1 contained only traces of methylene chloride at concentrations ranging from 0.0008 ppm (SW-1) to 0.0004 ppm (SW-6). Samples SW-4, SW-5, and SW-9 were collected in closest proximity to the study area. SW-4 contained 0.0005 ppm of methylene chloride, whereas SW-5 and SW-9 did not contain detectable VOC's.

2. **Semi-Volatile Organic Compounds.** A total of four different SVOC's were detected in the river water samples, but none were above applicable water quality standards (Table 5-25). Naphthalene was detected at a single location, SW-5, at a concentration of 0.0001 ppm. The other three SVOC's were phthalates, detected at all locations and likely to be sampling artifacts. The total concentration of all detected SVOC's ranged from 0.0009 ppm at locations SW-4 and SW-5 (adjacent to the study area) to 0.0002 ppm at SW-2 (downstream). The average total SVOC concentration for the three upstream samples was 0.0019 ppm, which is higher than the detected downstream total SVOC concentrations.

3. **Metals and Cyanide.** All detected metals were below New York State water quality standards (Table 5-26). Overall, the analytical data for metals showed remarkable uniformity from one location to the next. Cyanide was not detected in any river water samples.

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4. **Petroleum Hydrocarbons.** No significant peaks were identified in any of the surface water samples.

5. **Summary**. The analytical results for the river water sampling program indicate no evidence of impact by MGP residuals. All detected parameters were below applicable surface water quality standards, and no cyanide was detected at any location.

5.7 WATER WELL SURVEY

The study area is located within the Village of Homer, which administers a public water supply. According to the Village Superintendent of Water and Sewers, village businesses and residents receive their water from supply wells installed within the Homer/Preble aquifer, in a wellfield, approximately 1.5 miles north of the site. In view of this distance, the prevailing groundwater flow direction to the east, and considering the direct and short path of site groundwater to its discharge in the river, site groundwater quality has no effect on the Village water supply. The superintendent was personally aware of only a single resident and a single business within the village who use supply wells, but neither was within a 1/4 mile of the site, according to him.

The Cortland County Health Department was contacted to determine their knowledge of possible private wells in proximity to the study area. Although records of well construction permits do exist, they were not readily available for review and inclusion in this report. According to county staff, well construction permits are organized according to street location. The Health Department was able to provide information regarding water and sewer hookups to area businesses and residents, which was used to deduce which of those locations might be relying on a private water supply. If it assumed that properties with no public water hookup rely on wells, it is possible that as many as 10 to 12 locations within approximately 1/2 mile of the site may be using private supply wells. Figure 5-20 shows where supply wells are suspected of being located.

To supplement information about possible groundwater users near the study area, Stearns & Wheler completed a water well survey of local businesses and residents. A total of 14 surveys were hand delivered to locations shown on Figure 5-20. Of the surveys delivered, only two were returned. According to the water superintendent, the two survey respondents were south of the village border, in the Town of Cortlandville, which receives water from the City of Cortland

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wellfield, approximately 2 miles southwest of the site, within the Cortland aquifer. Both of the returned surveys reported a well on the premises. One of the two respondents reported that their well water was used for "everything" (Appendix E), suggesting that it served as a drinking water supply. The other respondent reported that the well was not used for drinking.

It is important to consider that the short groundwater flow path from the site to the river exempts the need to consider a customary 1-mile downgradient radius, since the downgradient area relative to the site only includes about 200 feet from the I.D. Booth building to the river. All other areas in proximity to the site are either upgradient, crossgradient, or hydraulically isolated from the site. Although the identified wells cross gradient of the site may be considered potential exposure points based on their proximity to the site, the hydraulic reality is that there is very little chance for human exposure to site related contaminants from these wells due to the prevailing groundwater flow direction, and the wells' locations outside of the flow path. This conclusion is supported by the fact that the monitoring well network at the site has verified that the lateral limits of the site plume do not encroach upon any nearby supply wells.

5.8 INDOOR AIR SAMPLING

Sampling of indoor air occurred in each of the two SRI phases. Phase 1, which occurred in 1999, involved the collection of passive air samples using Suma canisters inside the I.D. Booth building. The Phase 1 SRI air sampling program provided data for ambient air inside the building. For Phase 2, completed in 2001, Suma canisters were again used, but this time air samples were drawn from below the floor of the I.D. Booth building. Thus, the air that was sampled during Phase 2 cannot be directly breathed by building occupants, but represents the quality of air that accumulates directly below the floor.

A chemical inventory inspection was completed at the I.D Booth facility on October 22, 1999. The interior of the I.D. Booth building was inspected with regard to chemicals being stored in order to determine an appropriate strategy for deploying air sampling devices to detect the possible presence of vapors relating to former MGP operations on the premises.

The inspection identified a variety of common products that are inventoried on the premises for retail sale and are known to contain a variety of common chemicals, including paint, cleaners, and hydraulic oils. In general, there was no single, segregated area in which these products were stored. Rather, products tended to be stored according to specific manufacturer product lines.

In general, no specific areas were identified which were considered areas to be avoided for the indoor air sampling program, nor were there specific areas which stood out as uniquely favorable for the indoor air sampling. It was therefore agreed that six sampling locations would be adequate for Phase 1 of the SRI to account for a variable and possibly random sampling environment.

A. PHASE 1 SRI INDOOR AIR SAMPLING PROGRAM

1. **General Sampling Procedures.** Sampling devices were deployed in areas where:

- floor penetrations may allow subsurface vapors relating to MGP operations to enter the building
- building occupants/customers routinely congregate
- inventory materials and products relating to I.D. Booth may influence test results

The devices were set a minimum of 3 feet off the floor and away from drafty areas (doorways, windows, staircases, ventilation) that might produce air flow variability that could affect the results. The building is a single level, with no basement or crawlspace. Therefore all sampling devices were deployed without specific regard for the requirement that samples be collected from the building's lowest level.

Air samples were collected using evacuated Suma canisters. Once deployed, the canisters drew in ambient air over a 24-hour period from December 4-5, 1999. The air was analyzed for volatile organics per USEPA Method TO-14.

2. **Sample Locations.** Figure 3-2 includes the locations of the indoor air sample locations. The Suma canisters were deployed in the following areas:

a. **"Pipe Room" Storage**. This area is located in the southern portion of the building and holds various piping materials, and has a floor drain that runs along its center for the length of the building. As a feature which penetrates the floor, the floor drain may enable subsurface vapors related to MGP residual to enter the I.D. Booth building. One sampling canister was deployed in the central portion of the room, adjacent to the floor drain (SC-1).

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b. **Outdoors**. One sampling canister was deployed outside the facility as a control or background sample, within the secured storage area south of the I.D. Booth building (SC-2). The canister was placed underneath the pole barn away from the road to minimize interference by vehicular exhaust.

c. **Front Desk.** One sample was collected from the area that adjoins the front customer service desk (SC-3).

d. **Northern Storage Room.** Two samples were collected from the storage area in the northern portion of the building, adjacent to Verizon. One sample was collected along the northern wall of the room, which is adjacent to Verizon, and near the floor drain (SC-4). A second sample was collected towards the interior of the room at a convenient location in the general storage area (SC-5). This sample was collected above the assumed location of a former MGP gasholder.

e. **Verizon.** One sampling canister was deployed in the Verizon building which adjoins the northern wall of the I.D. Booth building. The canister was placed along the southern wall of the Verizon building, which adjoins I.D. Booth, and adjacent to the floor drain which apparently runs between the two buildings (SC-6).

An additional task within the air sampling procedure was to verify the direction of air circulation in Verizon, the north warehouse, and in the pipe room. This was done using smoke tubes, which determined the direction of airflow in proximity to the Suma canisters. No significant drafts or pressure differentials were identified in the warehouse in the areas where the canisters were deployed, which might induce preferred flow of vapors into or out of the sampling areas.

3. **Results**. The analytical results for the indoor air survey are presented as Table 5-27. A total of 19 different VOCs were detected in the indoor air samples. Of these 19 compounds, at least 10 were identified as being potentially present in equipment and/or material present at the I.D. Booth facility. The single compound detected at the highest level was tetrahydrofuran, which was detected at five of the six locations, and at concentrations that ranged from 6.6 parts per billion by volume (ppbv) at SC-6, to 24 ppbv at SC-1. Tetrahydrofuran is widely used as a chemical intermediate and solvent, and

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volatilizes rapidly. Thus, its presence in air at an industrial facility is not uncommon. However, it is not a common MGP residual, as it was not extensively used during the MGP era. For these reasons, tetrahydrofuran is believed to be an artifact of some site activity more recent than MGP operations.

Of the six locations, SC-4, located within the I.D. Booth building along the northern wall that adjoins the Verizon facility, contained the highest levels of VOCs (128 ppbv total VOCs). The second highest level of VOCs was from a second sample (SC-5) collected in the center of that same room (119 ppbv). The lowest concentration was from the sample collected outdoors (SC-2), at 1.8 ppbv.

No single compound was detected at all six locations, but a number were detected at all five interior locations: benzene, toluene, tetrachloroethene, 2-butanone, tetrahydrofuran, and ethanol. Each of these compounds can be found in industrial machinery and equipment, and can be released into the air as exhaust from machinery, and as volatile emissions from common petroleum products, including fuels, lubricants, adhesives, grease, and solvents.

From the analytical results it is apparent that total VOC levels in air within the I.D. Booth building are generally well below 1 ppm, which is viewed as both typical and permissible considering the nature of the equipment and materials stored on the premises. The detected levels were generally hundreds of times lower than permissible NIOSH or OSHA occupational exposure standards. Excluding the exterior air sample, the results at the other five locations are quite similar, ranging from 0.08 ppm (80 ppb) to 0.128 ppm. This indicates that there is no preferred pathway for vapors into the building, nor are there any "hot spot" areas where an uncontrolled and specific chemical source might be present.

When the smoke tests were conducted in Verizon and in the north warehouse, both tests indicated that air circulated towards Verizon. However, the large bay door in Verizon was open on the morning when the tests were completed and may have affected the results. In the pipe room, the air appeared to circulate in the opposite direction relative to the other room (away from Verizon).

B. PHASE 2 SRI INDOOR AIR SAMPLING PROGRAM

The first SRI phase determined that there were no elevated VOCs in ambient air in the I.D. Booth building. The Phase 2 SRI included collection of air samples from below the floor of the I.D. Booth building. Three samples were collected, at interior boring locations SB-9, -13, and –22, respectively. The samples were collected as grabs from an interval 2 to 3 feet below the floor, immediately after the floor was penetrated to that depth.

Soil vapor immediately below the floor at SB-9, near the relief holder, contained the highest concentration of VOCs among the 3 samples - 1,212 ppbv (by volume) of total VOCs. This is roughly an order of magnitude higher than the ambient air samples collected during Phase 1. Xylenes accounted for the highest concentration of individual compounds (300 ppbv for m&p xylenes, 120 ppbv for o xylene); followed by toluene (140 ppbv); 1,2,4-trimethytlbenzene (140 ppbv); and ethylbenzene (75 ppbv). Figure 5-21 shows the indoor air sampling results for both investigation phases. Table 5-28 presents the results of the Phase 2 air sampling program.

At the other 2 locations, total VOC levels were an order of magnitude lower (248 ppbv and 397 ppbv at SB-13 and –22, respectively). These results compare reasonably well with the total VOC concentrations detected in the ambient air during Phase 1; under the floor in areas away from the holder the total VOC levels are only 2 to 3 times higher than those found in ambient air. This indicates that there is no substantial buildup of VOCs in soil vapor below the floor, except near the relief holder.

5.9 PASSIVE SOIL GAS SURVEY

A passive soil gas survey was completed during October 5 through 18, 1999. A total of 11 passive gas detectors were deployed around the northwest wing of the Budget Inn, which is the portion of the motel closest to the MGP site (Figure 3-2). The detectors were deployed according to the manufacturer's instructions and were left in place at the direction of the manufacturer for a period of 12 days.

Figure 5-22 shows the concentrations of total detected VOCs in nanograms (ng) at each of the passive gas sampling locations. In all, seven different compounds were detected by the passive test kits: benzene, 2-methylnaphthalene, naphthalene, toluene, xylenes, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene (Table 5-29). Results, in nanograms of compound adsorbed to the detectors, indicate that the soil gas levels were highest near location PG-9. At this location, along the southern side of the motel's northwest wing, 108 nanograms of xylenes were detected,

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followed by toluene (78 ng), 1,3,5-trimethylbenzene (37 ng), 1,2,4-trimethylbenzene (29 ng), and benzene (28 ng). In general, detected VOCs were at higher levels along the wall of the motel away from the study area (locations PG-7 through PG-11). Along the wall of the motel that faced north towards the study area (locations PG-1 through PG-6), concentrations were lower. In fact, only location PG-4 had any detections at all (2-methylnaphthalene at 44 ng and naphthalene at 56 ng).

In order to establish soil gas levels in the presumed source area (PG-12 and PG-13), two passive gas detectors were installed along the eastern edge of the I.D. Booth building. At PG-12, near the southeast corner of the building, toluene (54 ng) and xylenes (43 ng) were detected. At PG-13, north of PG-12 along the east side of the building, benzene (29 ng) and toluene (50 ng) were detected. These findings indicate minimal gas phase impacts near the I.D. Booth building.

Figure 5-22 shows the distribution of total VOCs in soil gas between the I.D. Booth building and the motel. The results of the passive gas survey are equivocal at best, but generally do not indicate the site is a source of soil gas. First, there are a number of possible sources of the detected constituents in connection with the adjacent roadway and parking areas. In addition, there is no indication of a significant source of elevated soil vapor concentrations adjacent to the MGP, nor is there a clear concentration gradient from the site to indicate site-related migration. From passive gas survey results, it is concluded that the detections on the south side of the motel's northwest wing are probably due to automobile impacts from the motel parking lot. Otherwise, the passive survey results do not indicate that significant migrations of gaseous MGP residue have affected the motel.

5.10 DNAPL

Borings were advanced at a total of 55 locations during the SRI and prior investigations, and 21 soil borings (38 percent) produced soil samples that had some visible form of coal tar impact. Thirteen of these borings were either immediately adjacent to or within the I.D. Booth building. Of the eight remaining borings that had visible tar, five were east (downgradient) of the MGP, and three others were south of the MGP.

There are 15 borings directly east of the I.D. Booth building, oriented along one line at the eastern edge of Route 11 (B-15, B-16, B-19, B-5, B-14, B-6), and another line along the western

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bank of the river (MW-28D, SB-18, B-22, SB-17, B-17, B-18, SB-16, B-20, SB-15). Among these 15 borings, 5 encountered visible tar (B-15, B-16, B-19, SB-16, B-20), as noted above. However, only 2 of these borings are along the western riverbank (B-20, SB-16).

Including areas farther to the south of the MGP, there are a total of 12 soil borings along the western riverbank (B-17, B-18, B-20, B-21, B-22, SB-15, SB-16, SB-17, SB-18, MW-27, MW-28, MW-31). Among these locations there were only 3 isolated locations (SB-16/B-20, MW-27D, MW-31) where coal tar was visible in the soil samples. The above pattern indicates the frequency of visual observation of DNAPL in the soil borings clearly declines with distance from the source area. Figure 5-23 shows the soil borings that contained some form of visible tar, an delineates an approximate area of impact.

Boring MW-24 was advanced in 1999 near existing Well MW-3 during Phase 1 of the SRI to investigate the possible presence of DNAPL residing near the top of the fine sandy silt unit, which is presumed to be a confining unit compared to the coarser-grained units above it. The Phase 1 drilling program (Section 5.3) identified a NAPL presence in soil samples retrieved from the boring (in some cases only a sheen and in others more prevalent). Further, the Phase 1 test pit (TP-1, TP-1A) near the former purifying house contained what appeared to be a mixture of fill and highly viscous NAPL near the bottom of the pit (at 8 feet deep).

Small quantities of DNAPL began to accumulate in well MW-24 several weeks after it was installed in 1999, and shortly thereafter NYSEG began implementing a NAPL recovery program for well MW-24. Recovered NAPL was stored in an on-site polyethylene recovery tank. A submersible pump was placed in the well in March 2000, following completion of the first phase of the SRI. During the pump's installation (March 3, 2000), NAPL was measured from approximately 38 feet deep to the bottom of the sump at 42 feet. This is equivalent to approximately 0.6 gallons of product in the well. According to NYSEG field personnel, the product was reportedly a viscous mixture of NAPL and silt, which is consistent with field observations that the NAPL in soils was a highly viscous tar/soil mixture with a putty-like consistency. During an initial purge of MW-24 after the pump was installed, approximately 75 gallons of water was evacuated, and produced approximately 3 gallons of NAPL product.

Two weeks later, on March 17, 2000, there was no measurable NAPL in MW-24. The well was again purged, and only about 8 ounces (1/16 gallon) of NAPL was recovered as the first ½ gallon of water was evacuated. No appreciable NAPL returned to the well after it was purged during

the March 17 field visit. Approximately 15 gallons of water were removed from MW-24 on that day, and aside from the first ½ gallon removed, only tiny particulate globs of NAPL, approximately the size of a fine-grained sand, were visible in the water.

Table 5-30 summarizes NAPL collection observations at MW-24 during 2000. In all, approximately 20 gallons of DNAPL were removed from MW-24 during 2000. The data indicates that the recoverable amounts of DNAPL declined substantially throughout 2000. Generally, the volume of DNAPL removed during monthly site visits from April to September decreased from approximately 1 gallon to less than ¼ gallon per site visit. By September 2000 the NAPL could no longer be pumped from the well. According to NYSEG personnel, it had become too thick. The recovery program was suspended during the second phase of the SRI, and when it resumed in January 2001 approximately 2 gallons of DNAPL were recovered from MW-24.

Recovery data indicated that only a few gallons of DNAPL are recoverable at any given time. Monthly removal events between March and September 2000 produced less than one gallon per event, and after four suspended months between September 2000 and January 2001, only 2 gallons could be removed. On April 25, 2002 only 1.5 gallons of tar could be recovered.

During Phase 2 of the SRI (2001) each additional boring that was drilled was carefully logged to determine whether there was visible NAPL in the subsurface soil. In cases where NAPL was observed, observation wells were installed in order to determine the NAPL's potential mobility. MGP residuals were observed in all of the interior soil borings. Borings SB-9 and -10 (relief holder) produced odors and sheens, and a viscous tar-like sheen was present on groundwater that covered the soil boring equipment. Tar observed in soil samples from borings SB-11, -12, and –13 (former coal storage, tar storage, and retorts areas, respectively) was thoroughly intermixed with the soil matrix, and putty-like. Aside from these interior borings directly adjacent to or within MGP structures, only one soil boring outside the building, SB-21 adjacent to the east side of the building, produced soil samples with enough visible tar to prompt the installation of an observation well (OW-21). This well was screened to intercept tar-like residual at 8 to 16 feet in the boring. Although a sheen was observed on the water in this observation well several weeks after it was installed, there was no measurable NAPL in the observation well.

Table 5-31 presents SRI free product observations for the wells. MW-24 has contained measurable tar-like DNAPL on a fairly consistent basis since its installation, although the

amounts have varied. For example, during the specific SRI groundwater sampling events only traces of DNAPL were measured in MW-24. Other wells that have contained sheens and small amounts of LNAPL are noted on the table. Observations are based on pre-sampling activities at the wells prior to sampling, including product thickness measurements by electronic interface probe, and visual examination of water and sampling equipment. At a number of wells the NAPL appeared to float, for example at MW-11 and MW-4, where approximately 1 to 2 inches of a floating product was present. The product at MW-11 had an odor similar to paint thinner. At other locations, including MW-14, -15, and -17, petroleum odors were evident, with slight sheens, but no free product.

Overall, wells MW-3, -12, -16, -17, and -24 have contained floating sheens. Five of these seven wells are along the eastern edge of the I.D. Booth building. During SRI groundwater sampling activity, wells MW-16 and -17 were the only wells east of Route 11 in which sheens were observed on groundwater samples.

In November 2002 a well bailing program was initiated for selected downgradient wells (MW-5, -16, -17, -19, and –27D) to help determine whether DNAPL could be mobilized by bailing. These wells were inspected for measureable product thickness, and then bailed once or twice each week, for a period of 4 weeks.

On November 14, 2002 measurable DNAPL was observed for the first time in well MW-16. Site observations between November 14 and December 13, 2002 indicate measurable tar-like DNAPL was consistently present at the bottom of well MW-16, at a static thickness of approximately 1 to 1.5 feet. A modest amount of bailing reduced the product thickness to only a few inches. This reduced thickness persisted in the well between site visits that were spaced 3 or 4 days apart, indicating negligible DNAPL recovery over such a time period. However, during an 8-day period during which there were no site visits, the DNAPL thickness increased back to its original observed level (greater than one foot).

Despite the purging of wells MW-5, -17, -19 and –27D, no measurable DNAPL was observed or recovered in these wells during the November – December 2002 period. This indicates that recoverable DNAPL is limited to the area very close to MW-16.

Groundwater that was purged from wells MW-5 and MW-27D had no visible evidence of impact, although there was a slight odor in both. The water from these two wells was free of

sheen, however. Wells MW-17 (13.7 feet deep) and MW-19 (45.35 feet deep) produced water with a slight sheen and odor, but no measurable product thickness. Table 5-32 presents a summary of observations from the recent well bailing program.

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CHAPTER 6

NATURE AND EXTENT OF IMPACTS

6.1 - SOILS

The analytical data indicate a variety of organic compounds are present in subsurface soils across the study area. The concentrations of compounds in soils are noticeably higher immediately adjacent to the I.D. Booth building, especially near the former relief holder (MW-24 soil samples) and also along the western building perimeter, near borings SB-2 and SB-3. This pattern suggests that residual coal tar (DNAPL) is likely to be a primary source of soil impacts. Viscous, putty-like DNAPL was observed in a number of soil borings, usually at discrete intervals or seams, and intermixed with the soil. In all, visible tar was observed in soils from 21 of the borings from the Task 2 and 3 investigations together with this SRI, and observed far more frequently near the former MGP structures than farther away. For example, there are 21 soil borings adjacent to and within the I.D. Booth building, and 13 of them (i.e. 62 percent) encountered visible tar. In contrast, among the 34 other boring locationss farther away from the building, there were only 8 borings that encountered visible tar.

The potential mobility of tar at the site has remained an open question, and a key objective of this SRI is to address this issue. To help assess the mobility of the observed NAPL coal tar, attempts were made to isolate it for physical analysis (density, viscosity, surface tension), but it was so tightly bound and thoroughly mixed with the soil matrix that it could not be separated for analysis. Although the physical appearance of the NAPL as observed during the SRI and its adherence to the soils suggest that mobility is limited, there are some areas, for example at MW-16 and MW-24, where some degree of migration potential is evidenced by tar accumulation in wells. Moreover, NAPL at the site has clearly migrated based on its presence east of Route 11. However, NAPL as it occurs today may not be as mobile as it was in the past when it was less weathered and perhaps present in source areas (e.g former holders and related structures) in more substantial quantities to sustain flow.

Clear delineation of coal tar presence is a key to understanding its past migration tendencies and potential for further migration. In addition, being able to discriminate tar from other types of

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impact that may have some degree of chemical similarity to tar will properly focus remedial efforts. Many of the compounds detected in site soil samples, especially SVOCs, are common in MGP material, including coal tar. Comparing the concentrations of SVOCs in soils with New York State soil cleanup criteria (TAGM 4046) indicates an area of impact as shown on Figure 6-1 (red line). However, most of these compounds are also common in a variety of commercial chemicals, including petroleum products, asphalt, roofing material, and driveway sealer. The background surface soil sampling program (Section 5.1) verified that there are ambient sources of many of the same constituents that are present in MGP wastes, including coal tar. Thus, the edge of the impacted area based on TAGM limits may be arbitrarily defined in the presence of non-MGP ambient impacts.

The area of coal tar impact based on visual identification (i.e. NAPL or sheen in soil samples) is also depicted on Figure 6-1. The visual impacts include those that were observed in the previous Task 2 and 3 site investigations. The majority of the affected area is in and around the former MGP area, but the extension of NAPL impact to the east of Route 11 towards borings SB-16 and B-20 is apparent.

The visual identification of coal tar is fairly straightforward near the former MGP structures, and in other isolated areas where impacts are heavy, but becomes highly subjective and more a matter of question where the impacts become marginal (e.g. trace amounts evidenced by specks, sheen) and hence less visible away from the source area.

In order to verify the limits of MGP impact, specifically coal tar, to a higher degree of confidence, it is necessary to apply a method that is credible at differentiating the chemical fingerprint of tar from other ambient sources of organic compounds, and that is sensitive enough to reveal them even at lower levels that aren't visually apparent or are below TAGM limits. Such a method is essential for identifying likely migration routes for DNAPL coal tar, which is one of the principal objectives of the SRI. A comprehensive multivariate data evaluation was completed to this end. Multivariate methods identify differences in the relative proportions of detected compounds among the samples collected, and establish chemical fingerprints for different contaminant sources. A combination of the methods was used:

1. **Radial ("spider") plots** – The concentrations of selected indicator compounds were plotted along crossing axes, and characteristic polygons were produced. The differences in the shapes reflect differences in the relative proportions of the selected compounds,

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and represent differences in chemical composition. The different shapes are conveniently used to visually differentiate different sources of contamination.

2. Cluster Analysis – Cluster analysis provides a more precise and objective measure of the degree of chemical similarity between pairs of samples, based on the measured concentrations of specific compounds. The object of cluster analysis is to sort cases (people, things, events, laboratory data, etc.) into organized groups with similar characteristics. These groups are known as "clusters".

One type of cluster analysis produces a cluster diagram, or "tree" (see Figure 6-2). The branches of the tree link objects together based on how similar they are. In this particular case, the "objects" are the radial plots for a particular sample. The analysis begins with each radial plot being in a class by itself. The horizontal axis ("distances") on the tree diagram represents the degree of similarity among the samples (Figure 6-2). The smaller the distance that 2 or more objects are linked, the greater their similarity. Referring to the tree diagram, the cluster analysis begins on the left side of the distance axis (at zero), and seeks the 2 radial plots that most resemble one another. These two samples are linked together at the lowest linkage distance. In subsequent linkage steps, the analysis proceeds (moving to the right along the distance axis). With each step the linkage criteria is relaxed somewhat, so objects linked in each subsequent step aren't as similar to each other as were the objects that were linked in previous steps. The linkage distance increases incrementally with each step. In other words, as the analysis proceeds it lowers the threshold criteria for declaring 2 or more objects as similar. As a result, more and more objects (i.e. radial plots) are linked together, at greater and greater linkage distances, and forming clusters of increasingly dissimilar elements.

Samples that are more similar cluster closer together, and are linked at lower "distances", than those that are more different. Thus, cluster analysis can actually measure how different two shapes are, and can assign distances between pairs of shapes that reflect the degree of similarity. Radial plots arranged according to cluster analysis results provide a convenient way to easily differentiate different contaminant fingerprints, and hence the likelihood of multiple sources.

Each of the above methods is potentially able to identify chemical similarity between samples with respect to multiple variables at the same time, and each is useful for defining impacts and

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focusing remedial attention to areas affected by specific contaminants of interest. For the SRI, these methods were used to determine the extent of coal tar impact in soils and groundwater adjacent to the site, with the objective of determining whether coal tar impacts are distributed in a manner that indicates active subsurface migration of tar from the site to the river, and if so, where such migration is most likely to occur. This information is essential for directing an appropriate remedial action.

Figure 6-2 includes example radial plots of the PAH compounds acenaphthylene, acenaphthene, dibenzofuran, and fluorene, and the results of a cluster analysis of radial plots for SRI soil samples. The relative proportions of these four compounds in each soil sample were normalized to their total concentration so that the results of the cluster analysis would not be biased by the samples in which they were most concentrated. Acenaphthylene, acenaphthene, dibenzofuran, and fluorene were identified by EPRI as being one of 5 subgroups of PAH compounds present in coal tar (EPRI, May 1993). Each of the 5 subgroups of PAHs includes compounds that are physically and chemically similar. The EPRI study reported the relative proportions of the 5 compound subgroups among tar samples from 9 different MGP sites, and determined that the subgroup of compounds including acenaphthalene, acenaphthene, dibenzofuran, and fluorene was the least variable subgroup among the 9 different tar samples. This makes the chosen parameters potentially reliable indicators of coal tar impact. Further, because of their physical and chemical similarities, the relative proportions of these four compounds will remain largely unaffected by chemical weathering. Significant differences in their relative proportions between samples can therefore be viewed as an indication of different sources of impact.

Historical data (EC Jordan, 1987) for soils could not be used in the cluster analysis, because the historical data lacked dibenzofuran results. However, the number of soil samples collected during the SRI, and the locations of the samples, provides good areal coverage and is a sufficiently robust database. It is further noted that chemical fingerprints could be developed for Task 2 and 3 groundwater data (see Section 6.2), so where the historical soil data could not be fingerprinted (e.g. south of the site), groundwater fingerprints were developed at the historical soil boring locations at which wells were installed.

A number of soil samples collected from within the I.D. Booth building in and around the former MGP holder area encountered varying amounts of visible tar, and the data from these samples establishes the coal tar fingerprint. One such example is indicated on Figure 6-2, based on a tar-stained soil sample collected from test pit TP-1A. In contrast, a background soil sample

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collected approximately 2 miles away from the site shows an ambient chemical fingerprint. Referring to the cluster diagram to the left of the chemical fingerprints on the figure, the horizontal axis ("distance") indicates the relative distance at which samples are linked into clusters. From the diagram, samples SB-18A and SB-2B are linked first. These 2 samples are the most chemically similar of any 2 soil samples collected during the SRI. The second linkage occurs for samples SB-3A and SB-3B. This sample pair ranks second in terms of chemical similarity. The third linkage joins sample SB-22A with the prior linkage of SB-3A and –3B, forming the first real cluster (e.g. more than 2 samples linked). SB-22A is the first impacted soil sample from the MGP area inside the building to be linked to another soil sample. Thus, the fingerprinting technique combined with cluster analysis verifies that the impacts at SB-3, outside of the western side of the building, are very similar to the fingerprint at SB-22, are accordingly very likely due to MGP tar.

Subsequent linkages of samples proceed to the right. The 4th linkage joins sample SB-13B with samples SB-18A and –2B of the first linkage. Thus, there is a high degree of chemical similarity between these three samples. Sample SB-13B is clearly affected by MGP material, being collected from within the I.D. Booth building, from 16 to 20 feet deep, and containing over 2,700 ppm total SVOCs. Thus, samples SB-18A and SB-2B are very likely to be impacted by MGP material as well. This similarity is revealed despite the fact that the total SVOC concentrations at SB-18A and SB-2B are only 3.28 ppm and 1.08 ppm, respectively. The chemical fingerprints have effectively revealed traces of MGP influence, despite the fact that the actual concentrations at SB-18A and –2B are only 0.1 percent of those found at SB-13B.

The 5th linkage joins SB-9B (collected within relief holder) to sample MW-27D (32-24 feet deep, south of the MGP and west of the motel). Small amounts of tar-like material were observed at MW-27D, as specks/blobs on the soil sample. Subsequent linkages (6 through 9) create clusters of samples that are primarily from the main MGP area under and adjacent to the I.D. Booth building (samples SB-3A, -3B, -9B, -10, -11A, -13A, -22A), which suggests a high degree of chemical similarity among soil samples most likely to be impacted by the MGP. However, linkage number 8 joins sample S-32, a background sample from 2 miles away, to sample SB-1B. This is the first point at which an off-site background soil sample is linked to an on-site sample, and it occurs fairly early in the clustering calculation process, denoting a high degree of statistical similarity. Evidence of petroleum impact was visible in soils from boring SB-1, so the clustering analysis indicates SB-1 is affected by a petroleum source that is statistically similar to off-site petroleum sources, but it is not likely to be affected by coal tar. The cluster pair SB-1B

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and S-32 is linked shortly thereafter, at the 11th linkage, to S-21, which is another background sample from 2 miles away. This cluster formed at the 11th linkage represents an ambient petroleum-type fingerprint.

The 14th linkage is a significant juncture, because it is where the background cluster (S-32/S-21/SB-1B) is finally linked to an on-site cluster with a coal tar fingerprint (SB-18A/2B/13B). Thus, clusters that form after the 14th linkage are based on a lower degree of similarity than exists between background and site-related impacts. In theory, this linkage defines a statistical boundary between sample locations that are chemically similar to site contaminants and sample locations that have significant statistical differences.

By the 20th linkage, the only samples that have not yet been linked to any other sample are primarily from borings that are farther away from the MGP area on the western riverbank, including SB-15, -16, -17, -18, and MW-28D. Statistically, these samples have unique chemical fingerprints that bear little resemblance to each other, or to soils closer to the MGP area.

The radial plots were arranged based on the cluster analysis results (Figure 6-3). Samples (shapes) that are more chemically similar were placed near each other, and the linkage step at which samples were grouped is indicated through the 20th linkage step. As indicated previously, the higher the linkage step, the lower the degree of similarity. Colors assigned to the shapes reflect field observations for each of the samples. Bold highlighted shapes indicate soil samples that were collected within the I.D. Booth building, or immediately adjacent to MGP structures, with clear evidence of coal tar impact.

By the 14th linkage, data clusters indicate that the only samples with obvious statistical similarity to samples within and adjacent to the I.D. Booth building are from SB-18 (sample from14-16 feet deep), SB-16B (22-24 feet deep), and MW-27D (32-34 feet deep).

Figure 6-1 delineates the extent of coal tar influence based on the chemical fingerprints, and there is generally good agreement between the fingerprints and the area defined by visible tar in the soil samples. However, the fingerprints differentiate what appears to be petroleum-related sources of impact south of the building, beyond the apparent chemical influence of the tar. The fingerprints developed for groundwater support this interpretation (see Section 6.2).

Along the west riverbank the only soil boring samples that have any degree of similarity to MGP impacts are SB-16B (22-24 feet) and SB-18A (14-16 feet), as previously stated. These 2 riverbank borings are separated by other borings that produced soils with no visible impacts or TAGM exceedances (SB-17, B-17, B-18), and also with chemical fingerprints that indicate no coal tar presence (SB-17), which supports that the presence of coal tar in soils along the west bank is primarily in the 2 areas near SB-16 and SB-18. Samples collected above and below sample SB-16B (sample 16A at 4-12 feet and sample 16C at 30-32 feet) contained relatively low levels of contaminants, and had distinct chemical fingerprints that refute a significant tar presence. Impacts at SB-16 are apparently limited to a discrete vertical interval (~ 22-24 feet) and traces of tar may be present at SB-18 (3.28 ppm SVOCs but no TAGM exceedances).

South of the MGP, only the limited area near MW-27 appears to be affected by tar, and the degree of impact is evidently minor (no TAGM exceedances, and only 3.1 ppm total SVOCs). The specks of tar that were observed on a soil sample at MW-27 produce a chemical fingerprint similar to the one for soil from boring SB-9 within the holder area. However, this impact appears to be isolated, due to the absence of visible tar in other borings south/southeast of the MGP (B-6, B-13, B-14, SB-15, SB-21).

6.2 - GROUNDWATER

As discussed in Chapter 5, the study area is located in proximity to a sole source aquifer, the Homer/Preble aquifer, which provides area residents and businesses with water. The wellfield that extracts water from the aquifer is located approximately 1.5 miles north of the site. In view of the site's distance from the wellfield, the prevailing eastward direction of groundwater flow at the site, and the limited extent of groundwater impact in comparison to the distance to the wellfield, site groundwater quality has no direct impact on the village of Homer water supply. In regulatory principle, however, the occurrence of groundwater impact in proximity to a sole source aquifer compels a heightened degree of concern. In reality, the plume limits have been clearly defined both laterally and longitudinally, and there is no indication that groundwater impacts from the MGP are encroaching upon area supply wells.

Groundwater impacts are evident downgradient of the site (see Chapter 5). Groundwater isoconcentration plots of total VOCs and SVOCs indicate 2 separate groundwater plumes: one originating from the relief holder and a second subtler plume to the south of the building (Figures 5-9 through 5-12). North of the MGP, monitoring wells contain low or non-detectable amounts

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of dissolved VOCs and SVOCs, and therefore this area is evidently outside the MGP-related plume. Chemical fingerprints discussed below indicate that groundwater south of the I.D. Booth building has different chemical characteristics than groundwater east of the building, reflecting a distinction between groundwater that is impacted primarily by coal tar and groundwater impacted by other petroleum sources.

A similar data evaluation approach utilizing radial plots as applied to soils was also applied to groundwater. Figure 6-4 presents the chemical fingerprints based on the same four compounds (acenaphthylene, acenaphthene, dibenzofuran, fluorene) as were previously used for soils. The two rounds of SRI data from 1999 and 2001 are shown. There are noticeable differences between the groundwater fingerprints near the former holder area (MW-2, -3, -24) and the area farther downgradient (MW-15, -16, -17, -18). However, the elevated levels of dissolved organic compounds downgradient of the MGP, the prevailing groundwater flow direction, and most notably the recent presence of NAPL at MW-16 all indicate MGP impacts are nonetheless present in groundwater east of the site. The groundwater fingerprints based on acenaphthylene, acenaphthene, dibenzofuran, and fluorene do not retain shape along the groundwater flow path even where impacts are apparent, most likely because their solubilities are fairly low. Compounds that make good groundwater fingerprints need to have high enough solubilities to exert a noticeable influence over groundwater quality even when only small amounts are present in a contaminant. Compounds with lower solubilities generally need to be present in larger amounts to be noticeable. Thus, farther from the source area low solubility indicators are less obvious. The chemical and physical attributes that made acenaphthylene, acenaphthene, dibenzofuran, and fluorene a reliable fingerprint for soil-related impacts are not as suitable for groundwater.

Fingerprints based on more highly soluble compounds are better suited to groundwater evaluations. One such fingerprint, as described by Atlantic Environmental Services, Inc., (AES, 1996) relies on benzene, toluene, ethylbenzene, xylenes, and naphthalene. Groundwater equilibrated with coal tar will typically have a chemical fingerprint with a high proportion of naphthalene to BTEX, as indicated on Figure 6-5 as a spike-like shape. The groundwater samples collected from wells closest to the holders have fingerprints that closely resemble the characteristic naphthalene spike.

Note that data from well MW-17, a shallow well which has historically contained among the highest levels of dissolved VOCs and SVOCs at the site, has clear spike-like fingerprint similar

to coal tar. In contrast, data from MW-18, a deep well that contains only low levels of dissolved compounds, has a clearly different fingerprint. For groundwater, the chemical fingerprint based on BTEX and naphthalene is superior to the one based on the lower solubility PAHs for identifying where coal tar related impacts are most probable in groundwater. Fingerprints similar to tar, with the characteristic naphthalene spike, are most evident in groundwater from wells MW-2, -3, -4, -15, -16, -17, and -24.

Wells that are noticeably different from the dissolved tar fingerprint include the deep wells MW-6, -13, and –18. Well MW-13, which contains no detectable naphthalene (1999 and 2001 SRI sampling events) is apparently not affected by coal tar. MW-18 has contained only 0.3 ppb and 2 ppb of naphthalene based on 1999 and 2001 data, and consequently has a fingerprint with a shape of a flattened cone, as does the fingerprint for MW-6. Cone-like fingerprints are also apparent for shallow wells MW-11 and MW-14. Although there is some degree of similarity between the conical fingerprints of MW-11 and MW-14 and wells directly downgradient (east) of the MGP (e.g. MW-5, MW-19), there are very important differences. Specifically, the most recent SRI sampling event at MW-11 did not detect naphthalene (hence the triangular fingerprint for that event). Comparing data from the Task 3 investigation (EC Jordan 1987) with the two rounds of SRI data (1999, 2001) reveals a trend whereby naphthalene concentrations have declined relative to benzene at MW-11. Furthermore, there has been a noticeable decline in the levels of total VOCs and SVOCs at MW-11 since the Task 3 sampling event in 1987. The fingerprints in combination with the decline in concentrations at MW-11 indicate that there is unlikely to be tar nearby. At MW-14, the concentrations of total VOCs and SVOCs have also declined significantly since 1987, and the relative proportion of benzene compared to naphthalene is also high compared to the coal tar fingerprint in the 1987 (Task 3) and 1999 (SRI) sampling events. The 2001 SRI data indicate a relatively high proportion of naphtrhalene compared to benzene, as evidenced by the fingerprint, but the actual concentrations of these compounds are fairly low (0.0001 ppm benzene and 0.017 ppm naphthalene).

Benzene in particular, and BTEX in general, are less apt to adsorb to soils along the groundwater flow path as naphthalene is (AES, 1996). Thus, as groundwater flows farther away from the coal source, the relative proportion of naphthalene decreases, and the shape of the fingerprint changes from a pronounced spike to a more triangular shape noted for MW-11 and MW-14. In contrast, the data from MW-5, -15, -16, and –19 lacks the benzene point on the fingerprint (i.e. relative proportion of naphthalene is dominant). The retardation of naphthalene compared to benzene with distance from the source produces the observed differences in the fingerprints. The

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chemical evidence indicates that groundwater in the shallow wells south of the site is more distant from MGP sources (i.e. coal tar), than wells directly east of the MGP.

Chemical fingerprints based on BTEX and naphthalene indicate that there is likely to be coal tar as DNAPL in the area adjacent to the eastern edge of the I.D. Booth building, near the holder area (MW-2, -3, -4, -24), and also wells east of the building and Route 11 (MW-5, -15, -16, -17, and –19). The fingerprint for dissolved BTEX and naphthalene in monitoring wells farther south indicates that these wells are located further away for a coal tar source, and thus there does not appear to be a significant amount of soluble coal tar south and southeast of the MGP.

6.3 - RIVER SEDIMENTS

In contrast with soil and groundwater, the river sediments reside in a comparatively dynamic surface environment. Surface water flow, sediment erosion and re-deposition, and exposure to an oxygenated water column create a more chemically and physically "aggressive" environment. A heightened degree of chemical weathering, erosion, and deposition obscures chemical patterns that could help identify specific sources of impact to the river sediments. Radial plots prepared for the individual sediment samples included a variety of shapes, and cluster analysis revealed very little grouping among them. The lack of correlation among the samples in terms of chemical signatures reflects that the west branch of the Tioghnioga River is a variable flow regime, with erosional and depositional segments, that can transport and mix sediments. Moreover, there are sources of impact to the river aside from the MGP site that can impart various chemical signatures.

The degree of MGP impacts to the river sediments was assessed based on a comparison of sediment samples collected from areas near the site to those upstream and downstream of the site. The group of sediment samples closest to the site (SED-13 to SED-23), at which traces of tar and odors were apparent, had an average total PAH concentration of 149 ppm. South of SED-23, locations SED-24 to SED-29 had an average total PAH concentration of 1.9 ppm. South of SED-29, and extending southward to the railroad crossing, sediment samples generally contained less than 10 ppm total SVOCs, and several areas were at less than 4 ppm total PAHs. The average total PAH concentration between SED-30 and SED-34 is 4.7 ppm. Just north of the railroad crossing, extending southward to the meander, is where SVOC levels increased. South of SED-35 the average total PAH concentration is 234 ppm.

Site related impacts are apparent adjacent to the site and at the meander south of the railroad crossing, which are depositional environments for sediments. Between the site and the railroad crossing, conditions are generally erosive, as evidenced by a lack of sediment buildup, and there is minimal site related impact.

6.4 - DNAPL

One of the principal objectives of the SRI was to delineate the presence of DNAPL (e.g. coal tar) in the subsurface. DNAPL identification has relied primarily on visual identification of DNAPL as tar seams in soils, or as measurable product thickness in site monitoring wells. Beyond visually identifying DNAPL in soil and groundwater, it is more difficult to determine the degree of mobility, and migration paths that the mobile DNAPL will take.

Coal tar is present as DNAPL in the area adjacent to the former holders, as evidenced by measurable product in well MW-24, and based on visual observation of soil samples from borings that were completed within and directly adjacent to the holders. It is also apparent that DNAPL coal tar is present at well MW-16, east of Route 11. This identification of tar at MW-16 verifies that coal tar in the subsurface is potentially mobile, if not actively mobile. However, it is noteworthy that MW-16 was installed 15 years ago, but DNAPL was only observed for the first time in November 2002. Extensive roadwork along Route 11 adjacent to the site, which took place in 2001, may have disturbed the subsurface near MW-16 in a way that mobilized residual tar. The absence of similar occurrence of tar in other wells close to the Route 11 construction area (MW-5, -15, -19) indicates that there was only a limited volume of residual tar that was mobilized.

Site data suggest that the tar-like material observed in the river sediments represents prior impacts from the site, rather than active, ongoing transport from the site. Chemical data indicates that subsurface tar extends east from the holder area across Route 11, and then extends southeast towards the northern portion of the hotel. Otherwise, soil borings along the portion of the west riverbank north of the former holder area revealed little evidence of significant subsurface tar. In contrast to this discrete area of tar on site, tar was visible in river sediments across a relatively wide area that extended beyond the apparent limits of tar in the riverbank borings. For example, it does not appear that the tar observed in river sediments adjacent to and north of SB-18 is derived by an existing transport of tar from the site. There is, however,

potential for tar in the sediments to be transported after it is deposited, as evidenced by its detection downstream of the site.

There is no indication that the silt/clay layer offers a preferential flow path for DNAPL at the site. Rather, migration and occurrence of DNAPL is apparently influenced largely by smaller scale and complex heterogeneities in the subsurface soil/fill throughout the site.

Borings advanced down to the confining unit generally did not encounter accumulated NAPL at the top of the layer. This includes borings that were advanced inside of the building. Borings SB-12, -14, and –21 encountered soils that were affected by tar, but beyond approximately 20 feet deep there was very little evidence of NAPL, and no evidence was found at the top of the confining unit below the building. The boring for well MW-26, southwest of the I.D. Booth building, encountered the confining silt/clay unit at 60 feet below grade. This area represents the lowest elevation of the unit that was measured during the SRI. If NAPL migration were gravity driven, this would be a location in which it would be likely to accumulate. The soil data from boring MW-26 indicate that only trace amounts of SVOCs were present above the silt/clay unit (56 – 58 feet). Of the 371 ppb total SVOCs that were detected, 300 ppb were due to bis(2-ethylhexyl)phthalate, and 20 ppb were from benzoic acid.

The chemical fingerprints for groundwater (Section 6.2) reflect the presence of coal tar in the subsurface east of Route 11, based on the relative proportions of naphthalene compared to BTEX.

The area where DNAPL coal tar is most likely to reside has been mapped (Figure 6-1) based on the combined visual observation of tar and the chemical fingerprints. Groundwater fingerprints indicate the specks of tar observed at MW-27D appear to be a limited isolated area of impact as opposed to substantial lobe of free tar in that area. Wells upgradient of MW-27D (MW-6, -11, -13,-14) do not indicate a contiguous lobe.

The soil sample chemical fingerprints (Section 6.1) indicate that aside from soil borings within and immediately adjacent to the I.D. Booth building, the only SRI soil borings to produce samples chemically similar to MGP coal tar are SB-16 (22 to 24 feet deep), SB-18 (14-16 feet deep) and MW-27D (32-34 feet deep). At these locations the total SVOC concentrations are 121.5 ppm, 3.28 ppm, and 3.1 ppm, respectively. Thus, the fingerprints are capable of defining even very low levels of MGP impact, at discrete depth intervals. Other soil samples collected at

SB-16 (4-12 feet, 30-32 feet) and SB-18 (24-26 feet) had chemical fingerprints with virtually no similarity to MGP samples. The coal tar presence at this location is apparently confined to discrete vertical zones, along laterally narrow zones (e.g. no visual identification at borings SB-15, SB-17, B-17, B-18; fingerprint evidence at borings SB-17 or SB-15).

6.5 - SUMMARY

Volatile and semivolatile organic compounds were detected in most of the soil samples collected at various locations across the study area, as well as background locations farther away from the site. The highest concentrations of compounds were found in soils under the I.D. Booth building, near and within the former MGP structures, most notably the relief holder. Relatively high soil concentrations were also found at the building perimeter in close proximity to the MGP structures. Further away for the MGP, the levels of impact remain above applicable cleanup criteria in many cases, but are generally at lower concentrations than near the MGP.

An area of probable coal tar impacts in subsurface soils has been delineated, based on visual identification of coal tar, comparisons of analytical data with soil cleanup (TAGM) criteria, and chemical fingerprinting methods. The area with the greatest evidence of free-phase tar includes an area around the former relief holders, under the I.D. Booth building, and apparently extending east towards Route 11 and southeast beyond Route 11 along a narrow and vertically discrete band, as evidenced by visual observations at borings SB-16 and B-20. Chemical fingerprinting at SB-16 verifies that there is likely to be a limited quantity of coal tar at that location, from 22-24 feet deep. Samples from boring SB-16 at shallower and deeper intervals had chemical fingerprints that had very little similarity to the 22-24 foot sample, or to coal tar, which indicates coal tar impacts at SB-16 occur primarily at the discrete 22-24 foot depth. Farther north along the riverbank, at SB-18, the chemical fingerprint from 14-16 feet deep revealed chemical influence of trace amounts of coal tar, despite there being no visible tar, or any SVOCs above TAGM cleanup limits. A deeper sample interval at SB-18 had a chemical fingerprint that was very different from coal tar, and locations north and south of SB-18 (MW-27 and SB-17, respectively) had no indications of coal tar.

Overall, the general area of coal tar impact defined by the chemical fingerprints is in good agreement with the delineation of soil sample locations that exceed TAGM cleanup criteria for SVOCs. The area in front of the motel at which visible tar was observed (boring MW-27D) is apparently a limited and isolated occurrence, based on the fairly low concentrations of SVOCs

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detected there (3.1 ppm), and the fact that other borings between MW-27 and the main area of impact did not show significant signs of impact.

Soil and groundwater samples from areas west of the building, which is hydraulically upgradient of the MGP, appear to be unaffected by the MGP with the exception of very close to the building.

Groundwater impacts are evidenced by VOC and SVOC plumes that originate in the former holder area, and extend east-southeast towards the river. The plume geometry indicates two separate plumes, suggesting the possibility of multiple sources of impact. Groundwater impacts due east of the MGP, which is downgradient, appear to be more affected by coal tar residuals than does groundwater in the southern plume. Relatively lower levels of impact in the southern plume are believed to represent only marginal coal tar impacts beyond the edge of the primary plume, mixed with other sources of dissolved hydrocarbon impact. Based on groundwater fingerprints, there does not appear to be significant amounts of soluble or potentially mobile tar beyond the delineated area east of the site.

The coal tar that was encountered in soil samples was generally in a semi-solidified, putty-like state, which does not appear to be in a highly mobile physical form. However, coal tar as DNAPL has collected in site monitoring wells, most notably MW-24 immediately adjacent to the holders and MW-16 east of Route 11. Thus, clearly the tar has migrated, and the delineated area of tar suggests that some degree of transport from the site to the river may occur along the narrow band that extends to the southeast across the SB-16/B-20 area. The presence of tar in shallow river sediments supports that prior migration has occurred. However, it appears that the majority of the tar impact in river sediments is derived from prior deposition and transport of tar as opposed to an ongoing significant migration from the site. This is because the areal extent of tar in river sediments is larger than can be accounted for by the delineated pattern of tar on site and along the western riverbank. If ongoing migration is occurring, soil and groundwater data indicate it is probably focused towards the area north of the motel. In contrast to this discrete migration path, tar is observed in river sediments well to the north of the limits within which subsurface tar is most likely to reside.

River sediment samples indicate site related impact is present in the area of the river adjacent to the site, and also at a meander bend just north of a sediment trap, approximately 4,000 feet south

of the site. In all, impacted sediments were present along approximately 500 feet of the river adjacent to the site, and another 1,200 feet of river north of the southern sediment trap.

The top of the silt/clay confining unit was established as continuous across the site. Visual observation of soil samples did not indicate that coal tar was more prevalent near the top of the confining unit, with the exception of MW-24. Moreover, low spots on the surface of the confining unit do not appear to be tar collection points. The high degree of soil heterogeneity apparently governs tar migration on a localized scale that defys an easy prediction of flow pattern.

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CHAPTER 7

FISH AND WILDLIFE IMPACT ANALYSIS

7.1 INTRODUCTION

As specified in the approved work plan, a preliminary FWIA was completed on the NYSEG MGP site in accordance with the criteria outlined in NYSDEC Division of Fish and Wildlife's *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites* (1994). Steps I through IIC of the analysis were completed, including the description of the site and fish and wildlife resources and values within a 0.5-mile and 2-mile radius, identification of applicable fish and wildlife regulations, identification of contaminants of concern, analysis of contaminant pathways and receptors, and a review of the effects of site-related contaminants on potentially exposed individuals, population and community.

Data were compiled from reviews of published maps and reports; information obtained from state and federal regulatory agencies; a field investigation of the site and the surrounding area on November 2, 1999; and analytical data collected as part of this SRI. The technical literature regarding the effects of site-related contaminants on the biota was reviewed. A photographic log of items described in the following sections is included as Appendix D. The numbered photographs correspond to the numbered locations indicated on the figures referenced below.

7.2 SITE CONDITIONS

A. SITE LOCATION

The former MGP site is located on the west side of South Main Street (U.S. Route 11), immediately north of North Miller Avenue in the Village of Homer, Town of Cortlandville, Cortland County, NY. The site is situated adjacent to a suburban residential area, where it meets a commercial/industrial area. Lands surrounding, within 0.5 miles and within 2 miles of the site are dominated by a mix of suburban development, commercial/industrial development, and agricultural lands. Maps showing dominant development/cover types in the study area are depicted in Figures 7-1 and 7-2.

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B. NATURE OF THE PROPERTY AND SURROUNDINGS

The property is essentially rectangular in shape, bordered on the east side by a public road, on north and south sides by commercial development, and on the west side by a railway. The site currently contains a single building that is occupied by a plumbing and heating equipment retailer who shares the building with Verizon Telephone Company. To the north and south of the building are gravel and paved parking and storage areas, respectively. The vegetated areas of the site have herbaceous and shrub plant communities typical of disturbed sites. To the north of the site is a landscape maintenance equipment retailer, to the south is a small grocery market, to the east is South Main Street, to the southeast is the Budget Inn, and to the west is the Delaware Lackawanna Western Railway, beyond which is the Cortland Country Club golf course.

C. TOPOGRAPHIC FEATURES

The former MGP site is across South Main Street from the West Branch Tioughnioga River on a relatively flat, level piece of land at an elevation of approximately 1,115 feet above mean sea level (MSL), and 5 feet above the West Branch Tioughnioga River. The topography within a 0.5-mile radius is relatively flat except for the very eastern edge, which slopes up sharply. The topography within a 2-mile radius includes the relatively flat, level floor of the Homer-Preble Valley, and the surrounding steep, rolling hills where elevations climb to more than 1,600 feet. To the west, the topography rises to approximately 1,580 feet on Cosmos Hill; to the northeast, it rises to just over 1,600 feet on East Hill; and to the east, it reaches 1,460 feet as it approaches Carr Hill, which is just outside the 2-mile radius. To the south towards the City of Cortland the ground is fairly level.

D. SURFACE DRAINAGE PATTERNS

The area surrounding the site within a 2-mile radius drains in many directions. However the entire 2-mile radius is within the watershed of the West Branch Tioughnioga River. The former MGP site drains primarily to the east and ultimately into the West Branch which, located approximately 150 feet east of the site, is the nearest waterway. The West Branch Tioughnioga River flows south to southeast into the Tioughnioga River, which in turn discharges into the Susquehanna River, which flows into Chesapeake Bay.

7.3 ECOLOGICAL COMMUNITIES

A. VEGETATION

The dominant plant species were identified within a 0.5-mile radius and within a 2-mile radius of the site. A list of all plant species identified within the 2-mile and 0.5-mile radius areas is outlined below:

1. Plant Species On and Around Project Site (Within 0.5-Mile Radius).

Canada Yew	Tartarian Honeysuckle	Quaking Aspen	Cottonwood
Japanese Black Pine	Red Osier Dogwood	Staghorn Sumac	White Oak
American Beech	Red Oak	Shagbark Hickory	Blackberry
Crab Grass	Round-leaved Plantain	Dandelion	Yarrow
Common Plantain	Yellow Hawkweed	Birdsfoot Trefoil	Hairgrass
Common Ragweed	Foxtail Grass	Canada Goldenrod	Red Clover
Queen Anne's Lace	Wild Bergamot	Daisy Fleabane	Aster sp.
Ground Ivy	Moth Mullein	Bedstraw	Alfalfa
Grape	Teasel	Corn	Burdock
Common Milkweed	Woolgrass	Broad-leafed Cattail	

2. Additional Plant Species Present Within 2 Miles of the Project Site

Blue Spruce	Norway Spruce	Norway Maple	Arbor vitae
Red Pine	Black Willow	Steeplebush	White Birch
Apple	Privet	Weeping Willow	Barberry
Scarlet Oak	Crabapple	Deadly Nightshade	Geranium

No evidence of stressed vegetation was observed within the area of study.

B. FISH AND WILDLIFE

The developed nature and industrial commercial use of the site diminishes the value of the site in terms of wildlife habitat; however, the surrounding area provides a wide variety of habitat for many wildlife species. Wildlife typically found in urban, suburban, and rural agricultural areas is most likely to be present in the vicinity of the project site. A list of wildlife species that were observed in the area or are likely to use the area at some time of year is presented below. Species that were observed on or near the site during field activities are listed in italics.

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1. **Birds.**

Mourning Dove
Song Sparrow
Gray Catbird
American Crow
Black Capped Chickadee
Common Grackle
Mallard
Wild Turkey
Red-tailed Hawk
Coopers Hawk
Short-eared Owl
Ruby-throated Hummingbird
Common Flicker
Tree Swallow
White-breasted Nuthatch
Blue-gray Gnatcatcher
Warblers
Red-winged Blackbird
Brown-headed Cowbird

European Starling
House Sparrow
Mockingbird
Red Winged Blackbird
House Wren
House Finch
Black Duck
Northern Harrier
Sharp-shinned Hawk
Red-shouldered Hawk
Long-eared Owl
Chimney Swift
Red-bellied Woodpecker
Barn Swallow
Brown Creeper
Cedar Waxwing
Bobolink
Eastern Meadowlark
Northern Cardinal

American Robin
Downy Woodpecker
Rock Dove
Blue Jay
Dark eyed Junco
Canada Goose
Belted Kingfisher
Turkey Vulture
Kestrel
Great Horned Owl
Screech Owl
Hairy Woodpecker
Eastern Kingbird
Tufted Titmouse
Eastern Bluebird
Red-eyed Vireo
Common Grackle
Northern Oriole
American Goldfinch

2. **Mammals.**

White-tailed Deer
House Mouse
Raccoon

Cottontail Rabbit
Norway Rat
Muskrat

Gray Squirrel
Meadow Vole
Mole

3. **Herptiles.**

Common Snapping Turtle
Eastern Box Turtle
Spring Peeper

Eastern Garter Snake
American Toad

Northern Water Snake
Green Frog

4. **Fish.**

The West Branch Tioughnioga River is a small river that provides feeding, spawning, cover, and dispersal habitat for a variety of fish species. The stream varies in width, but is approximately 50 feet wide near the subject site. Based on field observations, depth varies in the study area from less than 1 foot near shore to more than 2 feet in the channel. These observations were made during relatively low flow conditions. According to the NYSDEC Bureau of Fisheries, the following fish species are part of the community of the Tioughnioga River:

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Brown Trout	Fallfish	Redside Dace	Rock Bass
Brook Trout	Spottail Shiner	Carp	Largemouth Bass
Rainbow Trout	Spotfin Shiner	Banded Darter	Smallmouth Bass
White Sucker	Common Shiner	Shield Darter	Chain Pickerel
Northern Hogsucker	Golden Shiner	Johnny Darter	Northern Pike
Creek Chub Sucker	Rosyface Shiner	Tessellated Darter	Burbot
Cutlips Minnow	Comely Shiner	Yellow Perch	Brown Bullhead
Bluntnose Minnow	Central Stoneroller	Walleye	Margined Madtom
Fathead Minnow	Longnose Dace	Bluegill	Mottled Sculpin
Creek Chub	Blacknose Dace	Pumpkinseed	Banded Killifish
River Chub	Pearl Dace	Redbreast Sunfish	American Eel

Some brown trout and brook trout are native to the stream; however, any rainbow trout and some brown trout in the referenced area are stocked by the state.

Records showed significant fish mortality occurred in only two events, both in 1988, in the area of or immediately downstream from the subject site. One incident was caused by the illegal discharge of a cleaning agent by a milk-processing plant in Homer, killing several hundred fish. The other event, which involved the death of six recently stocked brown trout, was near the subject site but the cause was never determined. The fish had been stocked eight days prior to their discovery and may have simply succumbed to post-stocking mortality. Reference is made to correspondence with the NYSDEC Bureau of Fisheries, contained in Appendix D.

C. RARE, THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

Requests were made to both the NYSDEC Natural Heritage Program (NHP) and Region 7 Bureau of Wildlife, as well as to the U.S. Fish & Wildlife Service (USFWS), for information regarding rare, threatened, endangered, or special concern species on the site or within the 2-mile radius area. NHP and USFWS records indicate that no rare, threatened, endangered, or species of special concern are known to be on or within 2 miles of the subject site. The Region 7 Bureau of Wildlife responded that it did not have resources available to maintain a convenient inventory of wildlife species and habitats (Appendix D).

D. VALUE OF FISH AND WILDLIFE RESOURCES

There is little valuable terrestrial wildlife habitat on the site itself; however, the lands within the 2-mile radius provide a wide range of habitats, from open agricultural and pasture fields, to

woodlots, to intensive urban development (City of Cortland). This area provides food, cover, water, and dispersal space resources to a wide variety of wildlife.

Remaining habitat is divided among suburban developed areas, which favor urban wildlife species such as squirrels, raccoons, mice, rats, and cosmopolitan bird species commonly found at backyard bird feeders, and open agricultural lands and forests which provide habitat for more rural species such as deer, turkey, and neotropical migrant songbirds.

As described above, the site adjoins the West Branch Tioughnioga River. This stream segment is classified C(T), meaning its designated best use is for fishing. Class C waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes. The (T) designates this stream segment as a trout water, with more stringent water quality standards in place for dissolved oxygen and ammonia to protect these sensitive aquatic organisms. NYSDEC plans to stock this segment of the West Branch Tioughnioga River with approximately 3500 brown trout in April-May 2002 (source: NYSDEC web site, March 20, 2002). There is no regulatory indication that water quality or habitat conditions in this segment of the River threaten or preclude attainment of the designated best use. That is, the NYSDEC compendia of stream (and lake) segments with water quality problems {the 303(d) and 305 (b) lists} do not include the West Branch Tioughnioga River. A New York State Watershed Restoration and Protection Action Strategy for the Susquehanna and Chemung Basins (draft April 2001) does not include this stream segment among the areas of concern.

The primary value to humans of the natural resources surrounding the NYSEG MGP site lies in agricultural, development, and recreational opportunities. The area is already partially developed in residential and commercial industrial corridors, but large tracts of open agricultural land and forest remain in the outlying areas. The suburban and urban areas present opportunities for expanding and renovating developed areas, while the open lands and forests provide for continued agricultural, forestry, and recreational pursuits of the region. The site itself offers little due to its size and location in a developed corridor. However, valuable natural resources can be found in close proximity. The West Branch Tioughnioga River offers recreational angling opportunities as well as a peaceful contrast to the adjacent commercial and suburban corridor. A community recreational area with ballfields is located across the River from the site.

7.4 PATHWAY ANALYSIS

The pathway and receptor analysis examines which media are contaminated, which chemicals are involved, the spatial extent and concentrations of chemicals measured during the site investigation, and what (non-human) organisms might be exposed to the chemicals. To assess whether fish and wildlife species are potentially at risk from the existing site conditions, site data were compared to benchmark values in published reports that relate levels of chemicals with an adverse impact on fish and wildlife receptors. This approach helps define the spatial extent of potentially hazardous contamination, which media are contaminated, and the species potentially at risk from contamination.

Review of site data indicates that there are elevated concentrations of target compounds present in certain media that may be accessible to fish and wildlife receptors. An analysis of the likelihood and importance of pathways of exposure and the wildlife receptors is presented in Table 7-1. The challenge for completing this analysis is to draw conclusions regarding the potential for specific chemical compounds to partition into the terrestrial or aquatic food web. Because data are limited it is necessary to extrapolate from limited studies. The following documents were reviewed as part of this analysis:

- USEPA Region 4 Ecological Risk Assessment Bulletins (Supplement to Risk Assessment Guidance for Superfund)
- NYS guidance documents
- Toxicological benchmarks for screening contaminants of potential concern for effects on sediment-associated biota: 1997 revision (Department of Energy report ES/ER/TM-95/R4).

A. EXPOSURE TO SHALLOW (SURFACE) SOILS

Results of the RI indicate that concentrations of target compounds in shallow soils exceed the EPA's recommended screening values and, in some cases, the NYS recommended soil cleanup

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objectives. The contaminants of potential concern include semivolatile organic compounds and metals. Wildlife communities can be exposed to site-related contaminants present in the shallow soils by several mechanisms:

- Wind and water transport (erosion) of contaminated soil particles to nearby surface water.
- Direct ingestion, inhalation, or dermal absorption of contaminants present in soil by resident or transient wildlife.
- Vegetative uptake of contaminants from soil and related food web effects.
- Food web effects of ingesting soil organisms containing elevated body burden of contaminants.

None of these exposure pathways is considered to be both complete and potentially important. In regards to erosion potential, it is noted that the majority of the site and surrounding area is either covered by asphalt, concrete, gravel, or grass, and so there is actually minimal surface soil exposed to erosion. Further, surface water drainage patterns in proximity to the site are controlled by storm water conveyances (ditches, storm sewers) that reduce the amount of overland flow from the site to the river. In reality, the combined influence of these circumstances minimizes erosional influx to the river from the site. In regards to the other mechanisms, given the limited extent of contamination and the developed nature of the site, the other three pathways were determined to be potentially complete but unlikely to be important.

B. EXPOSURE TO SUBSURFACE SOILS

It is unlikely that wildlife could be exposed to subsurface soils at depths greater than 3 feet. Test pit samples at the former Cortland MGP site were taken at depths of 5 and 8 feet with higher contamination levels found at the 8 feet depth. This pathway was determined to be unlikely to be complete and unlikely to be of ecological importance because of the limited nature of potential exposure to subsurface soils.

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C. EXPOSURE TO SURFACE WATER SEDIMENTS

Results of the RI field investigations indicate that concentrations of target compounds in surface water sediments exceed the NYSDEC sediment quality criteria, which have been developed to protect benthic organisms against acute and chronic toxicity effects. Based on these criteria, the contaminants of potential concern measured in surface water sediments at the site include several semivolatile organic compounds (SVOCs) and mercury.

Wildlife may be exposed to sediment related contaminants through various mechanisms, including:

- Direct contact
- Ingestion and absorption by resident macroinvertebrates
- Partitioning to overlying water
- Food web effects on higher organisms

Ingestion and absorption by the resident macroinvertebrate community was determined to be complete and important, given the high sediment concentrations found at the site and downstream, the sessile nature of these organisms, and hence there is heightened opportunity for direct contact. The other two exposure mechanisms were determined to be complete but unlikely to be important given the limited extent of contamination, the open nature of the system, and the mobility of higher organisms (fish, birds, mammals).

The extent of contamination may be assessed by comparing downstream concentrations to background concentrations. For example, with respect to mercury, the upstream concentration, determined as an average of concentrations from samples SED-6, -7, and –8, is 0.124 ppm. The downstream concentration, based on the average of SED-1, -2, and –3, is only slightly higher, at 0.187 ppm. Near the site, (locations SED-4, -5, and –9) the average is 0.24 ppm. Only in the relatively short segment of river near the site is elevated mercury apparent, so the extent of impact is limited.

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In regards to organic compounds, total organic carbon (TOC) content becomes relevant. From Phase 1 SRI data, if the comparison or upstream to downstream is done without correcting for site-specific organic carbon content (that is, using the bulk content data), concentrations revert to background levels at SED 2 (about 500 feet downstream of the main site) and stay below background at sediment SED 1 (about 250 feet further downstream from SED 2; total of 750 ft. downstream of the site). However, if this comparison is done after correcting for site-specific organic carbon content, contamination levels are higher than background at SED 1 (the furthest downstream site) but not at SED 2. This result is caused by the variability in TOC content of the sediments.

Because the influence of TOC on moderating toxicity of sediment contamination is a well documented paradigm, the normalized data (µg of contaminant per g organic carbon) were used to define the limits of the affected area. Based on this calculation, one SVOC, benzo(a)anthracene, was detected at concentrations above screening levels at SED 1.

The Phase 2 SRI included many more sampling locations than the initial phase. TOC analysis was completed where there was enough available sediment sample to complete the analysis. Generally, as will be discussed later, the data show that PAHs fall below screening level criteria by the downstream limit of the motel.

Data from the east bank of the river across from the site show concentrations similar to those found upstream. For example, at sample locations SED-16, -18, -20, and –22, closer to the east bank, the total PAH concentrations average was 3.2 ppm, as noted before. Upstream of the site, the average total PAH concentration was 6.7 ppm.

D. EXPOSURE TO SURFACE WATERS

The site investigation measured concentrations of target compounds in the West Branch Tioughnioga River at several locations upstream and downstream of the former Cortland MGP site. Only a trace of naphthalene, at 0.1 ppb (surface water standard is 10 ppb) was detected, at

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one sample location (SW-5). Severla phthalates were detected, but were also detected in laboratory method blanks. No other contaminants of concern were determined to be present in surface water samples.

Because of the very low to non-detectable levels of contamination found in surface waters it was concluded that this pathway is potentially complete but unlikely to be important.

E. EXPOSURE TO GROUNDWATER

The only viable transport mechanism for site impacts to reach off site is by surface runoff or groundwater. The Tioughnioga River is a regional groundwater discharge area and also receives surface runoff from a considerably large and developed drainage basin, including the former MGP site. The river effectively precludes groundwater and surface water runoff from affecting any area east of it. Considering the prevailing eastward groundwater and surface runoff direction, areas north, west, and south of the site are not particularly susceptible to groundwater or runoff impacts. Regarding surface runoff, it noted previously that storm sewers servicing the study area intercept the majority of surface flows and convey runoff away from adjacent resource areas. However, groundwater and surface runoff from the site represent transport mechanisms that could potentially affect aquatic resources within the Tioughnioga River, as either seepage via groundwater or from storm sewer outfalls. Two stormwater outfalls were identified within several hundred feet of the study area, adjacent to the south end of the motel, and adjacent to the north end of the auto transmission shop north of the site. Catch basins within the study area feed into these 2 outfalls. However, the majority of area around the site is covered by pavement or grass, so it is unlikely that storm runoff that enters the catch basins would have very much contact opportunity with the main area of deeper subsurface contamination. Thus, groundwater is viewed as the primary transport mechanism for site contaminants, potentially affecting water and sediment quality of the river.

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Results of the RI field investigations indicate that concentrations of target compounds in groundwater exceed NYSDEC standards or guidance value. The contaminants of concern include several VOCs, SVOCs, metals and cyanide.

Because of the proximity of the former Cortland MGP site to the Tioughnioga River, groundwater seepage into the river sediments is a complete and potentially important pathway

7.5 CRITERIA-SPECIFIC ANALYSIS

According to the requirements of Step II-B of the NYSDEC FWIA, contaminants present at this site were compared with regulatory standards or guidance criteria of the NYSDEC, where available, or with other published sources. The criteria/screening values used for this analysis are summarized in Table 7-2. Note that the criteria-specific analysis is directed at the only pathway and receptor considered to be both complete and likely to be important, the resident macroinvertebrate community directly affected by sediment contamination.

A. SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)

Results from the SVOC sample analysis for the Phase 1 SRI sediment sites were normalized for the amount of organic carbon found in each sediment sample. These Phase 1 SRI results are presented in Table 7-3. Table 7-4 presents the normalized data for all PAHs broken down into Low Molecular Weight (LMW) and High Molecular Weight (HMW). The normalized values are based on a maximum organic carbon content of 3 percent (30,000 ppm), in cases where the measured TOC was greater than that amount. This maximum limit was set to account for the fact that above 30,000 ppm the organic contaminants were likely affecting the outcome of the analysis, and using higher TOC levels would tend to underestimate the exposure potential. The sum of all results in these categories was used to compare against the published screening values for Total PAHs, Total LMW PAHs, and Total HMW PAHs. It is important to note that the sum includes parameters that have only estimated values.

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These results, along with the PAH data presented in Table 7-4, were compared with the criteria/screening values in Table 7-2 to determine where exceedences occurred. Any exceedences found are marked with an "*" in Table 7-3.

With the exception of benzo(a)anthracene and phenol, all detected exceedences occurred in samples taken at the former MGP site or downstream from it. The normalized results were compared first to NYSDEC sediment quality criteria; if none was available, they were compared to the EPA Region 4 screening values or the EPA Office of Solid Waste and Emergency Response ecotoxicological thresholds, as available, in that order. Benzoic acid and 4-methylphenol results were compared to the Washington State Sediment Quality Standards for marine sediments because no other criteria, benchmark, or screening value could be found for those parameters. No criteria, benchmark, or screening value could be found for carbazole or benzo (b) fluoranthene.

The organic parameters that exceeded published criteria, benchmarks, or screening values at this site are acenaphthene, benzo(a)anthracene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and phenol. There were also exceedences for LMW, HMW, and Total PAHs. Although phenol concentrations exceeded published criteria, the concentrations at the site and downstream were actually lower than at upstream sample locations. Therefore, phenol was not considered for further analysis.

The Phase 2 SRI included sediment samples from borings in the riverbed, which were anlayzed specifically for PAHs. TOC analysis was completed where there was enough sediment sample to allow it. This was primarily for sampling stations near the site, and slightly downstream of it (SED-17 to SED-25). The three sediment samples at each location were from 0 to 2 feet, 2 to 4 feet, and 4 to 6 feet, respectively. At locations where PAHs were present above the carbon-normalized sediment criteria, the PAHs were most frequently in excess of the criteria for the shallowest (0 to 2 feet) sample (Table 7-6). At location SED-17, there were 17 PAH compounds above the criteria from 0-2 feet, but only 4 above the criteria from 2-4 feet, and only 1 abovew criteria from 4-6 feet. At SED-21 the number of PAHs in excess of the criteria for the 0-2, 2-4,

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and 4-6 foot intervals were 7, 1, and 0, respectively. At SED-23 the number of PAHs in excess of the criteria for the 0-2, 2-4, and 4-6 foot intervals were 14, 5, and 1 respectively. At SED-19, where impacts were generally the most apparent, the number of PAHs in excess of the criteria for the 0-2, 2-4, and 4-6 foot intervals were 10, 13, and 8, respectively. The two locations with TOC data that were farthest downstream were SED-24 and SED-25, near the downstream end of the motel. At these two locations the number of PAHs above sediment criteria at each of the three depth intervals was 2, 0, 0 and 0,0,0, respectively. Thus, within a few hundred feet of the site the number of exceedances based on carbon-normalized levels declined substantially.

DEC-02502

B. METALS

Metals detected in stream sediments at concentrations above published criteria are presented in Table 7-5. Of those, copper and nickel show no significant difference between upstream, site, and downstream samples. Mercury concentrations at the former MGP site are twice as high as in upstream samples but further downstream the levels decline to upstream levels fairly quickly. The effects of mercury, if any, are limited to the immediate vicinity of the site. Given the elevated concentrations of copper and nickel in upstream sediment samples, these two metals are not considered for further analysis.

7.6 TOXIC EFFECTS ANALYSIS

A. MERCURY

All mercury compounds are potentially toxic. When deposited into the sediment and/or soil they become available for methylation by microorganisms, which can form highly toxic compounds such as methyl mercury. If ingested by higher trophic level organisms (eg. fish, people), mercury will circulate through the blood system and will readily form complexes with RNA, DNA and protein components Toxic levels may produce cell malfunction and death.

Mercury affects the nervous system by causing the death of brain cells. It also affects cells in other ways that can prevent cell division, cell progression, and will diminish cell populations. These actions are responsible for many of the toxic effects observed in the reproductive, blood, and immune systems of adults, and the development of embryos (Speirs 1993)

However, in order for mercury to be toxic it has to be biologically available to organisms. In studies of Clear Lake, a system with extremely high levels of mercury contamination, Suchanek *et al.* (1998) found that the toxicity levels in the benthic fauna was orders of magnitude below the expected levels. They postulated that several factors in the lake affected the bioavailability of mercury. These factors included the alkaline nature of Clear Lake water, the eutrophic status of

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the lake's ecosystem, and the shallow depth regime, which prevented stratification and widespread seasonal anoxic conditions. The Tioghnioga River can likewise be regarded as a shallow, well-mixed system that is unlikely to become stratified, and generally eutrophic.

B. POLYCYCLIC AROMATIC HYDROCARBONS (PAHs).

The ability of different organisms to metabolize hydrocarbons affects the rate at which they are accumulated. Bivalve mollusks will accumulate hydrocarbons rapidly while fish and some crustaceans will only accumulate hydrocarbons in heavily polluted areas. Aromatic hydrocarbons take longer to metabolize than the lower molecular weight nonaromatic hydrocarbons (Albers 1995).

According to Albers (1995), "trophic level increases in accumulation have not been observed in aquatic ecosystems." This is presumably because aquatic and terrestrial mammals, reptiles, and amphibians can metabolize hydrocarbons very efficiently. Albers cautions that the observation above might be due, in part, to the fact that the effects of hydrocarbons on fish and some aquatic invertebrates have been studied more completely.

The PAH concentrations found in the sediments at the Cortland former MGP site do not reach acute levels but surpass thresholds developed to protect against chronic toxicity. Therefore, one would expect to find sub-lethal effects in the affected organisms. Chronic effects in aquatic invertebrates might include reduced reproduction, inhibited embryo and larval development, delayed emergence of insect larvae, decreased respiration and heart rates, abnormal blood chemistry, and lesions. Chronic effects on fish include changes in heart and respiratory rates, gill hyperplasia, enlarged liver, reduced growth, fin erosion, impaired endocrine system, behavioral responses, and a variety of biochemical, blood, and cellular changes (Albers 1995).

Effects on amphibians have been poorly studied, almost exclusively under laboratory conditions (Sparling 2000). The few lab studies conducted seem to agree there is rapid uptake of PAHs

followed by rapid depuration. However, studies have not been conducted in field conditions where organisms might be constantly exposed to high levels of PAH contamination.

A study by Smith *et al.* (1996) evaluated the reliability of different sediment quality assessment values for freshwater ecosystems. These investigators derived a "threshold effects level" (TEL) and a "probable effects level" (PEL) based on an extensive review of field studies reported in the literature. These levels were compared with established screening values. The investigators found that the reliability of the TEL was very good (i.e., TEL were very good at indicating a level in their data set below which adverse effects rarely occur) but the PEL were less reliable (i.e., PEL were not as good at predicting a level within their data set above which adverse effects frequently occur).

Two of the organic contaminants of concern at the Cortland former MGP site (phenanthrene and benzo(a)anthracene) and one metal (mercury) were included in the Smith *et al.*(1996) study. The TEL for phenanthrene in their study was 41.9 µg/kg (which is about one-third of the NYSDEC benthic chronic criteria of 120 µg/kg), 31.7 µg/kg for benzo(a)anthracene (which is more than twice the NYSDEC benthic chronic criteria of 12 µg/kg), and 0.174 mg/kg for mercury (which is slightly higher than the NYSDEC LEL criteria of 0.15 mg/kg). Smith et al. estimated the PEL for phenanthrene as 515 µg/kg, benzo(a)anthracene as 385 µg/kg, and mercury as 0.486 mg/kg.

Smith *et al.* (1996) found that the incidence of adverse biological effects at contamination ranges for phenanthrene between the TEL and PEL was 17% (7/34). For benzo(a)anthracene, the incidence of adverse biological effects less than the TEL was 13% (8/53) and 6% (3/44) between the TEL and PEL. For mercury, the incidence of adverse biological effects below the TEL was 8% (13/147) and 34% (36/69) for concentrations between the TEL and the PEL. None of the concentrations found at the Cortland/Homer site for any of these contaminants (except phenanthrene at site 5, when corrected to a max. of 3% organic carbon) was higher than the PEL established by Smith *et al.* (1996). Since the impact in the West Branch Tioughnioga River limited to a specific area, and because the river is an open system in which organisms may enter and leave the area of impact, (unlike the conditions in the study cited), the expected incidence of

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adverse biological effects from these contaminants at the former MGP site should be lower than those found in the Smith *et al.* (1996) study for concentrations less than the PEL.

Although there is abundant evidence implying that high concentrations of PAHs in the environment represent a risk to fish and other aquatic organisms, studies investigating the response of populations in open ecosystems are very limited. The documented chronic effects on individual organisms and the long persistence (months to years) of these contaminants in sediments can create conditions that might affect wild populations over an extended period of time (Albers 1995, Zhang 2000). On the other hand, the West Branch Tioughnioga River in the region of Cortland/Homer site is an open system and the area of sediment exhibiting elevated concentrations of site-related chemicals is fairly limited. Most aquatic organisms will not be exposed to high contamination levels throughout their life history due to their migratory nature. The notable exception is the community of benthic macroinvertebrates due to their relatively sessile life history.

A study by Gewurtz *et al.* (2000) compared the dynamics of PAHs in benthic invertebrates in western Lake Erie. They found that mayfly larvae exposed to PAH-contaminated sediments accumulated large body burdens of PAHs. In contrast, PAH levels in crayfish present in the affected sediments were mostly undetectable. The PAH accumulation levels among the four types of organisms in this study were as follows: mayfly larvae>*Dreissenia* (zebra mussel)>amphipods>crayfish. The PAH levels in the western Lake Erie investigation were significantly lower than those detected at the Cortland/Homer site. The investigators postulate that elevated body burdens in mayflies, in a large enough population, might increase the risk of contaminant exposure to the insect's predators and thereby enter the food web.

Clements *et al.* (1994) investigated the food chain transfer of selected PAHs (fluoranthene and benzo(a)pyrene) from benthic macroinvertebrates (*Chironomus riparius*) to fish (*Lepomis macrochirus*). Although neither of these PAHs were detected above screening criteria at the Cortland/Homer site, this study illustrates the possible uptake and transfer of similar organic chemical in the aquatic food chain. Clements *et al.* (1994) found that, in general, PAH

concentrations in chironomids increased with concentrations in sediments. However, the relationship was quite different for these two PAHs; fluoranthene was accumulated in the tissue of these aquatic worms to a much greater extent than benzo(a)pyrene. When the contaminated chironomids were ingested by the fish, the concentrations of the both PAH compounds remained relatively low. This seemed to indicate either low uptake by the fish or rapid metabolism. The authors concluded that food chain uptake and transfer from contaminated sediments is a potential source of contamination for both benthic invertebrates and fish. However, they point out that other studies have shown that dietary uptake from sediments is insignificant compared to uptake from water. Even though water contamination levels at the site are very low, sediment bound contaminants may become available in water through the effects of benthic invertebrate activity.

Bestari *et al.* (1998) conducted a study comparing the distribution and composition of PAHs in an experimental microcosm treated with different levels of creosote. They found that at the highest creosote treatment (109 mg/l) there was no significant reduction in PAH sediment concentrations over time. However, at the lower treatment level (34 mg/l) low molecular weight (LMW) PAHs in sediment showed a significant reduction over time. The investigators hypothesize that microbial activity in the sediments is responsible for the observed decline of LMW PAHs and that this activity is suppressed at the higher PAH concentrations. Microbial decomposition of the LMW compounds might help explain the increasing prevalence of high molecular weight (HMW) PAHs in downstream sediments at the Cortland/Homer site.

In a similar study, Sven *et al.* (1997) examined the toxicity of sediments contaminated with fractions of creosote. They found that, contrary to previous studies where LMW PAHs were suggested to be more toxic due to their higher solubility, fish exposed to LMW PAHs in this study fared better than those exposed to HMW PAHs. After a 10-day exposure, fish [young-of-the-year spot (*Leiostomus xanthurus*)] in the HMW PAH treatment presented 63% epidermal lesions compared to 38% in the LMW PAH treatment. A total of 10 fish in the HMW PAH treatment died over the course of the experiment but no mortality was recorded for the LMW PAH treatment. Fin erosion and hemorrhaging were evident on every fish sampled in the HMW PAH treatment on days 7 and 10; no fin erosion was noted in the LMW PAH treatment but two

fish in that treatment showed slight hemorrhaging. Lesions and fin erosion were not found on control fish. The PAH solutions were normalized for the amount of phenanthrene in both the LMW and the HMW treatments. The PAHs with the highest concentrations in the LMW PAH treatment were acenaphthene and fluorene. In the HMW PAH treatment the PAHs with the highest concentrations were fluoranthene and pyrene, which are not contaminants of concern at the Cortland/Homer site but form part of the Total HMW PAH fraction that was found to exceed published screening criteria at sites 1 and 3. It is noted that the findings of this study are viewed as highly conservative, since in the Tioughnioga River the opportunity for exposure is much lower than the study. As noted before, the river is an open system in which fish can migrate into and out of the area of impact, and in reality the time that fish spend in the impacted area is limited. In contrast, the above study exposed fish on a more continuous basis.

Zhang *et al.* (2000) studied the desorption rates of PAHs from contaminated marine sediments. They placed trays with contaminated sediments in a sheltered bay with uncontaminated water and monitored the concentration of PAHs in the sediments and surrounding water. The investigators reported that the concentration of PAHs in the sediments went steadily down without increasing the concentration levels in the surrounding water. They postulated that the tidal flushing in the bay was enough to keep water concentrations at a minimum. This effect probably accounts for the low PAH concentrations observed in the Tioughnioga River, at the former Cortland MGP site. The constant flushing of the site keeps water concentrations below detection levels, for the most part, even though PAH concentrations in the sediments are several orders of magnitude higher.

In the terrestrial environment several studies have demonstrated that plant uptake of PAHs in contaminated soils is minimal. Porta *et al.* (1999) conducted a study of phytotoxicity in a site that had been contaminated by an oil spill. They grew corn and rice plants in soils with four levels of PAH contamination. Results from their study showed no apparent uptake of soil PAHs by plants. Corn plants showed signs of stress at total petroleum hydrocarbon content above 2000 mg/kg. As described in Section 6.3, there were no visual signs of stress on terrestrial vegetation at or near the former Cortland MGP site.

Substances in the soil can usually transfer to plants when dissolved in soil water available to roots. Trapp *et al.* (1997) found that LMW PAHs, specifically naphthalene and phenanthrene, could be uptaken by plants through this mechanism. However, for HMW PAHs such as anthracene and benzo(a)pyrene, this transfer path is insignificant.

A review of existing plant-soil PAH concentration ratios conducted by Edwards (1983) showed that plant uptake of PAHs is generally very low. Ratios ranged from 0.001 to 0.183 (fresh basis) for total PAH concentrations.

7.7 CONCLUSIONS

Given the low uptake of PAHs by plants, the high capacity of vertebrate organisms to metabolize these compounds, and the developed nature of the former Cortland MGP site, it is concluded that the risk to wildlife from ingesting on-site terrestrial vegetation would be minimal.

Mercury levels found in the Tioughnioga River sediments near the former Cortland MGP site exceed the NYSDEC LEL criteria. It is noted, however, that mercury is not a usual MGP contaminant. Moreover, the levels of mercury found in site soils are lower than off site, as evidenced by higher levels of mercury east of the river (soil borings SB-22 and -23) than at boring MW-24 near the former MGP.

Mercury can form highly toxic compounds at trace levels of contamination. However, in order to be toxic to organisms, mercury must be in a bioavailable form. The West Branch Tioughnioga River is likely to remain well-oxygenated throughout the year; anoxia of surface sediments is highly unlikely. However, even well-oxygenated aquatic systems typically exhibit a reduced layer deeper in sediments where methylation of mercury could occur. It is unclear how much of the mercury available at this site is bioavailable but it is possible that some organisms residing in sediments adjacent to the site could potentially experience toxic effects of mercury ingestion.

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There would be less opportunity for higher trophic level fish to be affected by mercury impacts in sediments adjacent to the site.

Overall, the Supplemental Remedial Investigation has documented the following conditions in the Tioughnioga River at the former Cortland MGP site:

- PAH concentrations in sediments above chronic benthic criteria or screening levels;
- water column concentrations mostly below detection levels;
- possible continued source of contaminants from groundwater and sub-surface runoff;
- an open system where water is constantly renewed and most organisms are not limited to contaminated areas; and,
- a fairly limited area of contamination extending several hundred feet downstream of the former MGP site, but not extending all the way across the river to the to the east shore.

Given these environmental conditions, one would expect to find some fish presenting sub-lethal effects of PAH toxicity (e.g., lesions) but most of the effects would be borne by the resident benthic organisms. It is possible that the community of benthic organisms in the most heavily contaminated areas is comprised of a reduced biomass of organisms, and/or limited to those species most tolerant of the residual contamination. This would reduce the mass of contaminant potentially transferred to other organisms through the food web. However, because benthic organisms are an important food source within the aquatic food web, the ecological effects of high PAH sediment contamination could be locally significant (Clements 1997).

It is probable that fish, piscivorous mammals and birds, and birds that feed on mayflies, are exposed to some level of PAHs through food chain uptake. But it seems that given the conditions found at the Cortland former MGP site (industrial/commercial area, open system, limited contaminated area) and the high PAH metabolizing rate of these higher organisms, the effects of PAH toxicity on them should be minimal.

CHAPTER 8

RISK ASSESSMENT

8.1 INTRODUCTION

This chapter presents the findings of a qualitative risk assessment that was completed as part of the SRI. The purpose of the risk assessment was to characterize the risk to human health posed by the presence of site-related contaminants. The analysis of risk at the site helps determine the need for, and the extent of, potential remedial actions. During the RI/FS process, remedial activities can be evaluated for their ability to reduce the risks to human health identified by the risk assessment.

Although this human health risk assessment was qualitative as opposed to quantitative, it was nonetheless prepared in a manner generally consistent with methodologies presented in USEPA guidance documents (*Risk Assessment Guidance for Superfund. Volume I, Human Health Evaluation Manual (Part A) Interim Final* (1989). In general, a quantitative risk assessment consists of four activities. Figure 8-1 presents a flow chart illustrating the role of each of the four steps in the quantitative risk assessment process.

Data collection and evaluation are the first steps undertaken in the risk assessment. The purpose of this activity is to define the extent to which contamination is present at the site, and then to identify the chemicals of potential concern. Samples of the various site media are collected and analyzed for quantitative information concerning concentrations of chemicals. The data obtained from the laboratories is then screened to identify chemicals of concern. As illustrated in Figure 8-2, the data screening includes steps such as data validation, comparison to background concentrations, and/or regulatory standards and guidance values. Chemicals that survive this screening process are termed chemicals of potential concern (COPC) and are carried through the remaining steps of the risk assessment process.

The second risk assessment activity is termed exposure assessment. Typically this activity considers the pathways by which people might realistically be exposed to site chemicals, both now and in the future. It is important to note that exposure can only occur when a chemical source exists simultaneously with a receptor and a mechanism for transport of the contaminant source to the receptor. Because this is a qualitative risk assessment, this report only includes an

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identification of possible exposure pathways. In a quantitative risk assessment, however, the end result of this step is a calculation that estimates the chemical intakes for each exposure pathway. The third activity is toxicity assessment. This step consists of reviewing toxicological databases for the chemicals of concern, and is often done in conjunction with the exposure assessment step. For this qualitative risk assessment, this activity includes a summary of the types of toxic effects associated with the site chemicals of concern.

The final activity is called risk characterization. In this last step, the previous activities are integrated together and the potential for adverse effects on human health is characterized. If exposure doses have been calculated, as in a quantitative risk assessment, this activity includes a comparison of the exposure doses to levels that are known to cause adverse health effects. Both carcinogenic (cancer-causing) and non-carcinogenic (toxic) effects on human health are detailed. The uncertainty in the process is discussed. The result of this step is an understanding of whether a reduction in risk may be required.

The results of the risk assessment are based on the outcome of this four-step process. For this project, the conclusions of this chapter will present a qualitative description of the chemicals of concern and the potential risk that the site COPCs pose to identified human receptors.

8.2 SITE BACKGROUND AND ENVIRONMENTAL SETTING

The land use and environmental setting of a site will, to a large degree, determine the amount of potential risk to human health posed by site conditions. Land use determines the extent to which potential receptors could contact impacted media (air, sediment, water, soil). Isolated sites and those with minimal access pose less of a potential risk to human health than sites accessible to large numbers of people. The environmental setting of the site also determines the relative importance of transport of chemicals through the various media. In the risk assessment process, information about this environmental setting, including current and future land use, is combined with knowledge of site-related contaminated media. This information is then integrated into an evaluation of current and future pathways by which exposure to site-related chemicals may occur. The paragraphs that follow describe the environmental setting of the former NYSEG Cortland/Homer MGP. Included are summaries of information presented in greater detail earlier in this report.

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The former MGP is located on the west side of South Main Street in the Village of Homer. The site is situated adjacent to a suburban residential area and is located where it meets a commercial/industrial area. The property itself is bordered on the east side by a public road, on the north and south sides by commercial development, and on the west by railroad tracks.

Land use in the vicinity of the site is varied. The area between the railroad tracks and the river is extensively commercially developed. Many businesses in this area are related to automobile and truck sales and service, or are businesses associated with construction trades. The land directly east and across Route 11 from the site is presently owned by NYSEG and is used as temporary storage space. A motel is located across Route 11 from the site, to the southeast, also adjacent to the river. There are a number of residential dwellings approximately one half mile south of the site, along South Main Street and Maryland Avenue. Soccer fields associated with the Homer School District are located further to the north of the site on the opposite side of the river. Besides the athletic fields, agricultural fields and open space are located to the east of the river. Interstate 81 also runs north/south through this area. A large automobile junkyard is located within approximately 1/2 mile from the site. The area west of the railroad (and site) is dominated by recreational, open space, and agricultural land uses. The golf course associated with the Cortland Country Club is located adjacent to the west side of the railroad tracks just west of the site.

Hydrogeologic data collected during the investigation indicate that groundwater is located from 5 to 10 feet below grade across the study area. The groundwater flows to the east across the site, discharging to the West Branch of the Tioughnioga River. There are generally no institutional or physical barriers to the river that restrict human access to it.

All the property in the area is served by public water from the Village of Homer. However, two private wells were identified near the site by the well survey conducted as part of the SRI activities. One well, owned by Wright Way Oil, is at a gas station directly southeast of the site. This well has been identified as being completed in bedrock and is used strictly for cooling ice machines associated with the gas station/convenience store. Another well is owned by Dann Grant and is located about 1/2 mile south of the site. This well is reported to be shallow in depth and is used as the supply of water for the homeowner.

8.3 SUMMARY OF SITE CONTAMINATION

The sampling plan designed to evaluate environmental conditions at the MGP site has been described in detail in Chapter 3. Groundwater, surface water, sediment, surface and subsurface soil, soil gas, and indoor air samples were collected during the two phases of the SRI to address the objectives of this investigation. In addition, the risk assessment integrated data from previous studies (E.C. Jordan Co.) in the evaluation of potential risks.

One of the objectives of the human health risk assessment was to integrate historical data with SRI data to an appropriate extent. Recalling that the present-day risk of exposure is based on existing site conditions, it is appropriate to consider whether the historical data, which is over 15 years old, accurately reflects existing circumstances. This is especially germane for groundwater, surface water, and air data. These fluid systems are dynamic and chemical evolution of contaminants over time is virtually certain. Moreover, surface soils across the study area have been re-worked, eroded, and chemically weathered, and accordingly surface soil quality has changed over the past 15 years. Because the SRI generated a robust and representative database for each of these media, and in view of the likelihood that data from prior investigations no longer represents the present-day chemical character of those media, it is concluded that the best assessment of current exposure risk can be derived from the recent SRI data. However, subsurface soil is considered to be less subject to the chemical dynamics that exclude the historical data for surface soils, groundwater, surface water and air. Thus, the historical data was used in addition to SRI data in the risk assessment.

As described in Chapter 3, each sample was analyzed in a New York State certified laboratory in the NYSDEC Analytical Services Protocol program. Following receipt of analytical data, the results were then screened for inclusion in the risk assessment. Figure 8-2 summarizes the process followed for each set of analytical data. Technically acceptable data underwent screening before inclusion in the assessment of site-related risk. This additional screening included comparison to background concentrations and comparison to applicable standards (NYS standards, criteria or guidance, SCGs) or preliminary remediation goals (PRGs), which are media specific cleanup goals that have been established by USEPA (Region 9) using available toxicity and carcinogenicity information. Tables 8-1 and 8-2 present the results of this screening based on NYS SGCs and EPA PRGs, respectively. The following paragraphs summarize the results of the data screening.

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A. **Groundwater.** Data screening for groundwater included the recent (1999 – 2001) SRI data. The historical data were excluded because groundwater quality changes over time, and the potential risk related to groundwater exposure is based on the existing level of contamination in groundwater. Groundwater conditions in the past are not as relevant for assigning a level of exposure risk, and because the historical data represents groundwater conditions from more than 15 years ago, it is not useful for assessing present-day risks. The SRI groundwater data collected from 31 monitoring wells provides a clear indication of existing groundwater quality at the site and is an appropriate baseline for assessing risk.

Groundwater chemicals of concern identified by the data screening process include several VOCs (benzene, toluene, ethylbenzene, xylenes, and styrene). All are hydrocarbons known to be associated with MGP residuals, but it should be noted that they are also all components of petroleum products. SVOCs that were identified by the data screening as being site-related COPC include four phenolic compounds (phenol, 2-methylphenol, 4-methylphenol, and 2,4-dimethylphenol), and eleven PAH compounds (naphthalene, acenaphthylene, acenaphthene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,I)perylene). Although eleven PAHs were identified as COPCs, it is noted that many of the higher molecular weight PAH compounds were only detected in the Phase I groundwater samples. PAH compounds are known to be associated with MGP sites, and are also components of petroleum fuels. Metals identified as being groundwater COPC include arsenic, barium, cadmium, chromium, iron, lead, magnesium, manganese, nickel and sodium. Finally total cyanide was also identified as a groundwater COPC.

B. **Surface Water.** The SRI included surface water samples from 9 locations upstream, adjacent to, and downstream of the site. Three other surface water samples were previously collected during the Task 2/3 Site Investigations, and represent surface water conditions as they existed more than 15 years ago. Similar to groundwater, the present-day risk associated with surface water exposure is based on the existing degree of surface water impact, so the SRI data were used in the risk assessment. As indicated on Tables 8-1 and 8-2, no contaminants of concern were identified in surface water samples.

C. **Sediment.** COPCs for sediments were based on data from the shallow (upper 2 feet) sediment samples, because the greatest potential exposure opportunity occurs for the shallower sediments. Several SVOC compounds and metals were identified as being potential, site-related

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COPCs. The SVOC compounds are all PAHs (acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, debenz(a,h)anthracene, and benzo(g,h,i)perylene). The metals identified by the data screening process include beryllium, chromium, copper, iron, and mercury. Total cyanide was also identified as a COPC.

D. **Surface Soil.** Exposure risks related to surface soils considered the recent SRI data in favor of the historical data to account for 15 years of chemical weathering processes. SRI surface soil samples were collected from two background locations, a swampy area behind ID Booth an area east of Rt 11 , an area on the ID Booth property, an area in front of the motel, and an area near Natoli's market. As a rule, constituents that were detected at higher levels in background soil locations than on site (e.g phenols) were dismissed as COPCs.

Only one set of surface soil samples were analyzed for VOCs, and none of these were identified as COPCs. Six PAH compounds were identified as being SVOC contaminants of concern in surface soil (benzo(a)anthracene, bennzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene). Phenol was also identified as a COPC in at least one area. Arsenic was the only metal identified as a contaminant of concern in surface soil.

E. **Subsurface Soil.** Exposure risks related to subsurface soils included both historical (Task 2 and 3) and SRI data. Unlike groundwater and surface water, which are dynamic and are subject to a relatively high degree of chemical evolution over time, and surface soils that are subjected to chemical weathering and erosion processes, surface soil conditions are comparatively static.

Several VOCs, SVOCs, and metals were identified as COPCs in subsurface soil samples. VOCs include acetone, 2-butanone, benzene, toluene, ethylbenzene and xylene. It should be noted that acetone and 2-butanone are not normally associated with MGP residuals. SVOC COPCs include three phenolic compounds (phenol, 2-methylphenol and 4-methylphenol), several PAHs (naphthalene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene), carbazole and dibenzofuran. Seven metals were identified as subsurface soil COPCs (beryllium, chromium, copper, iron, mercury, nickel, and zinc).

F. **Indoor Air.** Data screening of indoor air samples included comparison to values in the USEPA and NYSDOH database for indoor air (75^{th} percentile for indoor air in NYSDOH

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database allair.xls) and USEPA Region 9 PRGs for ambient air. Those compounds detected in both 1999 indoor air samples, 2001 subslab samples, and exceeding a PRG (or ambient air value if no PRG exists) were retained as COPCs. Indoor air COPCs include freon 12, benzene, ethylbenzene, hexane, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, and tetrahydrofuran. It should be noted that sources for many of these chemicals were also identified in the building.

8.4 SELECTION OF EXPOSURE PATHWAYS

For any site with chemical releases, a range of possible exposure pathways is possible, as illustrated in Figure 8-3. The exposure pathways that could actually occur are only a subset of the entire range of possibilities. The site's environmental setting and surrounding land use, coupled with the nature and extent of chemical impacts, determine the feasible exposure routes. Human exposure from site-related contamination is only possible when there is a pathway of contaminant migration and a human receptor. When the source (contamination), transport mechanism, and receptor are all present, the pathway is termed "complete." If one or more of the three items are missing, the exposure pathway is termed "incomplete." Exposures can only occur for complete pathways. In this section, the rationale for selection of exposure pathways for both current and future land use conditions at the Cortland/Homer study area is discussed.

Although several chemicals were detected in groundwater samples at concentrations exceeding regulatory standards, exposure to groundwater via ingestion is not considered a complete exposure pathway under the current land use scenario. The area surrounding the site is supplied with municipal water, and the only private wells identified in the vicinity are not in the area of the impacted groundwater. The impacted groundwater is confined to the immediate area between the site and the West Branch of the Tioughnioga River.

In the future, it is also unlikely that a private well would be installed in the area identified as being impacted by the MGP, as NYSEG owns much of the land between the former MGP property and the river, and could therefore impose deed restrictions preventing installation of a private well. In addition, future installation of a private well adjacent to the groundwater plume for potable purposes is unlikely because of the presence of public water. However unlikely, exposure by ingestion, inhalation in the shower, and dermal contact to groundwater contaminants in the future are considered possible future exposure pathways.

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Exposure to groundwater contaminants via inhalation of compounds that have diffused from the subsurface into basements or aboveground portions of buildings is a potential scenario under both current and future land use situations. Indoor air sampling in the ID Booth building did identify COPCs, however the chemicals were also associated with substances that are used or stored in the building. Further, since most buildings in the area are commercial enterprises, the maximum potential exposure that would occur would take place only during a normal work week, with the possible exception of the motel. Despite the residential-style of occupancy at the motel, the duration of exposure is distinctly shorter than the potential lifetime exposure upon which residential exposure is based. A work place exposure scenario is more applicable.

Exposure to chemicals and DNAPL detected in Tioughnioga River sediment is considered a complete pathway. Access to the river is possible. The motel adjacent to the creek just south of the site has no physical or institutional barriers to river access. It is also possible to access the river from the recreational fields located north of the site. Therefore, exposure via ingestion of fish and associated bioaccumulation, and incidental ingestion and dermal contact with sediment and/or DNAPL are considered complete pathways under both current and future conditions.

Exposure to contaminants in soil, both surface and subsurface, via accidental ingestion, dermal contact, and inhalation are considered complete exposure pathways. In most cases this exposure would be by people who work at area facilities or by construction workers, particularly along Route 11. Exposure of children staying at the motel to surface soil (for example, during play on the motel grounds) is also possible. Because surface soils around the motel are either covered by grass or pavement, the chance for accidental ingestion or inhalation of dust is relatively low.

The potential for exposure to subsurface soil is very low except for excavation/construction situations or in connection with maintenance of subsurface utilities. In these cases, construction and utility workers, as well as people visiting the site, would potentially be exposed to contaminants in subsurface soil. Exposure to subsurface soil may occasionally include exposure to DNAPL, specifically near the former holders and due east of the holders near Route 11. However, data and field observations presented in Chapters 5 and 6 indicate that exposure to DNAPL outside this specific area would be highly dependent upon location, with decreasing exposure opportunity with increasing distance from the former holders. Airborne transport of soil particles from construction areas could result in exposure to commercial facilities, as well as potentially to the athletic fields located slightly north and east of the facility. Exposure to vapor phase volatile organic compounds is also possible. Thus, under future scenarios, exposure of

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construction/utility workers to contaminants in subsurface soil is considered a potential complete exposure pathway.

Table 8-3 summarizes the results of this initial step in the risk assessment process.

8.5 HAZARD IDENTIFICATION

The next step of the risk assessment process is to evaluate exposure doses that could be expected to occur for each of the complete exposure pathways. As this risk assessment is only a qualitative assessment of potential health impacts, the hazard identification step involves only identification of contaminants of concern associated with each possible complete exposure pathway identified above. Once compounds have been identified, toxicological databases will be reviewed to determine potential health effects associated with the chemicals of concern. Table 8-4 summarizes compounds of concern associated with each potential exposure pathway.

8.6 TOXICITY ASSESSMENT

Toxicity assessment determines the extent to which adverse health impacts could arise from exposure to the identified site-related compounds of concern. Data on known health impacts for each identified compound of concern was obtained from the Integrated Risk Information System (IRIS) database. The database is maintained on the internet by the USEPA and includes information on known and suspected health impacts for a large number of chemicals.

Two types of health impacts from exposure to chemicals are possible. Toxicity, both subchronic and chronic, is the first type of health impact; carcinogenicity is the second. Subchronic and chronic toxic effects are health impacts that are exerted slowly over the same time period as exposure occurs. A "threshold" model is used to conceptualize these effects; that is, there is a dose below which no adverse effects will occur. Carcinogenic effects, in contrast, are molecular events that evoke changes on the cellular level that can lead to uncontrolled cellular proliferation and eventually to the disease cancer. Exposure can lead to clinical effects later in life, in comparison to the subchronic and chronic effects where the impacts occur over the same time period as exposure. Carcinogenesis is conceptualized as a "non-threshold" model because of the conventional assumption that there is no exposure that produces a zero chance of a carcinogenic response. (Note: This assumption does not assert that every exposure will result in a cancer, but rather that there is no minimum exposure level below which there is no cancer risk.)

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The potential impacts of exposure to non-carcinogenic chemicals are evaluated by comparing the calculated exposure to the published "reference dose" (RfD in units of mg/kg/day) or "reference concentration" (RfC in units of mg/cubic meter for exposure to toxics in air) for the chemical of concern. The RfD (or RfC) is the estimated exposure at which no adverse health impacts will occur, even among sensitive subpopulations. Exposure at the reference dose may occur without deleterious effects for a lifetime. Uncertainty in the RfD (or RfC), however, may span an order of magnitude.

For this risk assessment, IRIS was reviewed for known toxic effects caused by chemicals of concern. If a reference dose was listed, it was noted, along with the health effect or the target organ. The smaller the RfD, the more toxic the compound, as the effects occur for lower exposure concentrations.

Similarly, data contained in IRIS was also reviewed for known carcinogenic effects caused by site-related chemicals of concern, and the "weight of evidence" classification assigned to each chemical. Carcinogenic effects are quantified by using a "slope factor," which is the unit risk per mg/kg/day exposure dose. The slope factors resulting from human and animal studies are published by the USEPA and reflect consensus judgements of the agency scientists. Each slope factor is qualified by a "weight of evidence" factor denoting the uncertainty in prediction of human carcinogenicity. Similar to the RfD, the smaller the slope factor, the greater the estimate of potential risk due to exposure.

Tables 8-5 and 8-6 summarize the health effect parameters obtained from IRIS for the various chemicals of concern identified in the Cortland/Homer study area.

As indicated in Table 8-5, chronic non-carcinogenic effects have been associated with exposure, via ingestion, to many of the site chemicals of concern identified in the groundwater, surface and subsurface soil, and sediment. All the VOC contaminants of concern (subsurface soil and groundwater) are associated with non-carcinogenic health effects except benzene because references dose data are not available. Of the PAH compounds identified as being contaminants of concern, only the phenolic compounds (groundwater), naphthalene (groundwater, subsurface soil and sediment), and fluorene (sediment) are associated with non-carcinogenic health effects. In addition, anthracene, pyrene, and acenaphthene are at elevated levels in some samples (subsurface soil, groundwater, and sediment) and are associated with non-carcinogenic effects.

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Of the metals identified as contaminants of concern, all, except copper, iron, and magnesium are identified with chronic toxic effects. Of most concern, from an exposure standpoint, are lead and mercury. Information included in IRIS indicates that recent studies show neurological effects in children from exposure to lead occur at such low blood concentrations that the effects appear to occur without a threshold. For this reason, the RfD for oral exposure to lead has been withdrawn from IRIS. Instead, the database entry is that scientists conclude there is no observed effect level for oral exposure to lead. Mercury is also known to cause chronic, toxic effects and is associated with an extremely low RfD. Both contaminants were identified as contaminants of concern in more than one site media.

As indicated in Table 8-6, many of the chemicals identified in site media at elevated concentrations are also associated with carcinogenic effects. Benzene (groundwater) is a Class A carcinogen, meaning the compound is known to cause cancer in humans. Several of the PAH compounds identified as contaminants of concern are currently classified as B2 carcinogens, meaning that the compound is a probable human carcinogen, but there is inadequate human data. The basis for much of this classification is that these compounds are known components of substances (such as coal tar, soot, coke oven emissions, and cigarette smoke) that are known to cause cancer in humans. However, carcinogenic slope factors have not been calculated at this time. Arsenic, found in some groundwater samples at a concentration exceeding standards, guidance values, and criteria (SCGs) and background, is also currently classified as a known human carcinogen (Class A). Chromium (hexavalent chromium only) is also a Class A carcinogen; however, only via inhalation exposure.

8.7 CONCLUSIONS AND RISK CHARACTERIZATION

As discussed earlier in this chapter, several exposure pathways have been identified as being possible under current land use conditions in the Cortland/Homer study area, in connection with the following exposure media:

- Surface soils – dermal, ingestion, inhalation
- Air (subsurface migration of vapors) – inhalation
- Subsurface soils/DNAPL – dermal, ingestion, inhalation
- Sediment/DNAPL – dermal, ingestion

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Exposure to surface soil via accidental ingestion and inhalation and by direct contact is a potential exposure pathway. The primarily commercial land use surrounding the site makes workers (e.g. site employees, construction, utility) the principal exposed population. Motel guests including adults and children are also potentially exposed to surface soils, although for a shorter duration and less frequently than site workers.

Exposure to vapor phase compounds, specifically VOCs, that may diffuse from the subsurface and collect in buildings was initially considered a possible inhalation exposure pathway for locations immediately adjacent to the MGP. However, direct measurements of VOCs in soil vapor do not indicate that gas phase VOCs at the site are having a noticeable affect on areas further away from the site. In addition, because the site and surrounding area consists of primarily commercial establishments, more conservative residential exposure scenarios do not apply. It was carefully considered whether the motel might represent a residential setting. However, the residential exposure model is based on exposure durations of decades, and this is not consistent with the occupancy patterns at the motel. A typical motel guest will not reside at the motel for nearly as long as motel workers, and by that logic it is more appropriate to consider motel exposure in terms of a workplace exposure setting. Thus, the overall risk due to inhalation near the site is believed to be low.

The area is supplied with municipal drinking water. Groundwater impacts from the site extend in an easterly direction towards the river. There are no supply wells within the area of site-related groundwater impact and by this fact there is no existing opportunity for exposure to groundwater. In the future, deed restrictions could be implemented in the area of impacted groundwater.

Exposure of construction and utility workers to subsurface soil contamination is a credible future exposure scenario.

Finally, exposure to contaminants in Tioughnioga River sediment, including DNAPL, is considered a viable exposure pathway. There is access to the river in the area of impacts, and MGP residual-like material is present in the sediment in discrete locations.

In conclusion, the qualitative risk assessment has identified VOCs (especially benzene), metals, and PAH compounds as contaminants of concern based on their detection in various samples of media in the study area. The PAH compounds detected in samples of all media are those

compounds collectively referred to as carcinogenic PAHs. While quantification of the actual carcinogenic risk is not possible at this time, it is known that the individual chemicals are constituents of other substances known to cause cancer in humans. Concentrations of lead in surface soil and mercury in river sediment were also found to be elevated. At the present time, it is believed that adverse neurological effects due to lead exposure can occur in children at very low exposure doses. While PAHs are known to be associated with MGP processes and residuals, the actual source of the PAHs, and also metals, may not be the former MGP plant. However, trace metals are associated with coal ash, which may have been disposed in the vicinity of the plant when it was operated. Because coal burning occurred virtually everywhere in the past, measurable levels of trace metals related to coal ash are expected in background areas.

Although concentrations of the carcinogenic PAHs, non-carcinogenic PAHs, VOCs, and metals are high in subsurface soil samples, the chance for exposure is low because the site is already heavily developed. Should excavation activities occur in the future in the study area, personal protective equipment can be used to prevent exposure to construction workers. Dust suppression actions and work zone perimeter monitoring would be required, however, to verify that exposure to downwind receptors was not occurring.

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CHAPTER 9

CONCLUSIONS

The SRI at the former Cortland/Homer MGP site included sampling of soil, surface water, sediment, groundwater, air, and soil gas at various locations in and around the former facility. The sampling and analytical programs were based on findings from previous investigations which identified areas and potential contaminants of concern. The following conclusions are based on the findings of the SRI as well as a review of relevant historical site information:

A comprehensive background soil sampling program completed in November 2001 indicates that site surface soil quality is generally similar to that of the Cortland area as a whole.

A total of 59 soil borings (37 SRI soil borings that included 4 boring couplets, plus 22 previous borings) advanced across the site at 55 locations indicate that buried MGP residuals are present primarily within former MGP structures below the I.D. Booth building, and along the eastern edge of the I.D. Booth building immediately adjacent to these structures. Residuals were evident visually in soil borings as a mixture of highly viscous, putty-like tar mixed with silty soil. Laboratory TPH analysis indicates the tar/soil mixture to have coal tar signature. A number of VOCs and SVOCs were also detected, along with cyanide. SRI soil borings advanced further away from the I.D. Booth building encountered visible tar-like residual much less frequently than those close to the building, indicating that the majority of residual remains close to the MGP structures, but there is evidence that tar impacts extend to the east of the MGP.

In total, 21 of the 55 SRI soil boring locations had some degree of visible tar present in the soil samples. Thirteen of these 21 boring locations were immediately adjacent to or under the I.D. Booth building. The remaining 8 locations were east or southeast of the MGP.

Soil boring MW-24, advanced along the eastern edge of the I.D. Booth building near the former relief holder, produced soil samples with that contained or were stained with tar. Petroleum-like odors were also observed at various soil depths throughout the total boring depth of 40 feet. This appears to be the primary area of impact.

Borings east of the Tioughnioga River did not reveal evidence of MGP-related impacts, either visually or by laboratory analysis. Seven of 10 borings on the west bank of the river produced soil samples that had no visible impacts. The 3 riverbank borings with visible impact include SB-16 and B-20 (east of the building), and SB-31 (south of the motel). SB-31 did not contain detectable organic compounds.

A total of 31 monitoring wells were checked for free product during the groundwater sampling phase of the SRI, including 15 monitoring wells plus one NAPL observation well that were installed during the SRI. Only one of the monitoring at the site, MW-24, contained measurable DNAPL on a consistent basis during SRI field sampling activity from 1999 to 2001. However, in November 2002 DNAPL was discovered in well MW-16, on the east side of Route 11, for the first time. Well MW-16 has been in place since 1987. This recent finding indicates that tar-like DNAPL east of the site is potentially mobile. However, no DNAPL was observed on monitoring wells in close proximity to MW-16 that were bailed over a four-week period in November and December 2002 following the discovery of DNAPL at MW-16. This finding, together with chemical fingerprints for groundwater and soils, indicates the extent of DNAPL occurrence is probably limited to narrow bands and discrete horizons. The DNAPL is recoverable near the source area at an apparent rate of a few gallons per week, as evidenced by NYSEG's recovery efforts at MW-24 during 2000. The viscosity and density of the recovered tar is apparently increasing over time.

Sheens were observed in groundwater from 8 other monitoring wells during SRI groundwater sample collection, and measurable floating LNAPL was observed in MW-11 (3 inches).

The extent of coal tar impacts in the soil, as defined by chemical fingerprints, generally correspond with observations regarding the presence of visible tar in soil samples across the site. The principal area of impact includes adjacent to the former MGP structures, and extends to the east and southeast. There is virtually no evidence of coal tar north of the MGP, and south of the site chemical evidence indicates minimal tar.

Groundwater data from existing and new monitoring wells indicate groundwater impacts adjacent to the I.D. Booth building decline substantially downgradient to the east, towards the river. Two distinct groundwater plumes are apparent, extending east and southeast

from the former MGP area. The eastern plume has a chemical fingerprint that indicates tar is present in the subsurface, and that the amount of tar decreases with distance from the MGP area. The southern plume has a chemical fingerprint that indicates this area is more distant from the tar, which support the conclusion that most of the remaining tar is near the MGP and extends to the east, but not to the south or southeast.

Sediment probes and shallow borings within the river itself showed evidence of tar in the river sediments, primarily close to the MGP site and near the western riverbank. Tar-like impacts were also apparent approximately 5,000 feet downstream of the site, in sediments upstream of a sediment trap. Where present, the tar appears as a semi-solid in the upper 2 feet of sediment. It is recalled that tar was observed in riverbank borings relatively infrequently compared to its widespread occurrence in river sediments, primarily in the specific area north of the motel near borings SB-16 and B-20. It does not seem that the more widespread tar deposits in river sediments beyond this limited area on the riverbank could be derived from ongoing, active transport from the bank. Much of the impacted sediment area near the site is not adjoined by riverbank soils that contained a lot of tar.

Soil vapor and indoor air sampling in the I.D. Booth building detected various organic compounds that are common in developed/urbanized settings. Overall, the detected levels of gaseous compounds are not believed to represent a significant exposure risk.

The results of Steps I through IIC of the Fish and Wildlife Impact Analysis indicate that there is likely to be a complete exposure pathway between site-impacted river sediments and the aquatic community in the river. Most of the effects of site contamination, if any, would be borne by resident benthic organisms, on a localized scale, consistent with the fact that sediment impacts are most apparent in the western portion of the river near the site, and also in the southern meander bend south of the site.

Under existing conditions, direct human exposure to impacted soils is limited by the fact that the study area is extensively paved and non-residential. Future exposure to subsurface soils by site construction and utility workers is a possibility. Exposure to impacted groundwater is greatly limited by the fact that the area of impact is evidently small, with a total groundwater flow path from source to discharge area of less than 200 feet, and according to water well survey results, there are apparently no drinking water wells in the downgradient area potentially affected by site activities. Exposure to river sediments and

affected fish could potentially occur. Exposure to vapor phase contaminants via inhalation is possible, but the analytical data do not indicate that the site has had a noticeable affect on soil vapor levels.

CHAPTER 10

RECOMMENDATIONS

The SRI data should enable the completion of a feasibility study, which will assist in the selection of an appropriate site remedy. Enough site data has been produced so that the degree of MGP impact, and its affect on the surrounding environment, has been defined to the point that human health and environmental effects can be managed.

Based on the findings of the SRI, the greatest existing potential for human exposure to site related residuals is via direct contact with soils and river sediment. The most significant soil impacts are directly under and adjacent to the I.D. Booth building, in the area near the former gasholders and the purifying house.

Water quality in the river does not appear to be affected by the site, but sediments show signs of residual impact, particularly the upper one to two feet.

The above findings, and others presented in this SRI Report, will be taken into account when remedies are evaluated in the feasibility study. A focused feasibility study that targets subsurface soils in the former MGP area, as well as impacts to river sediments adjacent to the site, would produce a site remedy that will mitigate the vast majority of residual impact on site, and which will provide an immediate and lasting improvement to the ecological and recreational value to the river.

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TABLES

TABLE 3-1
River Reconnaisance and Sampling Summary - Phase 1
Sediment Probing Results
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Transect Location	Observation west bank	Transect Location	Observation stream bed	Transect Location	Observation east bank
1 A	***none, sample SW/SED-8***	1 B	none	1 C	none
2 A	***none, SW/SED-7***	2 B	none	2 C	none
3 A	none	3 B	none	3 C	none
4 A	slight sheen	4 B	none	4 C	none
5 A	none	5 B	none	5 C	none
6 A	slight sheen	6 B	none	6 C	none
7 A	***petro. type odor, SW/SED-6***	7 B	none	7 C	none
8 A	significant sheen; outfall	8 B	none	8 C	none
9 A	slight sheen	9 B	none	9 C	none
10 A	slight sheen	10 B	none	10 C	none
11 A	slight sheen	11 B	none	11 C	none
12 A	slight sheen	12 B	none	12 C	none
13 A	slight sheen	13 B	solid tar	13 C	slight sheen
14 A	***slight sheen, SW/SED-4***	14 B	tar present	14 C	***none, SW/SED-9***
15 A	sheen	15 B	tar; slight petro. Odor	15 C	slight sheen
16 A	***strong odor, SW/SED-5***	16 B	tar	16 C	none
17 A	slight sheen; odor	17 B	some tar	17 C	none
18 A	slight sheen	18 B	none	18 C	none
19 A	slight sheen	19 B	tar	19 C	none
20 A	none	20 B	pieces of tar	20 C	none
21 A	none	21 B	none	21 C	slight sheen
22 A	none	22 B	none	22 C	***none, SW/SED-3***
23 A	none	23 B	none	23 C	none
24 A	none	24 B	none	24 C	none
25 A	***none, SW/SED-2***	25 B	none	25 C	none
26 A	none; near outfall	26 B	none	26 C	none
27 A	none	27 B	none	27 C	none
28 A	none	28 B	none	28 C	none
29 A	none	29 B	none	29 C	none
30 A	none	30 B	none	30 C	none
31 A	none	31 B	none	31 C	none
32 A	none	32 B	none	32 C	none
33 A	none	33 B	none	33 C	none
34 A	none	34 B	none	34 C	none
35 A	none	35 B	none	35 C	none
36 A	none	36 B	none	36 C	none
37 A	none	37 B	none	37 C	none
38 A	***none, SW/SED-1***	38 B	none	38 C	none

Transect locations with ***bold italic*** face represent surface water and sediment locations.

TABLE 3-2
Water Well Survey
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

SURVEY LOCATION *	RETURNED yes	RETURNED no	COMMENTS
Natoli's Market		X	
Wrightway Oil	X		Well onsite used to cool ice machines
4372 Old Rt. 11		X	
4371 Old Rt. 11		X	
4370 Old Rt. 11		X	
4368 Old Rt. 11	X		Well onsite. Used for everything. No percieved water quality issues.
4371 Maryland Ave.		X	
4359 Maryland Ave.		X	
CNY Office Supplies		X	
Budget Inn Motel		X	
J&M Automotive		X	
Rick & Rich Towing		X	
208 South Main street		X	
Toro Dealer		X	

* See Figure 5-20 for locations

Table 4-1
Soil Boring Sample Analytical Results
Task 2 & 3
NYSEG Cortland/Homer Former MGP
Homer, New York

oring/Sample Depth (ft)	TAGM - Rec. Soil Cleanup Objective	Task 2									Task 3													
		B-2/S-1 8 - 10'	B-2/S-2 35 - 37'	B-2/S-3 50 - 54'	B-2/S-3 Duplicate	B-3/S-1 8 - 10'	B-3/S-2 40 - 42'	B-4/S-1 8.5-10.5'	B-5/S-1 4 - 6'	B-7/S-1 5 - 9'	B-10/S-1 5 - 7'	B-11/S-1 10 - 12'	B-12/S-1 8 - 10'	B-13/S-1 40 - 42'	B-13/S-1 Duplicate	B-14/S-1 8 - 10'	B-15/S-1 8 - 10'	B-16/S-2 36 - 38'	B-17/S-1 5 - 7'	B-18/S-1 6 - 8'	B-18/S-2 28 - 30'	B-19/S-1 41 - 43'	B-20/S-1 22 - 24'	B-21/S-1 30 - 32'	B-22/S-1 30 - 32'
	(ppm)																							
OC's ppm																								
enzene	0.06	16	ND	ND	ND	1	0.54	ND	1.7	ND	0.073	ND	ND	ND	ND	ND	0.084	ND	ND	0.058	ND	ND	ND	ND	ND
toluene	1.5	34	ND	ND	ND	4.2	0.82	ND	ND	ND	0.059	ND	ND	ND	0.068	ND	0.071	22	ND	0.073	ND	ND	ND	ND	ND
thylbenzene	5.5	18	ND	ND	ND	4.4	0.25	8.9	5	0.051	ND	ND	ND	ND	ND	0.011	0.12	5.1	0.14	0.13	ND	ND	0.39	ND	ND
yrene		ND	ND	ND	ND	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1	ND	ND	ND	ND	0.054	ND	ND
tal xylene	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	0.33	11	0.53	ND	ND	ND	0.39	ND	ND
m - xylene		29	ND	ND	ND	9.7	0.87	1.2	7.4	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o - xylene		35	ND	ND	ND	13	1.1	4.8	2.5	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
- xylene		24	ND	ND	ND	8.6	0.79	3.3	6.7	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
lorobenzene	1.7	ND	ND	ND	ND	11	2.8		6.5	ND	0.093	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tetrachioroethene		NA	NA	NA	NA	NA	NA	NA	1.9	ND	0.061	ND	ND	ND	0.061	ND	0.1	ND	ND	0.11	ND	ND	ND	ND	ND
trimethylbenzene		21	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
opylbenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
etone	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-hexanone		NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	ND	ND	ND	ND	ND
tal voc's	< 10 ppm	177				51.9	8.37	18.2	31.7	0.109	0.286				0.129	0.011	0.705	40.2	0.67	1.571			0.634		
AH's ppm																									
acenaphthene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.7	ND	ND	ND	ND	7.8	ND	ND
enaphthylene	41	6500	ND	ND	ND	ND	23	26	ND	ND	ND	ND	ND	ND	ND	ND	ND	17	ND	ND	ND	ND	5.3	ND	ND
hracene	50	ND	ND	ND	ND	430	8.6	ND	ND	1.2	ND	ND	ND	ND	ND	ND	ND	6	ND	ND	ND	ND	11	ND	ND
nzo(b)flouranthene	1.1	750	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
enzo(k)flouranthene	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.47	ND	ND	ND	ND	ND	ND	3.2	ND	ND	ND	ND	3.8	ND	ND
nzo(g,h,I)perylene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5	ND	ND
nzo(a)anthracene	0.224 or MDL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.9	ND	ND	ND	ND	5.2	ND	ND
nzo(a)pyrene	0.061 or MDL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.9	ND	ND	ND	ND	3.8	ND	ND
hrysene	0.4	870	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	ND	3.3	ND	ND	ND	ND	4.6	ND	ND
ibenzo(a,h)anthracene	0.014 or MDL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ranthene	50	2200	ND	ND	ND	330	45	98	ND	ND	67	ND	ND	ND	ND	ND	ND	7.2	ND	ND	ND	ND	12	ND	ND
rene	50	ND	ND	ND	ND	330	22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	ND	ND	ND	ND	11	ND	ND
deno(1,2,3,-cd)pyrene	3.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	ND	ND	1.4	ND	ND
phthalene	13	2000	ND	ND	ND	650	23	39	2.9	4.4	ND	ND	ND	ND	ND	ND	ND	67	ND	0.18	1.3	ND	ND	ND	ND
nanthrene	50	ND	ND	ND	ND	800	21	ND	ND	2.5	ND	ND	ND	ND	ND	ND	ND	26	ND	ND	ND	ND	36	ND	ND
ene	50	880	ND	ND	ND	1400	24	22	4.5	8.2	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	13	ND	ND
-4 dimethylphenol		NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	NA	ND	ND	NA	ND
s(2-ethylhexyl)phthalate	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	NA	ND	ND	NA	ND
-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND	ND	ND	NA	ND	ND	NA	ND
l benzyl phthalate	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND	ND	0.59	NA	ND	ND	NA	ND
nitrosodiphenylamine		NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	NA	NA	NA	ND	ND	ND	0.58	NA	ND	ND	NA	ND
tal pah's	< 500 ppm Tot SVOC	13200				3940	166.6	185	7.4	16.3	67.47					0.22		160.3		1.35	1.3		116.4		
als/Other ppm																									
n	2,000 or SB	13800	29900	28600	29600	14800	18300	13500	24300	22800	27000	32000	11000	20000	24000	11000	20000	20000	12000	19000	23000	24000	11000	12000	9900
	20 or SB	64	94	89	84	65	65	68	120	110	90	78	35	53	63	38	78	52	36	58	54	57	36	45	32
	SB	NA	NA	NA	NA	NA	NA	NA	NA	NA	16	10	5.7	7.6	9.2	6.4	8.3	ND	ND	9.5	6.1	12	6.1	ND	ND
cyanide		12.4	ND	ND	ND	6.88	ND	1.39	0.96	3.11	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
enable cyanide		12.4	ND	ND	ND	6.88	ND	1.39	0.96	3.11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ro-ferri cyanide		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
recoverable phenols	0.03 or MDL	9.65	ND	ND	ND	1.47	0.37	0.25	0.28	0.23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
organic carbon		43100	17600	17900	18100	60600	20800	39300	14800	28000	14000		47000	2900	3700	23000	1500	800	6900	16000	1600	2900	11000	90000	2200

site background
- method detection limit

DEC-02537

Table 4-2
Test Pit Sample Analytical Results
Task 3
NYSEG Cortland/Homer Former MGP
Homer, New York

Boring/Sample Depth (ft)	TAGM - Rec. Soil Cleanup Objective	TP-1/S-1 5'	TP-2/S-1 4 - 5'	TP-3/2-1 6 - 7'	TP-4/S-1 2 - 2.5'	TP-4/S-2 7 - 8'
	(ppm)					
VOC's ppm						
benzene	0.06	0.073	0.12	ND	1.6	0.18
toluene	1.5	ND	0.88	0.08	18	0.27
ethylbenzene	5.5	ND	2.7	0.27	66	13
styrene		ND	ND	ND	31	ND
total xylene	1.2	ND	12	ND	230	7.7
1,1 dichloroethene	0.4	0.083	ND	ND	ND	ND
total voc's		0.073	15.7	0.35	346.6	21.15
PAH's ppm						
acenaphthene	50	ND	ND	3.3	ND	17
acenaphthylene	41	ND	ND	3.2	7600	ND
anthracene	50	ND	29	3.4	3000	ND
benzo(b)flouranthene	1.1	ND	ND	ND	ND	ND
benzo(k)flouranthene	1.1	ND	20	4.7	1700	ND
benzo(g,h,I)perylene	50	ND	ND	1.3	ND	ND
benzo(a)anthracene	0.224 or MDL	ND	21	4.4	1700	ND
benzo(a)pyrene	0.061 or MDL	ND	14	3.2	1400	ND
chrysene	0.4	ND	ND	2.6	1600	ND
dibenzo(a,h)anthracene	0.014 or MDL	ND	ND	0.6	ND	ND
flouranthene	50	ND	51	6.6	4000	12
flourene	50	ND	27	3.9	4900	ND
indeno(1,2,3,-cd)pyrene	3.2	ND	ND	1.5	ND	ND
naphthalene	13	ND	57	8.5	17000	46
phenanthrene	50	ND	72	13	12000	21
pyrene	50	ND	39	9.6	5400	17
n-nitrosodiphenylamine		ND	ND	ND	ND	ND
total pah's		0	330	69.8	60300	113
Metals/Other ppm						
iron	2,000 or SB	13000	15000	13000	8400	1800
lead	20 or SB	51	68	53	190	76
zinc	SB	ND	8.9	12	280	7.1
total cyanide		ND	9.2	3.3	29	ND
amenable cyanide		ND	ND	ND	6	ND
ferro-ferri cyanide		ND	9.2	3.3	23	ND
total recoverable phenols	0.03 or MDL	ND	3	1	8.6	ND
total organic carbon		2500	42000	64000	330000	11000

Table 4-3
Groundwater Sample Analytical Results
Task 2 & 3
NYSEG Cortland/Homer Former MGP
Homer, New York

Well ID		Class GA	MW-1					MW-2				MW-3				MW-4				MW-5			
Sample Date	Water Solubility	Groundwater Std.	1/17/86	4/19/86	Duplicate	8/6/86	6/24/87	1/17/86	4/19/86	8/6/86	6/23/87	1/17/86	4/19/86	8/6/86	Duplicate	6/23/87	1/17/86	Duplicate	4/19/86	8/6/86	6/24/87	1/17/86	4/19/86	8/6/86	6/24/87
VOC's ppm		ppm																						
benzene	1,790 mg/l @ 25 deg C	0.001	ND	ND	ND	ND	ND	0.065	ND	ND	ND	0.51	0.63	0.95	0.95	0.68	0.016	0.014	ND	0.01	0.016	0.033	0.037	0.028	0.021
toluene	526 mg/l @ 25 deg C	0	ND	ND	ND	ND	ND	0.044	ND	ND	ND	1.1	1.1	1.9	1.8	1.3	0.046	0.042	ND	0.015	0.083	0.097	0.16	0.11	0.104
ethylbenzene	169 mg/l @ 25 deg C	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	1.1	1.2	1.3	0.625	0.0023	0.002	ND	ND	0.008	0.003	0.046	0.013	0.116
styrene	310 mg/l @25°C	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21	ND	0.15	0.19	ND	0.019	0.02	ND	ND	0.035	0.012	0.043	0.035	0.031
total xylene		0.005	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	NA	1.18	NA	NA	NA	NA	0.054	NA	NA	NA	0.184
m - xylene	146 mg/l @25°C	0.005	ND	NA	ND	ND	NA	0.0055	ND	0.0021	NA	0.69	0.55	1.4	1.5	NA	0.0082	0.009	ND	0.0098	NA	0.011	0.043	0.052	NA
o - xylene	175 mg/l @25°C	0.005	ND	NA	ND	ND	NA	0.036	ND	0.0025	NA	0.74	0.62	0.88	0.98	NA	0.026	0.028	ND	0.057	NA	0.042	0.16	0.11	NA
p - xylene	156 mg/l @25°C	0.005	ND	NA	ND	ND	NA	0.014	ND	0.0015	NA	0.57	0.49	0.63	0.71	NA	0.012	0.012	ND	0.013	NA	0.025	0.1	0.09	NA
trimethylbenzene	75 mg/l @25°C	0.005	ND	NA	ND	ND	NA	0.022	ND	0.0046	NA	0.27	ND	0.16	0.22	NA	0.0066	0.009	ND	0.012	NA	0.01	ND	ND	NA
acetone	miscible	0.050 (G)	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	NA	0.3	NA	NA	NA	NA	ND	NA	NA	NA	ND
methylene chloride	13,000 mg/l at 25 deg C	0.005	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	NA	0.08	NA	NA	NA	NA	0.007	NA	NA	NA	0.015
carbon disulfide	2860 mg/l at 25 deg C	0.005	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	ND
carbon tetrachloride	793 mg/l at 25 deg C	0.005	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	ND
2-butanone	353,000 mg/l @ 10 deg C	0.05	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	ND
total voc's			0	0	0	0	0	0.1865	0	0.0107	0	5.29	4.49	7.27	7.65	3.785	0.1361	0.136	0	0.1168	0.196	0.233	0.589	0.438	0.456
PAH's ppm		ppm																							
acenaphthene	insoluble	na	ND	ND	ND	ND	ND	ND	5.1	ND	0.014	4.6	7.2	1.8	0.28	0.692	ND	ND	ND	ND	ND	ND	ND	0.081	0.018
acenaphthylene	3.93 mg/l @25°C	0.020 (G)	ND	ND	ND	ND	ND	0.21	5.3	ND	0.013	3.7	11	ND	ND	0.623	ND	ND	ND	ND	ND	ND	ND	ND	0.015
anthracene	0.075 mg/l @15°C	0.050 (G)	ND	ND	ND	ND	ND	ND	ND	0.19	0.05	0.068	ND	3	0.22	1.7	ND	ND	ND	ND	ND	ND	0.063	0.14	0.04
benzo(b)flouranthene	0.0012 mg/l	0.000002 (G)	ND	ND	ND	ND	ND	ND	ND	ND	0.012	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.034	ND
benzo(k)flouranthene		0.000002 (G)	ND	ND	ND	ND	ND	ND	ND	ND	0.013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.029	ND
benzo(g,h,I)perylene	0.00026 mg/l @25°C	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.034	ND
benzo(a)anthracene	0.044 mg/l @24°C	0.000002 (G)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.052	ND
benzo(a)pyrene	0.003 mg/l @22°C	ND	ND	ND	ND	ND	ND	ND	0.69	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.059	0.12	ND
chrysene	0.006 mg/l @25°C	0.000002 (G)	ND	ND	ND	ND	ND	ND	ND	0.01	0.076	ND	2.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.099	0.18	ND
dibenzo(a,h)anthracene	$5.99x10^{-4}$ mg/l @25°C	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.059	0.55	0.019
flouranthene	0.265 mg/l @25°C	0.050 (G)	ND	ND	ND	ND	ND	ND	1.7	0.29	0.029	ND	2.1	2.3	0.082	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
flourene	1.9 mg/l @25°C	0.050 (G)	ND	ND	ND	ND	ND	0.042	8.1	0.19	0.02	0.14	13	16	7.8	1.12	ND	ND	ND	ND	ND	ND	0.057	0.12	ND
indeno(1,2,3,-cd)pyrene	0.062 mg/l @20°C	0.000002 (G)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
naphthalene	31.7 mg/l @25°C	0.010 (G)	ND	ND	ND	ND	ND	0.19	10	0.28	0.04	11	17	12	14	134	0.076	ND	ND	ND	ND	ND	0.16	0.22	0.362
phenanthrene	1.6 mg/l @15°C	0.050 (G)	ND	ND	ND	ND	ND	0.089	ND	0.18	0.05	0.13	3	3.1	0.98	1.71	ND	ND	ND	ND	ND	ND	0.059	0.11	0.04
pyrene	0.16 mg/l @26°C	0.050 (G)	ND	ND	ND	ND	ND	ND	4.9	0.39	ND	0.28	6.6	2.2	0.61	ND	ND	ND	ND	ND	ND	ND	0.051	0.12	ND
bis(2-ethylhexyl)phthalate	0.285 mg/l @ 24°C	0.005	NA	NA	NA	NA	0.032	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	0.03
n-nitrosodimethylamine	Very Soluble	0.050 (G)	NA	NA	NA	NA	0.034	NA	NA	NA	0.039	NA	NA	NA	NA	ND	NA	NA	NA	NA	0.044	NA	NA	NA	0.075
2-methylnaphthalene		na	NA	NA	NA	NA	NA	NA	NA	NA	0.035	NA	NA	NA	NA	16.4	NA	NA	NA	NA	0.01	NA	NA	NA	0.076
dibenzofuran	3 mg/l @25°C	na	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	0.553	NA	NA	NA	NA	ND	NA	NA	NA	ND
hexachloroethane	50 mg/l @22.3°C	0.005	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	0.014
dimethyl phalate	4,000 mg/l @25°C	na	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	0.012
2,6-dinitrotoluene		0.005	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	ND
n-nitroso-n-propylamine	10,000 mg/l	na	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	ND
di-n-butyl phthalate	13 mg/l @25°C	0.05	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	ND
2,4-dimethyl phenol	6,200 mg/l @25°C	0.050 (G)	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	ND
total pah's			0	0	0	0	0	0.531	35.79	1.52	0.251	19.994	59.9	43.2	23.972	139.845	0.076	0	0	0	0	0.548	1.67	0.494
Metals/Other ppm		ppm																							
iron		0.3	0.24	ND	ND	ND	0.05	0.51	0.2	0.19	0.27	0.44	0.14	0.15	0.24	5.2	0.16	0.11	ND	ND	0.06	0.26	0.36	0.42	0.59
lead		0.025	NA	ND	ND	ND	0.002	NA	ND	ND	0.002	NA	ND	ND	ND	ND	NA	NA	ND	ND	ND	NA	ND	ND	0.006
zinc		2 (G)	ND	ND	0.014	0.021	NA	ND	ND	ND	NA	ND	ND	0.011	ND	NA	ND	ND	ND	0.017	NA	ND	0.021	ND	NA
total cyanide		0.2	ND	ND	ND	ND	ND	0.96	0.3	0.13	0.09	0.12	0.11	0.14	0.25	0.26	ND	ND	ND	ND	0.01	ND	ND	ND	ND
amenable cyanide			ND	ND	ND	ND	0.01	0.51	0.015	ND	0.01	ND	0.012	ND	ND	0.01	ND	ND	ND	ND	0.01	ND	ND	ND	0.01
ferro-ferri cyanide			ND	ND	ND	ND	ND	0.45	0.235	0.13	0.08	0.12	0.098	0.14	0.25	0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND
total recoverable phenols			ND	0.05	0.08	0.012	0.017	0.38	0.22	0.012	0.034	0.21	0.16	0.23	0.17	0.48	ND	ND	0.05	ND	0.047	ND	0.026	0.018	0.027
total organic carbon			72	18	26	1.2	1.9	3.4	4.7	6.8	3.3	8.3	25	14	12	7.5	1.1	3.2	4.3	10	1.6	1.3	6.4	6.6	5.3
regulated organics			ND	0.05	0.08	0.012	0.034	0.8875	30.71	1.427	0.312	21.584	53.55	5055	31.582	160.04	0.1931	0.116	0.05	0.1168	0.241	0.221	1.12	2.047	1.096
Field Parameters																									
pH			7.5	7.4		7.2	7.6	7.5	7.5	7.8	7.9	7.5	7.2	7.3		7.4	7.5		7.5	7.6	7.5	6.8	7.2	7.5	7.6
conductivity			760	721		883	657	630	641	779	588	715	724	915		691	710		681	876	698	700	675	865	668
temperature (degrees C)			3	8.1		13.7	10.5	8.3	14.8	11.8	11.5	8.7	13	15.8		14.1	4		9.9	11.2	11.7	9.1	10.1	12.9	11.1

DEC-02539

Table 4-3
Groundwater Sample Analytical Results
Task 2 & 3
NYSEG Cortland/Homer Former MGP
Homer, New York

Well ID / Sample Date	Water Solubility	Class GA Groundwater Std	MW - 6 1/17/86	4/19/86	8/6/86	6/24/87	MW - 10 6/23/87	MW - 11 6/23/87	MW - 12 6/23/87	Duplicate	MW - 13 6/23/87	Duplicate	MW - 14 6/24/87	MW - 15 6/23/87	MW - 16 6/23/87	MW - 17 6/23/87	MW - 18 6/23/87	MW - 19 6/23/87	MW - 21 6/23/87
VOC's ppm		ppm																	
benzene	1,790 mg/l @ 25 deg C	0.001	ND	0.014	0.0035	0.034	ND	0.218	ND	ND	ND	0.204	0.022	0.049	0.167	0.069	0.014	ND	ND
toluene	526 mg/l @ 25 deg C	0	ND	ND	ND	ND	ND	0.071	ND	ND	ND	0.062	ND	ND	2.81	ND	ND	0.282	ND
ethylbenzene	169 mg/l @ 25 deg C	0.005	ND	ND	ND	ND	ND	0.354	ND	ND	ND	0.332	0.055	0.241	1.65	ND	0.03	0.223	ND
styrene	310 mg/l @25°C	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.07	ND	ND	0.156	ND
total xylene		0.005	NA	NA	NA	0.124	ND	0.215	ND	ND	ND	0.211	0.03	0.332	1.93	ND	0.032	0.285	ND
m - xylene	146 mg/l @25°C	0.005	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o - xylene	175 mg/l @25°C	0.005	ND	0.025	0.0048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
p - xylene	156 mg/l @25°C	0.005	ND	0.0091	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trimethylbenzene	75 mg/l @25°C	0.005	ND	ND	0.0028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
acetone	miscible	0.050 (G)	NA	NA	NA	ND	ND	0.226	ND	ND	ND	0.061	0.036	0.109	ND	0.262	0.027	0.11	ND
methylene chloride	13,000 mg/l at 25 deg C	0.005	NA	NA	NA	0.032	0.007	0.085	0.01	0.008	0.008	ND	0.012	0.068	0.085	0.107	0.023	0.101	0.01
carbon disulfide	2860 mg/l at 25 deg C	0.005	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
carbon tetrachloride	793 mg/l at 25 deg C	0.005	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	353,000 mg/l @ 10 deg C	0.05	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
total voc's			0	0.0481	0.0111	0.158	0	0.858	0	0	0	0.809	0.107	0.622	7.627	0.069	0.076	0.946	0
PAH's ppm		ppm																	
acenaphthene	Insoluble	na	ND	ND	ND	0.011	ND	0.028	ND	0.109	ND	ND	0.037	0.015	ND	0.066	0.028	NA	ND
acenaphthylene	3.93 mg/l @25°C	0.020 (G)	ND	ND	ND	ND	ND	ND	ND	0.092	ND	ND	0.04	0.015	ND	0.063	0.024	NA	ND
anthracene	0.075 mg/l @15°C	0.050 (G)	ND	1.1	0.099	ND	ND	0.046	ND	0.037	ND	ND	ND	0.012	62.9	0.024	ND	NA	ND
benzo(b)flouranthene	0.0012 mg/l	0.000002 (G)	ND	ND	ND	ND	0.015	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	NA	ND
benzo(k)flouranthene		0.000002 (G)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.8	ND	ND	NA	ND
benzo(g,h,I)perylene	0.00026 mg/l @25°C	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND
benzo(a)anthracene	0.044 mg/l @24°C	0.000002 (G)	ND	ND	ND	ND	0.01	ND	ND	ND	ND	ND	ND	ND	11.5	ND	ND	NA	ND
benzo(a)pyrene	0.003 mg/l @22°C	ND	ND	0.51	0.051	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.57	ND	ND	NA	ND
chrysene	0.006 mg/l @25°C	0.000002 (G)	ND	1.2	0.14	ND	0.011	ND	ND	ND	ND	ND	ND	ND	11.4	ND	ND	NA	ND
dibenzo(a,h)anthracene	$5.99x10^{-4}$ mg/l @25°C	na	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND
flouranthene	0.265 mg/l @25°C	0.050 (G)	ND	ND	0.12	ND	ND	ND	ND	ND	ND	ND	ND	ND	17	ND	ND	NA	ND
flourene	1.9 mg/l @25°C	0.050 (G)	ND	ND	ND	ND	ND	ND	ND	0.043	ND	ND	ND	0.011	26.6	0.019	ND	NA	ND
indeno(1,2,3,-cd)pyrene	0.062 mg/l @20°C	0.000002 (G)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	241	1.42	0.014	NA	0.016
naphthalene	31.7 mg/l @25°C	0.010 (G)	ND	4.2	0.13	ND	ND	0.828	ND	1.66	ND	ND	0.078	0.106	62	0.024	ND	NA	ND
phenanthrene	1.6 mg/l @15°C	0.050 (G)	ND	1.8	0.13	ND	ND	0.046	ND	0.037	ND	ND	ND	0.012	34.6	ND	ND	NA	ND
pyrene	0.16 mg/l @26°C	0.050 (G)	ND	ND	0.087	ND	0.016	0.012	ND	ND	ND	ND	ND	ND	ND	0.032	0.034	NA	ND
bis(2-ethylhexyl)phthalate	0.285 mg/l @ 24°C	0.005	NA	NA	NA	0.011	0.013	ND	ND	0.011	ND	ND	0.023	ND	ND	0.028	0.017	NA	0.019
n-nitrosodimethylamine	Very Soluble	0.050 (G)	NA	NA	NA	0.023	0.041	0.052	ND	0.042	0.032	0.044	ND	0.034	ND	0.178	0.152	NA	ND
2-methylnaphthalene		na	NA	NA	NA	ND	ND	0.114	ND	0.24	ND	ND	0.075	0.045	89.3	0.016	ND	NA	ND
dibenzofuran	3 mg/l @25°C	na	NA	NA	NA	ND	ND	0.015	ND	0.021	ND	ND	ND	ND	6.25	ND	ND	NA	ND
hexachloroethane	50 mg/l @22.3°C	0.005	NA	NA	NA	ND	ND	ND	ND	0.067	ND	ND	ND	ND	ND	ND	ND	NA	ND
dimethyl phalate	4,000 mg/l @25°C	na	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	0.011	ND	ND	0.011	ND	NA	ND
2,6-dinitrotoluene		0.005	NA	NA	NA	0.049	0.056	ND	ND	0.033	ND	ND	ND	ND	ND	ND	ND	NA	0.012
n-nitroso-n-propylamine	10,000 mg/l	na	NA	NA	NA	ND	ND	0.02	ND	0.012	ND	ND	ND	ND	ND	ND	ND	NA	ND
di-n-butyl phthalate	13 mg/l @25°C	0.05	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND
2,4-dimethyl phenol	6,200 mg/l @25°C	0.050 (G)	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND
total pah's			0	8.81	0.757	0.011	0.052	0.96	0	1.978	0	0	0.155	0.171	499.37	1.616	0.066	0	0.016
Metals/Other ppm		ppm																	
iron		0.3	0.15	0.12	0.21	0.23	0.5	9.3	0.78	0.64	0.1	9.5	3.4	2.1	0.3	1.7	0.29	0.09	0.41
lead		0.025	NA	ND	ND	0.005	0.005	0.003	0.003	0.001	0.002	0.003	0.011	0.002	0.003	0.002	0.004	0.002	0.002
zinc		2 (G)	ND	0.012	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
total cyanide		0.2	ND	ND	ND	ND	0.39	0.05	1.5	1.2	0.23	0.16	0.06	0.13	0.02	ND	ND	0.01	ND
amenable cyanide			ND	ND	ND	ND	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	ND	ND	0.01	0.01	0.01
ferro-ferri cyanide			ND	ND	ND	ND	0.38	0.03	1.49	1.19	0.22	0.15	0.05	0.12	0.02	ND	ND	ND	ND
total recoverable phenols			ND	0.11	ND	0.022	0.014	0.01	0.026	0.022	ND	0.049	0.017	0.028	0.028	0.038	0.08	0.027	0.046
total organic carbon			1.4	5.6	5.7	3	8.9	8.8	3.8	3.7	2.3	9.1	5.5	3.6	2.6	6.6	1.1	6.5	1.3
regulated organics			ND	8.9681	0.7681	0.273	0.156	2.104	0.01	2.309	0.072	0.809	0.32	0.925	601.6	1.962	0.31	NA	0.057
Field Parameters																			
pH			7	7.5	7.4		7.5	7.2	7.3	7.3	7.6	7.9	7	7.6	7.9	7.5	7.6	9.4	7.6
conductivity			1013	686	847		1780	1180	1270	1270	709	709	3430	432	607	771	621	312	711
temperature (degrees C)			9.8	10.4	12.4		10.7	13.2	15.2	15.2	10.7	10.7	12	15.9	11.7	11	10.2	15.4	11.2

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Table 4-4
Surfacewater, Sediment, & Seepage
Sample Analytical Results
Task 2 & 3
NYSEG Cortland/Homer Former MGP
Homer, New York
Former MGP

Sample Location	SW - 1			SW - 2			SW - 3			SED - 1		SED - 2		SED - 3		Basement Seepage Samples				
	Task 2			Task 2			Task 2			Task 2	Task 3	Task 2	Task 3	Task 2	Task 3	Task 2	Task 3			
Collection Date	1/7/86	4/16/86	8/6/86	1/7/86	4/16/86	8/6/86	1/7/86	4/16/86	8/6/86	8/6/86	6/25/87	8/6/86	6/25/87	8/6/86	6/25/87	1/17/86	6/25/87	6/25/87	6/25/87	6/25/87
																EE-101	FL-1/S-1	FL-2/S-1	FL-3/S-1	FL-4/S-1
VOC's ppm																				
benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.046	ND	ND	ND	ND	NA	NA	NA	NA
toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23	0.8	ND	ND	ND	NA	NA	NA	NA
styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
total xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	1.2	NA	ND	NA	NA	NA	NA	NA
m - xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	0.13	NA	ND	NA	ND	NA	NA	NA	NA
o - xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	0.12	NA	ND	NA	ND	NA	NA	NA	NA
p - xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	0.13	NA	ND	NA	ND	NA	NA	NA	NA
trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17	ND	ND	ND	ND	NA	NA	NA	NA
acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.6	ND	5.2	ND	4.5	ND	NA	NA	NA	NA
methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.8	NA	3	NA	4.3	NA	NA	NA	NA	NA
total voc's	0	0	0	0	0	0	0	0	0	0	0	0.826	2	0	0	0	0	0	0	0
PAH's ppm																				
acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	0.82	ND	ND	NA	NA	NA	NA
acenaphthylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	ND	ND	ND	NA	NA	NA	NA
anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.73	ND	5.1	12	2.8	ND	ND	NA	NA	NA	NA
benzo(b)flouranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.99	ND	ND	ND	1.4	ND	ND	NA	NA	NA	NA
benzo(k)flouranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.63	ND	ND	10	1.2	ND	ND	NA	NA	NA	NA
benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.76	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15	ND	ND	ND	NA	NA	NA	NA
benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.71	ND	ND	ND	1.1	ND	ND	NA	NA	NA	NA
chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.74	10	3.8	ND	ND	NA	NA	NA	NA
dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	ND	ND	ND	1.2	ND	ND	NA	NA	NA	NA
flouranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	0.86	22	2.3	ND	ND	NA	NA	NA	NA
flourene	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	ND	1.2	6	ND	ND	ND	NA	NA	NA	NA
indeno(1,2,3,-cd)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2	ND	2.7	12	2.1	ND	ND	NA	NA	NA	NA
phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.85	ND	1.1	30	1.4	ND	ND	NA	NA	NA	NA
pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	ND	0.84	40	2.2	ND	ND	NA	NA	NA	NA
2,4-dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA
bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA
diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA
2-methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	6	NA	ND	NA	NA	NA	NA	NA
n-nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA
phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA
total pah's	0	0	0	0	0	0	0	0	0	13.17	0	12.54	177	20.32	0	0	0	0	0	0
Metals/Other ppm																				
iron	0.19	1	0.22	0.15	0.96	0.17	0.17	1.1	0.18	12000	NA	12000	NA	15000	NA	4470	NA	NA	NA	NA
lead	NA	ND	ND	NA	ND	ND	NA	ND	ND	55	NA	25	NA	27	NA	NA	NA	NA	NA	NA
zinc	ND	ND	0.011	ND	ND	ND	ND	ND	ND	61	NA	66	NA	260	NA	150	NA	NA	NA	NA
total cyanide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	0.35	NA	ND	NA	390	7.6	3.6	2.5	16
amenable cyanide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	390	ND	ND	ND	ND
ferro-ferri cyanide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	0.35	NA	ND	NA	ND	7.6	3.6	2.5	16
total recoverable phenols	ND	0.099	ND	ND	ND	ND	ND	0.054	ND	0.16	NA	ND	NA	ND	NA	ND	NA	NA	NA	NA
total organic carbon	ND	4.2	1.7	ND	5.3	2.8	2	1.7	1.6	13000	NA	24000	NA	2700	NA	59000	NA	NA	NA	NA

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Table 4-5
Ambient Air Sample Analytical Results
Task 2 & 3
NYSEG Cortland/Homer Former MGP
Homer, New York

	Outdoor Samples					Indoor Samples	
Sample Location: Sample Identifier	Upwind A-202	Upwind A-202 Dup	Onsite A-203	Downwind A-201	Downwind A-204	A-205	A-206
High-Volume Sampler Volume Sampled (m^3) **PAH's** (ug/m^3)[2]	184	231	203	222	240	784 (liters)	466 (liters)
acenaphthene	ND	ND	ND	ND	ND	ND	ND
acenaphthylene	ND	ND	ND	ND	ND	ND	ND
anthracene	ND	ND	ND	ND	ND	ND	ND
benzo(b)flouranthene	ND	ND	ND	ND	ND	ND	ND
benzo(k)flouranthene	ND	ND	ND	ND	ND	ND	ND
benzo(g,h,I)perylene	ND	ND	ND	ND	ND	ND	ND
benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND
benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND
chrysene	ND	ND	ND	ND	ND	ND	ND
dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND
flouranthene	ND	ND	ND	ND	ND	ND	ND
flourene	ND	ND	ND	ND	ND	ND	ND
indeno(1,2,3,-cd)pyrene	ND	ND	ND	ND	ND	ND	ND
naphthalene	0.17	0.19	0.29	0.25	0.27	ND	ND
phenanthrene	ND	ND	ND	ND	ND	ND	ND
pyrene	ND	ND	ND	ND	ND	ND	ND
total pah's	0.17	0.19	0.29	0.25	0.27	0	0
High-Volume Sampler Volume Sampled (liters) **Metals** (ug/m^3)[4]	780	829	898	786	836		
iron	3.5	6.9	3.7	2.5	3.8	NA	NA
zinc	ND	ND	0.36	0.27	ND	NA	NA

TABLE 5-1
Semivolatile Organic Compounds
Surface Soil Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
October, 1999

Concentrations in micrograms per kilogram (ppb)

Analyte (ppb)	TAGM - Rec. Soil Cleanup Objectives (ppb)	SSS - 1 E of Rte 11		SSS - 2 ID Booth Bldg.		SSS - 3 Budget Inn Lawn		SSS - 4 Near Natolie's Mkt		SSS - 5 Background		SSS - 6 Background	
phenol	30 or MDL		U	27 *	J	18 *	J	15 *	J	6	J	15	J
benzyl alcohol			U		U	100 *	J		U		U		U
2- methylphenol	100 or MDL		U	25 *	J		U		U		U		U
4- methylphenol	900		U	63 *	J	41 *	J	22 *	J	14	J		U
2, 4- dimethylphenol			U	40 *	J		U		U		U		U
benzoic acid		54 *	J		U	190 *	J	34 *	J	17	J	61	J
naphthalene ++	**13,000**	7	J	220 *	J	91 *	J	25 *	J	22	J	33	J
2,6 dinitrotoluene	1,000		U		U		U		U		U		U
2-methylnaphthalene	36,400		U	81 *	J	56 *	J	24 *	J	21	J	19	J
dimethylphthalate	2,000		U		U		U	35 *	J		U		U
acenaphthalene	**41,000**	22	J	1300 *		970 *		140	J	150	J	150	J
acenaphthene	**50,000**		U	100 *	J	87 *	J	28 *	J	23	J	44	J
dibenzofuran	6,200		U	98 *	J	50 *	J	14	J	17	J	28	J
2,4 dinitrotoluene			U		U		U		U		U		U
diethylphthalate	7,100		U	9 *	JB		U		U	5	JB	9	JB
fluorene	**50,000**	5	J	170 *	J	93 *	J	32 *	J	30	J	62	J
n- nitrosodiphenylamine			U		U		U		U		U		U
phenanthrene	**50,000**	96	J	1800 *		1200 *		470 *	J	350	J	630	
anthracene	**50,000**	26	J	1000 *		760 *	J	240 *	J	230	J	230	J
carbazole		16	J	140 *	J	140 *	J	56 *	J	38	J	92	J
di-n-butylphthalate	8,100	25	JB	38 *	JB	50 *	JB	29	JB	29	JB	52	JB
fluoranthene	**50,000**	210	J	3300 *		2100 *		1100 *		630		960	
pyrene	**50,000**	220	J	4900 *		3600 *		1300 *		740		1100	
butylbenzylphthalate	50,000	24 *	J	190 *	J	60 *	J	61 *	J		U	28	J
benzo(a)anthracene ++	**224 or MDL**	120	J	3600 *		2300 *		1100 *		600		680	
chrysene ++	**400**	150	J	3300 *		2300 *		1200 *		620		700	
bis(2-ethyhexyl) phthalate	50,000	58 *	JB	220 *	JB	380 *	JB	420 *	JB	57	JB	430	JB
di-n-octylphthalate		13 *	JB	54 *	JB	18 *	JB	40 *	JB	9	JB	25	JB
benzo(b) fluoranthene ++	**1,100**	120	J	2500 *		1400 *		850 *		480		400	J
benzo(k) fluoranthene ++	**1,100**	140	J	2100 *		1900 *		1100 *		530		560	
benzo (a) pyrene ++	**61 or MDL**	130	J	3300 *		2200 *		1100 *		620		580	
indeno (1,2,3 - cd) pyrene ++	**3,200**	110	J	3000 *		2000 *		780 *		380		410	J
dibenzo (a,h) anthracene ++	**14 or MDL**	34	J	1100 *		700 *	J	300 *	J	150	J	140	J
benzo (g,h,i) perylene	**50,000**	130	J	3000 *		2200 *		760 *		380		470	
TOTAL SVOC's	<500,000	1,710		35,675 *		25,004 *		11,275 *		6,148		7,908	
SVOC AVERAGE		81		1274 *		926 *		418 *		236		304	
TOTAL CARCINOGENIC PAH		811		19120		12891		6455		3402		3503	
TOTAL PAH's		1520		34690		23901		10525		5935		7149	

U - Indicates that the compound was analyzed for but not detected.
J - The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.
B - Indicates the analyte is found in QC blanks.
* - Indicates value exceeds background levels, based on results from SSS-5 and SSS-6.
SVOC AVERAGE is the average concentration for detected compounds only.
BOLD ITALICS indicates Polycyclic Aromatic Hydrocarbons (PAH's).
++ indicates potential or suspected carcinogen

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TABLE 5-2
Target Analyte List (TAL) Metals
Surface Soil Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
October, 1999

Analyte (ppm)	SSS - 1 E of Rte 11	SSS - 2 ID Booth Bldg.	SSS - 3 Budget Inn Lawn	SSS - 4 Near Natolie's Mkt	SSS - 5 Background	SSS - 6 Background
Aluminum	10100	10200	12900 *	6140	10200	11700
Antimony	UN	UN	1.8 * BN	UN	1.8 BN	UN
Arsenic	6.8 *	5.1	7 *	3.4	5.8	5.7
Barium	87 *	58.3	92.6 *	32.8 B	72.1	98.9
Beryllium	0.34 B	0.35 B	0.56 * B	0.2 B	0.43 B	0.54 B
Cadmium	U	0.28 * B	0.25 * B	U	0.17	2.3
Calcium	5300	48500 *	15900 *		32300	6870
Chromium	14.1	19.8 *	19.3 *	21.1	15.5	17.9
Cobalt	7 B	7.2 B	8.4 * B	5.9 B	7.9 B	8.4 B
Copper	15	31 *	35.7 *	28.9	25.6	26.1
Iron	21000	20200	22700 *	17200	21200	22300
Lead	33	72.8 *	86 *	44.6	36	58.8
Magnesium	2570	9100 *	7960 *	20200	9200	4630
Manganese	1090 *	414	804 *	404	655	617
Mercury	0.05	0.18 *	0.15 *	0.022	0.08	0.15
Nickel	14.6	19.4	23.7 *	17.9	21.6	23.4
Potassium	414 B	997 * B	1720 *	677 B	945	902 B
Selenium	UN	UN	UN	UN	0.9 N	1.7 N
Silver	U	U	0.21 *	U	U	U
Sodium	162 * B	577 * B	176 * B	1620	187 B	105 B
Thallium	U	U	U	U	U	U
Vanadium	17.7 *	17.7 *	25.1 *	11.4	17.4	18.3
Zinc	89.2	121 * E	137 * E	100 E	110 E	145 E
R Cyanide	U	U	U	U	U	U
T Cyanide	U	U	U	U	U	U
R Sulfide	U	U	U	13.8	U	U
TOC	34100 *	25200 *	39600 *	16400	17500	38600

U - Indicates analyte was not detected at method reporting limit.
B - Indicates estimated value between IDL and contract required detection limit (CRDL).
E - Reported value is estimated because of the presence of interferance.
N - Spiked sample recovery not within control limits.
* - Indicates value that exceeds background levels, based on results from SSS-5 and SSS-6.

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TABLE 5-3
Volatile Organic Compounds & TCLP Benzene
Test Pit Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
October, 1999

Analyte (ppb)	*TAGM Rec. Soil Cleanup* Objectives (ppb)	*TP - 1 (5 ft deep)*		*TP - 1A (8 ft deep)*	
bromomethane			U		U
methylene chloride	100		U	340	J
acetone	200	610	B	2200	J
carbon disulfide	2700	3	J		U
2 butanone	300	74		4100	JB
1,2- dichloroethene (tot)	300		U		U
trichloroethene	700	7	J		U
tetrachloroethene	1,400	30			U
benzene	60	4	J	92	J
bromoform		1	J		U
toluene	1,500	2	J	84	J
ethylbenzene	5,500		U	1800	J
styrene			U		U
xylenes (tot)	1,200	22	J	2800	J
TOTAL VOC's	<10,00	653		11416	
TOTAL BTEX		28		4776	
VOC AVERAGE		73		1631	
TCLP Benzene		N/A			U

TABLE 5-5
Target Analyte List (TAL) Metals
Test Pit Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
October, 1999

Analyte (ppm)	*TAGM Rec. Soil Cleanup* Objectives (ppm)	*TP - 1 (5 ft deep)*		*TP - 1A (8 ft deep)*	
Aluminum	SB	12,500	E	9,580	E
Antimony	SB	1.5	UN	1.2	UN
Arsenic	7.5 or SB	6.1	N	6.8	N
Barium	30 or SB	132		95	
Beryllium	0.16 (HEAST) or SB	0.52	B	0.76	B
Cadmium	0.1 or SB	0.22	U	0.18	U
Calcium	SB	10,400		11,100	
Chromium	10 or SB	16.7		14.4	
Cobalt	30 or SB	7.7	B	9.5	
Copper	25 or SB	17.4	E	34.7	E
Iron	2,000 or SB	21,800	*E	27,200	*E
Lead	SB ***	31	*	11.4	*
Magnesium	SB	3320		4320	
Manganese	SB	256		440	
Mercury	0.1	0.14		0.16	
Nickel	13 or SB	18.4		25.7	
Potassium	SB	1180		1020	
Selenium	2 or SB	2	N	1.5	N
Silver	SB	0.22	U	0.18	U
Sodium	SB	146	B	93	B
Thallium	SB	2.9		1.8	U
Vanadium	150 or SB	22.1		17	
Zinc	20 or SB	91.1	E	105	E
R Cyanide	****		U	0	U
T Cyanide		39.8		82.3	
R Sulfide			U	16.1	
TOC		28,200		17,400	

U - Indicates analyte was not detected at method reporting limit.
B - Indicates analyte result between IDL and contract required detection limit (CRDL).
E - Reported value is estimated because of the presence of interferance.
N - Spiked sample recovery not within control limits.
* - Duplicate analysis not within control limit.
te: No some forms of metal salts such as aluminum phosphide, calcium cyanide, potasium cyanide, copper cyanide, silver cyanide, sodium cyanide, zinc phosphide, thallium salts, vanadium pentoxide, and chromium (VI) compounds are more toxic in nature. Please refer to the USEPA HEASTs database to find cleanup objectives if such metals are present in soil.
*** - Background levels for lead vary widely. Average levels in underdeveloped, rural areas may range from 4 - 61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range fro 200 - 500 ppm.
**** - Some forms of cyanide ar complex and very stable while other forms are pH dependent and hence are very unstable. Site-specific forms of cyanide should be taken into consideration when establishing soil cleanup objectives.

TABLE 5-4
Semivolatile Organic Compounds
Test Pit Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
October, 1999

Analyte (ppb)	*TAGM Rec. Soil Cleanup* Objectives (ppb)	*TP - 1 (5 ft deep)*		*TP - 1A (8 ft deep)*	
phenol	30 or MDL	91	JD		U
2 - methylphenol		66	JD		U
4 - methylphenol	100 or MDL	130	JD		U
2, 4 - dimethylphenol	900	100	JD		U
benzoic acid			U		U
naphthalene ++	13,000	2,400	D	210,000	
2,6 dinitrotoluene	1,00		U		U
2-methylnaphthalene	36,400	240	JD	31,000	J
acenaphthalene	41,000	610	JD	84,000	
acenaphthene	50,000	490	JD	9,900	J
dibenzofuran	6,200	900	JD	15,000	J
2,4 dinitrotoluene			U		U
diethylphthalate	7,100		U		U
fluorene	50,000	1,200	JD	37,000	J
n- nitrosodiphenylamine			U		U
phenanthrene	50,000	2,800	D	100,000	
anthracene	50,000	1,700	JD	30,000	J
carbazole		520	JD	2,600	J
di-n-butylphthalate	8,100		UB		
fluoranthene	50,000	4,700	D	40,000	J
pyrene	50,000	11,000	D	30,000	J
butylbnzylphalate	50,000		U		U
benzo(a)anthracene ++	224 or MDL	4,900	D	20,000	J
chrysene ++	400	3,400	D	13,000	J
bis(2-ethyhexyl) phthalate	50,000		UB		U
di-n-octylphthalate			UB		U
benzo(b) fluoranthene ++	1,100	2,300	D	6,500	J
benzo(k) fluoranthene ++	1,100	5,200	D	13,000	J
benzo (a) pyrene ++	61 or MDL	3,400	D	12,000	J
indeno (1,2,3 - cd) pyrene ++	3.2	5,800	D	9,700	J
dibenzo (a,h) anthracene ++	14 or MDL	2,400	D	3,500	J
benzo (g,h,i) perylene	50,000	3,900	DB	6,500	JB
TOTAL SVOC's	<500,000	58,247		673,700	
SVOC AVERAGE		2,532		35,458	
TOTAL CARCINOGENIC PAH		29,800		287,700	
TOTAL PAH's		56,200		625100	

U - Indicates that the compound was analyzed for but not detected.
J - The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.
B - Indicates the analyte is found in QC blanks.
D - Indicates reanalysis following dilution.
BOLD ITALICS are Polycyclic Aromatic Hydrocarbons (PAH's).
++ indicates possible or suspected carcinogen

TABLE 5-6
Volatile Organic Compounds
Soil Boring Samples (Phase 1)
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
October, 1999

Analyte (ppb)	*TAGM Rec. Soil Cleanup* Objectives (ppb)	*SB - 22 (MW-22) E of River, 36-38 ft*		*SB-23 (MW-23) E of River, 34-36 ft*		*SB-24 (MW-24) ID Booth, 38-40 ft*	
bromomethane			U		U		U
methylene chloride	100	1	J	1	J	82	J
acetone	200	13	B	18	B	440	JB
carbon disulfide	2700		U	0.8	J		U
2 butanone	300		U	4	JB	**1400**	B
1,2- dichloroethene (tot)	300		U		U		U
trichloroethene	700	2	J		U		U
tetrachloroethene	1,400	6	U		U		U
benzene	60	0.4	J		U		U
toluene	1,500		U		U	770	J
ethylbenzene	5,500		U		U	1600	
styrene			U		U	3900	
xylenes (tot)	1,200		U		U	**9900**	
TOTAL VOC's	<10,00	22.4		23.8		18092	
TOTAL BTEX		0.4		0		12270	
VOC AVERAGE		4.48		5.95		2584.571429	

U - Indicates that the compound was analyzed for but not detected.
J - The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.
B - Indicates the analyte is found in QC blanks.

TABLE 5-7 (page 1 of 3)
VOLATILE ORGANIC COMPOUNDS (VOCs)
Soil Boring Samples (Phase 2)
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Compounds (ppb)	TAGM Rec. Soil Cleanup Objectives (ppb)	SB-1A 6-8 FT	SB-1B 22-24 FT	SB-2A 14-16 FT	SB-2B 30-32 FT	SB-3A 8-10 FT	SB-3B 26-28 FT	SB-4 32-34 FT	SB-5A 6-8 FT	SB-5 28-30 FT	SB-6 32-34 FT	SB-7 32-34 FT	SB-8 32-34 FT	TCLP SB-9A 8-10 FT	SB-9B 26-28 FT	SB-10A 14-16 FT	SB-10B 22-24 FT
Chloromethane		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Bromethane		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Vinyl Chloride	200	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	300	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Methylene Chloride	100	130 J	12 B	32 B	8 B	2000 JB	8 B	4 JB	8 B	5 JB	18 B	4 JB	15	NA	640 JB	5200 J	1200 J
Acetone	200	U	45 B	62 B	6 JB	6900 U	9 JB	U	4 JB	16 B	16 B	4 JB	76 B	NA	4600	U	U
Carbon Disulfide	2,700	U	U	U	U	410 J	U	U	U	U	U	U	U	NA	U	U	U
Vinyl Acetate		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,1-Dichloroethane	200	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
cis-1, 2-Dichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
trans-1, 2 -Dichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Chloroform	300	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2- Dichloroethane	100	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
2- Butanone	300	U	5 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1 Trichloroethane	800	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Carbon Tetrachloride	600	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromidichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
1, 2-Dichloropropane		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
cis-1, 3- Dichloropropene		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Trichloroethene	700	U	U	U	U	U	U	U	1 J	U	U	U	U	U	U	U	U
Dibromochloromethane	na	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,1,2-Trichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Benzene	60 (TCLP - 500)	U	2 J	U	U	800 J	U	U	U	U	U	U	U	8300	1100 J	290000	3800
trans-1,3-Dichloropropane		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Bromoform		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
4- Methyl-2-Pentanone	1,000	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
2-Hexanone		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Tetrachloroethene	1,400	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Toluene	1,500	U	2 J	U	U	5600 J	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	600	U	U	U	U	U	U	U	U	U	2 J	U	0.6 J	NA	2300	380000	15000
Chlorobenzene	1,700	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U
Ethylbenzene	5,500	U	U	8 J	U	5700 J	1 J	U	U	U	U	U	U	U	U	U	U
Styrene		U	U	U	U	7800 J	U	U	U	U	U	U	U	NA	680 J	48000 U	4600
Xylene	1,200	U	U	26 J	U	86000	9	U	U	U	U	U	U	NA	2200	270000	17000
TOTAL VOCs	<10,000	130	66	128	41	115,210	27	4	13	21	36	8	92	NA	2600	280000	21000
AVERAGE VOCs		130	13	32	7	14,401	7	4	4	11	12	4	31		14,120	1,273,200	62,600
															2,017	212,200	10,433

Notes:
TCLP analysis completed on sample SB-9A
U = Indicates that the compound was analyzed for but not detected.
J - The concentration listed is an estimated value, which is less than the specified detection limit but is greater than zero.
B = Indicates that the analyte is found in QC blanks.

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TABLE 5-7 (page 2 of 3)
VOLATILE ORGANIC COMPOUNDS (VOCs)
Soil Boring Samples (Phase 2)
Supplemental Remedial Investigation
Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	TAGM Rec. Soil Cleanup Objectives (ppb)	SB-11A 10-12 FT	SB-11B 16-18 FT	SB-12 29-33 FT	SB-13A 8-11 FT	SB-13B 16-20 FT	SB14 28-29.5 FT	SB-15 30-34 FT	SB-16A 4-12 FT	SB-16B 22-24 FT	SB-16C 30-32 FT	SB-17A 14-16 FT	SB-17B 24-28 FT	SB-18A 14 -16 FT	SB-18B 24 -26 FT	SB-19 26-30 FT	SB-20 16-20 FT
Cloromethane		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromethane		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	200	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	300	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	100	250 J	48	7 B	2000	4 J	9	8 B	4 J	2900 JB	4 J	4 J	22 B	6 B	5 B	18 B	8 B
Acetone	200	U	82	7 JB	6400 J	21 B	30 B	23 B	29 B	8700 J	21 B	18 B	9 JB	28 B	4 JB	9 JB	4 JB
Carbon Disulfide	2,700	49 J	U	U	U	U	U	U	U	U	U	U	U	2 J	U	U	U
Vinyl Acetate		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	200	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1, 2-Dichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1, 2 -Dichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	300	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2- Dichloroethane	100	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2- Butanone	300	U	17 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1 Trichloroethane	800	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	600	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromidichioroethane		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2-Dichloropropane		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1, 3- Dichloropropene		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	700	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	na	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	60	120 J	5 J	U	7200 J	U	U	U	19	U	U	2 J	U	5	U	U	U
trans-1,3-Dichloropropane		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4- Methyl-2-Pentanone	1,000	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	1,400	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	1,500	670	14 J	1 J	23000	2 J	U	U	U	540 J	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	600	U	U	U	U	U	U	U	1 J	U	U	U	U	6	U	U	U
Chlorobenzene	1,700	U	U	U	U	U	1 J	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	5,500	2500	72	U	32000	0.7 J	U	U	U	U	U	U	U	U	U	U	U
Styrene		210 J	7 J	U	U	0.4 J	U	U	13	14000	U	2 J	U	20	U	U	U
Xylene	1,200	13000	220	U	260000	8	U	U	U	U	U	U	U	U	U	U	U
TOTAL VOCs	<10,000	16,799	465	15	330,600	36	40	31	16	4800 J	U	2 J	U	12	U	U	U
AVERAGE VOCs		2,400	58	5	55,100	6	13	16	82	30,940	25	28	31	79	9	27	12
									14	6,188	13	6	16	11	5	14	6

Notes:
U = Indicates that the compound was analyzed for but not detected.

J - The concentration listed is an estimated value, which is less than the specified detection limit but is greater than zero.

B = Indicates that the analyte is found in QC blanks.

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TABLE 5-7 (page 3 of 3)
VOLATILE ORGANIC COMPOUNDS (VOCs)
Soil Boring Samples (Phase 2)
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	*TAGM Rec. Soil Cleanup* Objectives (ppb)	SB21 32-34 FT	SB-22A 8-11 FT	SB-22B 13-15 FT	SB-31A 12-14 FT	SB-31B 42-44 FT	MW-25 10-14 FT	MW-26A 56-58 FT	MW-27S 12-14 FT	MW-27D 32-34 FT	MW-28D-A 10-12 FT	MW-28D-B 26-28 FT	MW-29D 42-44 FT	MW-32 34-36 FT
Chloromethane		U	U	U	U	U	U	U	U	U	U	U	U	U
Bromethane		U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	200	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	300	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	100	4 JB	48 B	40 B	16	36	27 B	14 B	3 JB	5 JB	2 JB	3 JB	20	40
Acetone	200	2 JB	42 JB	72 B	21	61	14 B	7 JB	35 B	11 JB	23 B	14 B	52 B	82
Carbon Disulfide	2,700	U	U	7 J	U	2 J	U	U	U	U	U	U	U	3 J
Vinyl Acetate		U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	200	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1, 2-Dichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1, 2 -Dichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	300	U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2- Dichloroethane	100	U	U	U	U	U	U	U	U	U	U	U	U	U
2- Butanone	300	U	U	U	U	10 J	U	U	U	U	U	U	U	U
1,1,1 Trichloroethane	800	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	600	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromidichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2-Dichloropropane		U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1, 3- Dichloropropene		U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	700	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	na	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane		U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	60	0.8 J	15 J	13 J	1 J	3 J	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropane		U	U	U	U	U	U	U	U	U	U	U	U	2 J
Bromoform		U	U	U	U	U	U	U	U	U	U	U	U	U
4- Methyl-2-Pentanone	1,000	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone		U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	1,400	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	1,500	2 J	48	24 J	2 J	2 J	U	U	2 J	0.8 J	U	U	0.6 J	2 J
1,1,2,2-Tetrachloroethane	600	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	1,700	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	5,500	2 J	31	15 J	0.5 J	2 J	U	U	2 J	U	U	U	U	U
Styrene		U	U	U	U	U	U	U	U	U	U	U	U	U
Xylene	1,200	4 J	240	74	U	4 J	U	U	2 J	2 J	U	U	U	5 J
TOTAL VOCs	<10,000	15	424	245	41	120	41	21	44	19	25	17	73	134
AVERAGE VOCs		2	71	35	8	15	21	11	9	5	13	9	24	22

Notes:

U = Indicates that the compound was analyzed for but not detected.

J - Indicates that the compound was analyzed for and determined to be present in the sample. The mass spectrum of the compound meets the identification criteria of the method. The concentration listed is an estimated value, which is less than the specified detection limit but is greater than zero.

B = Indicates that the analyte is found in QC blanks. Data presented above have been modified to account for detections in blanks. Reported concentrations less than ten times the amount present in the method blank have been qualified as "U" (not detected).

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TABLE 5-8
Semivolatiles Organic Compounds
Soil Boring Samples (Phase 1)
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
October, 1999

Analyte (ppb)	*TAGM Rec. Soil Cleanup* Objectives (ppb)	*SB - 22 (MW-22) E of River, 36-38 ft*		*SB-23 (MW-23) E of River, 34-36 ft*		*SB-24 (MW-24) ID Booth, 38-40 ft*	
phenol	30 or MDL		U		U		U
benzoic acid			U	34	J		U
naphthalene ++	**13,000**		U	79	JB	**920,000**	B
2,6 dinitrotoluene	1,00		U		U		U
2-methylnaphthalene	36,400		U	21	J	**480,000**	
acenaphthalene	**41,000**		U		U	**190,000**	
acenaphthene	**50,000**		U		U	**62,000**	J
dibenzofuran	6,200		U		U	**32,000**	J
2,4 dinitrotoluene			U		U		U
diethylphthalate	7,100		U		U		U
fluorene	**50,000**		U		U	**96,000**	J
n- nitrosodiphenylamine			U		U		U
phenanthrene	**50,000**	5	J		U	**340,000**	
anthracene	**50,000**		U		U	98,000	J
carbazole			U		U	8,400	J
di-n-butylphthalate	8,100	21	JB	19	JB		U
fluoranthene	**50,000**		U		U	**84,000**	J
pyrene	**50,000**		U		U	**130,000**	J
benzo(a)anthracene ++	**224 or MDL**		U		U	**48,000**	J
chrysene ++	**400**		U		U	**48,000**	J
bis(2-ethyhexyl) phthalate	50,000	1500	B	160	JB		U
di-n-octylphthalate		9	JB	7	JB		U
benzo(b) fluoranthene ++	**1,100**		U		U	**21,000**	J
benzo(k) fluoranthene ++	**1,100**		U		U	**335,000**	J
benzo (a) pyrene ++	**61 or MDL**		U		U	**44,000**	J
indeno (1,2,3 - cd) pyrene ++	**3.2**		U		U	**15,000**	J
dibenzo (a,h) anthracene ++	**14 or MDL**		U		U	**15,000**	J
benzo (g,h,i) perylene	**50,000**		U		U		U
TOTAL SVOC's	<500,000	1535		320		2,966,400	
SVOC AVERAGE		384		53		164,800	
TOTAL CARCINOGENIC PAH		0		79		1,446,000	
TOTAL PAH's		5		79		2,446,000	

U - Indicates that the compound was analyzed for but not detected.
J - The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.
B - Indicates the analyte is found in QC blanks.
BOLD ITALICS are Polycyclic Aromatic Hydrocarbons (PAH's).
++ indicates possible or suspected carcinogen

TABLE 5-9 (page 1 of 3)
TCL SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCS)
Soil Boring Samples (Phase 2)
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Compounds (ppb)	TAGM Recommended Soil Cleanup Objectives (ppb)	SB-1A 6-8 FT	SB-1B 22-24 FT	SB-2A 14-16 FT	SB-2B 30-32 FT	SB-3A 8-10 FT	SB-3B 26-28 FT	SB-4 32-34 FT	SB-5 28-30 FT	SB-5A 6-8 FT	SB-6 22-24 FT	SB-7 32-34 FT	SB-8 32-34 FT	TCLP SB-9A 8-10 FT	SB-9B 26-28 FT	SB-10A 14-16 FT	SB-10B 22-24 FT	SB-12 29-33 FT
Phenol	30 or MDL	U	5 J	14 J	5 J	U	U	5 J	U	U	U	U	U	NA	U	U	U	U
bis(2-Chloroethyl)ether		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2-Chlorophenol	800	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
1,3-Dichlorobenzene		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
1,4-Dichlorobenzene		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Benzyl alcohol		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
1,2-Dichlorobenzene		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2-Methylphenol	100 or MDL	U	U	13 J	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
4-Methylphenol		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21	300 J	NA	NA	NA
2,2-Oxybis(1-Chloropropane)		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
3&4-Methylphenol	900	U	13 JB	36 JB	14 JB	U	U	15 JB	14 JB	17 JB	16 JB	U	U	NA	810 JB	U	530	U
N-Nitroso-di-n-propylamine		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Hexachloroethane		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Nitrobenzene	200 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Isophorone	4,400	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2-Nitrophenol	330 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2,4-Dimethylphenol		U	U	40 J	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Benzoic acid		U	36 JB	22 JB	13 JB	U	U	U	U	17 JB	21 JB	70 JB	22 JB	9 J	140 J	U	U	U
bis(2-Chloroethoxy)methane		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2,4-Dichlorophenol	200 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
1,2,4-Trichlorobenzene		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Naphthalene	***13,000***	***42000***	29 J	360 J	57 J	***1400000***	190 J	180 J	U	5 J	36 J	3 J	U	NA	***30000***	***960000***	***12000***	260 J
4-Chloroaniline	220 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Hexachlorobutadiene		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
4-Chloro-3-methylphenol	240 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2-Methylnaphthalene	36,400	***43000***	26 J	140 J	20 J	***670000***	94 J	39 J	U	71 J	U	U	U	NA	U	U	U	U
Hexachlorocyclopentadiene		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2,4,6-Trichlorophenol		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2,4,5-Trichlorophenol	100	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2-Chloronaphthalene		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2-Nitroaniline	430 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Dimethylphthalate	2,000	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
2,6-Dinitrotoluene	1,000	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
3-Nitroaniline	500 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Acenaphthene	***50,000***	1400 JB	7 J	240 J	39 J	***1400000***	22 J	U	U	U	U	U	U	NA	U	U	U	U
2,4-Dinitrophenol	400	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
4-Nitrophenol	100 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Dibenzofuran	6,200	4500 J	4 J	420	37 J	***2900000***	45 J	U	U	U	U	U	U	NA	U	U	U	U
2,4-Dinitrotoluene		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Diethylphthalate	7,100	U	6 JB	6 JB	4 JB	U	U	U	U	U	U	U	U	NA	U	U	U	U
4-Chlorophenyl-phenylether		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Fluorene	***50,000***	9200	7 J	300 J	50 J	***3600000***	63 J	***3600000***	U	4 JB	3 J	U	U	NA	U	U	U	U
4-Nitroaniline		U	U	U	U	U	U	U	U	12 J	U	U	U	NA	U	U	U	U
4,6-Dinitro-2-methylphenol		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
N-Nitrosodiphenylamine (1)		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
4-Bromophenyl-phenylether		U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Hexachlorobenzene	410	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Pentachlorophenol	1,000 orMDL	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Phenanthrene	***50,000***	24000	23 J	670	140 J	***7900000***	150 J	***7900000***	U	51 J	3 J	U	U	NA	***7100***	***300000***	***69000***	190 J
Anthracene	***50,000***	7700 J	8 J	230 J	59 J	***3800000***	62 J	***3800000***	U	14 J	U	U	U	NA	26000	***93000***	22000	67 J
Carbazole		980 J	3 J	150 J	13 J	14000 J	22 J	14000 J	U	7 J	U	U	U	NA	1500 J	9200 J	1800 J	11 J
Di-n-butylphthalate	8,100	U	11 JB	8 JB	9 JB	U	10 JB	U	U	U	U	U	U	NA	U	U	U	U
Fluoranthene	***50,000***	7600 JB	12 JB	320 JB	87 JB	***4500000*** B	90 JB	***4500000*** B	U	8 JB	11 JB	20 JB	14 J	U	U	U	U	U
Pyrene	***50,000***	5800 J	12 J	170 J	51 J	***3400000***	52 J	***3400000***	U	4 JB	63 JB	2 JB	14 J	U	27000 B	***120000***	24000	100 J
Butylbenzylphthalate	50,000	U	U	U	U	U	U	U	5 JB	3 J	95 J	5 J	U	NA	26000	***140000***	33000	75 J
3,3-Dichlorobenzidine	NA	U	U	U	U	U	U	U	U	U	U	U	U	NA	U	U	U	U
Benzo(a)anthracene	***224 or MDL***	3200 J	7 J	110 J	39 J	***2100000***	39 J	***2100000***	U	45 J	U	U	14 J	U	U	U	U	U
Chrysene	***400***	***3600*** J	9 J	110 J	41 J	***1800000*** J	38 J	***1800000*** J	U	64 J	U	U	17 J	U	***14000***	***65000*** J	***14000***	39 J
bis(2-Ethylhexyl)phthalate	50,000	U	320 JB	59 JB	290 JB	U	53 JB	U	150 JB	170 JB	84 JB	U	U	NA	***14000***	***56000*** J	***11000***	35 J
Di-n-octylphthalate	50,000	U	U	U	U	U	U	U	U	42 J	U	U	U	NA	U	U	U	U
Benzo(b)fluoranthene	***1,100***	1100 J	6 J	54 J	22 J	7300000 J	19 J	7300000 J	U	42 J	U	U	U	NA	***6300*** J	***22000*** J	***8100*** J	21 J
Benzo(k)fluoranthene	***1,100***	***1400*** J	6 J	54 J	22 J	***1500000*** J	23 J	***1500000*** J	U	42 J	U	U	U	NA	***9000*** J	***45000*** J	***8800*** J	23 J
Benzo(a)pyrene	***61 or MDL***	***1700*** J	6 J	59 J	24 J	***1200000*** J	22 J	***1200000*** J	U	42 J	U	U	U	NA	***9000*** J	***45000*** J	***8800*** J	23 J
Indeno(1,2,3-cd)pyrene	***3,200***	700 J	U	34 J	12 J	***510000*** J	10 J	***510000*** J	U	47 J	U	U	U	NA	***11000*** J	***50000*** J	***10000***	29 J
Dibenz(a,h)anthracene	***14 or MDL***	***320*** J	U	***15*** J	6 J	U	U	U	U	U	U	U	U	NA	***3900*** J	***14000*** J	***3300*** J	8 J
Benzo(g,h,i)perylene	***50,000***	650 J	U	30 J	13 J	4600000 J	9 J	4600000 J	U	55 J	U	U	U	NA	***1300*** J	***4500*** J	***1100*** J	U
TOTAL SVOCs	< 500,000	158,850	559	3,780	1,079	6,060,000	1,068	3,580,272	1,150,185	942	217	67	243	NA	36000 J	14000 J	3400 J	8 J
SVOC AVERAGE		8,825	25	140	43	336,667	45	179,014	830,180	39	20	17	61	15,207	2,668,700	140,456	23,572	76
TOTAL CARCINOGENIC PAH		54,670	63	836	236	2,230,000	250	830,180	3,150,185	373	3	31	0	93,100	1,230,500	179,700	443	
TOTAL PAHs		110,370	132	2,766	652	4,690,000	789	1,150,185		515			4	303,100	2,013,500	376,700	980	

U - Indicates that the compound was analyzed for but not detected.
J - The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.
B - Indicates the analyte is found in QC blanks.
BOLD ITALICS are Polycyclic Aromatic Hydrocarbons (PAHs).
NA - Not Analyzed
--- Indicates possible or suspected carcinogen

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TABLE 5-9 (page 2 of 3)
TCL SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)
Soil Boring Samples (Phase 2)
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	TAGM Rec. Soil Cleanup Objectives (ppb)	SB-11A 10-12 FT	SB-11B 16-18 FT	SB-13A 8-11 FT	SB-13B 16-20 FT	SB-14 28-29.5 FT	SB-15 30-34 FT	SB-16A 4-12 FT	SB-16B 22-24 FT	SB-16C 30-32 FT	SB-17A 14-16 FT	SB-17B 24-28 FT	SB-18A 14-16 FT	SB-18B 24-28 FT	SB-19 26-30 FT	SB-20 16-20 FT	SB-21	SB-22A 8-11 FT	SB-31A 12-14 FT	SB-31B 42-44 FT
Phenol	30 or MDL	U	U	U	U	U	4 J	11 JB	**36** JB	9 JB	28 JB	7 JB	25 J	7 J	8 JB	7 JB	U	U	U	U
bis(2-Chloroethyl)ether		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Chlorophenol	800	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzyl alcohol		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Methylphenol	100 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,2'-Oxybis(1-Chloropropane)		U	U	U	U	U	U	U	U	U	13 JB	U	19 J	U	U	U	U	U	U	U
3&4-Methylphenol	900	U	21 J	**4300** J	U	U	13 JB	U	U	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine		U	U	U	U	U	U	U	U	U	20 J	U	47 JB	16 JB	U	U	U	U	U	U
Hexachloroethane		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	200 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Isophorone	4,400	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Nitrophenol	330 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzoic acid		U	U	U	U	U	U	U	U	U	21 J	U	35 J	U	U	U	U	U	U	U
bis(2-Chloroethoxy)methane		U	U	U	U	10 J	12 JB	U	U	U	U	13 J	U	13 JB	11 J	18 J	U	U	U	U
2,4-Dichlorophenol	200 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Naphthalene**	***13,000***	**230000**	3100	**870000** B	**620000** B	U	180 J	1100 B	5200 B	260 JB	2400 B	110 JB	650	260 J	65 JB	U	190 J	**37000** B	U	U
4-Chloroaniline	220 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	240 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Methylnaphthalene	36,400	**84000**	1700	**340000**	**280000**	U	29 J	250 J	9900	260 J	400	25 J	150 J	91 J	10 J	U	180 J	9000 J	U	U
Hexachlorocyclopentadiene		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	100	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Nitroaniline	430 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dimethylphthalate	2,000	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Acenaphthylene	***41,000***	9900 J	440	**140000** J	31000 J	U	130 JB	15 J	2800 J	240 J	90 J	53 J	93 JB	68 JB	U	U	590 J	13000 J	U	U
2,6-Dinitrotoluene	1,000	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
3-Nitroaniline	500 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Acenaphthene	***50,000***	**38000**	2200	**50000** J	**130000** J	U	140 J	140 J	13000	570	180 J	49 J	290 J	25 J	U	U	240 J	5600 J	U	U
2,4-Dinitrophenol	400	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	100 or MDL	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibenzofuran	6,200	**13000** J	1200	**150000**	**140000** J	U	110 J	27 J	2400 J	290 J	310 J	85 J	270 J	90 J	U	U	250 J	**13000** J	U	U
2,4-Dinitrotoluene		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Diethylphthalate	7,100	U	U	U	U	U	3 JB	U	U	8 JB	U	4 JB	4 JB	4 JB	21 JB	5 JB	U	U	U	U
4-Chlorophenyl-phenylether		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Fluorene	***50,000***	26000	1300	**220000**	**180000**	U	80 J	41 J	8100	220 J	550	10 J	360	10 J	U	U	U	15000 J	U	U
4-Nitroaniline		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
N-Nitrosodiphenylamine (1)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Bromophenyl-phenylether		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	410	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	1,000 orMDL	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Phenanthrene	***50,000***	**86000**	4700	**470000**	**420000**	U	400	55 J	27000	1100	360 J	100 J	630	120 J	4 J	3 J	5000	**88000**	U	U
Anthracene	***50,000***	30000	1700	**160000**	**140000** J	U	59 J	20 J	9700	360 J	73 J	26 J	45 J	72 J	U	U	2500	**38000**	U	U
Carbazole		13000 J	520	75000 J	51000 J	U	79 J	38 J	220 J	200 J	1800	84 J	560	74 J	U	U	20 J	6600 J	U	U
Di-n-butylphthalate	8,100	U	U	U	U	U	7 JB	8 JB	U	11 JB	7 JB	6 JB	8 JB	10 JB	6 JB	6 JB	U	U	U	U
Fluoranthene	***50,000***	33000	2100	**270000**	**240000**	U	99 JB	29 J	8300	360 J	28 J	14 J	19 JB	16 JB	U	U	3500	**140000**	U	U
Pyrene	***50,000***	36000	2200	**180000**	**160000**	U	98 J	36 J	12000	550	34 J	15 J	9 J	12 J	U	U	4000	**110000**	U	U
Butylbenzylphthalate	50,000	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	NA	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(a)anthracene*	***224 or MDL***	**19000**	**1100**	**110000** J	**100000** J	U	5 J	15 J	**5600**	**230** J	U	U	U	9 J	U	U	**1900**	**78000**	U	U
Chrysene*	***400***	**16000** J	**900**	**94000** J	**82000** J	U	9 J	20 J	**5300**	220 J	8 J	U	U	7 J	U	U	**1800**	**72000**	U	U
bis(2-Ethylhexyl)phthalate	50,000	U	170 J	U	U	1400 B	180 JB	180 JB	U	1500 B	55 JB	26 JB	68 JB	100 JB	270 JB	260 JB	250 J	2500 JB	43 J	270 J
Di-n-octylphthalate	50,000	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(b)fluoranthene*	***1,100***	**6800** J	340 J	**49000** J	**45000** J	U	5 J	15 J	**1600** J	89 J	U	U	U	5 J	U	U	580 J	**51000**	U	U
Benzo(k)fluoranthene*	***1,100***	**9400** J	580	**75000** J	**64000** J	U	4 J	13 J	**2400** J	110 J	U	U	U	4 J	U	U	910	**52000**	U	U
Benzo(a)pyrene*	***61 or MDL***	**12000** J	600	**70000** J	**61000** J	U	5 J	15 J	**3600** J	**150** J	U	U	U	5 J	U	U	**1200**	**58000**	U	U
Indeno(1,2,3-cd)pyrene*	***3,200***	**4200** J	280 J	**29000** J	**25000** J	U	U	9 J	1400 J	51 J	U	U	U	U	U	U	320 J	**41000**	U	U
Dibenzo(a,h)anthracene*	***14 or MDL***	**1600** J	**110** J	**11000** J	8800 J	U	U	U	**470** J	**24** J	U	U	U	U	U	U	**130** J	**5000** J	U	U
Benzo(g,h,i)perylene	***50,000***	4300 J	260 J	26000 J	22000 J	U	U	10 J	1500 J	55 J	U	U	U	U	U	U	320 J	39000	U	U
TOTAL SVOC's	< 500,000	672,200	25,521	3,393,300	2,799,800	1,410	1,652	2,047	121,526	6,857	6,377	637	3,282	1,018	395	299	24,220	873,700	43	270
SVOC AVERAGE		35,379	1,215	169,665	147,358	705	75	97	6,075	299	354	40	182	45	49	50	1,211	43,685	43	270
TOTAL CARCINOGENIC PAH		303,300	7,270	1,334,000	1,027,800	0	209	1,197	26,070	1,189	2,408	110	650	290	65	0	7,350	433,000	0	0
TOTAL PAH's		552,300	21,470	2,664,000	2,297,800	0	1,085	1,518	106,170	5,349	3,933	324	2,003	545	69	3	22,930	829,600	0	0

U - Indicates that the compound was analyzed for but not detected.
J - The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.
B - Indicates the analyte is found in QC blanks.
BOLD ITALICS are Polycyclic Aromatic Hydrocarbons (PAH's).
++ Indicates possible or suspected carcinogen

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TABLE 5-9 (page 3 of 3)
TCL SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)
Soil Boring Samples (Phase 2)
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	TAGM Rec. Soil Cleanup Objectives (ppb)	MW-25 10-14 FT	MW-26A 56-58 FT	MW-27S 12-14 FT	MW-27D 32-34 FT	MW-28D-A 10-12 FT	MW-28D-B 26-28 FT	MW-29D 42-44 FT	MW-32 34-36 FT
Phenol	30 or MDL	8 JB	7 JB	U	U	28 J	U	U	U
bis(2-Chloroethyl)ether		U	U	U	U	U	U	U	U
2-Chlorophenol	800	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene		U	U	U	U	U	U	U	U
1,4-Dichlorobenzene		U	U	U	U	U	U	U	U
Benzyl alcohol		U	U	U	U	U	U	U	U
1,2-Dichlorobenzene		U	U	U	U	U	U	U	U
2-Methylphenol	100 or MDL	U	U	U	U	21 J	U	U	U
2,2'-Oxybis(1-Chloropropane)		U	U	U	U	U	U	U	U
3&4-Methylphenol	900	U	U	U	U	44 J	U	U	U
N-Nitroso-di-n-propylamine		U	U	U	U	U	U	U	U
Hexachloroethane		U	U	U	U	U	U	U	U
Nitrobenzene	200 or MDL	U	U	U	U	U	U	U	U
Isophorone	4,400	U	U	U	U	U	U	U	U
2-Nitrophenol	330 or MDL	U	U	U	U	U	U	U	U
2,4-Dimethylphenol		U	U	U	U	62 J	U	U	U
Benzoic acid		31 J	20 J	U	U	U	U	13 J	U
bis(2-Chloroethoxy)methane		U	U	U	U	U	U	U	U
2,4-Dichlorophenol	200 or MDL	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene		U	U	U	U	U	U	U	U
Naphthalene**	*13,000*	19 JB	22 JB	44 J	380	310 J	920	U	U
4-Chloroaniline	220 or MDL	U	U	U	U	U	U	U	U
Hexachlorobutadiene		U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	240 or MDL	U	U	U	U	U	U	U	U
2-Methylnaphthalene	36,400	U	4 J	U	460	67 J	11 J	U	U
Hexachlorocyclopentadiene		U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol		U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	100	U	U	U	U	U	U	U	U
2-Chloronaphthalene		U	U	U	U	U	U	U	U
2-Nitroaniline	430 or MDL	U	U	U	U	U	U	U	U
Dimethylphthalate	2,000	U	U	U	U	U	U	U	U
Acenaphthylene	*41,000*	U	U	10 J	74 J	62 J	16 J	U	U
2,6-Dinitrotoluene	1,000	U	U	U	U	U	U	U	U
3-Nitroaniline	500 or MDL	U	U	U	U	U	U	U	U
Acenaphthene	*50,000*	U	U	14 J	180 J	95 J	67 J	U	U
2,4-Dinitrophenol	400	U	U	U	U	U	U	U	U
4-Nitrophenol	100 or MDL	U	U	U	U	U	U	U	U
Dibenzofuran	6,200	U	U	U	35 J	31 J	4 J	U	U
2,4-Dinitrotoluene		U	U	U	U	U	U	U	U
Diethylphthalate	7,100	3 JB	5 JB	U	U	U	34 J	U	U
4-Chlorophenyl-phenylether		U	U	U	U	U	U	U	U
Fluorene	*50,000*	U	U	U	160 J	22 J	8 J	U	U
4-Nitroaniline		U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol		U	U	U	U	U	U	U	U
N-Nitrosodiphenylamine (1)		U	U	U	U	U	U	U	U
4-Bromophenyl-phenylether		U	U	U	U	U	U	U	U
Hexachlorobenzene	410	U	U	U	U	U	U	U	U
Pentachlorophenol	1,000 orMDL	U	U	U	U	U	U	U	U
Phenanthrene	*50,000*	U	6 J	U	580	12 J	38 J	8 J	U
Anthracene	*50,000*	U	U	U	180 J	4 J	12 J	U	U
Carbazole		U	U	U	7 J	16 J	U	U	U
Di-n-butylphthalate	8,100	6 JB	7 JB	U	U	U	12 J	U	U
Fluoranthene	*50,000*	U	U	U	230 J	10 J	13 J	U	U
Pyrene	*50,000*	U	U	U	220 J	8 J	12 J	4 J	U
Butylbenzylphthalate	50,000	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	NA	U	U	U	U	U	U	U	U
Benzo(a)anthracene**	*224 or MDL*	U	U	U	120 J	7 J	6 J	U	U
Chrysene**	*400*	U	U	U	110 J	7 J	12 J	8 J	U
bis(2-Ethylhexyl)phthalate	50,000	160 JB	300 JB	58 J	150 J	150 J	120 J	480 B	100 J
Di-n-octylphthalate	50,000	U	U	U	U	U	U	U	U
Benzo(b)fluoranthene**	*1,100*	U	U	U	37 J	6 J	U	U	U
Benzo(k)fluoranthene**	*1,100*	U	U	U	56 J	4 J	U	U	U
Benzo(a)pyrene**	*61 or MDL*	U	U	U	71 J	U	U	U	U
Indeno(1,2,3-cd)pyrene**	*3,200*	U	U	U	19 J	U	U	U	U
Dibenzo(a,h)anthracene**	*14 or MDL*	U	U	U	9 J	U	U	U	U
Benzo(g,h,i)perylene	*50,000*	U	U	U	19 J	U	U	U	U
TOTAL SVOC's	< 500,000	227	371	126	3,097	966	1,285	513	100
SVOC AVERAGE		38	46	32	155	48	86	103	100
TOTAL CARCINOGENIC PAH		19	22	44	821	334	938	8	0
TOTAL PAH's		19	28	58	2,371	485	1,088	20	0

U - Indicates that the compound was analyzed for but not detected.
J - The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.
B - Indicates the analyte is found in QC blanks.
BOLD ITALICS are Polycyclic Aromatic Hydrocarbons (PAH's).
++ indicates possible or suspected carcinogen

TABLE 5-10
Target Analyte List (TAL) Metals
Soil Boring Samples (Phase 1)
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
October, 1999

Analyte (ppm)	TAGM Rec. Soil Cleanup Objectives (ppm)	SB - 22 (MW-22) E of River, 36-38 ft		SB-23 (MW-23) E of River, 34-36 ft		SB-24 (MW-24) ID Booth, 38-40 ft	
Aluminum	SB	9000		7760		7040	
Antimony	SB	1.6	UN	1.2	UN	1.6	UN
Arsenic	7.5 or SB	4.7		3.7		6.2	
Barium	30 or SB	52.5		38.3		46.5	
Beryllium	0.16 (HEAST) or SB	0.38	B	0.3	B	0.3	B
Cadmium	0.1 or SB	0.22	U	0.16	U	0.22	U
Calcium	SB	86700		38500		89800	
Chromium	10 or SB	13.3		11.8		12.5	
Cobalt	30 or SB	7.1	B	6.6	B	5.4	B
Copper	25 or SB	17.7		15.8		17.1	
Iron	2,000 or SB	16900		15900		14800	
Lead	SB ***	8.7		7.8		7	
Magnesium	SB	17800		13900		14300	
Manganese	SB	450		331		374	
Mercury	0.1	0.017		0.086		0.018	
Nickel	13 or SB	20		18.2		16.6	
Potassium	SB	1900		1340		1210	
Selenium	2 or SB	1.1	UN	0.83	UN	1.1	UN
Silver	SB	0.22	U	0.16	U	0.22	U
Sodium	SB	286	B	160	B	168	B
Thallium	SB	2.2	U	1.6	U	2.2	U
Vanadium	150 or SB	14.5		12.2		10.6	B
Zinc	20 or SB	63.4	E	54.2	E	65.9	E
R Cyanide			U	U		U	
T Cyanide	****		U	U		2.13	
R Sulfide		13.8		10		U	
TOC		8140		10600		11600	

U - Indicates analyte was not detected at method reporting limit.
B - Indicates analyte result between IDL and contract required detection limit (CRDL).
E - Reported value is estimated because of the presence of interferance.
N - Spiked sample recovery not within control limits.
* - Duplicate analysis not within control limit.
te: No some forms of metal salts such as aluminum phosphide, calcium cyanide, potasium cyanide, copper cyanide, silver cyanide, sodium cyanide, zinc phosphide, thallium salts, vanadium pentoxide, and chromium (VI) compounds are more toxic in nature. Please refer to the USEPA HEASTs database to find cleanup objectives if such metals are present in soil.
*** - Background levels for lead vary widely. Average levels in underdeveloped, rural areas may range from 4 - 61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range fro 200 - 500 ppm.
**** - Some forms of cyanide ar complex and very stable while other forms are pH dependent and hence are very unstable. Site-specific forms of cyanide should be taken into consideration when establishing soil cleanup objectives.

TABLE 5-11
Inorganic Analysis
Soil Boring Samples (Phase 2)
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppm)	SB-1A 6-8 FT	SB-1B 22-24 FT	SB-2A 14-16 FT	SB-2B 30-32 FT	SB-3A 8-10 FT	SB-3B 26-28 FT	SB-4 32-34 FT	SB-5 28-30 FT
Cyanide, Total	U	U	U	U	U	U	U	U
TOC	NA	NA	NA	NA	NA	NA	NA	NA
TPH - DRO	6,100	U	1.9	U	NA	NA	NA	NA

Analyte (ppm)	SB-5A 6-8 FT	SB-6 32-34 FT	SB-7 32-34 FT	SB-8 32-34 FT	SB-9B 26-28 FT	SB-10A 14-16 FT	SB-10B 22-24 FT	SB-12 29-33 FT
Cyanide, Total	U	U	U	U	1.06	13.8	2.7	U
TOC	NA	NA	NA	NA	NA	NA	NA	NA
TPH - DRO	NA	NA	NA	NA	NA	NA	NA	NA

Analyte (ppm)	SB-11A 10-12 FT	SB-11B 16-18 FT	SB-13A 8-11 FT	SB-13B 16-20 FT	SB-14 28-29.5 FT	SB-15 30-34 FT	SB-16A 4-12 FT	SB-16B 22-24 FT
Cyanide, Total	6.07	0.622	4.12	0.67	U	U	U	U
TOC	NA	NA	NA	NA	NA	NA	NA	NA
TPH - DRO	NA	NA	NA	NA	NA	NA	90	NA

Analyte (ppm)	SB-16C 30-32 FT	SB-17A 14-16 FT	SB-17B 14-16 FT	SB-18A 14 - 16 FT	SB-18B 24 - 26 FT	SB-19 26-30 FT	SB-20 16-20 FT	SB21 32-34 FT
Cyanide, Total	U	U	2.64	13.6	U	U	U	U
TOC	NA	NA	NA	NA	NA	NA	NA	NA
TPH - DRO	NA	NA	NA	NA	NA	NA	NA	NA

Analyte (ppm)	SB-22A 8-11 FT	SB-22B 13-15 FT	SB-31A 12-14 FT	SB-31B 42-44 FT	MW-25 10-14 FT	MW-26A 56-58 FT	MW-27S 12-14 FT	MW-27D 32-34 FT
Cyanide, Total	37.3	3.15	U	U	U	U	U	U
TOC	NA	NA	NA	NA	NA	NA	NA	53900
TPH - DRO	NA	NA	NA	NA	NA	NA	NA	NA

Analyte (ppm)	MW-28D-A 10-12 FT	MW-28D-B 26-28 FT	MW-29D 42-44 FT	MW-32 34-36 FT	SS-1	SS-2	SS-3	DUPLICATE (SS-3)
Cyanide, Total	1.32	U	U	U	U	U	U	U
TOC	21800	18800	23500	NA	NA	NA	NA	NA
TPH - DRO	NA	NA	NA	NA	5.6	U	U	22

TCLP Analyte (ppb)	SB-9A 8-10 FT
Arsenic	28.2 B
Barium	791 B
Cadmium	U
Chromium	U
Lead	98
Mercury	U
Selenium	U
Silver	U

U - Indicates that the compound was analyzed for but not detected.
NA- Indicates compound was not analyzed for

Table 5-12
Groundwater Elevation Data
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Oct-99

Well I.D.	Ground Elevation (ft)	Reference Point	Reference Elev.(ft.)* (ft)	Depth to Water (ft)	Water Elevevation (ft)	Total Depth (ft)	Screen Elevation (ft.)	Hydraulic Conductivity (ft/sec.)	(ft/day)	Seepage Velocity ft/day
MW-1	1114.00	Top of PVC	1116.25	5.49	1110.76	20.50	1093.50	6.970E-06	0.60	0.015
MW-2	1115.70	Top of PVC	1115.79	5.95	1109.84	34.00	1081.70	1.050E-04	9.07	0.227
MW-3	1115.80	Top of PVC	1115.54	5.70	1109.84	12.00	1103.80	2.050E-06	0.18	0.004
MW-4	1115.30	Top of PVC	1115.52	5.75	1109.77	33.60	1081.70	1.050E-05	0.91	0.023
MW-5	1112.80	Top of PVC	1112.81	4.65	1108.16	37.30	1075.50	1.173E-04	10.13	0.253
MW-6	1113.00	Top of PVC	1113.07	3.67	1109.40	31.00	1082.00	4.780E-06	0.41	0.010
MW-11	1116.10	Top of PVC	1114.97	5.43	1109.54	13.00	1103.10	4.140E-04	35.77	0.894
MW-12	1115.80	Top of PVC	1115.23	5.08	1110.15	12.50	1103.30	1.265E-04	10.93	0.273
MW-13	1113.50	Top of PVC	1113.47	5.62	1107.85	40.50	1073.00	9.510E-04	82.17	2.054
MW-14	1113.00	Top of PVC	1112.74	3.42	1109.32	11.50	1101.50	2.160E-06	0.19	0.005
MW-15	1113.30	Top of PVC	1113.25	3.81	1109.44	11.40	1101.90		NA	NA
MW-16	1113.30	Top of PVC	1113.25	3.97	1109.28	37.00	1076.30	2.583E-05	2.23	0.056
MW-17	1111.80	Top of PVC	1114.75	6.87	1107.88	11.00	1100.80	5.010E-04	43.29	1.082
MW-18	1111.30	Top of PVC	1114.81	6.93	1107.88	29.60	1081.70	3.720E-05	3.21	0.080
MW-19	1113.40	Top of PVC	1113.05	3.50	1109.55	47.50	1065.90		NA	NA
MW-21	1112.90	Top of PVC	1112.89	5.00	1107.89	37.00	1075.90	2.030E-05	1.75	0.044
MW-22	1109.9	Top of PVC	1110.14	0.91	1109.23	36.00	1073.90	5.620E-05	4.86	0.121
MW-23	1110.14	Top of PVC	1109.92	0.97	1108.95	35.00	1075.14	4.490E-05	3.88	0.097
MW-24	1115.67	Top of PVC	1115.67	5.86	1109.81	40.00	1075.67	1.580E-05	1.37	0.034
									Avg. seepage velocity :	0.3
									ft/year	113.2

Hydraulic gradient data used in the seepage velocity calculation was computed based on head loss from MW-24 and MW-6
Values for hydraulic conductivity are not available for monitoring wells MW-15 and MW-19.

Jan-02

Well I.D.	Ground Elevation (ft)	Reference Point	Reference Elev.(ft.)* (ft)	Depth to Water (ft)	Water Elevevation (ft)
MW-1	1114.00	Top of PVC	1116.25	6.12	1110.13
MW-2	1115.70	Top of PVC	1115.79	6.51	1109.28
MW-3	1115.80	Top of PVC	1115.54	6.17	1109.37
MW-4	1115.30	Top of PVC	1115.52	6.37	1109.15
MW-5	1112.80	Top of PVC	1112.81	4.17	1108.64
MW-6	1113.00	Top of PVC	1113.07	4.30	1108.77
MW-11	1116.10	Top of PVC	1114.97	5.88	1109.09
MW-12	1115.80	Top of PVC	1115.23	5.29	1109.94
MW-13	1113.50	Top of PVC	1113.47	4.76	1108.71
MW-14	1113.00	Top of PVC	1112.74	4.80	1107.94
MW-15	1113.30	Top of PVC	1113.25	4.39	1108.86
MW-16	1113.30	Top of PVC	1113.25	4.60	1108.65
MW-17	1111.80	Top of PVC	1114.75	n/a	-
MW-18	1111.30	Top of PVC	1114.81	n/a	-
MW-19	1113.40	Top of PVC	1113.05	3.99	1109.06
MW-21	1112.90	Top of PVC	1112.89	4.35	1108.54
MW-22	1109.9	Top of PVC	1110.14	1.49	1108.65
MW-23	1110.14	Top of PVC	1109.92	1.68	1108.24
MW-24	1115.67	Top of PVC	1115.67	6.34	1109.33
MW-25		Top of PVC	1117.43	5.95	1111.48
MW-26		Top of PVC	1118.00	8.01	1109.99
MW-27S		Top of PVC	1112.47	3.98	1108.49
MW-27D		Top of PVC	1112.29	3.81	1108.48
MW-28S		Top of PVC	1111.68	2.94	1108.74
MW-28D		Top of PVC	1111.50	n/a	
MW-29S		Top of PVC	1113.82	5.03	1108.79
MW-29D		Top of PVC	1113.82	n/a	
MW-30S		Top of PVC	1115.08	5.45	1109.63
MW-30D		Top of PVC	1115.15	6.00	1109.15
MW-32		Top of PVC	1109.94	1.81	1108.13

TABLE 5-13 (1 of 2)
VOLATILE ORGANIC COMPOUNDS
Groundwater Samples - Phase 1
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	Class GA Standard[1] (ppb)	Solubility in Water	MW-1 Screened 15.5 - 20.5 ft	MW-2 Screened 29 - 34 ft	MW-3 Screened 7 - 12 ft	MW-4 Screened 28.6 - 33.6ft	MW-5 Screened 32.3 - 37.3 ft	MW-6 Screened 26 - 31 ft	MW-11 Screened 8 - 13 ft	MW-12 Screened 7.5 - 12.5 ft	MW-13 Screened 35.5 -40.5ft
chloromethane	NA	5320 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U
bromomethane	5	15,200 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U
vinyl chloride	2	8.8X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U
chloroethane	5	5.68X10+3 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	U
acetone (G)	50	miscible	U	UB	28 JB	U	U	1 JB	10 JB	U	2 JB
methylene chloride	5	13,000 mg/l at 25 deg C	0.4 JB	U	U	U	U	U	U	U	U
1,1 dichloroethane	5	5,040 mg/l @ 25 deg C	U	U					U	1 J	U
cis 1,2 dichloroethene	5	6.41X10+3 mg/l @ 25 deg C	U	U					U	0.4 J	U
2 butanone	50	353,000 mg/l @ 10 deg C	2 JB	UB	24 JB	1 JB	2 JB	2 JB	8 JB	2 JB	U
trichloroethene	5	1,280 mg/l @ 25 deg C	U	U					U	1 J	U
bromodichloromethane	50	3.968X10+3 mg/l @ 30 deg C	U	U	U	U	U	U	U	U	0.8 J
1,1,2 trichloroethane	1	4.50 g/L @ 20 deg C	U	U	53 *	U	2 * J	U			
dibromochloromethane	50	2.70X10+3 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	4 J
benzene	1	1.79X10+3 mg/l @ 25 deg C	U	0.4 J	1100 *	11 *	21 *	9 *	93 *	U	
toluene	5	526 mg/l @ 25 deg C	U	U	990 *	63 *	94 *	0.4 J	2 J	U	U
ethylbenzene	5	169 mg/l @ 25 deg C	U	U	560 *	2 J	170 *	3 J	22 *	U	4 J
styrene	5	310 mg/l @ 25 deg C	U	U	96 *	18 *	U	U	U	U	4 J
xylenes (tot)	5	practically insoluble	U	U	2900 *	64 *	190 *	2 J	42 *	U	3 J
TOTAL VOCS			2.4	0.4	5751	159	479	17.4	177	4.4	17.8
TOTAL BTEX			0	0.4	5550	140	475	14.4	159	0	7
AVERAGE VOCS			0	0.4	719	26.5	79.833	2.9	29.5	1.1	2.9667

[1] From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998

(G) indicates parameters subject to guidance value, as opposed to water quality standard.

NA indicates parameter not subject to standard.

B indicates parameter was detected in laboratory QC blank.

"*" indicates parameter exceeds NYS water quality standard.

J indicates estimated concentration

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Table 5-13 (2 of 2)
VOLATILE ORGANIC COMPOUNDS
Groundwater Samples - Phase 1
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	Class GA Standard (ppb)	Solubility in Water	MW-14 Screened 6.5 - 11.5 ft	MW-15 Screened 6.4 - 11.4 ft	MW-16 Screened 32 - 37 ft	MW-17 Screened 6 - 11 ft	MW-18 Screened 24.6 - 29.6 ft	MW-19 Screened 42.5 - 47.5 ft	MW-21 Screened 32 - 37 ft	MW-22 Screened 31 - 35 ft	MW-23 Screened 30 - 35 ft	MW-24 Screened 30 - 40 ft
chloromethane	NA	5320 mg/l @ 25 deg C	U	U	U	U	U	U	U		U	U
bromomethane	5	15,200 mg/l @ 25 deg C	U	U	U	U	U	U	U		U	U
vinyl chloride	2	8.8X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U		U	U
chloroethane	5	5.68X10+3 mg/l @ 20 deg C	U	U	U	U	U	U	U		U	U
acetone	50	miscible	U	1 JB	U	4 JB	U	U	2 JB	1 JB	1 JB	30 JB
methylene chloride	5	13,000 mg/l at 25 deg C	U	U	U	U	U	U	0.4 JB	2 J	0.5 J	6 * J
1,1 dichloroethane	5	5,040 mg/l @ 25 deg C	U	U	U	U	U	U	U		U	U
cis 1,2 dichloroethene	5	6.41X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U		U	U
2 butanone	50	353,000 mg/l @ 10 deg C	2 JB	U	U	5 JB	U	2 JB	UB	2 JB	2 JB	36 JB
trichloroethene	5	1,280 mg/l @ 25 deg C	U	U	U	U	U	U	U		U	U
bromodichloromethane	50	3.968X10+3 mg/l @ 30 deg C	U	U	U	U	U	U	U		U	U
1,1,2 trichloroethane	1	4.50 g/L @ 20 deg C	U	U	U	U	U	U	U		U	U
dibromochloromethane	50	2.70X10+3 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	U	U
benzene	1	1.79X10+3 mg/l @ 25 deg C	21 *	100 *	48 *	180 *	2 * J	23 *	0.2 J		U	440 *
toluene	5	526 mg/l @ 25 deg C	1 J	5	20 *	42 *	0.2 J	140 *	0.2 J		U	610 *
ethylbenzene	5	169 mg/l @ 25 deg C	20 *	100 *	140 *	330 *	1 J	200 *	U		U	380 *
styrene	5	310 mg/l @ 25 deg C	U	U	U	U	U	U	U		U	650 *
xylenes (tot)	5	practically insoluble	8 *	100 *	95 *	330 *	2 J	290 *	U		U	1600 *
TOTAL VOCS			52	306	303	891	5.2	655	2.8	5	3.5	3752
TOTAL BTEX			50	305	303	882	5.2	653	0.4	0	0	3030
AVERAGE VOCS			10.4	61.2	75.8	148.5	1.3	131.0	0.7	1.7	1.2	469.0

[1] From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998

(G) indicates parameters subject to guidance value, as opposed to water quality standard.

NA indicates parameter not subject to standard.

B indicates parameter was detected in laboratory QC blank.

"*" indicates parameter exceeds NYS water quality standard.

J indicates estimated concentration

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TABLE 5-14 (page 1 of 2)
VOLATILE ORGANIC COMPOUNDS (VOCs)
Groundwater Samples - Phase 2
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
January, 2002

Compounds (ppb)	Class GA STANDARD*	Solubility in Water	MW-1 screened interval 15.5 - 20.5 ft	MW-2 screened interval 29 - 34 ft	MW-3 screened interval 7 - 12 ft	MW-4 screened interval 28.6 - 33.6 ft	MW-5 screened interval 32.3 - 37.3 ft	MW-6 screened interval 26 - 31 ft	MW-11 screened interval 8 - 13 ft	MW-12 screened interval 7.5 - 12.5 ft	MW-13 screened interval 35.5 - 40.5 ft	MW-14 screened interval 6.5 - 11.5 ft	MW-15 screened interval 6.4 - 11.4 ft	MW-16 screened interval 32 - 37 ft	MW-17 screened interval 6 - 11 ft	MW-18 screened interval 24.6 - 29.6 ft	MW-19 screened interval 42.5 - 47.5 ft	MW-21 screened interval 32 - 37 ft	MW-22 screened interval 31 - 36 ft
chloromethane	NA	5320 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
vinyl chloride	2	8.8X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bromomethane	5	15,200 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
chloroethane	5	5.68X10+3 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-dichloroethene	5	2,420 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
carbon disulfide	5	2860 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
acetone	50(G)	miscible	UB	U	U	U	UB	UB	U	U	U	U	UB	6 JB	UB	10 JB	UB	5 JB	U	U
methylene chloride	5	13,000 mg/l at 25 deg C	UB	U	4 J	U	UB	UB	0.4 JB	U	0.5 JB	UB	UB	UB	0.2 JB	UB	UB	U	U
trans-1,2-dichloroethene	5	0.63 g/100 g at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-dichloroethane	0.6	5,040 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,2-dichloroethene	5	6.41X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-butanone (mek)	NA	353,000 mg/l @ 10 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
chloroform	7	3.81 g/kg @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-trichloroethane	5	4,400 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
carbon tetrachloride	5	793 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzene	1	1.79X10+3 mg/l @ 25 deg C	U	U	560 *	2 J*	20 *	U	6 *	U	U	1 J*	180 *	100 *	120 *	5 J*	1 J*	U	U
1,2-dichloroethane	0.6	8,600 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trichloroethene	5	1,280 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-dichloropropane	1	2,800 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bromodichloromethane	50(G)	3.968X10+3 mg/l @ 30 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-dichloropropene	0.4	2,700 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-methyl-2-pentanone (MIBK)	NA	19,000 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
toluene	5	526 mg/l @ 25 deg C	U	U	490 *	0.8 J	51 *	U	11 *	U	U	U	17 *	22 *	43 *	U	5 J*	U	U
trans-1,3-dichloropropene	NA	2,800 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-trichloroethane	1	4.50 g/L @ 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
tetrachloroethene	5	0.015 G/100 ML @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-hexanone	50(G)	1.64X10+4 mg/l at 20 deg	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
dibromochloromethane	5	2.70X10+3 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
chlorobenzene	5	502 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
ethylbenzene	5	169 mg/l @ 25 deg C	U	U	180 *	0.8 J	96 *	U	2 J	U	U	U	61 *	130 *	200 *	0.6 J	46 *	U	U
styrene	5	310 mg/l @ 25 deg C	U	U	U	0.7 J	5 *	U	U	U	U	U	U	U	3 J	U	0.8 J	U	U
bromoform	50(G)	3,100 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-tetrachloroethane	5	2962 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
total xylene	5	practically insoluble	U	U	2100 *	5 J*	100 *	4 J	24 *	U	U	U	260 *	140 *	340 *	4 J	60 *	U	U
TOTAL VOCs			0.0	0.0	3,334.0	9.3	272.0	4.0	43.4	0.0	0.5	1.0	524.0	392.0	716.2	9.6	117.8	0.0	0.0
AVERAGE VOCs			0.0	0.0	666.8	1.9	54.4	4.0	8.7	0.0	0.5	1.0	104.8	98.0	102.3	3.2	19.6	0.0	0.0

From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998
G) indicates parameters subject to guidance value, as opposed to water quality standard.
U - Indicates that the compound was analyzed for but not detected.
J - Indicates that the reported value is an estimate.
B - Indicates the analyte is found in QC blanks.

* indicates that the parameter exceeds NYS water quality standard or guidance value.
NA indicates parameter not subject to a standard.

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TABLE 5-14 (page 2 of 2)
VOLATILE ORGANIC COMPOUNDS (VOCs)
Groundwater Samples - Phase 2
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
January, 2002

Compounds (ppb)	Class GA STANDARD*	Solubility in Water	MW-23 screened interval 30 - 35 ft	MW-24 screened interval 30 - 40 ft	MW-25 screened interval 4 - 14 ft	MW-26 screened interval 50 - 60 ft	MW-27s screened interval 5 - 15 ft	MW-27d screened interval 24 - 34 ft	MW-28s screened interval 4 - 14 ft	DUP-1 (from MW-28S)	MW-28d screened interval 18 - 28 ft	MW-29s screened interval 5 - 15 ft	MW-29d screened interval 35 - 45 ft	MW-30s screened interval 5 - 15 ft	MW-30d screened interval 24 - 34 ft	MW-31 screened interval 5 - 15 ft	DUP-2 (from MW-31)	MW-32 screened interval 24 - 34 ft
chloromethane	NA	5320 mg/l @ 25 deg C	U	U	U	U	1 J	U	U	U	U	U	U	U	U	U	U	U
vinyl chloride	2	8.8X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bromomethane	5	15,200 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
chloroethane	5	5.68X10+3 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-dichloroethene	5	2,420 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
carbon disulfide	5	2860 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
acetone	50(G)	miscible	U	U	UB	14 B	U	11	UB	UB	UB	UB	UB	UB	UB	U	U	U
methylene chloride	5	13,000 mg/l at 25 deg C	U	U	UB	U	U	1 JB	UB	UB	UB	UB	UB	UB	UB	U	0 J	U
trans-1,2-dichloroethene	5	0.63 g/100 g at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-dichloroethane	0.6	5,040 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,2-dichloroethene	5	6.41X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-butanone (mek)	NA	353,000 mg/l @ 10 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
chloroform	7	3.81 g/kg @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-trichloroethane	5	4,400 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
carbon tetrachloride	5	793 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzene	1	1.79X10+3 mg/l @ 25 deg C	U	10 J*	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-dichloroethane	0.6	8,600 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trichloroethene	5	1,280 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-dichloropropane	1	2,800 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bromodichloromethane	50(G)	3.968X10+3 mg/l @ 30 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-dichloropropene	0.4	2,700 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-methyl-2-pentanone (MIBK)	NA	19,000 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
toluene	5	526 mg/l @ 25 deg C	U	320 *	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,3-dichloropropene	NA	2,800 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-trichloroethane	1	4.50 g/L @ 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
tetrachloroethene	5	0.015 G/100 ML @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-hexanone	50(G)	1.64X10+4 mg/l at 20 deg	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
dibromochloromethane	5	2.70X10+3 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
chlorobenzene	5	502 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
ethylbenzene	5	169 mg/l @ 25 deg C	U	230 *	U	U	U	U	U	U	U	U	U	U	U	U	U	U
styrene	5	310 mg/l @ 25 deg C	U	300 *	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bromoform	50(G)	3,100 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-tetrachloroethane	5	2962 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
total xylene	5	practically insoluble	U	810 *	U	U	U	12 *	U	U	U	U	U	U	U	U	0 J	U
TOTAL VOCs			0	1670	0	14	1	24	0	0	0	0	0	0	0	0	1	0
AVERAGE VOCs			0	334	0	14	1	8	0	0	0	0	0	0	0	0	0	0

* From TOGS (1.1.1) Ambient Water Quality Staandards & Guidance Values, NYSDEC June 1998
(G) indicates parameters subject to guidance value, as opposed to water quality standard.
U - Indicates that the compound was analyzed for but not detected.
J - Indicates that the reported value is an estimate.
B - Indicates the analyte is found in QC blanks.

* indicates that the parameter exceeds NYS water quality standard or guidance value.
NA indicates parameter not subject to a standard.

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Table 5-15 (1 of 2)
SEMIVOLATILE ORGANIC COMPOUNDS
Groundwater Samples - Phase 1
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	Class GA Standard[1] (ppb)	Solubility in Water	MW-1 Screened 15.5 - 20.5 ft	MW-2 Screened 29 - 34 ft	MW-3 Screened 7 - 12 ft	MW-4 Screened 28.6 - 33.6ft	MW-5 Screened 32.3 - 37.3 ft	MW-6 Screened 26 - 31 ft	MW-11 Screened 8 - 13 ft	MW-12 Screened 7.5 - 12.5 ft	MW-13 Screened 35.5 - 40.5 ft	MW-14 Screened 36.5 - 41.5 ft
phenol	1	82,800 mg/L @ 25 deg C	U	U	22 * J	U	U	U	1.00 J	U	U	0.4 J
2 methylphenol	1	2.59X10+4 mg/l @ 25 deg C	U	U	110 * J	U	U	U	U	U	U	U
4 methylphenol	1	2.5 g in 100 ml @ 50 deg C	U	U	86 * J	U	U	U	U	U	U	U
benzoic acid	NA	3.4X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U
naphthalene ++ (G)	10	30 mg/l	29 *	0.7 J	5700 * J	240 *	270 * J	0.60 J	110.00 *	0.50 J	U	31 *
2,6 dinitrotoluene	5		U	U	U	U	U	U	U	U	U	U
2-methylnaphthalene	NA		0.6 J	0.1 J	700 J	7 J	14 J	U	18.00 J	U	U	0.2 J
acenaphthalene	NA	16.1 mg/l at 25 deg C	6 J	4 J	240 J	63	31 J	32.00	69.00	0.08 J	0.10 J	1 J
acenaphthene (G)	20	Insoluble	0.5 J	1 J	160 * J	6 J	16 J	11.00	U	U	U	39 *
dibenzofuran	NA	4.22 mg/l at 25 deg C	0.3 J	2 J	150 J	3 J	4 J	3.00 J	U	U	U	1 J
2,4 dimethylphenol (G)	50	7.87X10+3 mg/l @ 25 deg C	U	U	370 * J	U	U	U	U	U	U	U
2,4 dinitrotoluene	5	2.70X10+2 mg/l @ 22 deg C	U	U	U	U	U	U	U	U	U	U
diethylphthalate (G)	50	1000 mg/l at 25 deg C	0.1 J	U	U	0.6 J	U	0.2 JB	U	U	0.2 J	0.3 JB
fluorene (G)	50	Insoluble	U	3 J	200 * J	1 J	9 J	0.4 J	16 J	U	U	1 J
n- nitrosodiphenylamine (G)	50	35.10 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U
phenanthrene (G)	50	1.6 mg/l at 15 deg C	0.3 J	10	180 * J	4 J	11 J	1 J	5 J	0.08 J	0.1 J	0.9 J
anthracene (G)	50	4.34X10-2 mg/l at 24 deg C	0.3 J	2 J	71 * J	0.9 J	3 J	0.6 J	5 J	0.1 J	U	0.2 J
carbazole	NA	Insoluble	0.3 J	1 J	320 J	3 J	8 J	4 J	18 J	U	U	10 J
di-n-butylphthalate	50	13 mg/l at 25 deg C	0.5 JB	0.2 JB	U	1 JB	0.7 JB	0.6 JB	U	0.2 JB	0.6 JB	0.7 JB
fluoranthene (G)	50	Virtually Insoluble (0.2-0.26 mg/l)	U	9 J	52 * J	0.6 J	2 J	1 J	3 J	0.2 J	U	0.2 J
pyrene (G)	50	0.135 mg/l (+/- 0.005 mg/l)@ 25 deg C	U	7 J	33 J	0.6 J	2 J	1 J	7 J	0.2 J	0.09 J	0.1 J
benzo(a)anthracene ++ (G)	0.002	9.4X10-3 mg/l @ 25 deg C	U	4 * J	20 * J	U	0.8 * J	0.4 * J	1 * J	0.1 * J	U	0.1 * J
chrysene ++ (G)	0.002	1.89X10-3 mg/l at 25 deg C	U	3 * J	12 * J	U	0.5 * J	0.5 * J	2 * J	0.2 * J	U	0.08 * J
bis(2-ethyhexyl) phthalate	5	0.285 mg/l at 24 deg C	0.8 JB	0.5 JB	U	2 JB	2 JB	4 JB	5 JB	0.3 JB	0.9 JB	1 JB
di-n-octylphthalate	NA	3 mg/l at 25 deg C	0.6 JB	0.1 JB	U	1 JB	0.7 JB	0.8 JB	0.7 JB	0.1 JB	1 JB	0.5 JB
benzo(b) fluoranthene ++ (G)	0.002	0.0015 mg/l. /temp not specified	U	2 * J	U	U	U	0.5 * J	0.8 * J	0.2 * J	U	U
benzo(k) fluoranthene ++ (G)	0.002	8.0X10-4 mg/l at 25 deg C	U	2 * J	U	U	U	0.6 * J	1 * J	0.2 * J	U	U
benzo (a) pyrene ++	0	1.60X10-3 mg/l at 25 deg C	U	3 * J	12 * J	U	U	0.4 * J	2 * J	0.2 * J	U	U
indeno (1,2,3 - cd) pyrene ++ (G)	0.002	6.2X10-2 mg/l at 20 deg C	U	1 * J	U	U	U	0.4 * J	0.6 * J	0.1 * J	U	U
dibenzo (a,h) anthracene ++	NA	5.99X10-4 mg/l at 25 deg C	U	0.5 J	U	U	U	U	U	U	U	U
benzo (g,h,i) perylene	NA	0.00026 mg/l at 25 deg C	U	1 J	U	U	U	0.4 J	0.8 J	0.1 J	U	U
TOTAL SVOCS			39.3	57.1	8438	333.7	374.7	63.4	265.9	2.86	2.99	88.48
AVG SVOC			3.28	2.60	468.78	22.25	23.42	3.02	13.99	0.18	0.43	4.66
TOTAL CARCINOGENIC PAH			29	16.2	5744	240	271.3	3.4	117.4	1.5	0	31.18
TOTAL PAH's			36.1	53.2	6680	316.1	345.3	50.8	223.2	2.26	0.29	73.58

[1] From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998

(G) indicates parameters subject to guidance value, as opposed to water quality standard.

NA indicates parameter not subject to standard.

B indicates parameter was detected in laboratory QC blank.

"*" indicates parameter exceeds NYS water quality standard.

J indicates estimated concentration

BOLD ITALICS are Polycyclic Aromatic Hydrocarbons (PAH's).

++ indicates potetnial or suspected carcinogen

DEC-02561

Stearns & Wheler, LLC
Project No. 10126
April 2002

Table 5-15 (2 of 2)
SEMIVOLATILE ORGANIC COMPOUNDS
Groundwater Samples - Phase 1
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	Class GA Standard (ppb)	Solubility in Water	MW-15 Screened 6.4 - 11.4 ft	MW-16 Screened 32 - 37 ft	MW-17 Screened 6 - 11 ft	MW-18 Screened 24.6 - 29.6 ft	MW-19 Screened 42.5 - 47.5 ft	MW-21 Screened 32 - 37 ft	MW-22 Screened 31 - 36 ft	MW-23 Screened 30 - 35 ft	MW-24 Screened 30 - 40 ft
phenol	1	82,800 mg/L @ 25 deg C	U	U	U	U	U	U	U	U	U
2 methylphenol	1	2.59X10+4 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U
4 methylphenol	1	2.5 g in 100 ml @ 50 deg C	U	U	U	U	U	U	U	U	U
benzoic acid	NA	3.4X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U
naphthalene ++ (G)	10	30 mg/l	840 *	300 *	2600 *	0.3 J	360 *	U	U	U	4300 *
2,6 dinitrotoluene	5		U	U	U	U	U	U	U	U	U
2-methylnaphthalene	NA		26 J	15 J	44 J	U	43 J	U	U	U	1600
acenaphthalene	NA	16.1 mg/l at 25 deg C	4 J	32 J	6 J	11	24 J	U	U	U	890
acenaphthene (G)	20	Insoluble	130 * J	72 *	110 * J	18	22 * J	U	U	U	160 * J
dibenzofuran	NA	4.22 mg/l at 25 deg C	44 J	30 J	20 J	4 J	5 J	U	U	U	110 J
2,4 dimethylphenol (G)	50	7.87X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	15 J
2,4 dinitrotoluene	5	2.70X10+2 mg/l @ 22 deg C	U	U	U	U	U	U	U	U	U
diethylphthalate (G)	50	1000 mg/l at 25 deg C	U	U	U	U	U	0.1 J	0.2 J	0.1 J	U
fluorene (G)	50	Insoluble	29 J	35 J	24 J	0.6 J	14 J	U	U	U	360 * J
n- nitrosodiphenylamine (G)	50	35.10 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U
phenanthrene (G)	50	1.6 mg/l at 15 deg C	40 J	59 *	28 J	7 J	18 J	U	U	U	660 *
anthracene (G)	50	4.34X10-2 mg/l at 24 deg C	U	7 J	U	0.2 J	4 J	U	U	U	240 * J
carbazole	NA	Insoluble	74 J	40 J	42 J	3 J	4 J	U	U	U	100 J
di-n-butylphthalate	50	13 mg/l at 25 deg C	U	0.7 JB	U	0.2 JB	U	0.5 JB	0.8 JB	0.6 JB	U
fluoranthene (G)	50	Virtually Insoluble (0.2-0.26 mg/l)	U	10 J	U	0.4 J	1 J	0.1 J	U	U	240 * J
pyrene (G)	50	0.135 mg/l (+/- 0.005 mg/l)@ 25 deg C	U	9 J	U	0.3 J	1 J	0.08 J	U	U	230 * J
benzo(a)anthracene ++ (G)	0.002	9.4X10-3 mg/l @ 25 deg C	U	4 * J	U	U	U	U	U	U	110 * J
chrysene ++ (G)	0.002	1.89X10-3 mg/l at 25 deg C	U	3 * J	U	U	U	U	U	U	81 * J
bis(2-ethyhexyl) phthalate	5	0.285 mg/l at 24 deg C	U	2 JB	U	0.5 JB	U	0.9 JB	3 JB	0.9 JB	U
di-n-octylphthalate	NA	3 mg/l at 25 deg C	U	0.4 JB	U	0.1 JB	U	8 JB	1 JB	1 JB	U
benzo(b) fluoranthene ++ (G)	0.002	0.0015 mg/l. /temp not specified	U	2 * J	U	U	U	U	U	U	44 * J
benzo(k) fluoranthene ++ (G)	0.002	8.0X10-4 mg/l at 25 deg C	U	3 * J	U	U	U	U	U	U	82 * J
benzo (a) pyrene ++	0	1.60X10-3 mg/l at 25 deg C	U	4 * J	U	U	U	U	U	U	90 * J
indeno (1,2,3 - cd) pyrene ++ (G)	0.002	6.2X10-2 mg/l at 20 deg C	U	2 * J	U	U	U	U	U	U	38 * J
dibenzo (a,h) anthracene ++	NA	5.99X10-4 mg/l at 25 deg C	U	0.7 J	U	U	U	U	U	U	12 J
benzo (g,h,i) perylene	NA	0.00026 mg/l at 25 deg C	U	2 J	U	U	U	U	U	U	33 J
TOTAL SVOCS			1187	632.8	2874	45.6	496	9.68	5	2.6	9395
AVG SVOC			148.4	28.8	359.3	3.5	45.1	1.6	1.3	0.7	469.8
TOTAL CARCINOGENIC PAH			840	318.7	2600	0.3	360	0	0	0	4757
TOTAL PAH's			1043.0	544.7	2768.0	37.8	444.0	0.2	0.0	0.0	7570.0

[1] From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998

(G) indicates parameters subject to guidance value, as opposed to water quality standard.

NA indicates parameter not subject to standard.

B indicates parameter was detected in laboratory QC blank.

"*" indicates parameter exceeds NYS water quality standard.

J indicates estimated concentration

BOLD ITALICS are Polycyclic Aromatic Hydrocarbons (PAH's).

DEC-02562

TABLE 5-16 (page 1 of 2)
SEMI-VOLATILE ORGANIC COMPOUNDS (VOCs)
Groundwater Samples - Phase 2
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
January, 2002

Compounds (ppb)	Class GA STANDARD	Solubility in Water	MW-1 screened interval 15.5 - 20.5 ft	MW-2 screened interval 29 - 34 ft	MW-3 screened interval 7 - 12 ft	MW-4 screened interval 28.5 - 33.5 ft	MW-5 screened interval 32.3 - 37.3 ft	MW-6 screened interval 26 - 31 ft	MW-11 screened interval 8 - 13 ft	MW-12 screened interval 7.5 - 12.5 ft	MW-13 screened interval 35.5 - 40.5 ft	MW-14 screened interval 6.5 - 11.5 ft	MW-15 screened interval 6.4 - 11.4 ft	MW-16 screened interval 32 - 37 ft	MW-17 screened interval 6 - 11 ft	MW-18 screened interval 24.6 - 29.6 ft	MW-19 screened interval 42.5 - 47.5 ft	MW-21 screened interval 32 - 37 ft	MW-22 screened interval 31 - 36 ft
phenol	1	82,800 mg/L @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	0.9 J	U	U	U
bis(2-chloroethyl)ether	1	10,200 mg/l at 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-dichlorobenzene	3	125 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-dichlorobenzene	3	76 mg/l at 25 dec C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-dichlorobenzene	3	156 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzyl alcohol	NA	42,900 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-methylphenol	NA	2.59X10+4 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,2-oxybis (1-chloropropane)	NA	2720 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	7 J	4 J	U	U	U	U	U
n-nitroso-di-n-propylamine	NA	Soluble	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
hexachloroethane	5	7.7 mg/l at 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-methylphenol	NA	2.5 g in 100 ml @ 50 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-chlorophenol	NA	11,400 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
nitrobenzene	0.4	1.797X10+3 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroethoxy)methane	NA	81,000 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-trichlorobenzene	5	31.3 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzoic acid	NA	3.4X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
isophrone	50 (G)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4-dimethylphenol	50(G)	7.87X10+3 mg/l @ 25 deg C	U	U	82 *	U	U	U	U	U	U	U	U	U	U	U	U	U	U
hexachlorobutadiene	0.5	3.20 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
naphthalene ++	10(G)	30 mg/l	U	U	4600 *	35 *	170 *	U	U	U	U	17 *	680 *	600 *	2800 *	2 J	U	U	U
2,4-dichlorophenol	5	4.50X10+3 mg/l at 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-chloroaniline	5	3.9 g/l	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4,6-trichlorophenol	NA	800 MG/L @ 25 DEG C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-trichlorophenol	NA	1200 mg/kg @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
hexachlorocyclopentadiene	5	2 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-methylnaphthalene	NA		U	U	200 J	U	1 J	U	U	U	U	U	8 J	U	48 J	U	4 J	U	U
2-nitroaniline	5	1.47X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-chloronaphthalene	10(G)	11.7 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-chloro-3-methylphenol	NA	3850 MG/L @ 20 DEG C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,6-dinitrotoluene	5		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-nitrophenol	NA	2.19X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
3-nitroaniline	5	910 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
dimethyl phthalate	NA	4000 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4-dinitrophenol	10(G)	2790 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
acenaphthylene	NA	16.l mg/l at 25 deg C	U	2 J	170 J	12	20 J	16	U	U	U	U	U	18 J	U	14	6 J	U	U
2,4-dinitrotoluene	5	2.70X10+2 mg/l @ 22 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
acenaphthene	20(G)	Insoluble	U	1 J	55 J*	1 J	10 J	16	5 J	U	U	27 *	140 *	130 *	210 J*	27 *	10 J	U	U
dibenzofuran	NA	4.22 mg/l at 25 deg C	U	1 J	110 J	0.9 J	2 J	2 J	3 J	U	U	0.8 J	46 J	54 J	44 J	4 J	2 J	U	U
4-nitrophenol	NA	16,000 mg/l in water @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
flourene	50(G)	Insoluble	U	3 J	140 J*	U	5 J	0.9 J	4 J	U	U	U	27 J	38 J	56 J*	2 J	7 J	U	U
4-nitroaniline	5	600 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-bromophenyl phenyl ether	NA	Insoluble	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
hexachlorobenzene	0.04	4.7X10-3 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
diethyl phthalate	50(G)	1000 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-chlorophenyl phenyl ether	NA	3.3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
pentachlorophenol	1	14 mg/l at 26.7 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
n-nitrosodiphenylamine	50(G)	35.10 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4,6-dinitro-2-methylphenol	NA	0.013% @ 15 DEG C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
phenanthrene	50(G)	1.6 mg/l at 15 deg C	U	6 J	150 J*	1 J	5 J	U	U	U	U	U	37 J	51 J*	50 J*	1 J	7 J	U	U
anthracene	50(G)	4.34X10-2 mg/l at 24 deg C	U	U	65 J*	U	1 J	U	U	U	U	U	U	U	U	U	2 J	U	U
carbazole	NA	Insoluble	U	U	150 J	1 J	4 J	U	U	U	U	5 J	55 J	57 J	72 J	4 J	2 J	U	U
di-n-butyl phthalate	NA	13 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
flouranthene	50(G)	Virtually Insoluble (0.2-0.26 mg/l)	U	3 J	73 J*	U	2 J	U	3 J	U	U	U	U	U	U	U	0.5 J	U	U
pyrene	50(G)	0.135 mg/l (+/- 0.005 mg/l)@ 25 deg C	U	2 J	U	U	3 J	U	9 J	U	U	U	U	U	U	U	0.5 J	U	U
butyl benzyl phthalate	50(G)	0.71 mg/l temp not specified	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzo(a)anthracene ++	0.002(G)	9.4X10-3 mg/l @ 25 deg C	U	U	U	U	U	U	3 J*	U	U	U	U	U	U	U	U	U	U
chrysene ++	0.002(G)	1.89X10-3 mg/l at 25 deg C	U	U	U	U	U	U	3 J*	U	U	U	U	U	U	U	U	U	U
3,3-dichlorobenzidine	5	3.1 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-ethylhexyl)phthalate	5	0.285 mg/l at 24 deg C	U	U	U	U	U	U	U	4 J	U	U	U	U	U	U	U	U	U
di-n-octyl phthalate	NA	3 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzo(b)floranthene ++	0.002(G)	0.0015 mg/l, /temp not specified	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzo(k)flouranthene ++	0.002(G)	8.0X10-4 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzo(a)pyrene ++	NA	1.60X10-3 mg/l at 25 deg C	U	U	U	U	U	U	1 J	U	U	U	U	U	U	U	U	U	U
indeno(1,2,3-cd)pyrene ++	0.002(G)	6.2X10-2 mg/l at 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
dibenzo(a,h)anthracene ++	NA	5.99X10-4 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzo(ghi)perylene ++	NA	0.00026 mg/l at 25 deg C	U	U	U	U	U	U	1 J	U	U	U	U	U	U	U	U	U	U
TOTAL SVOCs			0	18	5795	51	223	35	32	4	0	50	1000	952	3280	55	41	0	0
AVERAGE SVOCs			0	3	527	8	20	9	4	4	0	12	125	119	469	7	4	0	0
TOTAL PAHs			0	17	5253	49	216	33	29	0	0	44	884	837	3116	45	33	0	0

* From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998
(G) indicates parameters subject to guidance value, as opposed to water quality standard.
U - indicates that the compound was analyzed for but not detected.
J - Indicates that the reported value is an estimate.
B - Indicates the analyte is found in QC blanks.

* indicates that the parameter exceeds NYS water quality standard or guidance value.
NA indicates parameter not subject to a standard.
(++) indicates suspected carcinogen
BOLD ITALICS indicates PAH

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TABLE 5-16 (page 2 of 2)
SEMI-VOLATILE ORGANIC COMPOUNDS (VOCs)
Groundwater Samples - Phase 2
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York
January, 2002

Compounds (ppb)	TOGS Standards	Solubility in Water	MW-23 screened interval 30 - 35 ft	MW-24 screened interval 30 - 40 ft	MW-25 screened interval 4 - 14 ft	MW-26 screened interval 50 - 60 ft	MW-27s screened interval 5 - 15 ft	MW-27d screened interval 24 - 34 ft	MW-28s screened interval 4 - 14 ft	DUP-1 (from MW-28S)	MW-28d screened interval 18 - 28 ft	MW-29s screened interval 5 - 15 ft	MW-29d screened interval 35 - 45 ft	MW-30s screened interval 5 - 15 ft	MW-30d screened interval 24 - 34 ft	MW-31 screened interval 5 - 25 ft	DUP-2 (from MW-31)	MW-32 screened interval 24 - 34 ft
phenol	1	82,800 mg/L @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroethyl)ether	1	10,200 mg/l at 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-dichlorobenzene	3	125 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-dichlorobenzene	3	76 mg/l at 25 dec C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-dichlorobenzene	3	156 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzyl alcohol	NA	42,900 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-methylphenol	NA	2.59X10+4 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,2-oxybis (1-chloropropane)	NA	2720 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
n-nitroso-di-n-propylamine	NA	Soluble	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
hexachloroethane	5	7.7 mg/l at 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-methylphenol	NA	2.5 g in 100 ml @ 50 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-chlorophenol	NA	11,400 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
nitrobenzene	0.4	1.797X10+3 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroethoxy)methane	NA	81,000 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-trichlorobenzene	5	31.3 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzoic acid	NA	3.4X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
isophrone	50 (G)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4-dimethylphenol	50(G)	7.87X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
hexachlorobutadiene	0.5	3.20 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
naphthalene ++	10(G)	30 mg/l	U	5000 *	U	U	U	350 *	U	U	U	U	U	U	U	1 J	U	U
2,4-dichlorophenol	5	4.50X10+3 mg/l at 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-chloroaniline	5	3.9 g/l	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4,6-trichlorophenol	NA	800 MG/L @ 25 DEG C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-trichlorophenol	NA	1200 mg/kg @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
hexachlorocyclopentadiene	5	2 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-methylnaphthalene	NA		U	580 J	U	U	U	210	U	U	U	U	U	U	U	U	U	U
2-nitroaniline	5	1.47X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-chloronaphthalene	10(G)	11.7 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-chloro-3-methylphenol	NA	3850 MG/L @ 20 DEG C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,6-dinitrotoluene	5		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-nitrophenol	NA	2.19X10+3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
3-nitroaniline	5	910 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
dimethyl phthalate	NA	4000 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4-dinitrophenol	10(G)	2790 mg/l @ 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
acenaphthylene	NA	16.1 mg/l at 25 deg C	U	490 J	U	U	U	27 J	0.5 J	0.5 J	2 J	U	U	U	U	U	U	U
2,4-dinitrotoluene	5	2.70X10+2 mg/l @ 22 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
acenaphthene	20(G)	Insoluble	U	62 J*	U	U	U	93 J*	3 J	3 J	3 J	0.4 J	U	U	U	U	U	U
dibenzofuran	NA	4.22 mg/l at 25 deg C	U	U	U	U	U	11 J	U	U	U	U	U	U	U	U	U	U
4-nitrophenol	NA	16,000 mg/l in water @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
flourene	50(G)	Insoluble	U	120 J*	U	U	U	58 J*	U	U	U	U	U	U	U	U	U	U
4-nitroaniline	5	600 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-bromophenyl phenyl ether	NA	Insolubie	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
hexachlorobenzene	0.04	4.7X10-3 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
diethyl phthalate	50(G)	1000 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-chlorophenyl phenyl ether	NA	3.3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
pentachlorophenol	1	14 mg/l at 26.7 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
n-nitrosodiphenylamine	50(G)	35.10 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4,6-dinitro-2-methylphenol	NA	0.013% @ 15 DEG C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
phenanthrene	50(G)	1.6 mg/l at 15 deg C	U	110 J*	U	U	U	71 J*	U	U	U	U	U	U	U	U	U	U
anthracene	50(G)	4.34X10-2 mg/l at 24 deg C	U	U	U	U	U	19 J	U	U	U	U	U	U	U	U	U	U
carbazole	NA	Insolubie	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
di-n-butyl phthalate	NA	13 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
flouranthene	50(G)	Virtually insolubie (0.2-0.26 mg/l)	U	U	U	U	U	9 J	U	U	U	U	U	U	U	U	U	U
pyrene	50(G)	0.135 mg/l (+/- 0.005 mg/l)@ 25 deg C	U	U	U	U	U	9 J	U	U	U	U	U	U	U	U	U	U
butyl benzyl phthalate	50(G)	0.71 mg/l temp not specified	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzo(a)anthracene ++	0.002(G)	9.4X10-3 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
chrysene ++	0.002(G)	1.89X10-3 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
3,3-dichlorobenzidine	5	3.1 mg/l @ 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-ethylhexyl)phthalate	5	0.285 mg/l at 24 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
di-n-octyl phthalate	NA	3 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzo(b)floranthene ++	0.002(G)	0.0015 mg/l, /temp not specified	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzo(k)flouranthene ++	0.002(G)	8.0X10-4 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzo(a)pyrene ++	ND	1.60X10-3 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
indeno(1,2,3-cd)pyrene ++	0.002(G)	6.2X10-2 mg/l at 20 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
dibenzo(a,h)anthracene ++	NA	5.99X10-4 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
benzo(ghi)peryiene ++	NA	0.00026 mg/l at 25 deg C	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL SVOCs			0	6362	0	0	0	857	4	4	5	0	0	0	0	1	0	0
AVERAGE SVOCs			0	1060	0	0	0	86	2	2	3	0	0	0	0	1	0	0
TOTAL PAHs			0	5782	0	0	0	636	4	4	5	0	0	0	0	1	0	0

* From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998
(G) indicates parameters subject to guidance value, as opposed to water quality standard.
U - indicates that the compound was analyzed for but not detected.
J - indicates that the reported value is an estimate.
B - indicates the analyte is found in QC blanks.

* indicates that the parameter exceeds NYS water quality standard or guidance value.
NA indicates parameter not subject to a standard.
(++) indicates suspected carcinogen
BOLD ITALICS indicates PAH

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Table 5-17 (1 of 2)
TAL Metals, Cyanide, and Sulfide
Groundwater Samples - Phase 1
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	Class GA Standard[1] (ppb)	MW-1 Screened 15.5 - 20.5 ft		MW-2 Screened 29 - 34 ft		MW-3 Screened 7 - 12 ft		MW-4 Screened 28.6 - 33.6ft		MW-5 Screened 32.3 - 37.3 ft		MW-6 Screened 26 - 31 ft		MW-11 Screened 8 - 13 ft		MW-12 Screened 7.5 - 12.5 ft		MW-13 Screened 35.5 - 40.5 ft	
aluminum	NA	2740		486		1190		4040		479		379		417		398		1340	
antimony	3	7	UN	7	U	7	U	7	UN	7	U	7	U	7	U	7	U	7	UN
arsenic	25	4	U	9	B	5.1	B	7	B	4	U	4	U	4	U	8	B	4	U
barium	1000	299	B	318		267		247		220		233		368		233		211	
beryllium (G)	3	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
cadmium	5	1	UN	1	U	1	U	1	U	22.5	*	2.5	B	1	U	1	U	1	UN
calcium	NA	113000		106000		173000		117000		116000		111000		126000		227000		92700	
chromium	50	113		2	U	2	U	221		41		3.8	B	5.4	B	38.8		727	
cobalt	NA	5.1	B	2	U	3.1	B	9	B	2	B	2	U	2	U	5.4	B	21.1	B
copper	200	6	B	4.3	B	4	B	25.1		16.6	B	12	B	4.1	B	1	U	64	
iron	300	5010	*	1420	*	11100	*	11900	*	1750	*	1390	*	10800	*	8770	*	11300	*
lead	25	3	U	5.2		15.9		5		25.5	*	30	*	4.7		3	U	16.2	
magnesium (G)	35000	22700		26800		39800	*	26900		22400		24500		19300		31200		19900	
manganese	300	100		395	*	1570	*	430	*	472	*	558	*	2080	*	4320	*	276	
mercury	0.7	0.1	U	0.1	UN	0.11	B	0.1	U	0.1	U	0.1	U	0.1	U	0.1	UN	0.1	U
nickel	100	18.2	B	3	U	3.3	BN	100		25.4	BN	3	UN	3	UN	39.9	B	204	*
potassium	NA	2190	B	958	B	2880	B	2180	B	1150	B	1140	B	5280		3060	B	1420	B
selenium	10	5	U	5	U	5	U	5.7		5	U	**5**	**U**	**5**	**U**	5	U	5	U
silver	50	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
sodium	20000	30400	*	24200	*	92500	* E	35100	*	37100	*	35300	* E	118000	* E	95200	*	39000	*
thallium (G)	0.5	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
vanadium	NA	3.5	B	2	U	2	U	5.6	B	2	U	2	U	2	U	2	U	3.8	B
zinc (G)	2000	11.1	B	14	B	90.4		35.5		117		93.4		56.8		5.4	B	42.1	
tot cyanide	200		U		U	7960	*		U		U		U	214	*	1900	*		U
sulfide (G)	50		U	1600	*		U		U		U		U	3200	*		U		U

[1] From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998

U - Indicates analyte was not detected at method reporting limit.

* indicates parameter exceeds NYS Water Quality Standard

G - Indicates guidance value

B - Indicates analyte result between IDL and contract required detection limit (CRDL).

E - Reported value is estimated because of the presence of interface.

N - Spiked sample recovery not within control limits.

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Table 5-17 (2 of 2)
TAL Metals, Cyanide, and Sulfide
Groundwater Samples - Phase 1
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	Class GA Standard (ppb)	MW-14 Screened 6.5 - 11.5 ft		MW-15 Screened 6.4 - 11.4 ft		MW-16 Screened 32 - 37 ft		MW-17 Screened 6 - 11 ft		MW-18 Screened 24.6 - 29.6 ft		MW-19 Screened 42.5 - 47.5 ft		MW-21 Screened 32 - 37 ft		MW-22 Screened 31 - 36 ft		MW-23 Screened 30 - 35 ft		MW-24 Screened 30 - 40 ft	
aluminum	NA	934		1520		197	B	409		48.4	B	397		614		1950		14700		30200	
antimony	3	7	U	7	U	7	U	7	U	7	U	7	U	7	UN	7	UN	7	UN	7	UN
arsenic	25	4.9	B	10		4	U	10.3		7.6	B	10.5		4	U	4	UN	7.5	B	28.9	*
barium	1000	876		1620	*	296		927		253		204		150	B	172	B	259		446	
beryllium (G)	3	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	UN	1	U	1.2	B
cadmium	5	1	U	1	U	1	U	1	U	1	U	1	U	1	UN	1	UN	1	UN	1	UN
calcium	NA	165000		193000		103000		182000		112000		96400		87900		103000		158000		19600	
chromium	50	2.2	B	2	U	2	U	2	U	2	U	2	U	36.8		4.8	B	22.9		63.5	
cobalt	NA	2.3	B	2.2	B	2	U	2	U	2	U	2.8	B	5.2	B	2	U	11.9	B	25.2	B
copper	200	37.8		1.4	B	9.8	B	9.5	B	1	U	26.8		13.6	B	6.6	B	33.8		96.3	
iron	300	6880	*	11100	*	2840	*	9270	*	859	*	2060	*	1980	*	4010	*	28800	*	66600	*
lead	25	26.9		18.4		13.7		7.4		3	U	15.5		3	U	3	U	11.7		43.7	
magnesium (G)	35000	23200		30900		21100		33600		24800		21100		18700		26000		45700	*	56700	*
manganese	300	2760	*	2900	*	604	*	2330	*	614	*	561	*	69.9		377	*	755	*	1680	*
mercury	0.7	0.1	B	0.1	UN	0.1	U	0.1	UN	0.1	UN	0.1	UN	0.13	B	0.1	U	0.1	U	0.35	
nickel	100	3.3	BN	6	B	3	UN	3	U	3	U	3	U	67.6		5	B	33.3	B	113	*
potassium	NA	7610		6450		1150	B	1820	B	933	B	1740	B	1100	B	4100	B	6510		7770	
selenium	10	5	U	5.1		5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
silver	50	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
sodium	20000	278000	* E	256000	*	38900	* E	143000	*	35400	*	44100	*	36400	*	58600	*	56600	*	40300	*
thallium (G)	0.5	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
vanadium	NA	2	B	2.6	B	2	U	2	U	2	U	2	U	2	U	2	U	21.2	B	45.9	B
zinc (G)	2000	135		46.9		121		18.7	B	3	U	36.4		13.8	B	16.4	B	90.1		234	
tot cyanide	200	51		177		24.6		42			U		U		U		U		U	124	
sulfide (G)	50		U		U		U		U	1600	*		U		U		U		U		U

1 From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998

U - Indicates analyte was not detected at method reporting limit.

* indicates parameter exceeds NYS Water Quality Standard

G - Indicates guidance value

B - Indicates analyte result between IDL and contract required detection limit (CRDL).

E - Reported value is estimated because of the presence of interface.

N - Spiked sample recovery not within control limits.

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TABLE 5-18
INORGANIC DATA
Groundwater Samples - Phase 2
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP

Analyte (mg/L)	Class GA STANDARD*	MW-1 screened interval 15.5 -20.5 ft	MW-2 screened interval 29 - 34 ft	MW-3 screened interval 7 - 12 ft	MW-4 screened interval 28.6 - 33.6 ft	MW-5 screened interval 32.3 - 37.3 ft	MW-6 screened interval 26 - 31 ft	MW-11 screened interval 8 - 13 ft	MW-12 screened interval 7.5 - 12.5 ft	MW-13 screened interval 35.5 - 40.5 ft	MW-14 screened interval 6.5 - 11.5 ft	MW-15 screened interval 6.4 - 11.4 ft
nitrate (NO_3-N)	10	1.2	0.09 B	2.8	1.5	0.026 B	0.029 B	0.039 B	6.7	2.2	U	U
sulfate	250	27	46	59	25	17	25	37	1400 *	26	30	2.7
cyanide (total)	0.2	U	U	5.55 *	U	U	U	0.788 *	5.2 *	U	0.047	0.149
BOD5	NA	U	U	14	U	3.8	U	49	U	U	U	11
alkalinity ($CaCO_3$)	NA	292	236	356	282	320	288	254	302	258	462	322
sulfide	.05(G)	U	U	U	U	U	U	U	U	U	U	U
ammonia (NH_3)	2	0.11	0.1	1.5	0.094	0.14	0.098	0.16	0.17	0.11	0.61	1.1
nitrogen (TKN)	NA	0.103	U	2.51	0.224	1.26	0.136	0.587	2.89	0.179	1.06	2.04
COD	NA	5.44 B	U	58.2	U	7.96 B	U	69	17.3	U	36	28.8
Iron	300	914 *	276	5,980 *	7,260 *	17,900 *	343 *	2,580 *	11,200 *	3,540 *	11,200 *	3,300 *
Manganese	300	22	70	868 *	107	584 *	327 *	713 *	918 *	77	1,420 *	1,000 *

Analyte (mg/L)	Class GA STANDARD*	MW-16 screened interval 32 - 37 ft	MW-17 screened interval 6 - 11 ft	MW-18 screened interval 24.6 - 29.6 ft	MW-19 screened interval 42.5 - 47.5 ft	MW-21 screened interval 32 - 37 ft	MW-22 screened interval 31 - 36 ft	MW-23 screened interval 30 - 35 ft	MW-24 screened interval 30 - 40 ft	MW-25 screened interval 4 - 14 ft	MW-26 screened interval 50 - 60 ft	MW-27s screened interval 5 - 15 ft
nitrate (NO_3-N)	10	U	0.025 B	0.028 B	0.053 B	0.74	0.63	0.23	0.45	1.2	2.9	2.2
sulfate	250	9.7	0.52 B	19	8.5	27	40	42	25	28	23	6.5
cyanide (total)	0.2	0.109	0.024	U	U	U	U	U	U	U	U	U
BOD5	NA	U	7.1	U	2.3	U	U	U	9.8	U	U	3.2
alkalinity ($CaCO_3$)	NA	304	336	286	226	264	532	390	282	336	242	566
sulfide	.05(G)	U	U	U	U	U	U	U	U	U	U	U
ammonia (NH_3)	2	0.7	0.35	0.14	0.71	0.085	U	U	U	0.13	0.11	0.15
nitrogen (TKN)	NA	0.986	0.608	0.158	1.33	U	1.18	0.378	0.256	0.802	0.114	4.88
COD	NA	19.1	15.9	U	10.1	U	7.24 B	9.75 B	9.39 B	6.16 B	U	10.5
Iron	300	1,640 *	2,150	246	9,520 *	343 *	31,700 *	15,100 *	1,030 *	2,060 *	U	48,900 *
Manganese	300	563 *	666	540 *	387 *	9 B	1,280 *	620 *	328 *	94	16	1,990 *

Analyte (mg/L)	Class GA STANDARD*	MW-27d screened interval 24 - 34 ft	MW-28s screened interval 4 - 14 ft	DUP-1 (from MW-28S)	MW-28d screened interval 18 - 28 ft	MW-29s screened interval 5 - 15 ft	MW-29d screened interval 35 - 45 ft	MW-30s screened interval 5 - 15 ft	MW-30d screened interval 24 - 34 ft	MW-31 screened interval 5 - 15 ft	DUP-2 (from MW-31)	MW-32 screened interval 24 - 34 ft
nitrate (NO_3-N)	10	1.8	U	U	U	1.8	2.6	U	0.053 B	1.2	1.2	2.9
sulfate	250	25	120	130	33	44	24	41	33	86	86	31
cyanide (total)	0.2	U	0.199	0.191	0.037	0.194	U	0.016	U	U	U	U
BOD5	NA	U	5.6	5.9	U	U	U	U	U	6.2	2.6	U
alkalinity ($CaCO_3$)	NA	268	460	448	274	520	250	534	258	1890	1960	312
sulfide	.05(G)	U	2 *	1.2 *	U	U	U	U	U	U	U	U
ammonia (NH_3)	2	0.088	0.64	0.72	0.11	0.15	0.12	0.38	0.12	1.9	0.25	U
nitrogen (TKN)	NA	0.173	2.58	2.9	0.234	3.96	0.121	1.86	0.163	10.5	1.17	0.201
COD	NA	4.01	39.5	32	5.44 B	21.2	U	41.3	U	23.4	11.9	U
Iron	300	4,120 *	12,600 *	11,900 *	2,870 *	16,000 *	372 *	20,500 *	4,550 *	190,000 *	138,000 *	7,310 *
Manganese	300	344 *	549 *	569 *	483 *	521 *	55	1,250 *	154	18,200 *	15,600 *	231

* From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998
* indicates parameter exceeds NYS water quality standard.
(G) indicates parameters subject to guidance value, as opposed to water quality standard.

U - indicates that the compound was analyzed for but not detected.
B - Indicates the analyte is found in QC blanks.
NA indicates parameter not subject to a standard.

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Table 5-19
River Boring Summary
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

BORING I.D.	LOCATION*	OBSERVATION
RB-1	center of stream. 30 feet away from transect 5A	
0'-2'		top 4" black granular tar with some odor. Grade to gravel.
2'-4'		wet brown sand and gravel
RB-2	near west bank. Approximately 20' from transect 7A	
0'-2'		top 3" black solid coal tar. Grade to gravel and sand.
2'-4'		wet brown sand and gravel
RB-3	downstream. Approximatel 18' from transect 8A	
0'-2'		top 3" black solid coal tar. Grade to gravel and sand.
2'-4'		NA
RB-4	60' downstream of RB-3, 10 feet from west bank.	
0'-2'		wet brown sand and gravel
2'-4'		wet brown sand and gravel
RB-5	20 feet from west bank. Behind MW-18	
0'-2'		wet brown sand and gravel
2'-4'		NA
RB-6	30 feet from west bank. Near transect 16 A	
0'-2'		wet brown sand and gravel
2'-4'		NA
RB-7	near east bank. 15 feet downstream of transect 16C	
0'-2'		wet brown sand and gravel
2'-4'		NA

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Table 5-19 continued
River Boring Summary
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

PHASE 2 SEDIMENT BORINGS BORING ID DEPTH	BLOW COUNT	RECOV	PID	LOCATION/LABORATORY SAMPLES	OBSERVATIONS
SED-10				14' from east bank, 300 ' north of bridge	wet fine to coarse SAND & GRAVEL, trace silt/clay & cobbles
0 - 2'	35,28,25,48	8"	48	sample # 10A	
2 - 4'	99,41,34,37	8"			
4 - 6'	52,54,50,71	16"	33	sample # 10B	
6 - 8'	24,34,57,54	12"	36	sample # 10C	
SED-11				center stream, 100' north of bridge	wet brown fine to coarse SAND & GRAVEL, trace silt/clay
0 - 2'		12"		sample # 11A	
2 - 4'	49,56,58,46	14"			
4 - 6'	63,81,93	14"		sample # 11B	
6 - 8'		10"		sample # 11C	
SED-12				mid stream behind Rick & Rich Towing	wet fine to coarse SAND & GRAVEL, trace silt/clay & cobbles
0 - 2'	35,30,47,133	12"	8	sample # 12A	
2 - 4'	65,96,47,58	10"	43.3		
4 - 6'	54,63,47,53	8"	18	sample # 12B	
6 - 8'	20,30,37,50	4"	4.2	sample # 12C	
ED-13				mid stream south edge of storm drain	wet fine to coarse SAND & GRAVEL, trace silt/clay & cobbles
0 - 2'	23,49,73,70	2"	54.8	sample # 13A	
2 - 4'	,133,175,202	4"	16		
4 - 6'	100,53,42,44	12"		sample # 13B	
6 - 8'	17,36,23,35	6"	8	sample # 13C	
ED-14				mid stream, north end of Transmission shop	sheen noticed from up stream of platform wet brown fine to coarse SAND & GRAVEL, trace silt/clay & cobbles
0 - 2'	18,30,36,42	8"	0	sample # 14A	
2 - 4'	53,42,40,42	16"	24		
4 - 6'	57,42,51,80	12"		sample # 14B	
6 - 8'	36,35,40,40	2"		sample # 14C	
ED-15				12' from west bank, middle of tranny shop	wet brown fine to coarse SAND & GRAVEL, trace silt/clay & cobbles
0 - 2'	23,11,12,19	6"	41	sample # 15A	
2 - 4'	51,78,140,68	12"	52		
4 - 6'	49,52,36,150	12"		sample # 15B	
6 - 8'		4"		sample # 15C	
SED-16				10' from east bank,south end tranny shop	wet brown fine to coarse SAND & GRAVEL, trace silt/clay & cobbles
0 - 2'	20,25,30,31	8"	0	sample # 16A	
2 - 4'	39,46,50,65	12"	38		
4 - 6'	91,79,90,89	14"	54	sample # 16B	
6 - 8'	10,41,43,49	6"		sample # 16C	
D-17				20' from west bank, north end Verizon bldg.	wet brown fine to coarse SAND & GRAVEL, trace silt/clay & cobbles Faint tar like odor & some tar like substance in shallow sample
0 - 2'	26,49,44,56	3"		sample # 17A	
2 - 4'	66,53,43,46	16"			
4 - 6'	93,107,501,150	10"		sample # 17B	
6 - 8'	120,35,25,30			sample # 17C	
D-18				12' from east bank, north end Verizon garage door	wet brown fine to coarse SAND & GRAVEL, trace silt/clay & cobbles, more silt/clay toward bottom of hole
0 - 2'	18,11,26,27	6"		sample # 18A	
2 - 4'	29,44,54,33	12"			
4 - 6'	196,86,55,55	14"		sample # 18B	
6 - 8'	39,31,30,42	18"		sample # 18C	
SED-19				14' from west bank, south edge Verizon garage do	wet brown fine-coarse SAND & GRAVEL, trace-some cobbles slight tar like odor @ 2 - 4'
0 - 2'	20,7,37,46			sample # 19A	
2 - 4'	106,89,42,49				
4 - 6'	68,130,324,265			sample #19B	
6 - 8'				sample #19C	

Table 5-19 continued
River Boring Summary
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

PHASE 2 SEDIMENT BORINGS BORING I.D. DEPTH	BLOW COUNT	RECOV.	PID	LOCATION/LABORATORY SAMLPES	OBSERVATIONS
SED-20				16' from east bank, across from big cotton wood	wet brown fine-coarse SAND & GRAVEL, trace-some silt/clay & cobbles
0 - 2'	10,38,35,47	4"	20	sample # 20A	
2 - 4'	176,87,96,76	18"	13.8		
4 - 6'	175,97,39,68	12"		sample # 20B	
6 - 8'	33,35,45,44	8"		sample #20C	
SED-21				14' form west bank, near MW-18	wet brown fine-coarse SAND & GRAVEL, trace silt/clay & cobbles soils dark and oil stained, but no sheen, faint tar like odor
0 - 2'	23,43,42,37	5"	5.2	sample # 21A	
2 - 4'	37,52,66,101	16"	4.1		
4 - 6'	35,40,39,50	8"	0	sample # 21B	
6 - 8'	48,44,56,48	1"	27	sample #21C	
SED-22				16' from east bank, south end Booth bldg.	wet brown fine-coarse SAND & GRAVEL, trace silt/clay & cobbles soils dark and oil stained, but no sheen, faint tar like odor, slight odor @ 2' - 4'
0 - 2'	240,207,148	6"	0	sample # 22A	
2 - 4'	240,207,148,134	4"	62		
4 - 6'	172,152,91,64	12"	5.1	sample # 22B	
6 - 8'	20,30,23,20	2"	0	sample #22C	
SED-23				30' from west bank, north end motel	wet brown fine-coarse SAND & GRAVEL, trace silt/clay & cobbles
0 - 2'	18,23,26,28	6"	0	sample # 23A	
2 - 4'	183,100,106,147	7"	0	sample # 23B	
4 - 6'	115,132, ,55	12"	0	sample # 23B	
6 - 8'	58,60,42,42	12"	0	sample #23C	
SED-24				20' from west bank, behind motel	wet brown fine-coarse SAND & GRAVEL, trace silt/clay & cobbles
0 - 2'	15,46,47,41	8"	0	sample # 24A	
2 - 4'	70,60,62,35	10"	0		
4 - 6'	98,58,40,38	16"	0	sample # 24B	
6 - 8'	56,62,144,180	8"	0	sample #24C	
SED-25				15' from west bank, near motel dock	wet brown fine-coarse SAND & GRAVEL, some cobbles, trace silt/clay
0 - 2'	24,35,50,32	4"	0		
2 - 4'	31,38,48,35	14"	0	sample # 25A	
4 - 6'	50,54,86,70	8"	0	sample # 25B	
6 - 8'	50,45,39,41	12"	0	sample #25C	
SED-26				mid stream, north end of office products bldg.	wet brown fine-coarse SAND & GRAVEL, trace silt/clay & cobbles, more silt/clay with depth
0 - 2'	17,29,31,31	8"	0	sample # 26A	
2 - 4'	36,26,41,35	6"	0	sample # 26B	
4 - 6'	65,41,23,21	6"	0		
6 - 8'	46,23,21,20	0	0		
SED-27				mid stream, 110' north of bridge	wet brown fine-coarse SAND & GRAVEL, trace-some silt/clay & cobbles
0 - 2'	34,30,36,56	16"	0	sample # 27A	
2 - 4'	38,67,62,63	10"	0	sample # 27B	
4 - 6'	133,57,66,109	12"	0	sample # 27C	
6 - 8'	121,88,67,56	5"	0	sample #27D	
SED-28				7' from west bank, 90' north of bridge	wet brown fine-coarse SAND & GRAVEL, trace-some silt/clay & cobbles
0 - 2'	13,23,62,50	5"	0	sample # 28A	
2 - 4'	75,25,53,41	6"	0		
4 - 6'	91,43,26,28			sample # 28B	
6 - 8'	28,53,52,70	5"	0	sample #28C	
SED-29				5' from west bank, south end of office products bld	0 - 4' wet firm SILT/CLAY & fine-coarse sand + gravel, trace cobbles 4' - 8' wet brown fine-coarse SAND & GRAVEL, trace-some silt/clay & cobbles
0 - 2'	9,12,28,30	8"	0	sample # 29A	
2 - 4'	53,66,55,30	6"	0		
4 - 6'	57,44,42,37	10"	0	sample # 29B	
6 - 8'	35,74,41,50	10"	0	sample #29C	

Table 5-19 continued
River Boring Summary
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

PHASE 2 SEDIMENT BORINGS					
BORING ID / DEPTH	BLOW COUNT	RECOV.	PID	LOCATION/LABORATORY SAMLPES	OBSERVATIONS
SED-30				6' from west bank, 18' south of bridge	
0 - 2'	13,17,27,44	4"	24	sample # 30A	wet brown fine - coarse SAND & GRAVEL, trace cobbles silt/clay
2 - 3'	30,189	6"	11	sample # 30B	
SED-31				mid stream	
0 - 2'	30,45,44,74	NR			wet brown fine - coarse SAND & GRAVEL, trace cobbles silt/clay
1.5 - 3'	70,50,75	10"	35	sample # 31B	
SED-32				mid stream, south of island	wet brown fine - coarse SAND & GRAVEL, some silt/clay, trace cobbles
0 - 2'	30,79,63,81	14"	19	sample # 32A	2-3.5' wet brown fine - coarse SAND & GRAVEL, some silt/clay
2 - 3.5'	117,58,55	6"	62	sample # 32B	
SED-33				mid stream	
0 - 2'	27,57,51,63	14"	37	sample # 33A	wet brown fine - coarse SAND & GRAVEL, trace silt/clay
2 - 3'	15,28	7"	48	sample # 33B	2-3" wet brown fine - coarse SAND, some silt/clay, trace gravel
SED-34				mid stream	
0 - 2'	25,36,26,31	14"	39	sample # 34A	wet fine-coarse SAND, some gravel & silt/clay
2 - 3'	16,30	6"	61	sample # 34B	
SED-35				mid stream, 200' north of rapid behind Cort. Co. DO	
0 - 2'	6,6,19,22	6"	56	sample # 35A	wet fine-coarse GRAVEL, some sand, trace silt/clay, yellow rust staining
2 - 3'	30,43	4"	44	sample # 35B	
SED-36				mid stream 80' north of R.R. bridge	
0 - 2'	37,45,50,55	12"	64	sample # 36A	wet fine-coarse SAND & GRAVEL, trace silt/clay
2 - 3'	80,105	10"	27	sample # 36B	
SED-37				70' south of R.R. bridge, @ foot of west bank	
0 - 2'	12,38,138,22	10"	16	sample # 37A	wet fine-coarse GRAVEL, some fine-coarse sand, trace-some silt/clay
2 - 3'	141,209	6"	20	sample # 37B	
SED-38				8' from west bank just south of sheen spotted during probing	
0 - 2'	5,9,8,6	8"	47	sample # 38A	wet fine-coarse GRAVEL, some fine-coarse sand, trace-some silt/clay,
2 - 3'	20,17	8"	14	sample # 38B	sheen a & tar odor @2-3', wood with creosote @4-5'
3 - 5'	88,80,10,28	8"	44	sample # 38C	
SED-39				mid stream, 40' south of SED-38	
0 - 2'	9,18,19,13	NR			wet fine-coarse GRAVEL, trace fine-coarse sand & silt/clay
2 - 3'	37,67	6"		sample # 39B	
SED-40				20' from west bank, south end deposit bank	
0 - 2'	3,20,39,37	12"	27	sample # 40A	wet fine-coarse GRAVEL, some fine-coarse sand, trace silt/clay
2 - 3'	70,87	12"		sample #40B	
SED-41				14' from east bank 1/2 way along deposit bank	
0 - 2'	3,5,8,9	7"		sample # 41A	wet fine-coarse SAND & GRAVEL, trace silt/clay & organic matter
2 - 3'	54,114	11"		sample #41B	
SED-42				south of deposit bank	wet fine-coarse SANDL, trace gravel silt/clay & organic matter
0 - 2'	2,4,1,4	4"		sample # 42A	fine-coarse SAND & GRAVEL, some silt/clay & organic matter
2 - 3'	20,40	12"		sample #42B	
SED-43				mid stream, 100' north of sed trap	
0 - 2'	1,23,40,40	12"		sample # 43A	fine-coarse GRAVEL, trace-some sand & silt/clay, possible tar @ surface
2 - 3'	55,43	4"		sample # 43B	and @ 2.5' & tar odor
3 - 5'	58,50,41,39	9"		sample # 43C	
SED-44				20' north of sed trap, mid stream	
0 - 2'	5,16,126,60	8"		sample # 44A	fine-coarse GRAVEL, trace sand & silt/clay
2 - 3'	191,90	6"		sample #44B	

TABLE 5-20 (Page 1 of 5)
VOLATILE ORGANIC COMPOUNDS (VOCs)
Tioughnioga River Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	SED - 1 Downstream	SED - 2 Downstream	SED - 3 Downstream	SED - 4 Site	SED - 5 Site	SED - 7 Upstream	SED - 8 Upstream	SED - 9 Site (E Bank)
bromomethane	U	U	U	U	U	U	U	U
methylene chloride	3 J	4 J	2 J	3 J	20 J	1 J	0.9 J	1 J
acetone	68 B	77 B	28 JB	45 B	360 B	26 B	9 JB	82 JB
carbon disulfide	U	U	U	2 J	U	6 J	0.4 J	0.7 J
2 butanone	20 JB	16 JB	8 JB	15 JB	64 J	U	15 U	18 J
1,2- dichloroethene (tot)	U	U	U	U	U	U	U	U
trichloroethene	U	U	U	U	7 J	1 J	U	U
tetrachloroethene	U	U	U	1 J	U	8	2 J	2 J
benzene	U	U	U	9 J	170	U	U	U
toluene	U	3 J	U	1 J	17 J	U	U	U
ethylbenzene	U	2 J	U	4 J	780	U	U	U
styrene	U	U	U		U	U	U	U
xylenes (tot)	U	U	U	4 J	0	U	U	U
TOTAL VOC's	91	102	38	84	1418	42	27.3	103.7
TOTAL BTEX	0	5	0	18	967	0	0	0
VOC AVERAGE	30	20	13	9	177	8	5	21

U - Indicates that the compound was analyzed for but not detcted.
J -The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.
B - Indicates the analyte is found in QC blanks.

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TABLE 5-20 (Page 2 of 5)
VOLATILE ORGANIC COMPOUNDS (VOCs)
Tioghnioga River Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
May, 2001

Analyte (ppb)	SED-10A 0-2 FT	SED-10B 2-4 FT	SED-10C 4-6 FT	SED-11A 0-2 FT	SED-11B 2-4 FT	SED-12A 0-2 FT	SED-12B 2-4 FT	SED-13B RE 2-4 FT	SED-13C 4-6 FT	SED-14A 0-2 FT	SED-14B RE 2-4 FT	SED-14C 4-6 FT	SED-15B 2-4 FT	SED-16A 0-2 FT	SED-16B 2-4 FT	SED-17B 2-4 FT	SED-18B 2-4 FT	SED-18C 4-6 FT
Cloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	16	17	47	7 B	8 B	7 B	10 B	8 B	6 B	5 JB	8 B	9 B	6 B	9 B	7 B	17	12	12
Acetone	34 B	26 B	34 B	12 B	16 B	12 B	16 B	10 JB	21 B	4 JB	7 JB	14 B	5 JB	6 JB	10 JB	22 B	7 JB	13 B
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1, 2-Dichloroethene	U	U	1 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1, 2 -Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2- Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2- Butanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1 Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromidichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1, 3- Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	8	0.7 J	0.8 J	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	0.7 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4- Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	4 J	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Xylene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL VOCs	50.00	43.00	94.70	19.70	24.80	19.00	26.00	18.00	27.00	9.00	15.00	23.00	11.00	15.00	17.00	39.00	19.00	25.00
AVERAGE VOCs	25.00	21.5	15.78	6.57	8.27	9.50	13.00	9.00	13.50	4.50	7.50	11.50	5.50	7.50	8.50	19.5	9.5	12.5

Notes:
U = Indicates that the compound was analyzed for but not detected.

J - The concentration listed is an estimated value, which is less than the specified detection limit but is greater than zero.

B = Indicates that the analyte is found in QC blanks.

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TABLE 5-20 (Page 3 of 5)
VOLATILE ORGANIC COMPOUNDS (VOCs)
Tioghnioga River Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
May,2001

Analyte (ppb)	SED-19A 0-2 FT	SED-19B 2-4 FT	SED-20B 2-4 FT	SED-20C 4-6 FT	SED-21B 2-4 FT	SED-21C 4-6 FT	SED-22A 0-2 FT	SED-22B 2-4 FT	SED-22C 4-6 FT	SED-23A 0-2 FT	SED-23B 2-4 FT	SED-23C 4-6 FT	SED-24A 0-2 FT	SED-24B 2-4 FT	SED-24C 4-6 FT	SED-25A 0-2 FT	SED-25B 2-4 FT	SED-25C 4-6 FT
Cloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	20 B	10	6	8	10	8	5 J	11	6	7	7	10	12	12	8	9 B	12	15
Acetone	72 B	17 B	5 JB	190 B	12 B	4 JB	3 JB	6 JB	7 JB	4 JB	6 JB	10 JB	6 JB	11 B	8 JB	39 B	15 B	4 JB
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1, 2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1, 2 -Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2- Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2- Butanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1 Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromidichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1, 3- Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	10 J	1 J	U	U	3 J	3 J	U	0.6 J	U	U	2 J	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4- Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	3 J	1 J	U	U	1 J	1 J	U	0.6 J	U	0.6 J	0.7 J	0.9 J	U	0.6 J	U	4 J	4 J	0.7 J
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	10 J	1 J	U	U	4 J	5	U	U	U	2 J	5 J	0.6 J	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Xylene	8 J	1 J	U	U	4 J	7	U	U	U	3 J	4 J	U	U	U	U	U	U	U
TOTAL VOCs	123.00	31.00	11.00	198.00	34.00	28.00	8.00	18.40	13.00	16.60	24.70	21.50	18.00	23.60	16.00	52.00	31.00	19.70
AVERAGE VOCs	20.5	5.17	5.5	99.00	5.67	4.67	4.00	4.60	6.50	3.32	4.12	5.38	9.00	7.87	8.00	17.33	10.33	6.57

Notes:
U = Indicates that the compound was analyzed for but not detected.

J - The concentration listed is an estimated value, which is less than the specified detection limit but is greater than zero.

B = Indicates that the analyte is found in QC blanks.

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TABLE 5-20 (Page 4 of 5)
VOLATILE ORGANIC COMPOUNDS (VOCs)
Tioghnioga River Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
May, 2001

Analyte (ppb)	SED-26A 0-2 FT		SED-26B 2-4 FT		SED-27A 0-2 FT		SED-27B 2-4 FT		SED-27C 4-6 FT		SED-28B 2-4 FT		SED-28C 4-6 FT		SED-29A 0-2 FT		SED-29B 2-4 FT		SED-29C 4-6 FT		SED-30B 2-4 FT		SED-32A 0-2 FT		SED-32B 2-3.5 FT		SED-33A 0-2 FT		SED-33B 2-3 FT	
Cloromethane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Bromethane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Vinyl Chloride		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Chloroethane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Methylene Chloride	6	B	14	B	13		5		5		6		10	B	5	B	7	B	9	B	38		11		15		13		14		
Acetone	5	JB	36	B	5	JB	7	JB	7	JB	15	B	16	B	8	JB	8	JB	30	B	31	B	19	B	4	JB	7	JB	14	B	
Carbon Disulfide		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Vinyl Acetate		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
1,1-Dichloroethene		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
1,1-Dichloroethane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
cis-1, 2-Dichloroethene		U		U		U		U		U		U		U		U		U		U	0.9	J		U		U	0.3	J		U
trans-1, 2 -Dichloroethene		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Chloroform		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
1, 2- Dichloroethane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
2- Butanone		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
1,1,1 Trichloroethane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Carbon Tetrachloride		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Bromidichloroethane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
1, 2-Dichloropropane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
cis-1, 3- Dichloropropene		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Trichloroethene		U		U		U		U		U		U		U		U		U		U	6		1	J	4	J	3	J	2	J
Dibromochloromethane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
1,1,2-Trichloroethane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Benzene		U		U		U		U		U		U		U		U		U		U	0.4	J		U		U		U		U
trans-1,3-Dichloropropene		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Bromoform		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
4- Methyl-2-Pentanone		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
2-Hexanone		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Tetrachloroethene		U		U		U		U		U		U		U		U		U		U	0.3	J		U		U		U		U
Toluene	0.6	J	6			U		U		U		U	1	J	0.6	J	0.9	J	2	J	2	J		U		U	2	J	0.8	J
1,1,2,2-Tetrachloroethane		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Chlorobenzene		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Ethylbenzene		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Styrene		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
Xylene		U		U		U		U		U		U		U		U		U		U		U		U		U		U		U
TOTAL VOCs	11.60		56.00		18.00		12.00		12.00		21.00		27.00		13.60		15.90		41.00		78.60		31.00		23.00		25.30		30.80	
AVERAGE VOCs	3.87		18.67		9.00		6.00		6.00		10.50		9.00		4.53		5.30		13.67		11.23		10.33		7.67		5.06		7.70	

Notes:
U = Indicates that the compound was analyzed for but not detected.

J = The concentration listed is an estimated value, which is less than the specified detection limit but is greater than zero.

= Indicates that the analyte is found in QC blanks.

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TABLE 5-20 (Page 5 of 5)
VOLATILE ORGANIC COMPOUNDS (VOCs)
Tioghnioga River Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
May, 2001

Analyte (ppb)	SED-34B 2-3 FT	SED-36A 0-2 FT	SED-36B 2-3 FT	SED-37A 0-2 FT	SED-37B 2-3 FT	SED-38B 2-3 FT	SED-39B 2-3 FT	SED-40A 0-2 FT	SED-40B 2-3 FT	SED-41A 0-2 FT	SED-41B 2-3 FT	SED-42B 2-3 FT	SED-43A 0-2 FT	SED-43C 3-5 FT
Cloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	19	12	9	12	10	19	15	4 JB	4 JB	4 JB	2 JB	3 JB	4 JB	4 JB
Acetone	18 B	22 B	5 JB	12 B	3 JB	24 B	32 B	51 B	39 B	14 B	24 B	U	120 B	20 B
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U	0.4 J	0.5 J
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1, 2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1, 2 -Dichloroethene	U	U	U	U	U	U	U	U	0.6 J	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2- Dichloroethane	U	U	U	U	U	U	U	4 J	3 J	4 J	6	8	2 J	8
2- Butanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1 Trichloroethane	U	U	U	U	U	3 J	U	U	U	U	U	U	7 J	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromidichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1, 2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1, 3- Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	7	U	U	1 J	U	2 J	2 J	0.7 J	5 J	3 J	0.3 J	4 J	U	0.8 J
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	0.6 J	U	U	U	U	14	U	U	0.2 J	U	U	U	0.4 J	0.3 J
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4- Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	0.3 J	U	0.3 J	0.6 J	0.6 J
Toluene	4 J	U	U	0.5 J	U	24	0.9 J	0.8 J	1 J	5 J	7	U	1 J	0.9 J
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	U	U	U	U	U	170	U	U	U	U	U	U	6	2 J
Styrene	U	U	U	U	U	U	U	U	U	U	U	U	0.9 J	U
Xylene	U	U	U	U	U	110	U	U	U	U	U	U	2 J	0.6 J
TOTAL VOCs	48.6	34.00	14.00	25.50	13.00	366.00	49.90	60.50	52.80	30.30	39.30	15.30	144.30	37.70
AVERAGE VOCs	9.72	17.00	7.00	6.38	6.50	45.75	12.48	12.10	7.54	5.05	7.86	3.83	13.12	3.77

Notes:
U = Indicates that the compound was analyzed for but not detected.

J - The concentration listed is an estimated value, which is less than the specified detection limit but is greater than zero.

B = Indicates that the analyte is found in QC blanks.

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TABLE 5-21 (1 of 5)
SEMI-VOLATILE/POLYCYCLIC AROMATIC HYDROCARBONS
Tioughnioga River Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	SED - 1 Downstream		SED - 2 Downstream		SED - 3 Downstream		SED - 4 Site		SED - 5 Site		SED - 6 Upstream		SED - 7 Upstream		SED - 8 Upstream		SED - 9 Site (E Bank)	
phenol	13	J	29	J		U	22	J		U		U	150	J	360	J	380	J
4 - methylphenol		U		U		U	39	J		U		U		U		U		U
benzoic acid	58	J		U		U		U		U		U		U		U		U
naphthalene ++	32	J	87	J	47	J	530	J	110000			U		U		U		U
2,6 dinitrotoluene		U		U		U		U		U		U		U		U		U
2-methylnaphthalene	18	J	30	J	44	J	55	J	2400	J		U		U		U		U
acenaphthalene	90	J	340	J	280	J	830	J	390	J	110	J	80	J	65	J	76	J
acenaphthene	45	J	420	J	380	J	2200		24000		240	J		U		U		U
dibenzofuran	18	J	28	J	150	J	370	J	7500	J		U		U		U		U
2,4 dinitrotoluene		U		U		U		U		U		U		U		U		U
diethylphthalate	14	J	24	J		U	17	J		U		U		U		U		U
fluorene	48	J	62	J	420	J	1100		11000	J		U		U		U		U
n- nitrosodiphenylamine		U		U		U		U		U		U		U		U		U
phenanthrene	500	J	350	J	2500		3300		20000	J	390	J	460	J	570	J	470	J
anthracene	190	J	220	J	980	J	1900		2200	J	190	J	150	J	170	J	180	J
carbazole	62	J	41	J	110	J	1000		11000	J		U		U		U		U
di-n-butylphthalate	62	JB	70	JB	55	JB	50	JB		U		U		U		UB		U
fluoranthene	910	J	640	J	2500		3700		2000	J	780	J	670	J	900	J	840	
pyrene	990		820	J	3100		4700		3500	J	850	J	840	J	1000		960	
butylbnzylphalate	64	J		U	290	J		U		U		U		U		U		U
benzo(a)anthracene ++	570	J	490	J	1800		3400		1100	J	400	J	410	J	490	J	480	J
chrysene ++	700	J	520	J	1600		3300		1400	J	580	J	550	J	620	J	610	J
bis(2-ethyhexyl) phthalate	310	JB	230	JB	280	JB	720	JB	690	JB		U	470	JB	370	JB	660	JB
di-n-octylphthalate	23	JB	34	JB		U	30	JB		U		U		U		U		U
benzo(b) fluoranthene ++	480	J	340	J	1000		1900		1100	J	370	J	380	J	500	J	380	J
benzo(k) fluoranthene ++	540	J	450	J	1200		2200		1300	J	370	J	410	J	440	J	520	J
benzo (a) pyrene ++	580	J	490	J	1500		2900		1400	J	480	J	480	J	580	J	530	J
indeno (1,2,3 - cd) pyrene ++	360	J	290	J	870	J	1400			U	380	J	400	J	400	J	330	J
dibenzo (a,h) anthracene ++	130	J	100	J	320	J	530	J		U		U		U		U		U
benzo (g,h,i) perylene	360	J	290	J	800	J	1200			U	480	J	540	J	480	J	380	J
TOTAL SVOC's	7167		6395		20226		37393		200980		5620		5990		6945		6796	
SVOC AVERAGE	276		266		919		1496		11822		432		428		496		485	
TOTAL CARCINOGENIC PAH	3392		2767		8337		16160		116300		2580		2630		3030		2850	
TOTAL PAH's	6525		5909		19297		35090		179390		5620		5370		6215		5756	

U - Indicates that the compound was analyzed for but not detected.
J - The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.
B - Indicates the analyte is found in QC blanks.
BOLD ITALICS are Polycyclic Aromatic Hydrocarbons (PAH's).

++ indicates possible or suspected carcinogen

DEC-02577

TABLE 5-21 (Page 2 of 5)
SEMI-VOLATILES/POLYCYCLIC AROMATIC HYDROCARGONS (PAHs)
Tioghnioga River Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
May, 2001

Analyte (ppb)	SED-10A 0-2 FT		SED-10B 2-4 FT		SED-10C 4-6 FT		SED-11A 0-2 FT		SED-11B 2-4 FT		SED-11C 4-6 FT		SED-12A 0-2 FT		SED-12B 2-4 FT		SED-12C 4-6 FT		SED-13A 0-2 FT		SED-13B 2-4 FT		SED-13C 4-6 FT	
naphthalene ++		U		U		U		U		U		U		U		U		U	64	J		U		U
2-methylnaphthalene		U		U		U		U		U		U		U		U		U	150	J		U		U
acenaphthylene	32	J		U		U	17	J		U		U	11	J		U		U	180	J		U		U
acenaphthene		U		U		U	14	J		U		U		U		U		U	600	J		U		U
fluorene	20	J		U		U	30	J		U		U	21	J		U		U	1400	J		U		U
phenanthrene	330	J		U		U	250	JB		U		U	120	JB	14	JB	19	JB	9300	B		U		U
anthracene	130	J		U		U	88	J		U		U	48	J		U		U	3700			U		U
fluoranthene	760			U		U	450			U		U	220	J	12	J	24	J	12000			U		U
pyrene	620			U		U	310	J		U		U	150	J	10	J	18	J	7000			U		U
benzo(a)anthracene ++	340	J		U		U	220	J		U		U	110	J		U		U	5200			U		U
chrysene ++	330	J		U		U	210	J		U		U	110	J		U		U	4300			U		U
benzo(b) fluoranthene ++	300	J		U		U	160	J		U		U	88	J		U		U	3600			U		U
benzo(k) fluoranthene ++	290	J		U		U	220	J		U		U	98	J		U		U	3000			U		U
benzo (a) pyrene ++	360	J		U		U	210	J		U		U	100	J		U		U	3900			U		U
indeno (1,2,3 - cd) pyrene ++	250	J		U		U	110	J		U		U	45	J		U		U	2400			U		U
dibenzo (a,h) anthracene ++	78	J		U		U	45	J		U		U	22	J		U		U	1100	J		U		U
benzo (g,h,i) perylene	280	J		U		U	110	J		U		U	43	J		U		U	2000			U		U
TOTAL PAHs	4120		0		0		2444		0		0		1186		36		61		59894		0		0	

Analyte (ppb)	SED-14A 0-2 FT		SED-14B 2-4 FT		SED-15A 0-2 FT		SED-15B 2-4 FT		SED-15C 4-6 FT		SED-16A 0-2 FT		SED-16B 2-4 FT		SED-16C 4-6 FT		SED-17A 0-2 FT		SED-17B 2-4 FT		SED-17C 4-6 FT	
naphthalene ++		U		U		U		U		U		U		U		U	8500	J	150	J	27	J
2-methylnaphthalene		U		U		U		U		U		U		U		U	3400	J	55	J	U	
acenaphthylene		U		U	15	J		U		U	14	J		U		U	59000	J	490	J	28	J
acenaphthene		U		U		U		U		U	12	J		U		U	70000	J	760	J	43	J
fluorene		U		U		U		U		U	25	J		U		U	150000		1300		40	J
phenanthrene	51	JB		U	110	JB		U		U	200	JB		U	19	JB	640000		5800		220	J
anthracene	18	J		U	35	J		U		U	66	J		U		U	320000		3000		93	J
fluoranthene	110	J		U	140	J		U		U	260	J		U	16	J	570000		4600		180	J
pyrene	86	J	9	J	120	J		U		U	200	J		U	15	J	410000		3800		160	J
benzo(a)anthracene ++	57	J		U	70	J		U		U	140	J		U		U	240000		2100		72	J
chrysene ++	51	J		U	74	J		U		U	130	J		U		U	220000		1700		63	J
benzo(b) fluoranthene ++	50	J		U	62	J		U		U	99	J		U		U	160000		1100		40	J
benzo(k) fluoranthene ++	47	J		U	69	J		U		U	120	J		U		U	140000		1400		48	J
benzo (a) pyrene ++	50	J		U	88	J		U		U	130	J		U		U	220000		1800		53	J
indeno (1,2,3 - cd) pyrene ++	20	J		U	65	J		U		U	70	J		U		U	140000		1100		20	J
dibenzo (a,h) anthracene ++		U		U	29	J		U		U	32	J		U		U	43000	J	340	J	U	
benzo (g,h,i) perylene	17	J		U	69	J		U		U	68	J		U		U	130000		1100		19	J
TOTAL PAHs	557		9		946		0		0		1566		0		50		3523900		30595		1106	

Notes:

U = Indicates that the compound was analyzed for but not detected.

J - The concentration listed is an estimated value, which is less than the specified detection limit but is greater than zero.

B = Indicates that the analyte is found in QC blanks.

++ indicates possible or suspected carcinogen

DEC-02578

TABLE 5-21 (3 of 5)
SEMI-VOLATILES/POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Tioughnioga River Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Foremr MGP
May, 2001

Analyte (ppb)	SED-18A 0-2 FT		SED-18B 2-4 FT		SED-18C 4-6 FT		SED-19A 0-2 FT		SED-19B 2-4 FT		SED-19C 4-6 FT		SED-20A 0-2 FT		SED-20B 2-4 FT		SED-20C 4-6 FT		SED-21A 0-2 FT		SED-21B 2-4 FT		SED-21C 4-6 FT	
naphthalene ++	15	J	12	J	11	J	1400	J	12000	J	780	J	70	J	200	J	350	J	2800		450		600	
2-methylnaphthalene	12	J		U		U	990	J	23000		1600		52	J	100	J	99	J	360	J	82	J	99	J
acenaphthylene	55	J		U	14	J	800	J	5600	J	320	J	140	J	32	J	40	J	230	J	71	J	82	J
acenaphthene	41	J	11	J		U	8500		57000		3200		92	J	33	J	57	J	2000		260	J	290	J
fluorene	71	J		U		U	5800		49000		2900		220	J		U		U	900		140	J	150	J
phenanthrene	590		48	J	8	J	15000		140000		8100		1500		34	J	17	J	2800		530		480	
anthracene	190	J	20	J		U	10000		62000		4100		660		16	J		U	1000		120	J	70	J
fluoranthene	640		36	J		U	100000		80000		4100		1800		32	J		U	1900		150	J	21	J
pyrene	710		39	J	8	J	8900		76000		4400		1600		29	J		U	1500		160	J	16	J
benzo(a)anthracene ++	380	J	18	J		U	4900		36000		1900		1000		14	J		U	1100		59	J		U
chrysene ++	330	J	17	J		U	4500		30000		1600		900		15	J		U	990		48	J		U
benzo(b) fluoranthene ++	190	J		U		U	2500		19000		830	J	550			U		U	590		24	J		U
benzo(k) fluoranthene ++	200	J		U		U	3300		23000		1300	J	720			U		U	710		43	J		U
benzo (a) pyrene ++	280	J		U		U	4200		30000		1500		830			U		U	880		45	J		U
indeno (1,2,3 - cd) pyrene ++	200	J		U		U	2600		15000	J	640	J	530			U		U	450		11	J		U
dibenzo (a,h) anthracene ++	71	J		U		U	850	J	4700	J	210	J	200	J		U		U	160	J		U		U
benzo (g,h,i) perylene	210	J		U		U	2400		15000	J	670	J	520			U		U	360	J		U		U
TOTAL PAHs	4185		201		41		176640		677300		38150		11384		505		563		18730		2193		1808	

Analyte (ppb)	SED-22A 0-2 FT		SED-22B 2-4 FT		SED-22C 4-6 FT		SED-23A 0-2 FT		SED-23B 2-4 FT		SED-23C 4-6 FT		SED-24A 0-2 FT		SED-24B 2-4 FT		SED-24C 4-6 FT		SED-25A 0-2 FT		SED-25B 2-4 FT		SED-25C 4-6 FT	
naphthalene ++	66	J	260	J	300	J	1000	J	440		410		46	J	29	J	23	J	U		U		U	
2-methylnaphthalene	54	J	120	J	90	J	680	J	99	J	62	J	21	J	U			U	U		U		U	
acenaphthylene	100	J	240	J	88	J	2900	J	310	J	81	J	290	J	33	J	22	J	U		U		U	
acenaphthene	100	J	240	J	90	J	2900	J	520		290	J	64	J	12	J	8	J	U		U		U	
fluorene	200	J	450			U	3600	J	550		140	J	140	J	10	J		U	U		U		U	
phenanthrene	1200		2300		78	J	19000		2800		510		990		44	J	7	J	28	J	12	J	U	
anthracene	860		1100		39	J	26000		2500		350	J	790		22	J	7	J	31	J	16	J	U	
fluoranthene	1000		1900		20	J	15000		1900		220	J	1500		49	J	13	J	40	J	15	J	U	
pyrene	1200		1800		23	J	19000		2100		210	J	2100		50	J	17	J	44	J	18	J	U	
benzo(a)anthracene ++	670		950			U	10000		1100		79	J	940		22	J		U	22	J	U		U	
chrysene ++	660		850		12	J	10000		1000		78	J	840		20	J		U	20	J	U		U	
benzo(b) fluoranthene ++	330	J	620			U	4800		590		35	J	400		10	J		U	12	J	U		U	
benzo(k) fluoranthene ++	300	J	660			U	6400		690		60	J	620		13	J		U	13	J	U		U	
benzo (a) pyrene ++	480		830			U	8200		800		61	J	700		14	J		U	14	J	U		U	
indeno (1,2,3 - cd) pyrene ++	300	J	480			U	2200	J	290	J	16	J	330	J	5	J		U	U		U		U	
dibenzo (a,h) anthracene ++	110	J	150	J		U	1100	J	97	J		U	120	J	U			U	U		U		U	
benzo (g,h,i) perylene	300	J	490			U	1800	J	320	J	14	J	410		6	J		U	U		U		U	
TOTAL PAHs	7930		13440		740		134580		16106		2616		10301		339		97		224		61		0	

Notes:

U = Indicates that the compound was analyzed for but not detected.

J - The concentration listed is an estimated value, which is less than the specified detection limit but is greater than zero.

B = Indicates that the analyte is found in QC blanks.

++ indicates possible or suspected carcinogen

DEC-02579

TABLE 5-21 (Page 4 of 5)
SEMI-VOLATILE/POLYCYCLIC AROMATIC HYDROCARGONS (PAHs)
Phase III Tioghnioga River Sediment Analysis Tables
NYSEG Cortland/Homer Former MGP Site
Cortland, New York
May-01

Analyte (ppb)	SED-26A 0-2 FT	SED-26B 2-4 FT	SED-27A 0-2 FT	SED-27B 2-4 FT	SED-27C 4-6 FT	SED-27D 6-8 FT	SED-28A 0-2 FT	SED-28B 2-4 FT	SED-28C 4-6 FT	SED-29A 0-2 FT	SED-29B 2-4 FT	SED-29C 4-6 FT
naphthalene ++	120 J	U	U	U	U	U	52 J	U	U	U	U	U
2-methylnaphthalene	130 J	U	U	U	U	U	79 J	U	U	U	U	U
acenaphthylene	2500 J	23 J	U	U	6 J	U	170 J	U	U	92 J	U	U
acenaphthene	200 J	U	U	U	U	U	400	U	U	97 J	U	U
fluorene	760 J	14 J	U	U	U	U	300 J	U	U	150 J	U	U
phenanthrene	6700	100 J	U	U	55 J	12 J	2500	U	U	1200	30 J	U
anthracene	3200 J	41 J	U	U	38 J	U	780	U	U	330 J	U	U
fluoranthene	12000	160 J	5 J	U	120 J	15 J	1500	U	U	550	22 J	U
pyrene	20000	170 J	U	U	260 J	19 J	1700	U	U	770	31 J	U
benzo(a)anthracene ++	8900	95 J	U	U	94 J	U	990	U	U	280 J	12 J	U
chrysene ++	8100	81 J	U	U	88 J	U	930	U	U	260 J	9 J	U
benzo(b) fluoranthene ++	4000	44 J	U	U	38 J	U	650	U	U	120 J	U	U
benzo(k) fluoranthene ++	5700	58 J	U	U	54 J	U	670	U	U	170 J	U	U
benzo (a) pyrene ++	6600	59 J	U	U	61 J	U	820	U	U	210 J	U	U
indeno (1,2,3 - cd) pyrene ++	3100 J	24 J	U	U	26 J	U	86 J	U	U	66 J	U	U
dibenzo (a,h) anthracene ++	1200 J	U	U	U	10 J	U	34 J	U	U	22 J	U	U
benzo (g,h,i) perylene	3800	24 J	U	U	31 J	U	68 J	U	U	76 J	U	U
TOTAL PAHs	87010	893	5	0	881	46	11729	0	0	4393	104	0

Analyte (ppb)	SED-30A 0-2 FT	SED-30B 2-4 FT	SED-31B 1.5-3 FT	SED-32A 0-2 FT	SED-32B 2-3.5 FT	SED-33A 0-2 FT	SED-33B 2-3 FT	SED-34A 0-2 FT	SED-34B 2-3 FT	SED-35A 0-2 FT	SED-35B 2-3 FT
naphthalene ++	57 J	U	U	U	19 J	U	U	U	U	U	28 J
2-methylnaphthalene	66 J	U	U	U	17 J	U	U	U	U	220 J	14 J
acenaphthylene	430 J	24 J	13 J	U	56 J	U	U	U	U	1600 J	110 J
acenaphthene	310 J	13 J	10 J	U	90 J	U	U	U	U	2400 J	190 J
fluorene	600 J	39 J	21 J	14 J	130 J	U	U	U	U	4800	310 J
phenanthrene	4400	310 J	210 J	110 J	860	21 J	89 J	22 J	15 J	24000	1800
anthracene	2000	120 J	76 J	45 J	360	U	42 J	12 J	U	12000	450
fluoranthene	4500	420	320 J	170 J	970	44 J	140 J	29 J	14 J	19000	1700
pyrene	4300	390	280 J	130 J	930	36 J	130 J	24 J	14 J	19000	1800
benzo(a)anthracene ++	2800	220 J	150 J	69 J	510	20 J	64 J	12 J	U	9800	900
chrysene ++	2600	210 J	150 J	67 J	450	18 J	57 J	13 J	U	8900	760
benzo(b) fluoranthene ++	1500	160 J	100 J	49 J	280 J	16 J	40 J	U	U	4100	510
benzo(k) fluoranthene ++	2000	200 J	140 J	66 J	440	13 J	46 J	U	U	5900	560
benzo (a) pyrene ++	2500	220 J	140 J	64 J	440	18 J	52 J	U	U	8000	750
indeno (1,2,3 - cd) pyrene ++	1100	110 J	63 J	20 J	250 J	U	14 J	U	U	3600 J	380
dibenzo (a,h) anthracene ++	440 J	46 J	26 J	U	94 J	U	U	U	U	1400 J	140 J
benzo (g,h,i) perylene	860	120 J	65 J	19 J	240 J	U	13 J	U	U	3300 J	380
TOTAL PAHs	30463	2602	1764	823	6136	186	687	112	43	128020	10782

Notes:

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B = Indicates that the analyte is found in QC blanks.

++ indicates possible or suspected carcinogen

EC-02580

TABLE 5-21 (5 of 5)
SEMI-VOLATILE/POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Tioughnioga River Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Foremr MGP

Analyte (ppb)	SED-36A 0-2 FT		SED-36B 2-3 FT		SED-37A 0-2 FT		SED-37B 2-3 FT		SED-38A 0-2 FT		SED-38B 2-3 FT		SED-38C 3-5 FT		SED-40A 0-2 FT		SED-40B 2-3 FT		SED-41A 0-2 FT		SED-41B 2-3 FT	
naphthalene ++		U		U	440	J	29	J		U	170	J	900	J		U	46	J	110	J	1100	J
2-methylnaphthalene	41	J		U	340	J	28	J	120	J	280	J	1400	J		U	78	J		U	2600	J
acenaphthylene	340	J	12	J	2600	J	220	J	1600	J	220	J	350	J	440	J	750	J	500	J	3800	J
acenaphthene	61	J		U	5700	J	920		810	J	990		2300		140	J	520	J	300	J	17000	
fluorene	160	J		U	7600		620		690	J	710		1800		130	J	730	J	500	J	15000	J
phenanthrene	1500		90	J	36000		2200		9100		2600		6600		1,600		5,900		4,500		80,000	
anthracene	880		180	J	16000		690		4200		1100		2400		670	J	1600		1800	J	22000	
fluoranthene	4100		200	J	31000		2500		19000		2400		5200		3800		4700		6000		37000	
pyrene	4300		220	J	26000		2200		18000		1700		4400		4600		7000		4600		38000	
benzo(a)anthracene ++	2400		100	J	14000		1200		11000		1200		2500		2600		2900		3500		19000	
chrysene ++	2200		100	J	13000		1000		9700		1200		2400		2400		2800		3200		17000	
benzo(b) fluoranthene ++	1200		53	J	7200		640		4600		890		1200	J	1400	J	1200	J	2500		11000	J
benzo(k) fluoranthene ++	1400		69	J	9800		710		6500		850		1700		2100		1800		3500		13000	J
benzo (a) pyrene ++	2000		84	J	12000		1000		7800		1100		2100		2200		2200		3000		16000	
indeno (1,2,3 - cd) pyrene ++	1000		24	J	6800	J	400		3300		130	J	800	J	310	J	1000	J	330	J	1900	J
dibenzo (a,h) anthracene ++	380	J		U	2400	J	150	J	1400	J	54	J	330	J	130	J	410	J	120	J	650	J
benzo (g,h,i) perylene	930		24	J	6100	J	330	J	2600	J	74	J	590	J	250	J	1000	J	250	J	1400	J
TOTAL PAHs	22892		1156		196980		14837		100420		15668		36970		22770		34634		34710		296450	

Analyte (ppb)	SED-42A 0-2 FT		SED-42B 2-3 FT		SED-43A 0-2 FT		SED-43B 2-3 FT		SED-43C 3-5 FT		SED-44A 0-2 FT		SED-44B 2-3 FT	
naphthalene ++		U		U	89	J	18000	J	280	J		U	14	J
2-methylnaphthalene	52	J	100	J	180	J	25000	J	740	J		U	17	J
acenaphthylene	330	J	860	J	280	J	35000	J	1000	J	68	J	160	J
acenaphthene	410	J	690	J	1300	J	260000		5400		73	J	98	J
fluorene	500	J	1100	J	1300	J	220000		5100		82	J	160	J
phenanthrene	3,500		9,100		6400		1,100,000		26,000		710		1,200	
anthracene	1100		3200		2,200		240000		6500		180	J	440	
fluoranthene	3400		11000		2900		390000		10000		700		1200	
pyrene	2600		8200		2800		420000		10000		680		1800	
benzo(a)anthracene ++	1700		5300		1500		210000		5200		400	J	620	
chrysene ++	1600		4500		1500		180000		4800		380	J	530	
benzo(b) fluoranthene ++	1500		3800		850	J	110000	J	2600	J	390	J	290	J
benzo(k) fluoranthene ++	1800		4600		1100	J	160000		4400		370	J	400	J
benzo (a) pyrene ++	1500		4300		1100	J	170000		4200		370	J	480	
indeno (1,2,3 - cd) pyrene ++	120	J	370	J	92	J	15000	J	340	J	32	J	180	J
dibenzo (a,h) anthracene ++	50	J	140	J		U	5300	J	120	J		U	63	J
benzo (g,h,i) perylene	95	J	260	J	63	J	12000	J	260	J	21	J	210	J
TOTAL PAHs	20257		57520		23654		3570300		86940		4456		7862	

Notes:

U = Indicates that the compound was analyzed for but not detected.

J - The concentration listed is an estimated value, which is less than the specified detection limit but is greater than zero.

B = Indicates that the analyte is found in QC blanks.

++ indicates possible or suspected carcinogen

DEC-02581

TABLE 5-22
INORGANICS
Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppm)	LEL ppm	SEL ppm	SED - 1	SED - 2	SED - 3	SED - 4	SED - 5	SED - 6	SED - 7	SED - 8	SED - 9
Aluminum			14100	17600	8030	10900	13900	13400	8770	13000	12300
Antimony	2	25	3.1 UN	4.9 UN	1.7 UN	3.4 UN	4.2 UN	4.1 UN	1.4 UN	3.5 UN	2.7 * BN
Arsenic	6	33	3.4 B	4.2 B	2.6	2.8 B	3.2 B	2.3 UN	2.4	3.3 B	2.5 B
Barium			162	202	93.1	136	253	234	73.5	144	146
Beryllium			0.55 B	0.7 U	0.38 B	0.49 U	0.59 U	0.58 UN	0.3 B	0.53 B	0.51 B
Cadmium	0.6	9	0.44 U	0.7 U	0.25 U	0.49 U	0.59 U	0.58 UN	0.45 B	0.51 U	0.37 U
Calcium			25800	34200	30000	24100	34900	24900	45900	2180	25700
Chromium	26	110	24	27.4 *	13.2	18.4	22.8	22.3	15.4	22.3	20.4
Cobalt			8.2 B	9.5 B	6.4 B	6 B	8.2 B	7.4 B	5.6 B	7.8 B	7.7 B
Copper	16	110	33.2 *	29.6 *	23.5 *	21.7 *	31.1 *	26.9 *	21.6 *	36.6 *	36.8 *
Iron	20000	40000	20700 *	23100 *	16300	16700	20300 *	20300 *	16300	18600	20300 *
Lead	31	110	59.1 *	53.4 *	47.4 *	44.9 *	57 *	44.5 *	58.9 *	53.9 *	49.5 *
Magnesium			6770	7140	5600	4900	6440	5930	11200	5800	6360
Manganese	460	1100	280	460	204	240	302	283	263	232	249
Mercury	0.15	1.3	0.14	0.25 *	0.17 *	0.23 *	0.37 *	0.14	0.082	0.15	0.12
Nickel	16	50	23.2 *	25.8 * B	18.9 *	17.6 * B	23.4 * B	22 * B	17.2 *	23.7 *	21.8 *
Potassium			1490 B	2020 B	833 B	1100 B	1310 B	1260 B	852 B	1070 B	1220 B
Selenium			2.2 UN	3.5 UN	1.2 N	2.4 UN	3 UN	2.9 UN	1 UN	2.6 N	1.8 UN
Silver	1	2.2	0.44 U	0.7 U	0.25 U	0.49 U	0.59 U	0.58 U	0.2 U	0.51 U	0.37 U
Sodium			175 B	347 B	153 B	322 B	529 B	1140 B	160 B	293 B	316 B
Thallium			4.4 U	7 U	2.5 U	4.9 U	5.9 U	5.8 U	2 U	5.1 U	3.7 U
Vanadium			22 B	26.6 B	13	16.6 B	21.4 B	20.4 B	12.6	19.2 B	18.2 B
Zinc	120	270	190 * E	192 * E	138 * E	146 * E	182 * E	163 * E	168 * E	171 * E	136 * E
R Cyanide			U	U	U	U	U	U	U	U	U
T Cyanide			U	U	U	U	2.11	U	U	U	U
R Sulfide			34.7	62.9	U	126	284	39.3	20.3	U	34.5
TOC			6800	75700	17900	50800	70900	64900	30400	56000	46600

U - Indicates analyte was not detected at method reporting limit.
B - Indicates analyte result between IDL and contract required detection limit (CRDL).
E - Reported value is estimated because of the presence of interface.
N - Spiked sample recovery not within control limits.
LEL - Lowest Effect Level for metals contamination in sediment. Blank cell indicates no screening value for that parameter. (Technical Guidance for Screening Contaminated Sediments, NYSDEC 1999).
SEL - Severe Effect Level for metals contamination in sediment . Blank cell indicates no screening value for that parameter. (Technical Guidance for Screening Contaminated Sediments, NYSDEC 1999).

DEC-02582

TABLE 5-23
Total Cyanide, Total Organic Carbon (TOC), & Total Petroleum Hydrocarbons (TPH)
Tioghnioga River Sediment Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
May, 2001

SAMPLE I.D.	Percent Solids	Total Cyanide (PPM)	TOC (PPM)	TPH (PPB)
ED-10A	87	U		150000
SED-10B	89	U		U
ED-10C	88	U		U
ED-11A	83	U		58000
ED-11B	90	U		U
SED-11C	92	U		U
ED-12A	88	U		39000
ED-12B	89	U		U
ED-12C	88	U		U
SED-13A	84	U		160000
ED-13B	88	U		U
ED-13C	90	U		U
ED-14A	91	U		U
SED-14B	91	U		U
SED-15A	86	U		97000
ED-15B	92	U		U
ED-15C	88	U		18000
SED-16A	82	U		59000
SED-16B	91	U		U
ED-16C	88	U		U
ED-17A	84.4	U	15000	20000000
ED-17B	87.1	U	33200	U
SED-17C	90.3	U	30600	U
ED-18A	84	U	15900	82000
ED-18B	91.7	U	24000	U
ED-18C	85.8	U	38100	U
SED-19A	59.2	6.69	33200	1100000
ED-19B	88.5	10.8	20000	2000000
D-19C	89	8.06	18400	22000
D-20A	89.3	U	7660	57000
SED-20B	88	U	24600	U
SED-20C	92.7	U	33600	U
D-21A	87.5	U	9870	940000
D-21B	92.5	1.67	27000	U
SED-21C	93.4	1.3	26600	U
SED-22A	82.2	U	22000	360000
D-22B	91.3	U	21400	22000
D-22C	91.7	U	27700	U
SED-23A	83.5	U	8220	320000
SED-23B	85.7	U	16800	79000
D-23C	89.3	U	20200	U
D-24A	82.8	U	19900	78000
SED-24B	90.2	U	25800	U
SED-24C	89	U	26300	U

SAMPLE I.D.	Percent Solids	Total Cyanide (PPM)	TOC (PPM)	TPH [1] (PPB)
SED-25A	90.8	U	25400	U
SED-25B	92.1	U	35400	U
SED-25C	91.5	U	43600	U
SED-26A	87.9	U	11300	200000
SED-26B	85.9	U	13500	U
SED-27A	92.8	U	14200	U
SED-27B	91.5	U	9730	U
SED-27C	91.9	U	23100	20000
SED-27D	89.8	U	32400	U
SED-28A	82.5	U	13600	190000
SED-28B	91.3	U	25200	U
SED-28C	82.4	U	22700	U
SED-29A	82.5	U	25900	U
SED-29B	83	U	29500	U
SED-29C	91.6	U	36400	U
SED-30A	87	U		280000
SED-30B	90	U		24000
SED-31B	88	U		U
SED-32A	89	U		U
SED-32B	90	U		31000
SED-33A	91	U		U
SED-33B	87	U		U
SED-34A	89	U		U
SED-34B	89	U		U
SED-35A	87	U		240000
SED-35B	90	U		20000
SED-36A	91	U		310000
SED-36B	90	U		U
SED-37A	91	U		500000
SED-37B	90	U		130000
SED-38A	79	U		350000
SED-38B	88	U		310000
SED-38C	87	U		360000
SED-40A	89	U		12850
SED-40B	88	U		340000
SED-41A	69	U		310000
SED-41B	79	U		1800000
SED-42A	71	U		630000
SED-42B	77	U		360000
SED-43A	91	U		90000
SED-43B	87	U		16000000
SED-43C	93	U		450000
SED-44A	74	U		170000
SED-44B	79	U		160000

te:
U = Indicates that the compound was analyzed for but not detected.

Stearns & Wheler, LLC
Project No. 10126
April 2002

TABLE 5-24
VOLATILE ORGANIC COMPOUNDS
River Water Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	Health Standard [1] (ppb)	SW-1 Downstream	SW-2 Downstream	SW-3 Downstream	SW-4 Site	SW-5 Site	SW-6 Upstream	SW-7 Upstream	SW-8 Upstream	SW-9 Site East Bank
chloromethane	NA	U	U	U	U	U	U	U	U	U
bromomethane	5	U	U	U	U	U	U	U	U	U
vinyl chloride (G)	0.3	U	U	U	U	U	U	U	U	U
chloroethane (G)	5	U	U	U	U	U	U	U	U	U
acetone (G)	50	2 JB	U	U	U	1 JB	1 JB	U	U	U
methylene chloride	5	0.8 J	0.7 J	U	0.5 J	U	0.4 J	U	U	U
1,1 dichloroethane	5	U	U	U	U	U	U	U	U	U
cis 1,2 dichloroethene	5	U	U	U	U	U	U	U	U	U
2 butanone (G)	50	2 JB	2 JB	U	U	U	2 JB	2 JB	U	U
trichloroethene	5	U	U	U	U	U	U	U	U	U
bromodichloromethane (G)	50	U	U	U	U	U	U	U	U	U
1,1,2 trichloroethane	1	U	U	U	U	U	U	U	U	U
dibromochloromethane (G)	50	U	U	U	U	U	U	U	U	U
benzene	1	U	U	U	U	U	U	U	U	U
toluene	5	U	U	U	U	U	U	U	U	U
ethylbenzene	5	U	U	U	U	U	U	U	U	U
styrene (G)	5	U	U	U	U	U	U	U	U	U
xylenes (tot)	5	U	U	U	U	U	U	U	U	U
TOTAL BTEX		0	0	0	0	0	0	0	0	0
TOTAL VOCS		4.8	2.7	0	0.5	1	3.4	2	0	0

[1] From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998

(G) indicates parameters subject to guidance value, as opposed to water quality standard.

NA indicates parameter not subject to standard.

B indicates parameter was detected in laboratory QC blank.

"*" indicates parameter exceeds NYS water quality standard.

J indicates estimated concentration

DEC-02584

TABLE 5-25
SEMI-VOLATILE ORGANIC COMPOUNDS
River Water Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	Health Standard[1] (ppb)	SW-1 Downstream	SW-2 Downstream	SW-3 Downstream	SW-4 Site	SW-5 Site	SW-6 Upstream	SW-7 Upstream	SW-8 Upstream	SW-9 Site - East Bank
phenol	1	U	U	U	U	U	U	U	U	U
2 methylphenol	1	U	U	U	U	U	U	U	U	U
4 methylphenol	1	U	U	U	U	U	U	U	U	U
benzoic acid	NA	U	U	U	U	U	U	U	U	U
naphthalene ++ (G)	10	U	U	U	U	0.1 J	U	U	U	U
2,6 dinitrotoluene	0.07	U	U	U	U	U	U	U	U	U
2-methylnaphthalene	4.7	U	U	U	U	U	U	U	U	U
acenaphthalene	NA	U	U	U	U	U	U	U	U	U
acenaphthene (G)	20	U	U	U	U	U	U	U	U	U
dibenzofuran	NA	U	U	U	U	U	U	U	U	U
2,4 dimethylphenol (G)	50	U	U	U	U	U	U	U	U	U
2,4 dinitrotoluene	5	U	U	U	U	U	U	U	U	U
diethylphthalate (G)	50	0.1 J	0.1 J	U	0.1 J	0.2 J	0.1 J	0.1 J	0.1 J	U
fluorene (G)	50	U	U	U	U	U	U	U	U	U
n- nitrosodiphenylamine (G)	50	U	U	U	U	U	U	U	U	U
phenanthrene (G)	50	U	U	U	U	U	U	U	U	U
anthracene (G)	50	U	U	U	U	U	U	U	U	U
carbazole	NA	U	U	U	U	U	U	U	U	U
di-n-butylphthalate	50	0.4 JB	0.4 JB	0.4 JB	0.5 JB	1 JB	0.5 JB	0.4 JB	0.4 JB	0.5 JB
fluoranthene (G)	50	U	U	U	U	U	U	U	U	U
pyrene (G)	50	U	U	U	U	U	U	U	U	U
benzo(a)anthracene ++ (G)	NA	U	U	U	U	0.1 J	U	U	U	U
chrysene ++ (G)	0.002	U	U	U	U	U	U	U	U	U
bis(2-ethyhexyl) phthalate	0.002	0.5 * JB	0.8 * JB	0.6 * JB	0.7 * JB	1 * JB	1 * JB	0.8 * JB	0.8 * JB	0.7 * JB
di-n-octylphthalate	5	0.2 J	0.4 J	0.2 J	0.8 J	0.5 J	0.4 J	0.4 J	0.6 J	0.3 J
benzo(b) fluoranthene ++ (G)	NA	U	U	U	U	U	U	U	U	U
benzo(k) fluoranthene ++ (G)	0.002	U	U	U	U	U	U	U	U	U
benzo (a) pyrene ++	0.002	U	U	U	U	U	U	U	U	U
indeno (1,2,3 - cd) pyrene ++ (G)	0.002	U	U	U	U	U	U	U	U	U
dibenzo (a,h) anthracene ++	0.002	U	U	U	U	U	U	U	U	U
benzo (g,h,i) perylene	NA	U	U	U	U	U	U	U	U	U
TOTAL SVOCS		1.2	1.7	1.2	2.1	2.9	2	1.7	1.9	1.5
TOTAL CARCINOGENIC PAH		0	0	0	0	0.2	0	0	0	0
TOTAL PAH's		0	0	0	0	0.1	0	0	0	0

[1] From TOGS (1.1.1) Ambient Water Quality Standards & Guidance Values, NYSDEC June 1998

(G) indicates parameters subject to guidance value, as opposed to water quality standard.

NA indicates parameter not subject to standard.

BOLD ITALICS are Polycyclic Aromatic Hydrocarbons (PAH's).

B indicates parameter was detected in laboratory QC blank.

"*" indicates parameter exceeds NYS water quality standard.

J indicates estimated concentration

++ indicates potential or suspected carcinogen

DEC-02585

TABLE 5-26
TARGET ANALYTE LIST (TAL) METALS
River Water Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppb)	Health Standard[1] (ppb)	SW - 1	SW - 2	SW - 3	SW - 4	SW - 5	SW - 6	SW - 7	SW - 8	SW - 9
Aluminum	100	19 U	42.7 B	19 U	19 U	19 U	46.6 B	22.3 B	25 B	31.6 B
Antimony	3	7 * U	7 * U	7 * U	7 * U	7 * U	7 * U	1 U	7 * U	7 * U
Arsenic	50	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Barium	1000	86.7 B	92.6 B	85.6 B	88.9 B	88.6 B	90.8 B	90.4 B	89.4 B	85 B
Beryllium (G)	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Calcium	NA	53900	57200	56200	55400	54600	55000	56000	55600	54600
Chromium	50	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Cobalt	NA	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Copper	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Iron	300	35 U	115	35 U	35 U	35 U	71.5 B	35 U	35 U	46.6 B
Lead	50	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Magnesium	35000	13300	13800	13700	13600	13600	13600	13700	13700	13700
Manganese	300	15.8	25.8	20.3	27.4	21.2	25.5	20.6	17.2	18.3
Mercury	1	0.1 UN	0.1 UN	1 * UN	0.1 UN	0.1 UN	0.1 UN	0.1 UN	0.1 UN	0.1 UN
Nickel	100	3 U	3 U	3.5 B	3 U	3 U	3 U	3 U	3 U	3 U
Potassium	NA	1230 B	1380 B	1350 B	1300 B	1270 B	1270 B	1350 B	1320 B	1290 B
Selenium	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	NA	1820	17900	18000	20800	19900	19100	19100	19200	18700
Thallium (G)	1	10 * U	10 * U	10 * U	10 * U	10 * U	10 * U	10 * U	10 * U	10 * U
Vanadium	14	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc (G)	2000	3 U	2 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Cyanide (ppm)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U

U - Indicates analyte was not detected at method reporting limit.
B - Indicates analyte result between IDL and contract required detection limit (CRDL).
E - Reported value is estimated because of the presence of interface.
N - Spiked sample recovery not within control limits.
G - Indicates guidance value

DEC-02586

TABLE 5-27
EPA Method TO-14
Indoor Air Samples
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (ppbv)	SC-1	SC-2	SC-3	SC-4	SC-5	SC-6
Freon 12	U	U	U	1	1	1.3
Freon 114	U	U	U	U	U	U
Chloromethane	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U
Freon 11	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U
Freon 113	U	U	U	U	U	U
Methylene Chloride*	U	1.8	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U
cis-1,2-Dichloroethene	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U
1,1,1-Trichloroethane*	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U
Benzene*	1.9	U	1.8	3.7	3.3	7.2
1,2-Dichloroethane	U	U	U	U	U	U
Trichloroethene*	U	U	U	1.3	0.99	U
1,2-Dichloropropane	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U
Toluene*	8.8	U	10	18	14	23
trans-1,3-Dichloropropene	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U
Tetrachloroethene*	8	U	4.4	6.1	6.6	1.9
Ethylene Dibromide	U	U	U	U	U	U
Chlorobenzene	U	U	U	1.2	U	U
Ethyl Benzene*	U	U	2	4.2	1.2	2.4
m,p-Xylene*	2.2	U	U	1.6	3.7	9.2
o-Xylene*	U	U	2.6	20	1.4	2.9
Styrene	3.2	U	U	U	15	4.5
1,1,2,2-tetrachloroethane	U	U	U	U	U	U
1,3,5-Trimethylbenzene	U	U	U	1.3	U	U
1,2,4-Trimethylbenzene	U	U	U	U	1.1	2.4
1,3-Dichlorobenzene	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U
Chlorotoluene	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U
Propylene	U	U	U	U	U	U
1,3-Butadiene*	U	U	U	U	U	U
Acetone*	12	U	U	18	20	11
Carbon Disulfide	U	U	U	U	U	U
2-Propanol	U	U	U	6.6	6.2	12
trans-1,2-Dichloroethene	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U
2-Butanone	6.1	U	11	8.3	8.2	U
Hexane*	3.6	U	U	8.9	7.3	8.1
Tetrahydrofuran*	24	U	51	21	22	6.6
Cyclohexane*	U	U	U	U	U	U
1,4-Dioxane	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U
4-Methyl-2-pentanone	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U
4-Ethyltoluene	U	U	U	U	U	U
Ethanol	11	U	12	7.5	7.2	7.8
Methyl tert-Butyl Ether	U	U	U	U	U	4.6
Heptane*	U	U	U	U	U	U

U indicates compound not detected.
* indicates potential source of compound was identified during site chemical inventory.

TABLE 5-28
T0 14 Volatile Organics in Air
Grab Sampling Program - Phase 2
Supplemental Remedial Investigation
NYSEG Coreltnad/Homer Former MGP

Analyte (ppb v/v)	SB-9	SB-13	SB-22	NIOSH REL (ppb)
1,1,1-Trichloroethane	ND	ND	ND	350,000
1,1,2,2-Tetrachloroethane	ND	ND	ND	1,000
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ND	ND	1,000,000
1,1,2-Trichloroethane	ND	ND	ND	10,000
1,1-Dichloroethane	ND	ND	ND	100,000
1,1-Dichloroethene	ND	ND	ND	
1,2,4-Trichlorobenzene	ND	ND	ND	5,000
1,2,4-Trimethylbenzene	140	9.2	3.7	25,000
1,2-Dibromoethane	ND	ND	ND	45
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	ND	ND	1,000,000
1,2-Dichlorobenzene	ND	ND	ND	50,000
1,2-Dichloroethane	ND	ND	ND	1,000
1,2-Dichloropropane	ND	ND	ND	**75,000
1,3,5-Trimethylbenzene	53	6.3	1.3	25,000
1,3-Butadiene	ND	ND	44	**1,000
1,3-Dichlorobenzene	ND	ND	ND	
1,4-Dichlorobenzene	ND	ND	ND	**75,000
1-Butanol	ND	ND	ND	50,000
2-Butanone (MEK)	ND	7.7	11	200,000
2-Hexanone	ND	ND	ND	1,000
3-Chloropropene	ND	ND	ND	1,000
4-Methyl-2-pentanone (MIBK)	ND	ND	ND	50,000
Acetone	ND	ND	29	250,000
Acetronitrile	ND	ND	ND	20,000
Acrolein	ND	8.8	ND	100
Acrylonitrile	ND	ND	ND	1,000
alpha-Methylstyrene	ND	ND	ND	100,000
Benzene	54	7.2	20	100
Benzyl chloride	ND	0.58	ND	1,000
Bromodichloromethane (G)	ND	0.4	ND	
Bromoform	ND	ND	ND	500
Bromomethane	ND	ND	ND	**20,000
Carbon disulfide	ND	4.3	1.2	1,000
Carbon tetrachloride	ND	ND	ND	2,000
Chlorobenzene	ND	ND	ND	**75,000
Chlorodifluoromethane	ND	0.76	1.8	1,000,000
Chloroethane	ND	ND	ND	**1,000,000
Chloroform	ND	0.97	1.4	2,000
Chloromethane	ND	ND	ND	100,000
cis-1,2-Dichloroethene	ND	ND	ND	200,000
cis-1,3-Dichloropropene	ND	ND	ND	1,000
Cumene	12	0.37	ND	50,000
Cyclohexane	ND	2.6	3.3	300,000
Dibromochloromethane (G)	ND	ND	ND	
Dibromomethane	ND	ND	ND	
Dichlorodifluoromethane;CFC-12	ND	0.58	ND	1,000,000
Ethyl ether	ND	ND	ND	400,000
Ethylbenzene	75	3.3	4.4	100,000
Hexachlorobutadiene	ND	ND	ND	20
Methanol	ND	ND	33	200,000
Methyl tert-butyl ether	ND	9.4	9.9	
Methylene chloride	ND	ND	ND	**25,000
Naphthalene	13	2	1.3	10,000
n-Butane	ND	30	56	800,000
n-Decane	31	11	1.2	500
n-Dodecane	10	1.6	3.1	500
n-Heptane	57	4.4	6.2	85,000
n-Hexane	8.8	16	21	50,000
n-Octane	99	2.7	2.6	75,000
Nonane	41	6.7	ND	500
n-Propylbenzene	29	0.88	0.83	
n-Undecane	20	5.1	1.9	500
Pentane	ND	31	41	120,000
Styrene	9.2	30	39	50,000
Tetrachloroethene	ND	ND	ND	**100,000
Toluene	140	28	42	100,000
trans-1,2-Dichloroethene	ND	ND	ND	200,000
trans-1,3-Dichloropropene	ND	ND	ND	1,000
Trichloroethene	ND	ND	ND	**100,000
Trichlorofluoromethane;CFC-11	ND	ND	ND	1,000,000
Vinyl acetate	ND	ND	ND	4,000
Vinyl chloride	ND	ND	ND	**1,000
Xlyenes (o)	120	4.5	4.6	100,000
Xylenes (m&p)	300	12	13	100,000
Total VOC's	1212	248.34	397.73	

TABLE 5-29
PASSIVE SOIL GAS SURVEY
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

Analyte (nanograms)	PG-1	PG-2	PG-3	PG-4	PG-5	PG-7	PG-8	PG-9	PG-10	PG-11	PG-12	PG-13
benzene	U	U	U	U	U	U	U	28	27	U	U	29
2-methylnaphthalene	U	U	U	44	U	U	U	U	U	U	U	U
naphthalene	U	U	U	56	U	63	U	U	U	U	U	U
toluene	U	U	U	U	U	29	34	78	30	54	29	50
xylenes	U	U	U	U	U	43	U	108	45	43	67	U
1,2,4 trimethylbenzene	U	U	U	U	U	U	U	29	U	U	U	U
1,3,5 trimethylbenzene	U	U	U	U	U	U	U	37	U	U	U	U

U indicates compound not detected.

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TABLE 5-30
NAPL Recovery Record, MW-24
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

DATE	VOLUME REMOVED WATER	NAPL	OBSERVATIONS
3/3/00	75 gal	3 gal	Consistency of NAPL was very thick, and contained silt. Pump became clogged several times during pumping due to NAPL viscosity.
3/17/00	15 gal	8 ounces	Visible NAPL present as particulate globs in purge water, approximatley fine grained sand size. Most of the 8 oz of NAPL were present in the first 1/2 gallon of water removed.
4/20/00	8 gal	1.5 gal	NAPL very thick in nature. Purge water cleared up after 5 gallons of water were removed. The first 3 gallons contained most of the NAPL recovered.
5/25/00	8 gal	1 gal	Most of the NAPL recovered at the start of purging.
6/28/00	30 gal	1 liter	Most of the NAPL recovered at the start of purging.
7/27/00	15 gal	0.5 liters	Most of the NAPL recovered at the start of purging. Towards end of purging NAPL was present as small globs in water.
8/10/00	10 gal	0.5 liters	Most of the NAPL recovered at the start of purging. Towards end of purging NAPL was present as small globs in water.
9/21/00	0	0	Tar too thick to pump.
1/30/02	5 gal	2 gal	
4/25/02	2.5 gal	1.5 gal	Initially 3.94 ft of DNAPL present

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TABLE 5-31
Field Parameters & Observations
Groundwater Sampling - Phase 2
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

	pH		conductivity (ms/cm)		turbidity (ntu)		dissolved oxygen (ppm)		temperature (°C)		salinity (%)		Eh (mV)		Visual Observations
Well #	initial	final	initial	final	initial	final	initial	final	initial	final	initial	final	initial	final	
MW-1	7.08	7.06	0.95	0.96	31	320	2.54	1.89	8.3	8.5	0.04	0.04			
MW-2	7.32	7.16	0.607	0.687	19	286	3.6	2.6	9.9	10	0.02	0.02			tar odor
MW-3	No Field Parameters														H_2O black w/sheen & tar odor
MW-4	7.1	7.08	0.94	0.96	167	212	2.54	2.28	9.7	9.6	0.04	0.04			
MW-5	7.26	7.16	1.41	0.85	or	or	1.7	1.86	10.6	10.8	0.06	0.03			sheen & tar odor
MW-6	7.34	7.06	0.772	0.825	0	230	5.57	2.45	9.2	10.7	0.03	0.03			
MW-11	No Field Parameters														H_2O oily brown, solvent/thinner odor, LNAPL thickness ~ 0.25', floaters
MW-12	6.82		1.34		or		4.9		8.6		0.05				dry @ 1.5 gal.
MW-13	7.02	7.11	0.96	0.93	111	600	3.45	3.21	10.3	10.1	0.04	0.04			H_2O rusty & sheen
MW-14	6.74	6.83	3.07	3.39	52		1.82	2.26	8.6	8.9	0.14	0.16			H_2O rusty, slight sheen, petroleum odor
MW-15	7.01	7.04	1.97	1.99	61	330	2.1	1.74	8.9	9.3	0.09	0.01	-46	-54	strong petroleum odor & sheen
MW-16	7.08	7.15	1.44	0.813	0	0	1.56	2.04	10.6	0.03	0.06	0.03	-48	146	
MW-17	7.08		1.14		0		1.65		9.7		0.05				sheen & petroleum odor
MW-18	7.14	7.15	0.741	0.773	0	0	2.25	1.34	9.7	10.8	0.03	0.03			
MW-19	6.87	7.31	0.445	0.458	0	410	1.37	2.79	8.2	10.1	0.01	0.01			
OW-21	No Field Parameters														H_2O black(ashen), tar like odor, trace specs of tar on bailer
MW-21	6.95	7.08	0.831	0.834	122	28	3.3	2.13	10.2	10.2	0.03	0.03			
MW-22	7.22	7.15	0.99	1.13	14	or	4.8	2.89	7.2	9.8	0.04	0.04			
MW-23	7.19	7.13	0.823	1.03	8	or	4.88	1.85	8.4	9.7	0.03	0.04			
MW-24	No Field Parameters														H_2O has sheen & tar odor, tar on well casing staining bailer no obtaiable fluid product
MW-25	6.86	6.92	1	1.02	or	or	1.71	1.5	6.8	6.7	0.04	0.04			
MW-26	7.15	7.27	0.92	0.94	7	or	3.74	4.56	10.3	10.4	0.02	0.04			
MW-27s	7.26	7.18	0.408	0.567	or	or	2.57	2.01	8.1	9	0.01	0.02			
MW-27d	7.18	7.18	0.855	0.91	530	625	2.52	3.05	10.6	10.8	0.03	0.03			sheen & tar odor
MW-28s	6.76	6.79	2.41	2.61	or	or	0.94	1.18							
MW-28d	7.11	7.13	0.67	0.668	or	or	2.01	1.85	11.8	12	0.02	0.02			
MW-29s	6.97	6.97	1.09	1.1	870	or	3.15	2.71	9.1	8.8	0.04	0.04			
MW-29d	7.26	7.27	0.95	0.95	460	or	3.65	3.71	10.9	9.9	0.04	0.04			
MW-30s	6.72	6.77	3.62	3.37	or	687	2.14	1.52	9.4	10.2	0.17	0.16			slight petroleum odor
MW-30d	7.42	7.13	0.514	0.757	66	or	4.33	1.38	10.5	12	0.02	0.03			
MW-31	7.15	7.14	1.05	0.92	or	or	2.79	2.88	10.6	11.6	0.04	0.04			
MW-32	7.21	7.15	1.26	1.21	9	613	3.27	2.67	7	9.4	0.05	0.05			

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TABLE 5-32
WELL PURGING SUMMARY, NOV - DEC 2002
Supplemental Remedial Investigation
NYSEG Cortland/Homer Former MGP
Homer, New York

MW-16 - 37 ft deep — Purged using stainless steel bailer.

Date	Depth to Water (feet)	Depth to NAPL	Total Volume Purged (gallons)	Volume NAPL Purged	Observations
14-Nov	4.61	35.5	0	0	Approximately 12 to 18 inches of DNAPL at well bottom
15-Nov	4.59	36.5	0.75	<0.75	6 to 8 inches DNAPL. Bailed ~ 0.75 gallons of NAPL/water mixture.
18-Nov	4.33	36.8	0.25	<0.25	2 to 3 inches DNAPL at bottom of well. Bailed ~ 0.25 gallons NAPL/water
21-Nov	-	36.8	0.75	<0.75	Approx 3 inches DNAPL at ottom of well. Bailed ~ 0.75 gallons NAPL/water
25-Nov	-	> 36.8	0.5	<0.5	Less than 2 inches DNAPL at bottom of well. Bailed approx 0.5 gal NAPL/water
3-Dec	4.14	35.4	-	-	Approx 1.6 feet DNAPL. Stainless steel bailer frozen in drum. Could not purge.
10-Dec	4.15	35.4	-	-	Approx 1.6 feet DNAPL. Stainless steel bailer frozen in drum. Could not purge.
13-Dec	4.34	35.4	2	<2	Approx 1.6 feet DNAPL at bottom. Bailed 2 gallons NAPL/water
Totals			4.25	0	

MW-5 - 31.8 ft deep — Purged using Whale Pump.

Date	Depth to Water (feet)	Depth to NAPL	Total Volume Purged (gallons)	Volume NAPL Purged	Observations
14-Nov	4.16	None	25	0	No NAPL or sheen
18-Nov	3.39	None	28	0	No NAPL or sheen
21-Nov	3.48	None	28	0	No NAPL or sheen
3-Dec	3.73	None	35	0	No NAPL or sheen
10-Dec	3.76	None	27	0	No NAPL or sheen
Totals			143	0	

MW-17 - 13.7 ft deep — Purged using Whale Pump.

Date	Depth to Water (feet)	Depth to NAPL	Total Volume Purged (gallons)	Volume NAPL Purged	Observations
14-Nov	6.34	None	15	0	Light sheen
18-Nov	5.53	None	27	0	Light sheen
21-Nov	5.67	None	26	0	Sheen observed; cleared after pumping
25-Nov	5.59	None	24	0	Sheen observed; cleared after pumping
3-Dec	5.92	None	35	0	Water clear, but with MGP odor
10-Dec	5.91	None	26	0	No NAPL or sheen
Totals			153	0	

MW-19 - 45.35 ft deep — Purged using Whale Pump.

Date	Depth to Water (feet)	Depth to NAPL	Total Volume Purged (gallons)	Volume NAPL Purged	Observations
14-Nov	4.08	None	18	0	Slight sheen, bailed well dry
18-Nov	3.99	None	8	0	Slight sheen, bailed well dry
21-Nov	3.72	None	9	0	Slight sheen, bailed well dry
25-Nov	3.54	None	8	0	Slight sheen, bailed well dry
3-Dec	3.78	None	12	0	Odor, no sheen; bailed dry
10-Dec	3.79	None	11	0	Slight sheen, bailed well dry
Totals			66	0	

MW-27D - 33.2 ft deep — Purged using Whale Pump.

Date	Depth to Water (feet)	Depth to NAPL	Total Volume Purged (gallons)	Volume NAPL Purged	Observations
15-Nov	3.01	None	7	0	No NAPL or sheen
18-Nov	2.99	None	27	0	No NAPL or sheen
21-Nov	3.16	None	26	0	No NAPL or sheen
25-Nov	3.1	None	24	0	No NAPL or sheen
3-Dec	3.38	None	35	0	No NAPL or sheen
10-Dec	3.4	None	26	0	No NAPL or sheen
Totals			145	0	

TABLE 7-1

SUMMARY OF PATHWAYS AND RECEPTORS,
FISH AND WILDLIFE IMPACT ANALYSIS
Cortland/Homer Former MGP Site

Contaminant Source	Pathways of Exposure	Receptors	Completeness and ecological significance
Shallow (surface) soils	Loss to surface waters by erosion (wind and water)	Aquatic organisms	Complete, potentially important. Surface soils on the site have elevated SVOC
	Ingestion, inhalation, dermal absorption by resident and transient wildlife	Soil organisms (earthworms) Burrowing organisms (voles)	Potentially complete, unlikely to be important. Surface soils on the site have elevated SVOC. Wildlife habitat is limited on the developed site.
	Vegetative uptake from soils and related food web effects	Herbivorous wildlife (deer mouse)	Potentially complete, unlikely to be important. Surface soils on the site have elevated SVOC. Wildlife habitat is limited on the developed site.
	Food web effects of ingesting soil organisms	Birds	Potentially complete, unlikely to be important due to limited extent of spatial contamination and limited habitat.
Sub-surface soils	Ingestion, inhalation, dermal absorption by burrowing wildlife	Meadow vole	Unlikely to be complete, unlikely to be important. Test pits show contamination is higher at depths beyond which wildlife would use. Developed nature of site limits use by wildlife.
Surface water sediments	Ingestion and absorption by resident macroinvertebrates	Aquatic insects and worms	Complete, potentially important
	Partitioning to overlying water	Fish	Complete, unlikely to be important due to limited extent of contamination.
	Food web effects on higher organisms	Mink, heron	Complete, unlikely to be important due to limited extent of contamination.
Surface Waters	Ingestion and absorption by aquatic organisms	Fish	Complete, unlikely to be important (surface water contaminant levels are mostly non-detectable)
Groundwater	Seepage to surface water	Aquatic organisms (especially benthic organisms)	Complete, potentially important

Table 7-2. Sediment Quality Criteria, Benchmarks, and Screening Values.

	Benthic chronic[1] µg/g OC	Benthic acute[1] µg/g OC	Screening value[2] µg/kg	Secondary chronic value[3] µg/kg	ARCS TEC[4] µg/kg dry weight	ARCS PEC[4] µg/kg dry weight	ARCS NEC[4] µg/kg dry weight	Ontario MOE Low[4] µg/kg dry weight	Ontario MOE High[4] µg/kg dry weight	OSWER value[5] µg/kg dry weight	Washington State SQC[6] µg/kg dry weight
acenaphthalene (acenaphthylene)			330								
acenaphthene	140										
anthracene	107	986									
benzo(a)anthracene	12	94									
benzo(a)pyrene			330								
benzo(b)fluoranthene											
benzo(g,h,i)perylene					290	6300	3800	170	3200		
benzo(k)fluoranthene								240	13400		
benzoic acid											650
bis(2-ethylhexyl)phthalate	199.5										
butylbenzyl phthalate				11000						11000	
carbazole											
chrysene			330								
dibenzo(a,h)anthracene			330								
dibenzofuran				420						2000	
diethylphthalate				600						630	
di-n-butylphthalate										11000	
fluoranthene	1020										
fluorene	8	73									
indeno(1,2,3-cd)pyrene					78	836.66	3800	200	3200		
2-methylnaphthalene	34	304									
4-methylphenol											670
naphthalene	30	258									
phenanthrene	120										
phenol	0.5										
pyrene	961	8775									
LMW PAHs			330								
HMW PAHs			655								
TOTAL PAHs			1684								

1 = Technical guidance for screening contaminated sediments, NYSDEC 1999

2 = EPA Region 4 Waste management division sediment screening values for hazardous waste sites

3 = EqP derived sediment quality benchmarks, ORNL 1997

4 = Selected toxicity test-and screening level concentration-based sediment quality benchmarks for freshwater sediments, ORNL 1997

5 = EPA Office of Solid Waste and Emergency Response ecotoxicological thresholds, ORNL 1997

Wash[illegible] State sediment quality standards WAC 17[illegible] 320 [illegible] marine sediments

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Table 7-3. Concentration of contaminants found in sediment samples adjusted for site-specific organic carbon content.

	SED 1	SED 2	SED 3	SED 4	SED 5	SED 6	SED 7	SED 8	SED 9
acenaphthalene (acenaphthylene)	13.24	11.33	15.64	27.67	13.00	3.67	2.67	2.17	2.53
acenaphthene	6.62	14.00	21.23	73.33	800.00*	8.00			
anthracene	27.94	7.33	54.75	63.33	73.33	6.33	5.00	5.67	6.00
benzo(a)anthracene	83.82*	16.33*	100.56*	113.33*	36.67*	13.33*	13.67*	16.33*	16.00*
benzo(a)pyrene	85.29	16.33	83.80	96.67	46.67	16.00	16.00	19.33	17.67
benzo(b)fluoranthene	70.59	11.33	55.87	63.33	36.67	12.33	12.67	16.67	12.67
benzo(g,h,i)perylene	52.94	9.67	44.69	40.00		16.00	18.00	16.00	12.67
benzo(k)fluoranthene	79.41	15.00	67.04	73.33	43.33	12.33	13.67	14.67	17.33
benzoic acid	8.53								
bis(2-ethylhexyl)phthalate	45.59	7.67	15.64	24.00	23.00		15.67	12.33	22.00
butylbenzyl phthalate	9.41		16.20						
carbazole	9.12	1.37	6.15	33.33	366.67				
chrysene	102.94	17.33	89.39	110.00	46.67	19.33	18.33	20.67	20.33
dibenzo(a,h)anthracene	19.12	3.33	17.88	17.67					
dibenzofuran	2.65	0.93	8.38	12.33	250.00				
diethylphthalate	2.06	0.80		0.57					
di-n-butylphthalate			2.40						
fluoranthene	133.82	21.33	139.66	123.33	66.67	26.00	22.33	30.00	28.00
fluorene	7.06	2.07	23.46*	36.67*	366.67*				
indeno(1,2,3-cd)pyrene	52.94	9.67	48.60	46.67		12.67	13.33	13.33	11.00
2-methylnaphthalene	2.65	1.00	2.46	1.83	80.00*				
4-methylphenol				1.30					
naphthalene	4.71	2.90	2.63	17.67	3666.67*				
phenanthrene	73.53	11.67	139.66*	110.00	666.67*	13.00	15.33	19.00	15.67
phenol	1.91*	0.97*		0.73*			5.00*	12.00*	12.67*
pyrene	145.59	27.33	173.18	156.67	116.67	28.33	28.00	33.33	32.00
TOC (mg/kg)	6800	75700[a]	17900	50800[a]	70900[a]	64900[a]	30400[a]	56000[a]	
LMW PAHs	135.74	50.30	259.83	330.50*	5666.33*	31.00	23.00	26.83	
HMW PAHs	826.47*	147.67	820.67*	841.00*	393.33	156.33	156.00	180.33	
TOTAL PAHs	962.21	197.97	1080.50	1171.50	6059.67*	187.33	179.00	207.17	

Empty cells mean parameter was not detected at that site.
An "*" denotes values that exceed the sediment quality criteria, benchmark, or screening value for a particular parameter.
[a] Correction done based on maximum of 3% organic carbon content, per NYSDEC.

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Table 7-4. Analytical results for PAHs (reported in ppb) corrected for site-specific organic carbon and sorted for High (HMW) or Low molecular weight (LMW).

		SED 1	SED 2	SED 3	SED 4	SED 5	SED 6	SED 7	SED 8	SED 9
PAH, HMW	Pyrene	145.59	*10.83*	173.18	92.52	*49.37*	*13.10*	*27.63*	17.86	20.60
PAH,HMW	benzo(a)anthracene	*83.82*	*6.47*	100.56	66.93	*15.51*	*6.16*	*13.49*	*8.75*	*10.30*
PAH,HMW	benzo(a)pyrene	*85.29*	*6.47*	83.80	57.09	*19.75*	*7.40*	*15.79*	*10.36*	*11.37*
PAH,HMW	benzo(b)fluoranthene	*70.59*	*4.49*	55.87	37.40	*15.51*	*5.70*	*12.50*	*8.93*	*8.15*
PAH,HMW	benzo(g,h,i)perylene	*52.94*	*3.83*	*44.69*	23.62	*0.00*	*7.40*	*17.76*	*8.57*	*8.15*
PAH,HMW	benzo(k)fluoranthene	*79.41*	*5.94*	67.04	43.31	*18.34*	*5.70*	*13.49*	*7.86*	*11.16*
PAH,HMW	Chrysene	*102.94*	*6.87*	89.39	64.96	*19.75*	*8.94*	*18.09*	*11.07*	*13.09*
PAH,HMW	dibenzo(a,h)anthracene	*19.12*	*1.32*	*17.88*	*10.43*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
PAH,HMW	Fluoranthene	*133.82*	*8.45*	139.66	72.83	*28.21*	*12.02*	*22.04*	*16.07*	18.03
PAH,HMW	indeno(1,2,3-cd)pyrene	*52.94*	*3.83*	*48.60*	*27.56*	*0.00*	*5.86*	*13.16*	*7.14*	*7.08*
PAH,LMW	acenaphthalene (acenaphthylene)	*13.24*	*4.49*	*15.64*	*16.34*	*5.50*	*1.69*	*2.63*	*1.16*	*1.63*
PAH,LMW	Acenaphthene	*6.62*	*5.55*	*21.23*	43.31	338.50	*3.70*	*0.00*	*0.00*	*0.00*
PAH,LMW	Anthracene	*27.94*	*2.91*	*54.75*	37.40	*31.03*	*2.93*	*4.93*	*3.04*	*3.86*
PAH,LMW	Fluorine	*7.06*	*0.82*	*23.46*	21.65	*155.15*	*0.00*	*0.00*	*0.00*	*0.00*
PAH,LMW	2-methylnaphthalene	*2.65*	*0.40*	*2.46*	*1.08*	*33.85*	*0.00*	*0.00*	*0.00*	*0.00*
PAH,LMW	Naphthalene	*4.71*	*1.15*	*2.63*	*10.43*	1551.48	*0.00*	*0.00*	*0.00*	*0.00*
PAH,LMW	Phenanthrene	*73.53*	*4.62*	139.66	64.96	*282.09*	*6.01*	*15.13*	*10.18*	*10.09*
	Total LMW PAHs	135.74	19.93	259.83	195.18	2397.60	14.33	22.70	14.38	15.58
	Total HMWs PAHs	826.47	58.52	820.67	496.65	166.43	72.27	153.95	96.61	107.94
	Total PAHs	962.21	78.45	1080.50	691.83	2564.03	86.59	176.64	110.98	123.52

estimated value less than specified minimum detection limit but greater than zero. Italics =

Table 7-5. Exceedences of Target Analyte List metals found in sediment samples.

	LEL mg/kg	SEL mg/kg	SED 1	SED 2	SED 3	SED 4	SED 5	SED 6	SED 7	SED 8	SED 9
copper	16	110	33.2	29.6	23.5	21.7	31.1	26.9	21.6	36.6	36.8
mercury	0.15	1.3	0.14	0.25	0.17	0.23	0.37	0.14	0.082	0.15	0.12
nickel	16	50	23.2	25.8	18.9	17.6	23.4	22	17.2	23.7	21.8

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TABLE 7-6
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Tioghnioga River Sediment Samples
Sediment Quality Criteria Comarison
Carbon-Normalized Values
May,2001

Analyte (ug/g OC))	SED-17A 0-2 FT.		SED-17B 2-4 FT.		SED-17C 4-6 FT.		SED-18A 0-2 FT.		SED-18B 2-4 FT.		SED-18C 4-6 FT.		SED-19A 0-2 FT.		SED-19B 2-4 FT.		SED-19C 4-6 FT.	
naphthalene ++	566.67	*	5.00		0.90		0.94		0.50		0.37		46.67	*	600.00	*	42.39	*
2-methylnaphthalene	226.67	*	1.83		0.00		0.75		0.00		0.00		33.00		1150.00	*	86.96	*
acenaphthylene	3933.33	*	16.33		0.93		3.46		0.00		0.47		26.67		280.00		17.39	
acenaphthene	4666.67	*	25.33		1.43		2.58		0.46		0.00		283.33	*	2850.00	*	173.91	*
fluorene	10000.00	*	43.33	*	1.33		4.47		0.00		0.00		193.33	*	2450.00	*	157.61	*
phenanthrene	42666.67	*	193.33	*	7.33		37.11		2.00		0.27		500.00	*	7000.00	*	440.22	*
anthracene	21333.33	*	100.00		3.10		11.95		0.83		0.00		333.33	*	3100.00	*	222.83	*
fluoranthene	38000.00	*	153.33		6.00		40.25		1.50		0.00		3333.33	*	4000.00	*	222.83	
pyrene	27333.33	*	126.67		5.33		44.65		1.63		0.27		296.67		3800.00	*	239.13	
benzo(a)anthracene ++	16000.00	*	70.00	*	2.40		23.90	*	0.75		0.00		163.33	*	1800.00	*	103.26	*
chrysene ++	14666.67		56.67		2.10		20.75		0.71		0.00		150.00		1500.00		86.96	
benzo(b) fluoranthene ++	10666.67		36.67		1.33		11.95		0.00		0.00		83.33		950.00		45.11	
benzo(k) fluoranthene ++	9333.33	*	46.67		1.60		12.58		0.00		0.00		110.00		1150.00	*	70.65	
benzo (a) pyrene ++	14666.67	*	60.00	*	1.77	*	17.61	*	0.00		0.00		140.00	*	1500.00	*	81.52	*
indeno (1,2,3 - cd) pyrene ++	9333.33	*	36.67		0.67		12.58		0.00		0.00		86.67	*	750.00	*	34.78	
dibenzo (a,h) anthracene ++	2866.67	*	11.33		0.00		4.47		0.00		0.00		28.33		235.00		11.41	
benzo (g,h,i) perylene	8666.67	*	36.67		0.63		13.21		0.00		0.00		80.00		750.00	*	36.41	
TOC	15000.00		30000.00		30000.00		15900.00		24000.00		30000.00		30000.00		20000.00		18400.00	

Analyte (ug/g OC))	SED-20A 0-2 FT.		SED-20B 2-4 FT.		SED-20C 4-6 FT.		SED-21A 0-2 FT.		SED-21B 2-4 FT.		SED-21C 4-6 FT.	
naphthalene ++	9.14		8.13		11.67		283.69	*	16.67		22.56	
2-methylnaphthalene	6.79		4.07		3.30		36.47	*	3.04		3.72	
acenaphthylene	18.28		1.30		1.33		23.30		2.63		3.08	
acenaphthene	12.01		1.34		1.90		202.63	*	9.63		10.90	
fluorene	28.72	*	0.00		0.00		91.19	*	5.19		5.64	
phenanthrene	195.82	*	1.38		0.57		283.69	*	19.63		18.05	
anthracene	86.16		0.65		0.00		101.32		4.44		2.63	
fluoranthene	234.99		1.30		0.00		192.50		5.56		0.79	
pyrene	208.88		1.18		0.00		151.98		5.93		0.60	
benzo(a)anthracene ++	130.55	*	0.57		0.00		111.45	*	2.19		0.00	
chrysene ++	117.49		0.61		0.00		100.30		1.78		0.00	
benzo(b) fluoranthene ++	71.80		0.00		0.00		59.78		0.89		0.00	
benzo(k) fluoranthene ++	93.99		0.00		0.00		71.94		1.59		0.00	
benzo (a) pyrene ++	108.36	*	0.00		0.00		89.16	*	1.67	*	0.00	
indeno (1,2,3 - cd) pyrene ++	69.19		0.00		0.00		45.59		0.41		0.00	
dibenzo (a,h) anthracene ++	26.11		0.00		0.00		16.21		0.00		0.00	
benzo (g,h,i) perylene	67.89		0.00		0.00		36.47		0.00		0.00	
TOC	7660.00		24600.00		30000.00		9870.00		27000.00		26600.00	

Analyte (ug/g OC))	SED-22A 0-2 FT.		SED-22B 2-4 FT.		SED-22C 4-6 FT.		SED-23A 0-2 FT.		SED-23B 2-4 FT.		SED-23C 4-6 FT.	
naphthalene ++	3.00		12.15		10.83		121.65	*	26.19		20.30	
2-methylnaphthalene	2.45		5.61		3.25		82.73	*	5.89		3.07	
acenaphthylene	4.55		11.21		3.18		352.80	*	18.45		4.01	
acenaphthene	4.55		11.21		3.25		352.80	*	30.95		14.36	
fluorene	9.09	*	21.03	*	0.00		437.96	*	32.74	*	6.93	
phenanthrene	54.55		107.48		2.82		2311.44	*	166.67	*	25.25	
anthracene	39.09		51.40		1.41		3163.02	*	148.81	*	17.33	
fluoranthene	45.45		88.79		0.72		1824.82	*	113.10		10.89	
pyrene	54.55		84.11		0.83		2311.44	*	125.00		10.40	
benzo(a)anthracene ++	30.45	*	44.39	*	0.00		1216.55	*	65.48	*	3.91	
chrysene ++	30.00		39.72		0.43		1216.55		59.52		3.86	
benzo(b) fluoranthene ++	15.00		28.97		0.00		583.94		35.12		1.73	
benzo(k) fluoranthene ++	13.64		30.84		0.00		778.59	*	41.07		2.97	
benzo (a) pyrene ++	21.82	*	38.79	*	0.00		997.57	*	47.62	*	3.02	*
indeno (1,2,3 - cd) pyrene ++	13.64		22.43		0.00		267.64	*	17.26		0.79	
dibenzo (a,h) anthracene ++	5.00		7.01		0.00		133.82		5.77		0.00	
benzo (g,h,i) perylene	13.64		22.90		0.00		218.98	*	19.05		0.69	
TOC	22000.00		21400.00		27700.00		8220.00		16800.00		20200.00	

Analyte (ug/g OC))	SED-24A 0-2 FT.		SED-24B 2-4 FT.		SED-24C 4-6 FT.		SED-25A 0-2 FT.		SED-25B 2-4 FT.		SED-25C 4-6 FT.	
naphthalene ++	2.31		1.12		0.87		0.00		0.00		0.00	
2-methylnaphthalene	1.06		0.00		0.00		0.00		0.00		0.00	
acenaphthylene	14.57		1.28		0.84		0.00		0.00		0.00	
acenaphthene	3.22		0.47		0.30		0.00		0.00		0.00	
fluorene	7.04		0.39		0.00		0.00		0.00		0.00	
phenanthrene	49.75		1.71		0.27		1.10		0.40		0.00	
anthracene	39.70		0.85		0.27		1.22		0.53		0.00	
fluoranthene	75.38		1.90		0.49		1.57		0.50		0.00	
pyrene	105.53		1.94		0.65		1.73		0.60		0.00	
benzo(a)anthracene ++	47.24	*	0.85		0.00		0.87		0.00		0.00	
chrysene ++	42.21		0.78		0.00		0.79		0.00		0.00	
benzo(b) fluoranthene ++	20.10		0.39		0.00		0.47		0.00		0.00	
benzo(k) fluoranthene ++	31.16		0.50		0.00		0.51		0.00		0.00	
benzo (a) pyrene ++	35.18	*	0.54		0.00		0.55		0.00		0.00	
indeno (1,2,3 - cd) pyrene ++	16.58		0.19		0.00		0.00		0.00		0.00	
dibenzo (a,h) anthracene ++	6.03		0.00		0.00		0.00		0.00		0.00	
benzo (g,h,i) perylene	20.60		0.23		0.00		0.00		0.00		0.00	
TOC	19900.00		25800.00		26300.00		25400.00		30000.00		30000.00	

Analyte (ug/g OC))	SED-26A 0-2 FT.		SED-26B 2-4 FT.		SED-27A 0-2 FT.		SED-27B 2-4 FT.		SED-27C 4-6 FT.		SED-27D 6-8 FT.	
naphthalene ++	10.62		0.00		0.00		0.00		0.00		0.00	
2-methylnaphthalene	11.50		0.00		0.00		0.00		0.00		0.00	
acenaphthylene	221.24		1.70		0.00		0.00		0.26		0.00	
acenaphthene	17.70		0.00		0.00		0.00		0.00		0.00	
fluorene	67.26	*	1.04		0.00		0.00		0.00		0.00	
phenanthrene	592.92	*	7.41		0.00		0.00		2.38		0.40	
anthracene	283.19	*	3.04		0.00		0.00		1.65		0.00	
fluoranthene	1061.95	*	11.85		0.35		0.00		5.19		0.50	
pyrene	1769.91	*	12.59		0.00		0.00		11.26		0.63	
benzo(a)anthracene ++	787.61	*	7.04		0.00		0.00		4.07		0.00	
chrysene ++	716.81		6.00		0.00		0.00		3.81		0.00	
benzo(b) fluoranthene ++	353.98		3.26		0.00		0.00		1.65		0.00	
benzo(k) fluoranthene ++	504.42	*	4.30		0.00		0.00		2.34		0.00	
benzo (a) pyrene ++	584.07	*	4.37	*	0.00		0.00		2.64	*	0.00	
indeno (1,2,3 - cd) pyrene ++	274.34	*	1.78		0.00		0.00		1.13		0.00	
dibenzo (a,h) anthracene ++	106.19		0.00		0.00		0.00		0.43		0.00	
benzo (g,h,i) perylene	336.28	*	1.78		0.00		0.00		1.34		0.00	
TOC	11300.00		13500.00		14200.00		9730.00		23100.00		30000.00	

Analyte (ug/g OC))	SED-28A 0-2 FT.		SED-28B 2-4 FT.		SED-28C 4-6 FT.		SED-29A 0-2 FT.		SED-29B 2-4 FT.		SED-29C 4-6 FT.	
naphthalene ++	3.82		0.00		0.00		0.00		0.00		0.00	
2-methylnaphthalene	5.81		0.00		0.00		0.00		0.00		0.00	
acenaphthylene	12.50		0.00		0.00		3.55		0.00		0.00	
acenaphthene	29.41		0.00		0.00		3.75		0.00		0.00	
fluorene	22.06	*	0.00		0.00		5.79		0.00		0.00	
phenanthrene	183.82	*	0.00		0.00		46.33		1.02		0.00	
anthracene	57.35		0.00		0.00		12.74		0.00		0.00	
fluoranthene	110.29		0.00		0.00		21.24		0.75		0.00	
pyrene	125.00		0.00		0.00		29.73		1.05		0.00	
benzo(a)anthracene ++	72.79	*	0.00		0.00		10.81		0.41		0.00	
chrysene ++	68.38		0.00		0.00		10.04		0.31		0.00	
benzo(b) fluoranthene ++	47.79		0.00		0.00		4.63		0.00		0.00	
benzo(k) fluoranthene ++	49.26		0.00		0.00		6.56		0.00		0.00	
benzo (a) pyrene ++	60.29	*	0.00		0.00		8.11	*	0.00		0.00	
indeno (1,2,3 - cd) pyrene ++	6.32		0.00		0.00		2.55		0.00		0.00	
dibenzo (a,h) anthracene ++	2.50		0.00		0.00		0.85		0.00		0.00	
benzo (g,h,i) perylene	5.00		0.00		0.00		2.33		0.00		0.00	
TOC	13600.00		25200.00		22700.00		25900.00		29500.00		30000.00	

* indicates the compound exceeds one or more of the following sediment criteria values (see Table 7-2):
Technical guidance for screening contaminated sediments, NYSDEC 1999
EPA Region 4 Waste management div. Sediment screening values for hazardous waste sites
EqP derived sediment quality benchmarks, ORNL 1997
Selected toxicity test-and screening level concentration-based sediment quality benchmarks for freshwater sediments, ORNL 1997
EPA Office of Solid Waste and emergency Response ecotoxicological thresholds, ORNL 1997
Washington State Sediment Quality Standards, WAC 172-204-320 (marine)

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TABLE 8-1
Identification of Contaminants of Concern - Exceed NYSDEC SCGs

Compound	Groundwater		Subsurface Soil		Sediment		Surface Water		Indoor Air	
	Ave	Max	Mean	Max	Ave	Max	Mean	Max	Ave	Max
VOCs									*	**
Acetone			X	X						X
2-Butanone			X	X						
Benzene	X	X	X	X					X	X
Toluene	X	X	X	X					X	X
Ethylbenzene	X	X	X	X					X	X
Styrene	X	X							X	X
Total Xylenes	X	X	X	X					X	X
SVOCs	Ave- Ph.I	Ave- Ph.II	Mean	Max	Ave	Max	Mean	Max	Mean	Max
Phenol	X	X	X	X						
2-Methylphenol	X	X	X	X						
4-Methylphenol	X	X	X	X						
Benzoic acid			X	X						
Naphthalene	X	X	X	X						
2-Methylnaphthalene										
Acenaphthylene	X	X								
Acenaphthene	X	X				X				
Dibenzofuran										
2,4-Dimethylphenol		X								
Diethylphthalate										
Fluorene						X				
Phenanthrene			X	X		X				
Anthracene						X				
Carbazole										
Di-n-butylphthalate										
Fluoranthene						X				
Pyrene						X				
Benzo(a)anthracene	X		X	X	X	X				
Chrysene	X		X	X	X	X				
Bis(2-ethyhexyl) phthalate										
Di-n-octylphthalate										
Benzo(b)fluoranthene	X		X	X	X	X				
Benzo(k)fluoranthene	X		X	X	X	X				
Benzo(a)pyrene	X		X	X	X	X				
Indeno(1,2,3 - cd)pyrene	X		X	X	X	X				
Dibenz(a,h)anthracene	X		X	X	X	X				
Benzo(g,h,i)perylene	X					X				

	Indicates the compound was not elevated in this media above a cleanup goal or criteria.
	Indicates that the media was not sampled for this compound.
X	Indicates that compound concentration (mean concentration or maximum concentration) exceeded cleanup goal or criteria.

* Freon 12, 1,2,4-Trimethylbenzene, and Hexane also exceeded SCG

** Freon 12, 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, and Hexane also exceeded SCG

Printed 7/1/03, 1:45 PM

TABLE 8-2
Identification of Contaminants of Concern - Exceed USEPA Region 9 PRGs

Compound	Groundwater		Subsurface Soil		Sediment		Surface Water		Indoor Air	
	Ave	Max	Mean	Max	Ave	Max	Mean	Max	Ave	Max
VOCs									*	**
Acetone										
2-Butanone										
Benzene	X	X	X	X					X	X
Toluene		X								
Ethylbenzene	X	X		X					X	X
Styrene										
Total Xylenes	X	X								
SVOCs	Ave- Ph.I	Ave- Ph.II	Mean	Max	Ave	Max	Mean	Max	Mean	Max
Phenol	X	X								
2-Methylphenol	X	X								
4-Methylphenol	X	X								
Benzoic acid										
Naphthalene	X	X	X	X						
2-Methylnaphthalene										
Acenaphthylene	X	X								
Acenaphthene	X	X								
Dibenzofuran			X	X						
2,4-Dimethylphenol		X								
Diethylphthalate										
Fluorene										
Phenanthrene										
Anthracene										
Carbazole			X	X						
Di-n-butylphthalate										
Fluoranthene										
Pyrene				X						
Benzo(a)anthracene	X				X	X				
Chrysene	X					X				
Bis(2-ethyhexyl) phthalate										
Di-n-octylphthalate										
Benzo(b)fluoranthene	X				X	X				
Benzo(k)fluoranthene	X					X				
Benzo(a)pyrene	X				X	X				
Indeno(1,2,3 - cd)pyrene	X				X	X				
Dibenz(a,h)anthracene	X				X	X				
Benzo(g,h,i)perylene	X									

	Indicates the compound was not elevated in this media above a cleanup goal or criteria.
	Indicates that the media was not sampled for this compound.
X	Indicates that compound concentration (mean concentration or maximum concentration) exceeded cleanup goal or criteria.

* Tetrahydrofuran also exceeded SCG

** 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, and Tetrahydrofuran also exceeded SCG

TABLE 8-2, continued
Identification of Contaminants of Concern - Exceed USEPA Region 9 PRGs

Compound	Groundwater		Subsurface Soil		Sediment		Surface Water	
	Ave.	Max	Mean	Max	Ave	Max	Mean	Max
Metals/Inorganics								
Aluminum								
Antimony								
Arsenic	X	X	X	X	X	X		
Barium								
Beryllium								
Cadmium		X						
Calcium								
Chromium		X						
Cobalt								
Copper								
Iron		X				X		
Lead								
Magnesium								
Manganese		X						
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Total Cyanide								

	Indicates the compound was not elevated in media above a cleanup goal or criteria.
	Indicates that the media was not sampled for this compound.
X	Indicates that compound concentration (mean or max concentration) exceeded cleanup goal or criteria.

TABLE 8-3 (Page 1 of 2)
SELECTION OF EXPOSURE PATHWAYS
NYSEG Cortland/Homer - Former MGP

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Existing Pathway Yes/No	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Groundwater	Tap Water	Resident	Adult	Dermal	Off-Site	No	No residential wells in vicinity of site
						Ingestion	Off-Site	No	No residential wells in vicinity of site
					Child	Dermal	Off-Site	No	No residential wells in vicinity of site
						Ingestion	Off-Site	No	No residential wells in vicinity of site
		Air	Vapors at Showerhead	Resident	Adult	Inhalation	Off-Site	No	No residential wells in vicinity of site
					Child	Inhalation	Off-Site	No	No residential wells in vicinity of site
		Air	Air (migration from subsurface)	Resident	Adult	Inhalation	Off-Site	No	No residences in areas of impact
					Child	Inhalation	Off-Site	No	No residences in areas of impact
				Worker	Adult	Inhalation	On-Site	Yes	Impacts under building
				Worker	Adult	Inhalation	Off-Site	Yes	Impacts under adjacent building
	Soil	Surface soil	Surface Soil	Worker	Adult	Inhalation	On & Off-Site	Yes	Impacted Surface Soil detected
						Ingestion	On & Off-Site	Yes	Impacted Surface Soil detected
						Dermal	On & Off-Site	Yes	Impacted Surface Soil detected
		Air	release of VOCs	Worker	Adult	Inhalation	On & Off-Site	Yes	Impacted Surface Soil detected
			release of VOCs	Resident	All ages	Inhalation	On & Off-Site	No	No residences in areas of impact
	Subsurface Soil	Soil and NAPL	Subsurface Soil and/or NAPL	Worker	Adult	Inhalation	On & Off-Site	Yes	Subsurface Impacts on site and off
						Ingestion	On & Off-Site	Yes	Subsurface Impacts on site and off
						Dermal	On & Off-Site	Yes	Subsurface Impacts on site and off
		Air	Air (migration from subsurface)	Worker	Adult	Inhalation	On Site	Yes	Migration of vapors into buildings
				Worker	Adult	Inhalation	Off-Site	Yes	Seeps found in off-site buildings
	Sediment and Surface Water	Sediment and Water	In River	Trespasser - (Recreation	Adult	Ingestion	Off-Site	Yes	Recreational contact with sediment in river
						Dermal	Off-Site	Yes	Recreational contact with sediment in river
					Teen/ Child	Ingestion	Off-Site	Yes	Recreational contact with sediment in river
						Dermal	Off-Site	Yes	Recreational contact with sediment in river

DEC-02601

TABLE 8-3 (Page 2 of 2)
SELECTION OF EXPOSURE PATHWAYS
NYSEG Cortland/Homer - Former MGP

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Future Pathway Yes/No	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Groundwater	Tap Water	Resident	Adult	Dermal	Off-Site	No	Future development could include wells
						Ingestion	Off-Site	No	Future development could include wells
					Child	Dermal	Off-Site	No	Future development could include wells
						Ingestion	Off-Site	No	Future development could include wells
		Air	Vapors at Showerhead	Resident	Adult	Inhalation	Off-Site	No	Future development could include wells
					Child	Inhalation	Off-Site	No	Future development could include wells
		Air	Air (migration from subsurface)	Resident	Adult	Inhalation	Off-Site	No	Future development could include homes
					Child	Inhalation	Off-Site	No	Future development could include homes
				Worker	Adult	Inhalation	On-Site	Yes	Impacts under building
				Worker	Adult	Inhalation	Off-Site	Yes	Impacts under adjacent building
	Soil	Surface soil	Surface Soil	Worker	Adult	Inhalation	On & Off-Site	Yes	Impacted Surface Soil detected
						Ingestion	On & Off-Site	Yes	Impacted Surface Soil detected
						Dermal	On & Off-Site	Yes	Impacted Surface Soil detected
				Resident	Adult	Inhalation	On & Off-Site	Yes	Future development could include homes
					Child	Inhalation	On & Off-Site	Yes	Future development could include homes
				Resident	Adult	Ingestion	On & Off-Site	Yes	Future development could include homes
					Child	Ingestion	On & Off-Site	Yes	Future development could include homes
				Resident	Adult	Dermal	On & Off-Site	Yes	Future development could include homes
					Child	Dermal	On & Off-Site	Yes	Future development could include homes
		Air	release of VOCs	Worker	Adult	Inhalation	On & Off-Site	No	Impacted Surface Soil detected
	Subsurface Soil	Soil and NAPL	Subsurface Soil and/or NAPL	Worker	Adult	Inhalation	On & Off-Site	Yes	Subsurface Impacts on site and off
						Ingestion	On & Off-Site	Yes	Subsurface Impacts on site and off
						Dermal	On & Off-Site	Yes	Subsurface Impacts on site and off
		Air	Air (migration from subsurface)	Worker	Adult	Inhalation	On Site	Yes	Migration of vapors into buildings
				Worker	Adult	Inhalation	Off-Site	Yes	Seeps found in off-site buildings
	Sediment and Surface Water	Sediment and Water	In River	Trespasser - (Recreation	Adult	Ingestion	Off-Site	Yes	Recreational contact with sediment in river
						Dermal	Off-Site	Yes	Recreational contact with sediment in river
					Teen/ Child	Ingestion	Off-Site	Yes	Recreational contact with sediment in river
						Dermal	Off-Site	Yes	Recreational contact with sediment in river

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TABLE 8-4
Summary of Contaminants of Concern Associated with Complete Exposure Pathways

Exposure Pathway	Affected Media	Potential for Occurrence	Contaminants of Concern (Mean Conc. > Background and SCGs)	Contaminants of Potential Concern (Max Conc. > Background and SCGs)
Ingestion of Groundwater	Groundwater	Possible, but unlikely under Future conditions only	benzene, toluene, ethylebenzene, xylene, 1,1,2-TCA, styrene, phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, naphthalene, benzo(a)anthracene, chrysene, B(b)F, B(k)F, B(a)P, indeno(1,2,3-cd)pyrene, manganese	acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyreme
Inhalation of Soil Vapor in Buildings	Groundwater and Subsurface	Possible for People working in Site bldgs.	benzene, toluene, ethylebenzene, xylene, 1,1,2-TCA, styrene, acetone, 2-butanone	No additional contaminants
Accidental Ingestion and/or Inhalation of Soil	Surface and Subsurface Soil	Possible	B(b)F, B(k)F, B(a)P, dibenz(a,h)anthracene, 2-methylphenol, 4-methylphenol, naphthalene, dibenzofuran, B(a)A, chrysene, indeno(1,2,3-cd)pyrene, acetone, 2-butanone, benzene, xylenes, chromium, copper, lead, beryllium, iron, mercury, nickel, zinc	2-methylnaphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, magnesium, manganese
Dermal Contact with Soil/DNAPL	Surface and Subsurface Soil	Possible	B(b)F, B(k)F, B(a)P, dibenz(a,h)anthracene, 2-methylphenol, 4-methylphenol, naphthalene, dibenzofuran, B(a)A, chrysene, indeno(1,2,3-cd)pyrene, acetone, 2-butanone, benzene, xylenes, chromium, copper, lead, beryllium, iron, mercury, nickel, zinc	2-methylnaphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, magnesium, manganese
Ingestion and/or Dermal Contact with Sediment/ DNAPL	Sediment	Possible	naphthalene, fluorene, benzo(a)anthracene, benzo(a)pyrene, antimony, copper, mercury, zinc	benzene, phenol, acenaphthene, phenanthrene, iron
Ingestion via bio-accumulation	Sediment and/or Surface Water	Possible	naphthalene, fluorene, benzo(a)anthracene, benzo(a)pyrene, antimony, copper, mercury, zinc	benzene, phenol, acenaphthene, phenanthrene, iron

DEC-02603

TABLE 8-5

Identification of Non-carcinogenic Health Effects Associated with Contaminants of Concern

Chemical of Concern	*Media*					*RfD* [1]	*Uncert.*	*Mod.*	*Target*	*Conf.*
VOCs	*Air*	*Surface Soil*	*Sub. Soil*	*Grndwater*	*Sediment*	(mg/kg/day	*Factor*	*Factor*	*Organ/effect*	
Acetone			√			0.1	*1000*	1	*kidney, liver*	low
2-Butanone			√			0.6	*3000*	1	*low birth wt.*	low
Freon 12	√					0.2	100	1	reduced body wt.	medium
1,2,4-Trimethylbenzene	√					*Not listed in EPA Database.*				
1,3,5-Trimethylbenzene	√					*Not listed in EPA Database.*				
Hexane	√					*Not Available at this time*				
Benzene	√		√	√	√	*Not Available at this time*				
Toluene				√		0.2	*1000*	1	*liver, kidney*	medium
Ethylbenzene	√			√		0.1	*1000*	1	*liver, kidney*	low
Styrene				√		0.2	*1000*	1	*blood, liver*	medium
Xylenes (total)			√	√		0.2	*1000*	1	*inc. mortality*	medium
SVOCs										
Phenol		√		√	√	0.3	300	1	dec maternal wt	medium
2-Methylphenol				√		0.05	1000	1	neurotoxicity	medium
4-Methylphenol				√		*RfD* withdrawn in 1991				
2,4-Dimethylphenol				√		0.02	3000	1	blood, lethargy	low
Naphthalene			√	√	√	0.02	3000	1	dec. body weight	low
2-Methylnaphthalene			√			*Not listed in EPA Database.*				
Acenaphthylene			√	√		N/A				
Acenaphthene			√	√	√	0.06	3000	1	blood	low
Dibenzofuran			√			N/A				
Fluorene			√		√	0.04	3000	1	blood	low
Fluoranthene			√			0.04	3000	1	kidney, liver	low
Phenanthrene			√		√	N/A				
Anthracene			√			0.3	3000	1	-	low
Carbazole		√				Not listed in EPA Database.				
Pyrene				√		0.03	3000	1	kidney	low
Benz[a]anthracene		√	√	√	√	N/A				
Chrysene			√	√		N/A				
Benzo[b]fluoranthene		√	√	√		N/A				
Benzo[k]fluoranthene		√	√	√		N/A				
Benzo[a]pyrene		√	√	√	√	N/A				
Indeno[1,2,3 - cd]pyrene		√	√	√		N/A				
Dibenz[a,h]anthracene		√	√	√		N/A				
Benzo[g,h,I]perylene				√		N/A				

[1] Health information obtained from EPA's Integrated Risk Information System (IRIS) database.

N/A indicates the parameter is not available at this time.

√ indiates mean conc. of compound exceeded cleanup goal or criteria.

TABLE 8-5, continued

Identification of Non-carcinogenic Health Effects Associated with Contaminants of Concern

Chemical of Concern	*Media*					*RfD* [1]	*Uncert.*	*Mod.*	*Target*	*Conf.*
VOCs	*Air*	*Surface Soil*	*Sub. Soil*	*Grndwater*	*Sediment*	(mg/kg/day)	*Factor*	*Factor*	*organ/ effect*	
Metals										
Arsenic		√		√		0.0003	3	1	skin, vasc. System	medium
Barium				√		0.07	3	1	kidney	medium
Beryllium			√			0.002	300	1	small intestine	low
Cadmium				√		0.0005	10	1	kidney	high
Cr Cr(III)			√	√		1.5	100	10		low
Cr Cr(VI)						0.003	300	3		low
Copper			√		√	N/A				
Iron			√	√	√	*Not listed in EPA Database - essential nutrient*				
Lead			√	√		*Effects appear to occur without threshold.*				
Magnesium				√		*Not listed in EPA Database - essential nutrient*				
Manganese				√		0.14	1	1	CNS System	medium
Mercury			√		√	0.0003	1000	1	autoimmune sys.	high
Nickel (soluble salts)			√	√		0.02	300	1	dec wt/organ wt.	medium
Zinc			√		√	0.3	3	1	-	medium
Inorganics										
Cyanide (free)						0.02	100	5	cellular necrosis	medium

[1] Health information obtained from EPA's Integrated Risk Information System (IRIS) database.

N/A indicates the parameter is not available at this time.

√ indiates mean conc. of compound exceeded cleanup goal or criteria.

TABLE 8-6

Identification of Carcinogenic Health Effects Associated with Contaminants of Concern

Chemical of Concern *VOCs*	*Media**					*Slope factor* *1/(mg/kg/day)*	*Class **	*Target organ*
	Air	*Surface Soil*	*Sub. Soil*	*Gr\ndwater*	*Sediment*			
Acetone			√			None	D	
2-Butanone			√			None	D	
Freon 12	√					Has not undergone carcinogenicity review		
1,2,4-Trimethylbenzene	√					Not listed in EPA Database.		
1,3,5-Trimethylbenzene	√					Not listed in EPA Database.		
Hexane	√					N/A		
Benzene	√		√	√	√	1.5E-2 to 5.5E-2	A	blood
Toluene				√		None	D	
Ethylbenzene	√			√		None	D	
Styrene				√		Under review as of May 1990		
Xylenes (total)			√	√		Data inadequate to assess the carcinogenicity		
SVOCs								
Phenol		√		√	√	None	D	
2-Methylphenol				√		None	C	skin
4-Methylphenol				√		None	C	
2,4-Dimethylphenol				√		Not evaluated at this time		
Naphthalene			√	√	√	Not derived	C[1]	
2-Methylnaphthalene			√			Not listed in EPA Database.		
Acenaphthylene			√	√		None	D	
Acenaphthene			√	√	√	Not Available - Pulled for re-evaluation 5/93		
Dibenzofuran			√			None	D	
Fluorene			√		√	None	D	
Fluoranthene			√			None	D	
Phenanthrene			√		√	None	D	
Anthracene			√			None	D	
Carbazole		√				Not listed in EPA Database.		
Pyrene				√		None	D	
Benz[a]anthracene		√	√	√	√	N/A	B2	multiple
Chrysene			√	√		N/A	B2	multiple
Benzo[b]fluoranthene		√	√	√		N/A	B2	multiple
Benzo[k]fluoranthene		√	√	√		N/A	B2	multiple
Benzo[a]pyrene		√	√	√	√	4.5E+0 to 11.7E+0	B2	multiple
Indeno[1,2,3 - cd]pyrene		√	√	√		N/A	B2	
Dibenz[a,h]anthracene		√	√	√		N/A	B2	
Benzo[g,h,I]perylene				√		None	D	

* *Weight of Evidence Classification:

A = Human Carcinogen

B1 = Probable Human Carcinogen, limited human data.

B2 = Probable Human Carcinogen, inadequate human data.

C = Possible Human Carcinogen

D = Not classifiable as to Human Carcinogenicity.

N/A = Not available at this time.

√ indiates conc. of compound exceeded cleanup goal

[1] EPA reclassified Naphthalene to Class C in Sept. 1998, however human cancer potential "cannot be determined."

*** Inhalation unit risk in units of $\mu g/m^3$

TABLE 8-6, continued
Identification of Carcinogenic Health Effects Associated with Contaminants of Concern

Chemical of Concern *VOCs*	*Media**					*Slope factor* *1/(mg/kg/day)*	*Class **	*Target organ*
	Air	*Surface Soil*	*Sub. Soil*	*Groundwater*	*Sediment*			
Metals								
Arsenic		√		√		1.5	A	multiple
Barium				√		Not available		
Beryllium			√			Not available	B1	oral exposure
Cadmium				√		N/A	B1	ung (inhalation)
Chromium (Cr(VI))			√	√		0.012 ***	A/D	Inhal./Oral
Chromium (Cr(III))						None	D	
Copper			√		√	None	D	
Iron			√	√	√	None	D	
Lead			√	√			B2	
Magnesium				√		Not listed in EPA Database.		
Manganese				√		None	D	
Mercury			√		√		C	kidney
Nickel (soluble salts)			√	√		None	D	
Zinc			√		√	Not evaluated for carcinogenicity		
Inorganics								
Cyanide (free)						None	D	

* *Weight of Evidence Classification:

[1] EPA reclassified Naphthalene to Class C in Sept. 1998, however human cancer potential "cannot be determined."

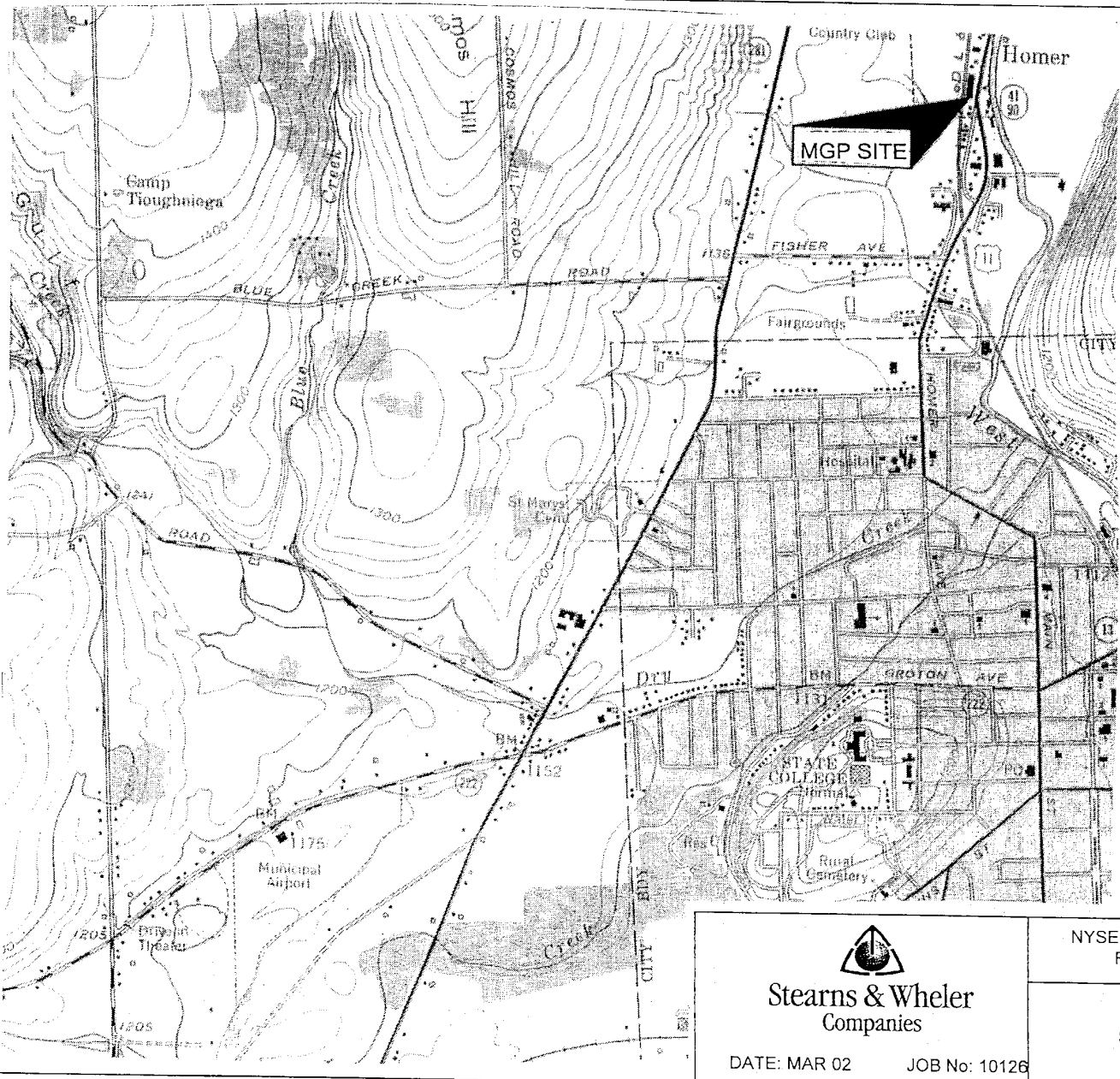
*** Inhalation unit risk in units of $\mu g/m^3$

A = Human Carcinogen
B1 = Probable Human Carcinogen, limited human data.
B2 = Probable Human Carcinogen, inadequate human data.
C = Possible Human Carcinogen
D = Not classifiable as to Human Carcinogenicity.
N/A = Not available at this time.

√ indiates conc. of compound exceeded cleanup goal

FIGURES

DEC-02609

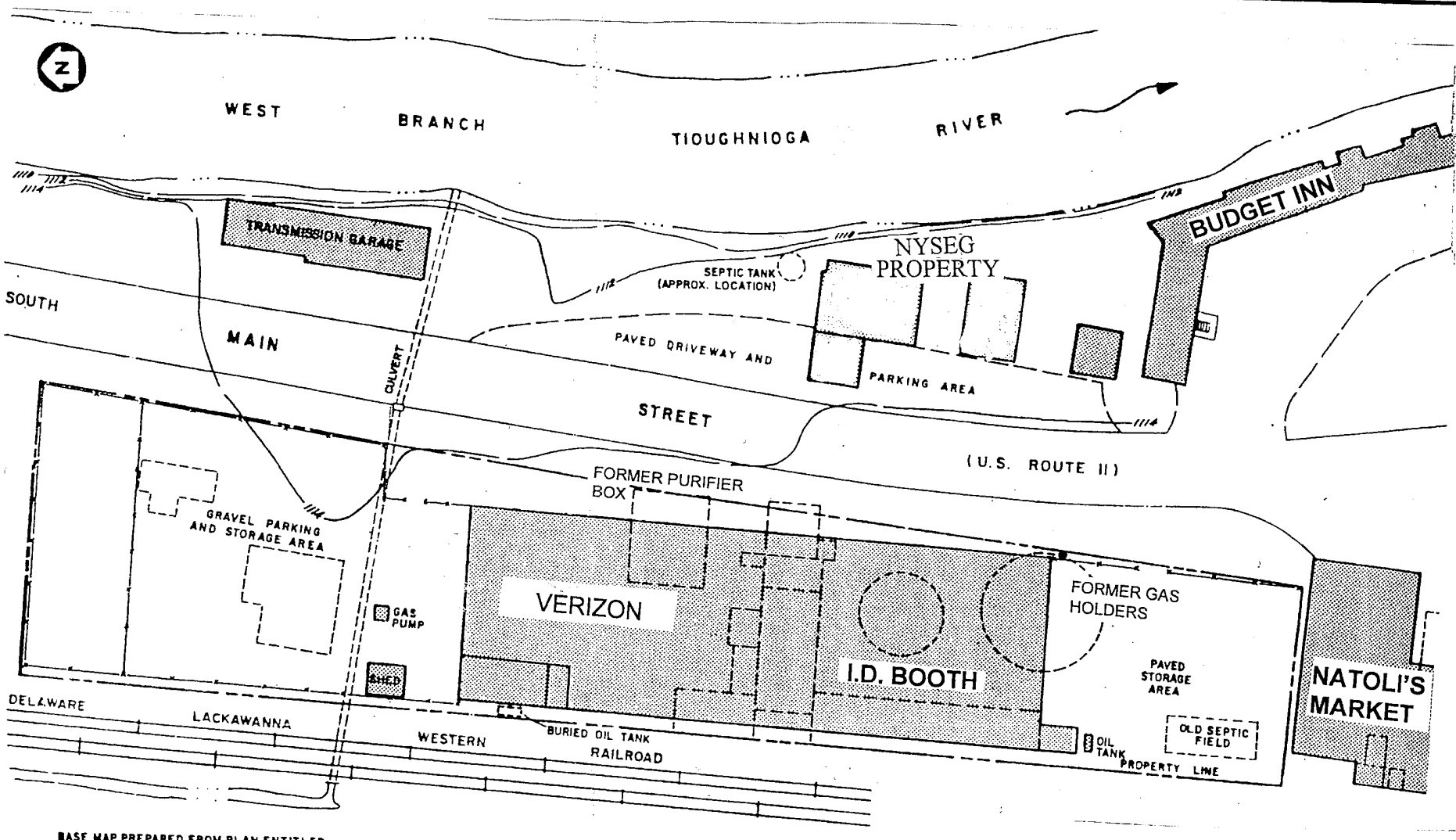


Stearns & Wheler
Companies

DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 1-1
SITE LOCATION



BASE MAP PREPARED FROM PLAN ENTITLED VILLAGE OF HOMER, NEW YORK, EXISTING WATER SYSTEM, DATED JULY 1975 OBTAINED FROM JOHN S. MACNEILL, JR., CONSULTING ENGINEER AND LAND SURVEYOR, HOMER, NY. AND FIELD CHECKED BY E.C. JORDAN (DEC. 1985.)

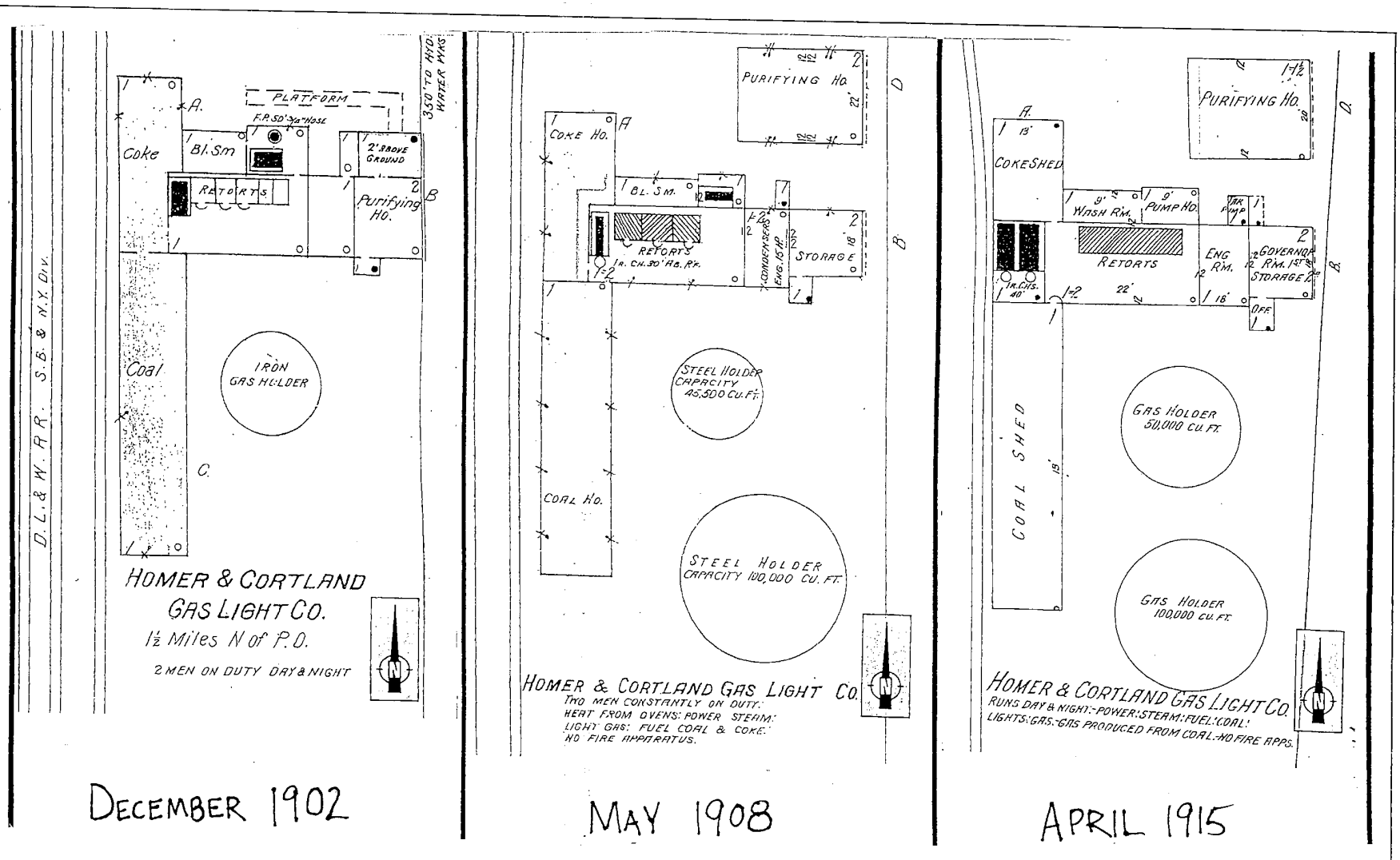
Stearns & Wheler Companies

DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 1-2
SITE PLAN

DEC-02610



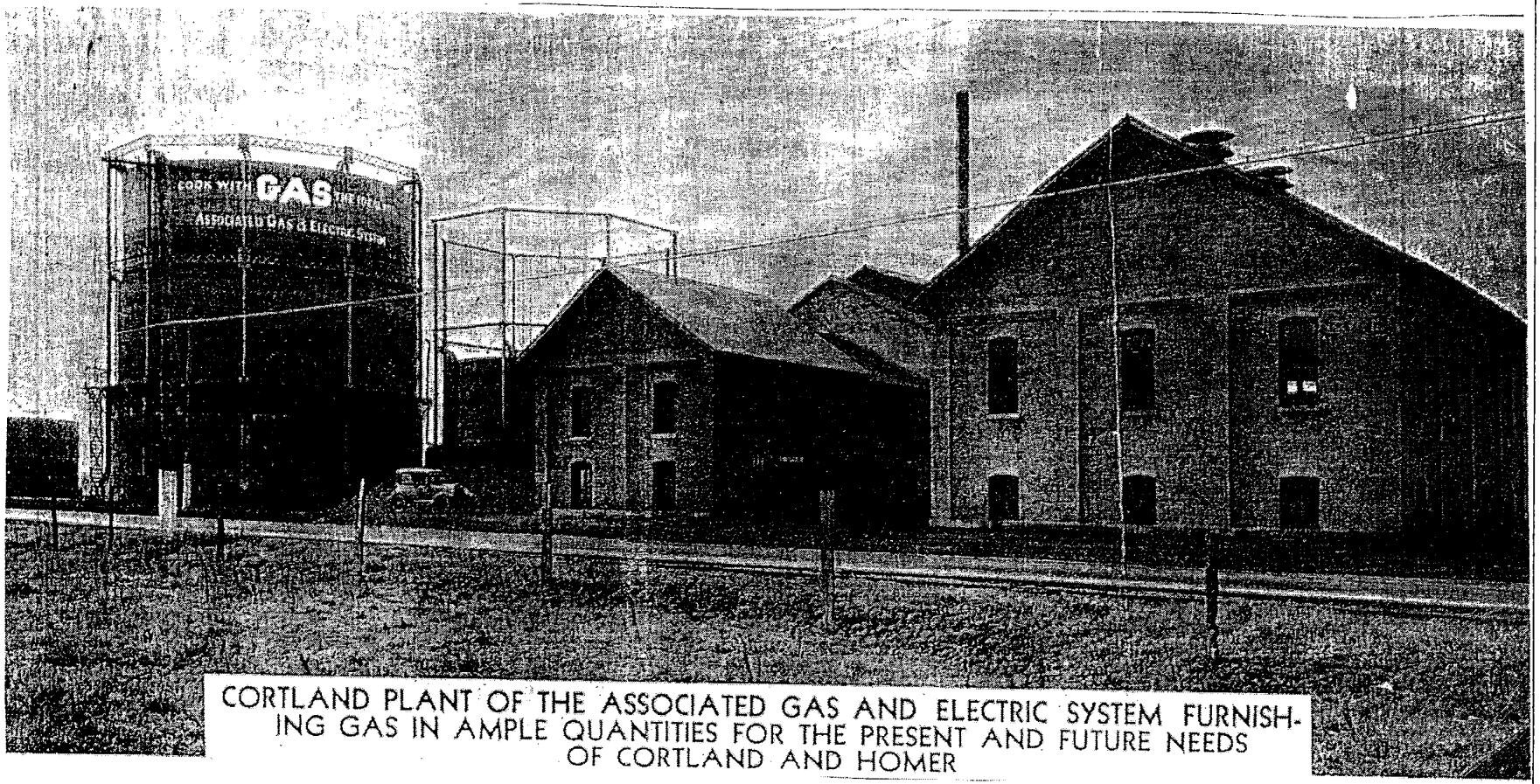
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NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 2-1
SANBORN™ MAPS

DEC-02611



CORTLAND PLANT OF THE ASSOCIATED GAS AND ELECTRIC SYSTEM FURNISHING GAS IN AMPLE QUANTITIES FOR THE PRESENT AND FUTURE NEEDS OF CORTLAND AND HOMER

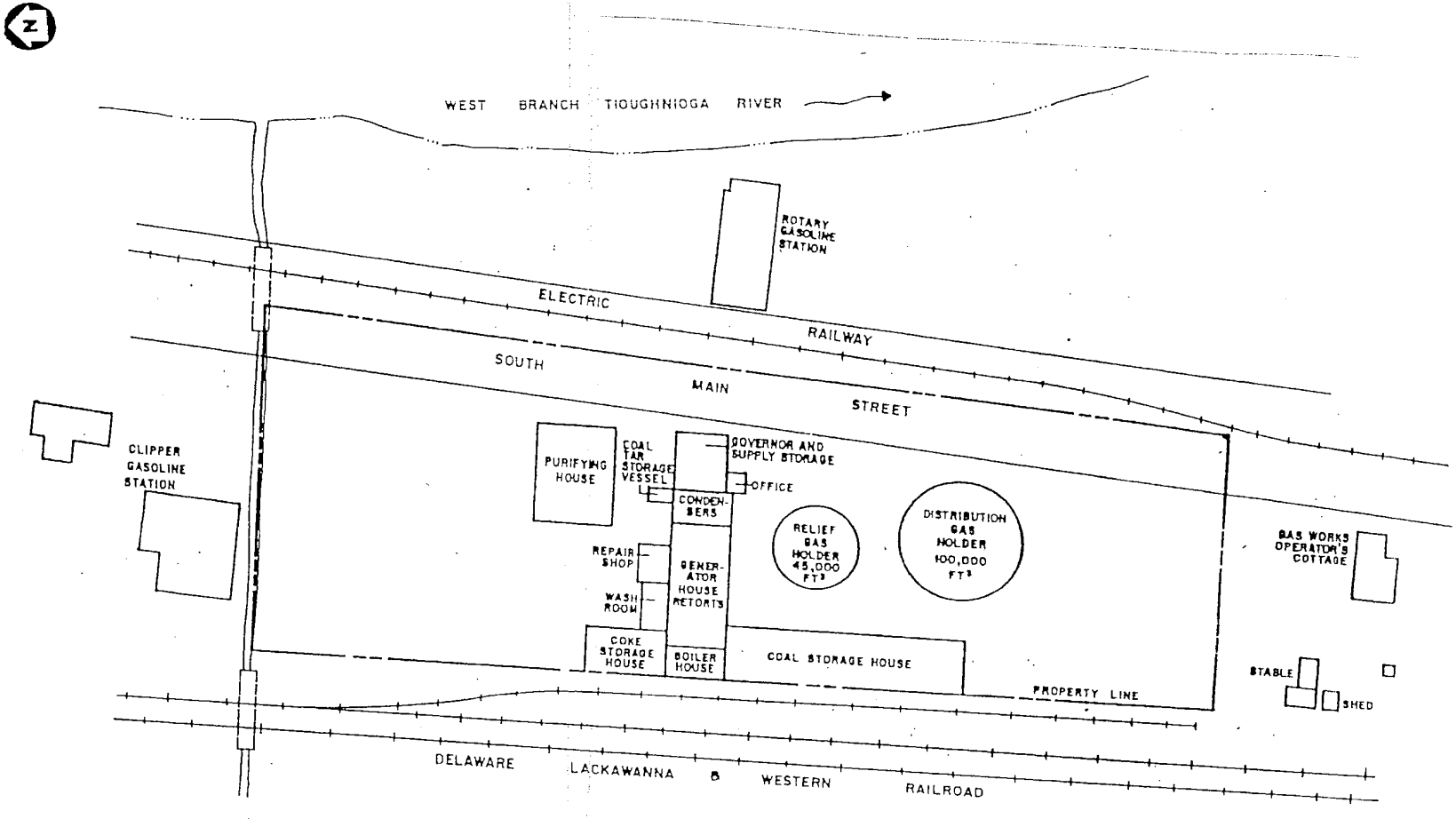
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DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 2-2
SITE PHOTOGRAPH CIRCA
LATE 1920S

DEC-02612



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

SOURCE: E.C. JORDAN 1987

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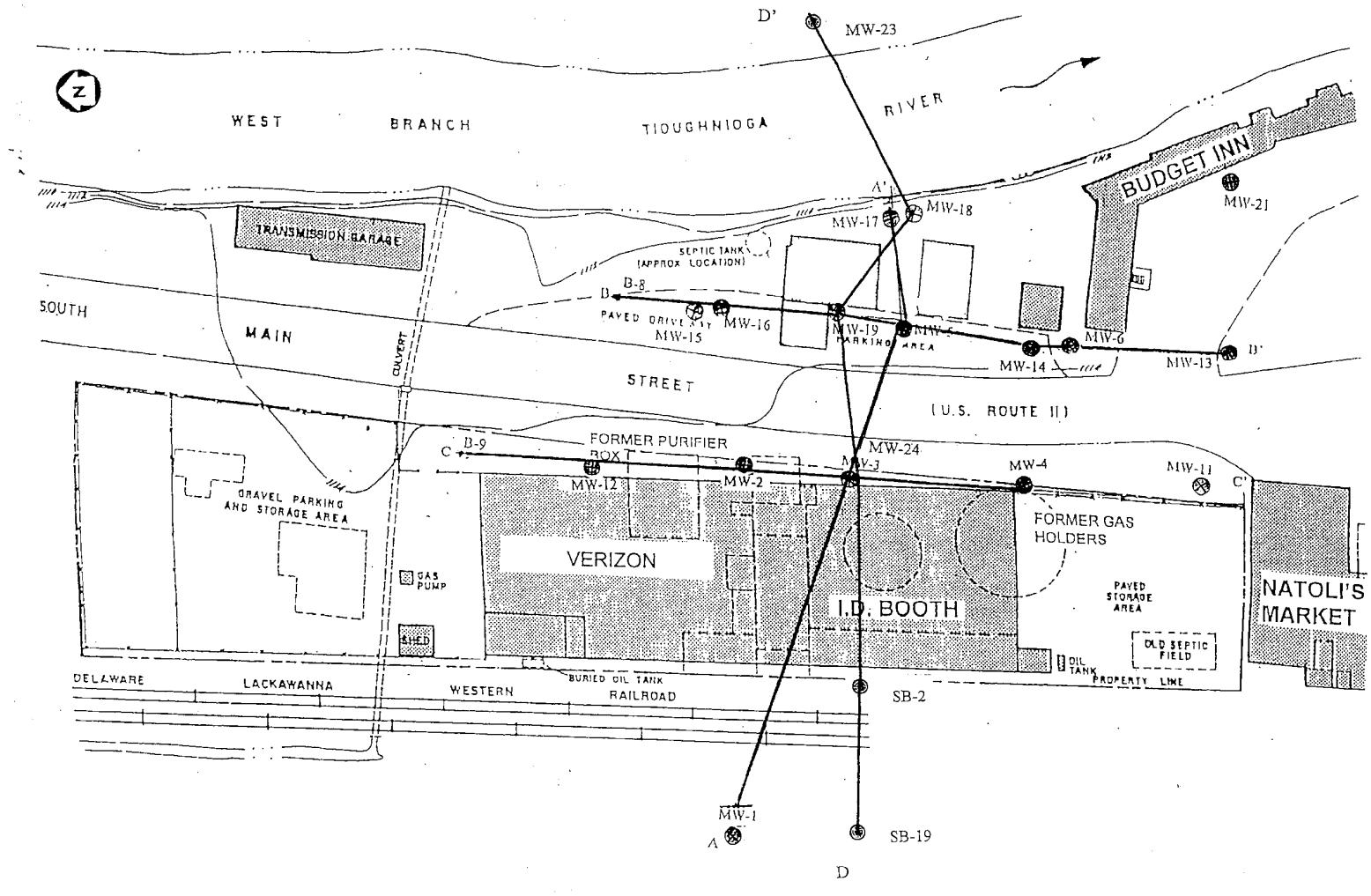
DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 2-3
COAL GASIFICATION PLANT
CIRCA 1920

DEC-02613

DEC-02614



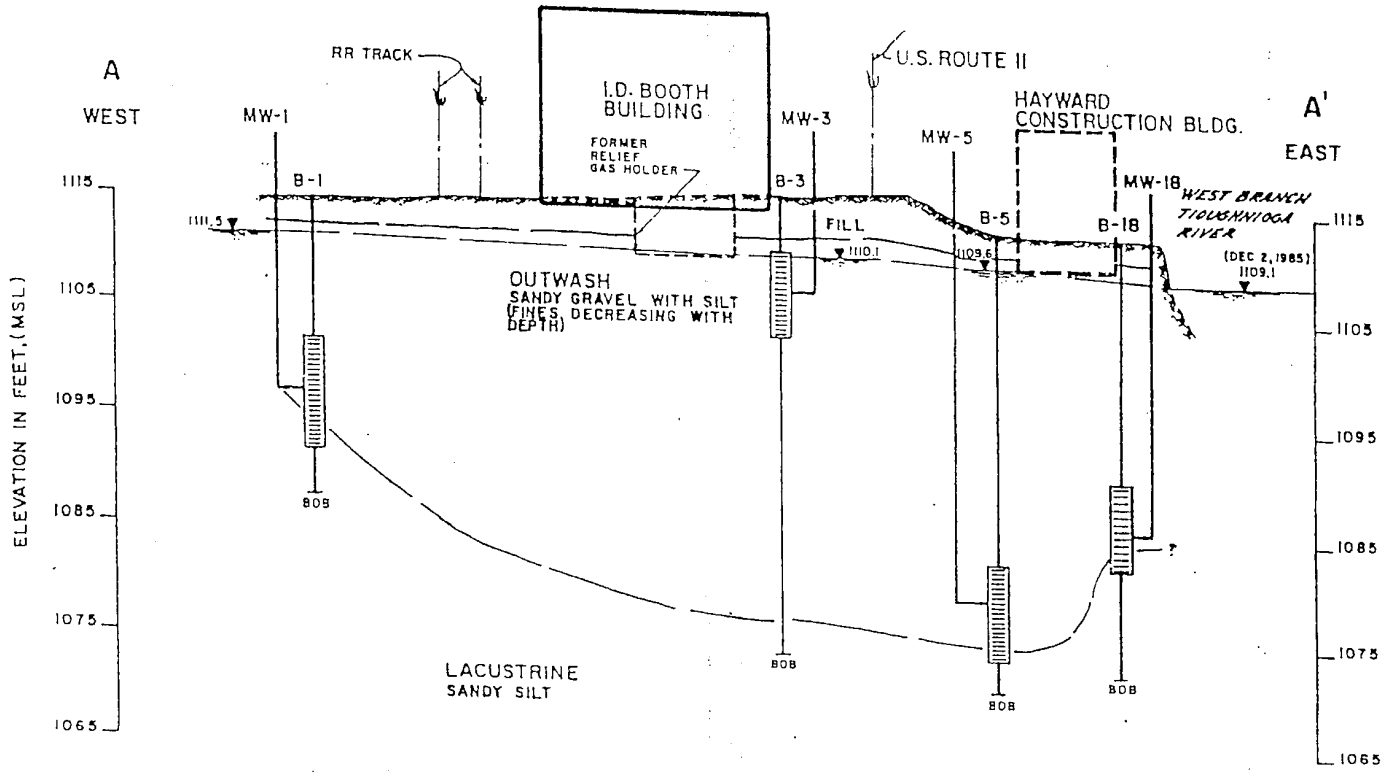
SOURCE: E.C. JORDAN 1987

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DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER FORMER MGP SRI

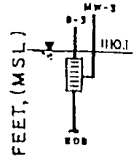
FIGURE 2-4
GEOLOGIC PROFILE LOCATIONS



GEOLOGIC DESCRIPTIONS

SANDY GRAVEL	GRAY TO BROWN, MOIST, FINE SAND AND GRAVEL W/VARYING AMOUNTS OF SILT (FINE FRACTION DECREASES WITH DEPTH)
SANDY SILT	GRAY SILT W/SOME CLAY AND OCCASIONAL FINE SAND

LEGEND



- BORING AND MONITORING WELL LOCATION
- OBSERVED WATER LEVEL (FEET, MSL) ON APRIL 19, 1986
- WELL SCREEN/ SAND BACKFILL
- BOTTOM OF BORING

NOTES:

1. SEE FIGURE 3-1 FOR LOCATION AND ORIENTATION OF PROFILE
2. PROFILES ARE BASED ON AN INTERPRETATION OF AVAILABLE SUBSURFACE EXPLORATIONS. ACTUAL CONDITIONS MAY VARY FROM THOSE SHOWN.

APPROXIMATE HORIZONTAL SCALE

0 50 100 FEET

VERTICAL EXAGGERATION 5:1

SOURCE: E.C. JORDAN 1987

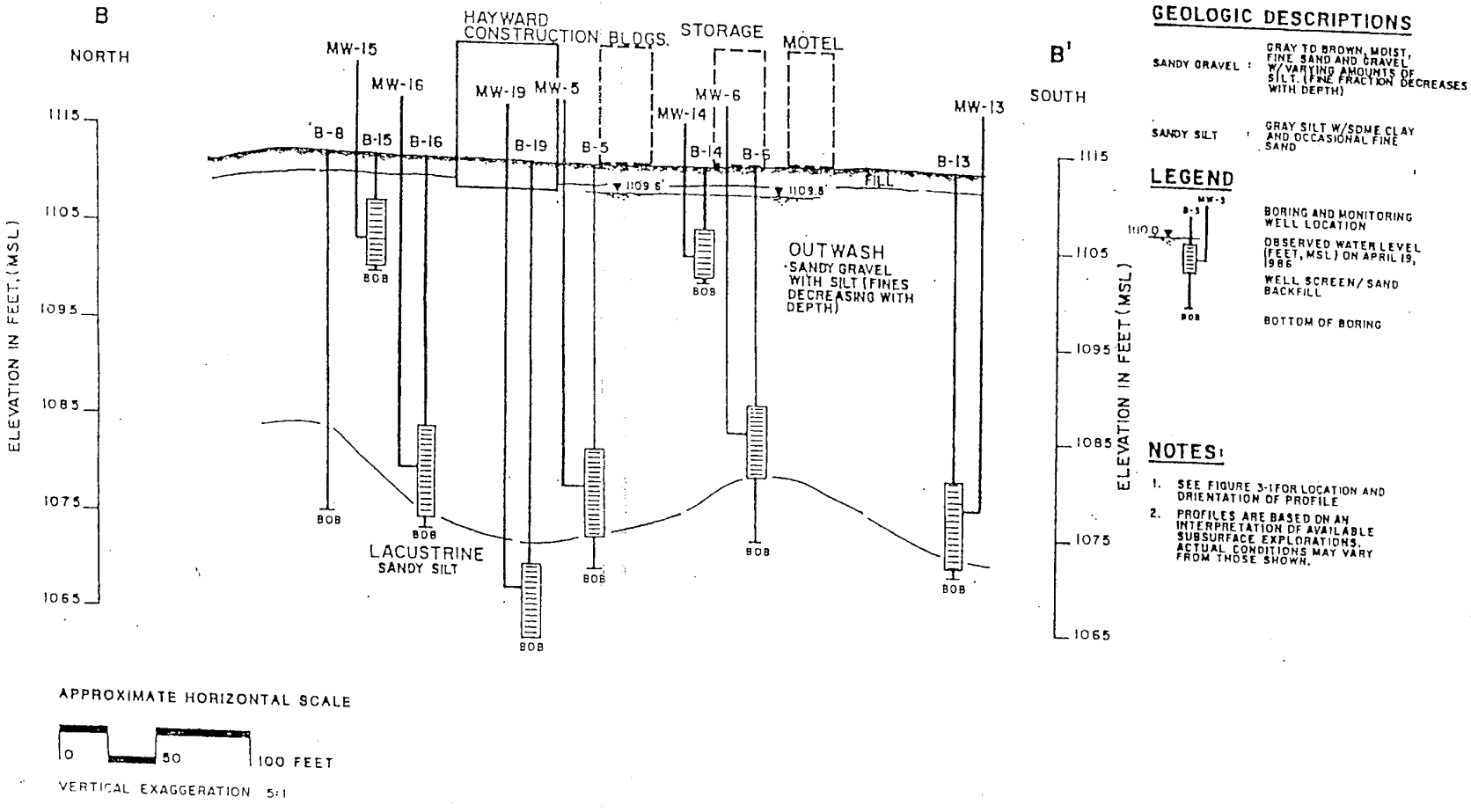
Stearns & Wheler Companies

DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 2-5
GEOLOGIC PROFILE A-A'

DEC-02615



GEOLOGIC DESCRIPTIONS

SANDY GRAVEL : GRAY TO BROWN, MOIST, FINE SAND AND GRAVEL W/VARYING AMOUNTS OF SILT. (FINE FRACTION DECREASES WITH DEPTH)

SANDY SILT : GRAY SILT W/SOME CLAY AND OCCASIONAL FINE SAND

LEGEND

MW-3
B-3
1109.9
BOB

BORING AND MONITORING WELL LOCATION

OBSERVED WATER LEVEL (FEET, MSL) ON APRIL 19, 1986

WELL SCREEN/SAND BACKFILL

BOTTOM OF BORING

NOTES:

1. SEE FIGURE 3-1 FOR LOCATION AND ORIENTATION OF PROFILE
2. PROFILES ARE BASED ON AN INTERPRETATION OF AVAILABLE SUBSURFACE EXPLORATIONS. ACTUAL CONDITIONS MAY VARY FROM THOSE SHOWN.

SOURCE: E.C. JORDAN 1987

Stearns & Wheler Companies

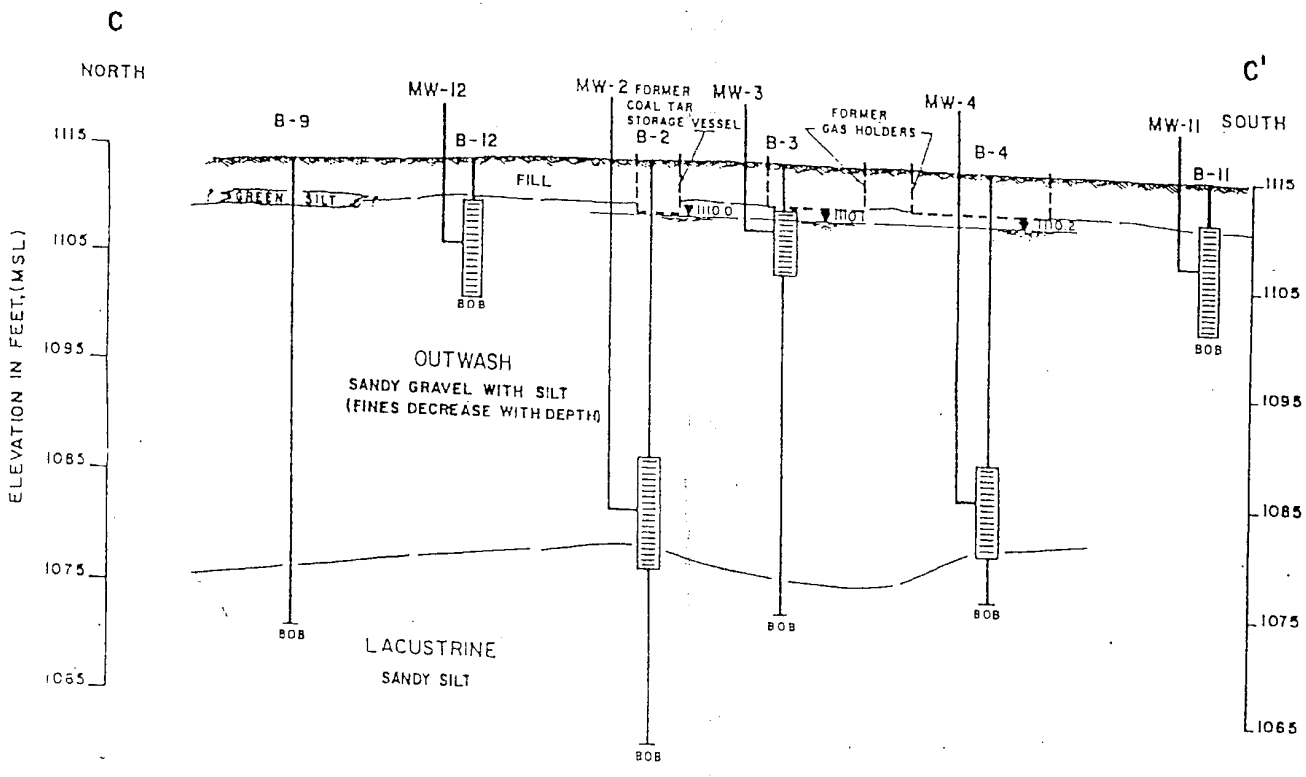
DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 2-6
GEOLOGIC PROFILE B-B'

DEC-02616

DEC-02617

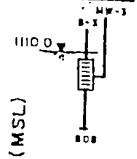


GEOLOGIC DESCRIPTIONS

SANDY GRAVEL : GRAY TO BROWN, MOIST, FINE SAND AND GRAVEL W/VARYING AMOUNTS OF SILT. (FINE FRACTION DECREASES WITH DEPTH)

SANDY SILT : GRAY SILT W/SOME CLAY AND OCCASIONAL FINE SAND

LEGEND



BORING AND MONITORING WELL LOCATION

OBSERVED WATER LEVEL (FEET, MSL) ON APRIL 19, 1986

WELL SCREEN / SAND BACKFILL

BOTTOM OF BORING

NOTES:

1. SEE FIGURE 3-1 FOR LOCATION AND ORIENTATION OF PROFILE
2. PROFILES ARE BASED ON AN INTERPRETATION OF AVAILABLE SUBSURFACE EXPLORATIONS. ACTUAL CONDITIONS MAY VARY FROM THOSE SHOWN.

APPROXIMATE HORIZONTAL SCALE

0 50 100 FEET

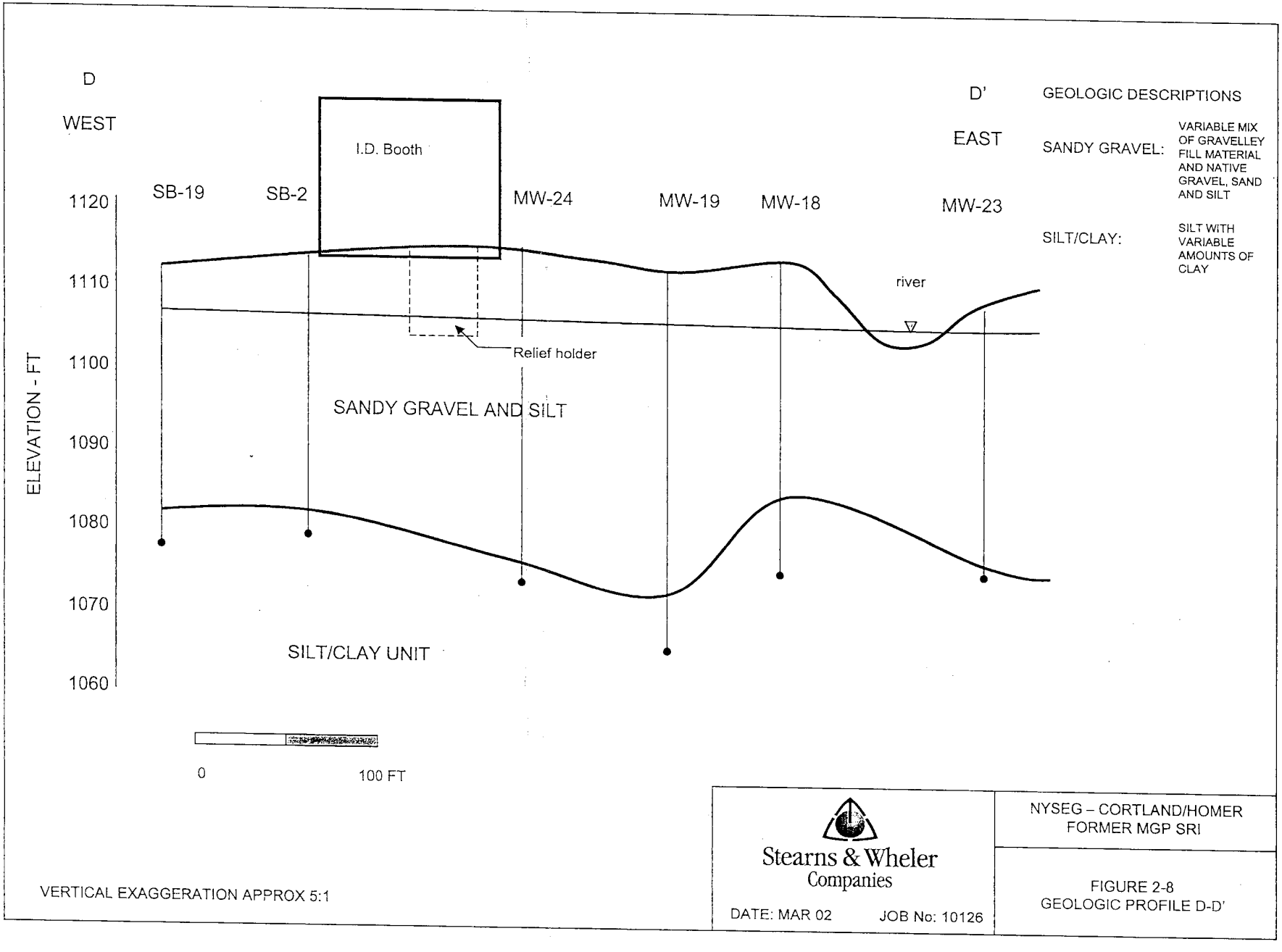
VERTICAL EXAGGERATION 5:1

Stearns & Wheler Companies

DATE: MAR 02 JOB No: 10126

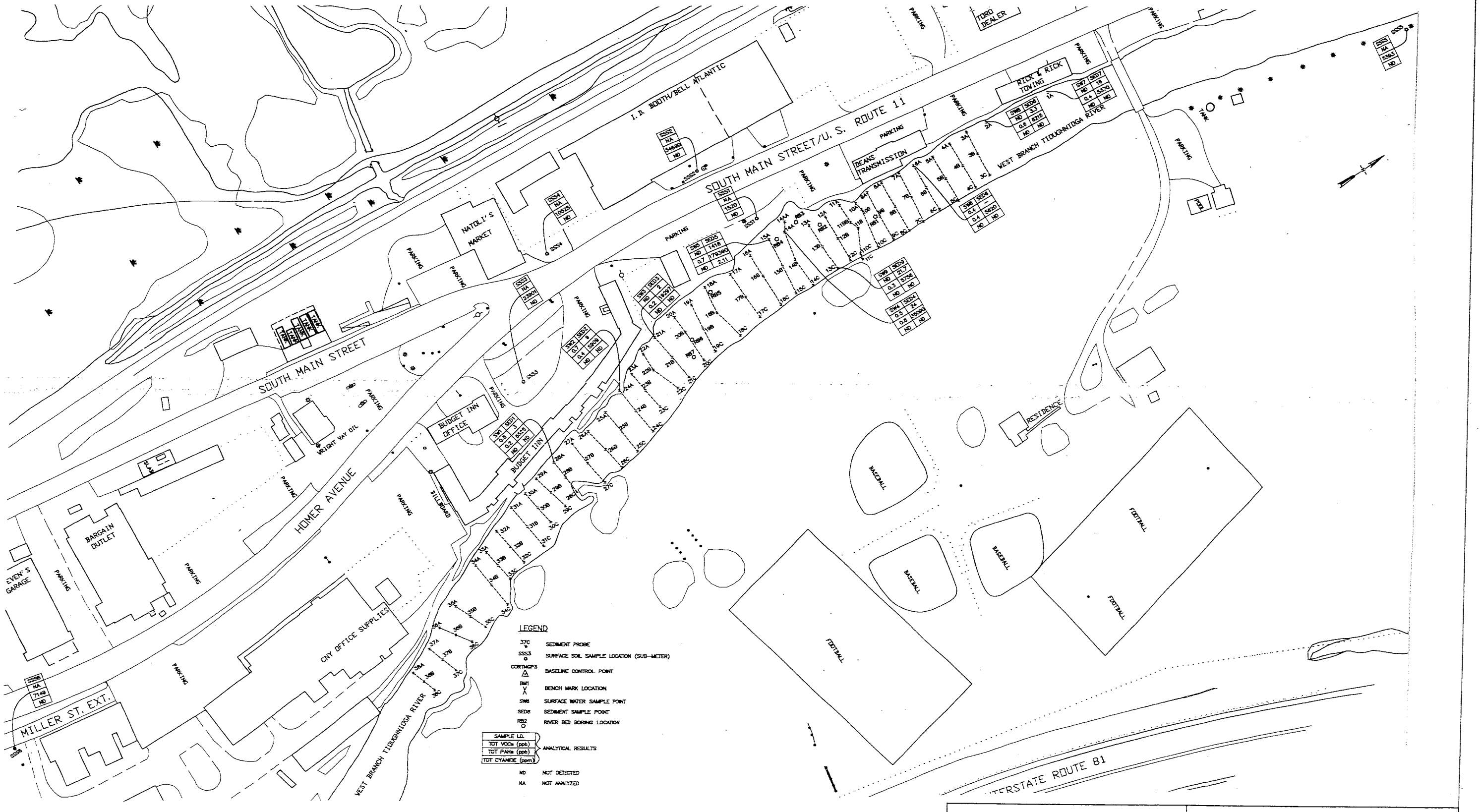
NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 2-7
GEOLOGIC PROFILE C-C'


D
WEST
D'
EAST
I.D. Booth
SB-19
SB-2
MW-24
MW-19
MW-18
MW-23
1120
1110
1100
1090
1080
1070
1060
ELEVATION - FT
river
Relief holder
SANDY GRAVEL AND SILT
SILT/CLAY UNIT
0
100 FT
GEOLOGIC DESCRIPTIONS
SANDY GRAVEL:
VARIABLE MIX OF GRAVELLEY FILL MATERIAL AND NATIVE GRAVEL, SAND AND SILT
SILT/CLAY:
SILT WITH VARIABLE AMOUNTS OF CLAY
VERTICAL EXAGGERATION APPROX 5:1
Stearns & Wheler
Companies
DATE: MAR 02
JOB No: 10126
NYSEG – CORTLAND/HOMER
FORMER MGP SRI
FIGURE 2-8
GEOLOGIC PROFILE D-D'

DEC-02618

DEC-026191



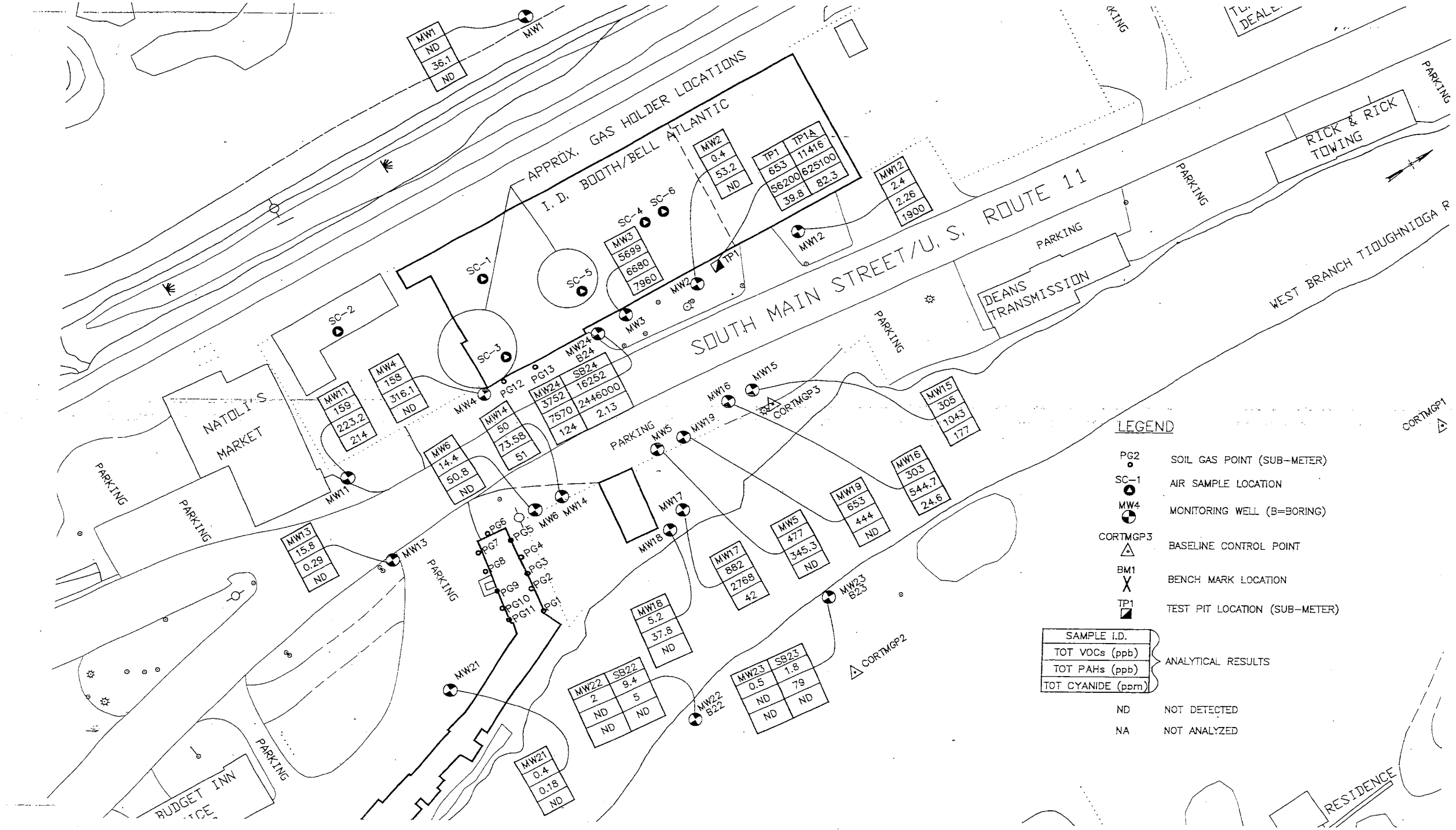
Stearns & Wheler Companies

NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 3-1
PHASE 1 SRI SURFACE SOIL AND RIVER SAMPLING PROGRAMS

DATE: MAR 02 JOB No: 10126

DEC-02620



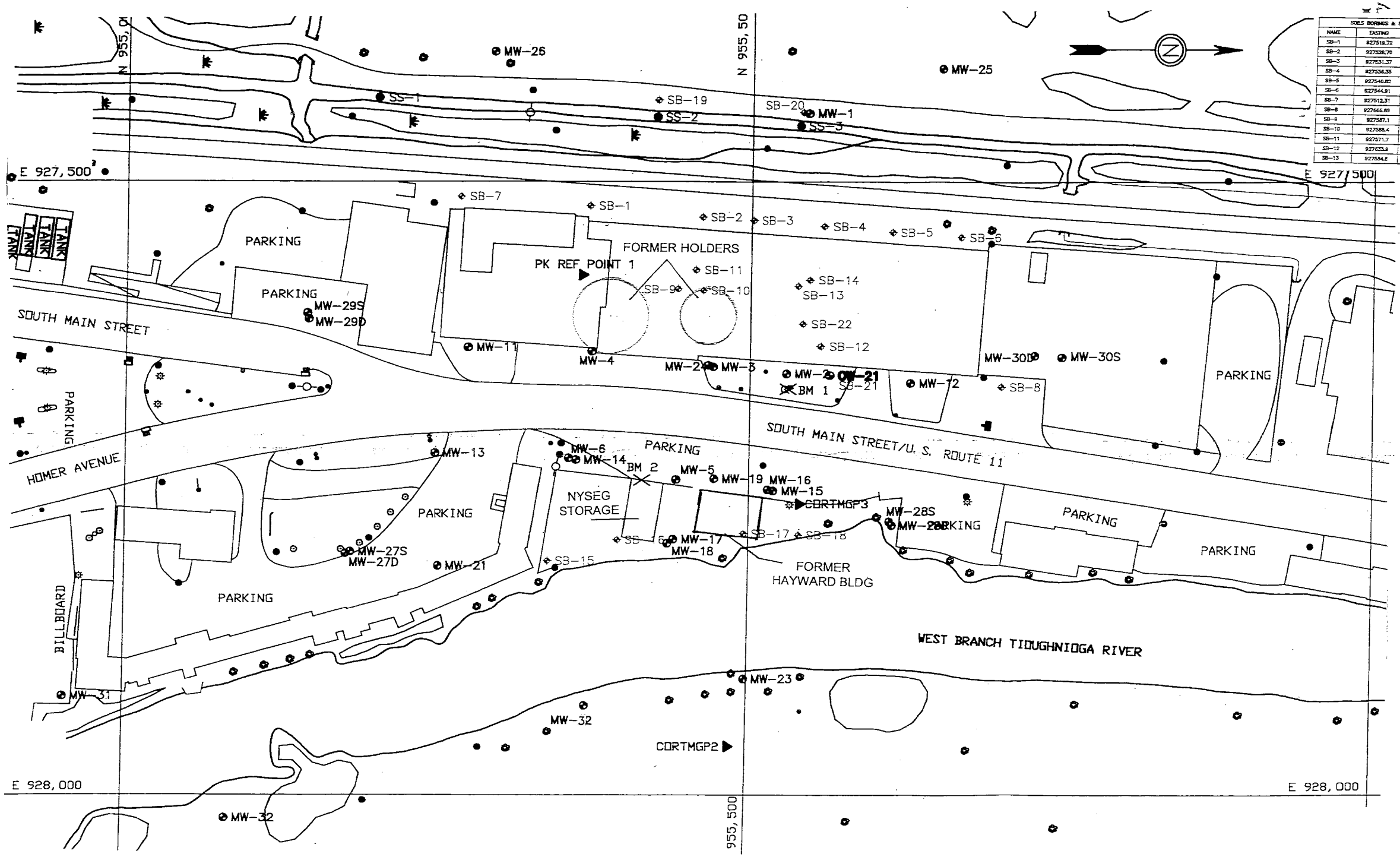
Stearns & Wheler Companies

DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 3-2
PHASE I SRI TEST PIT, SOIL BORING, GROUNDWATER, AND AIR SAMPLING PROGRAM

DEC-02621



SOILS BORINGS & SEDIMENT SAMPLES			
NAME	EASTING	NORTHING	ELEVATION
SB-1	927518.72	955376.62	1115.3
SB-2	927528.70	955436.73	1114.8
SB-3	927531.37	955501.53	1115.1
SB-4	927536.35	955558.63	1115.0
SB-5	927540.82	955612.37	1115.0
SB-6	927544.91	955668.95	1115.3
SB-7	927512.31	955256.00	1114.8
SB-8	927666.89	955702.39	1115.0
SB-9	927587.1	955441.0	1115.9
SB-10	927588.4	955460.8	1115.9
SB-11	927571.7	955455.1	1115.9
SB-12	927633.9	955556.8	1116.2
SB-13	927594.6	955538.8	1115.9

SOILS BORINGS & SEDIMENT SAMPLES (CONT.)			
NAME	EASTING	NORTHING	ELEVATION
SB-14	927579.8	955548.0	1115.9
SB-15	927609.24	955539.62	1112.1
SB-16	927792.14	955395.03	1112.6
SB-17	927786.97	955496.10	1112.4
SB-18	927788.13	955541.02	1111.2
SB-19	927434.20	955423.67	1113.9
SB-20	927443.97	955541.42	1114.8
SB-21	COINCIDENT WITH OW-21.		
SB-22	927615.60	955542.70	1116.2
SS-1	927432.04	955199.13	1111.3
SS-2	927447.88	955423.00	1111.4
SS-3	927454.92	955539.35	1112.2

MONITORING OR OBSERVATION WELLS				
NAME	EASTING	NORTHING	TOP OF CASING ELEVATION	TOP OF GUARD PIPE OR CURB BOX ELEVATION
MW-1	927444.71	955545.95	1116.25	1116.47
MW-2	927656.30	955529.75	1115.79	1115.98
MW-3	927650.84	955469.58	1115.54	1115.90
MW-4	927637.80	955573.21	1115.52	1115.71
MW-5	927742.86	955441.14	1112.81	1113.01
MW-6	927725.19	955355.55	1113.07	1113.23
MW-11	927634.61	955572.91	1114.87	1115.29
MW-12	927663.48	955628.28	1115.23	1116.06
MW-13	927721.09	955247.18	1113.47	1113.68
MW-14	927725.57	955361.47	1112.74	1112.19
MW-15	927751.93	955520.24	1113.25	1112.58
MW-16	927751.08	955515.49	1113.25	1113.62
MW-17	927791.64	955639.56	1114.75	1114.83
MW-18	927794.97	955434.80	1114.81	1114.87
MW-19	927742.15	955471.63	1113.05	1113.67
MW-21	927815.13	955550.80	1112.86	1113.14
MW-22	927926.82	955371.28	1109.92	1110.18
MW-23	927905.16	955498.00	1110.14	1110.70
MW-24	927649.26	955465.83	1115.87	1116.16
MW-25	927406.65	955652.04	1117.43	1117.90
MW-26	927394.96	955292.07	1116.00	1116.40
MW-27D	927803.17	955176.52	1112.26	1112.81
MW-27S	927801.66	955180.34	1112.47	1112.78
MW-28D	927779.99	955614.37	1111.50	1111.81
MW-28S	927777.02	955612.26	1111.58	1111.93
MW-29D	927611.46	955145.27	1113.82	1114.14
MW-29S	927606.77	955144.15	1113.82	1114.12
MW-30D	927641.14	955729.26	1115.18	1115.53
MW-30S	927642.55	955751.32	1115.08	1115.53
MW-31	927919.24	954952.47	1113.62	1113.86
MW-32	928018.78	955083.69	1109.94	1110.28
OW-21	927657.09	955563.69	1115.53	1115.95

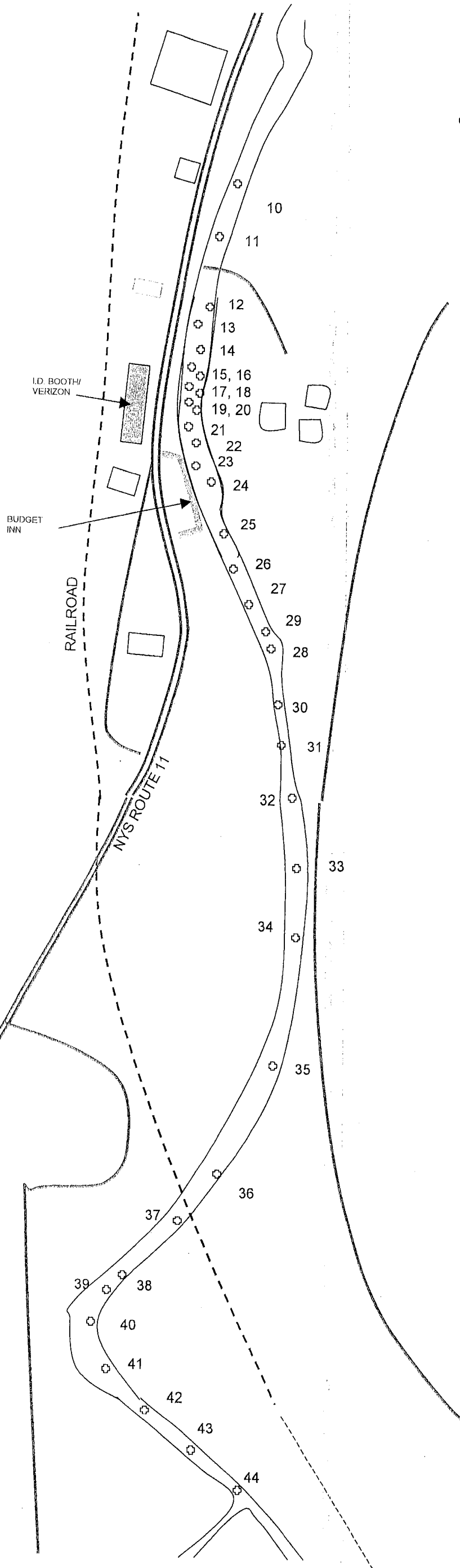
0 50 100 150
Scale SCALE REFERENCE Feet

Stearns & Wheler
Companies

DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 3-3
PHASE 2 SRI SOIL BORING/WELL
LOCATIONS

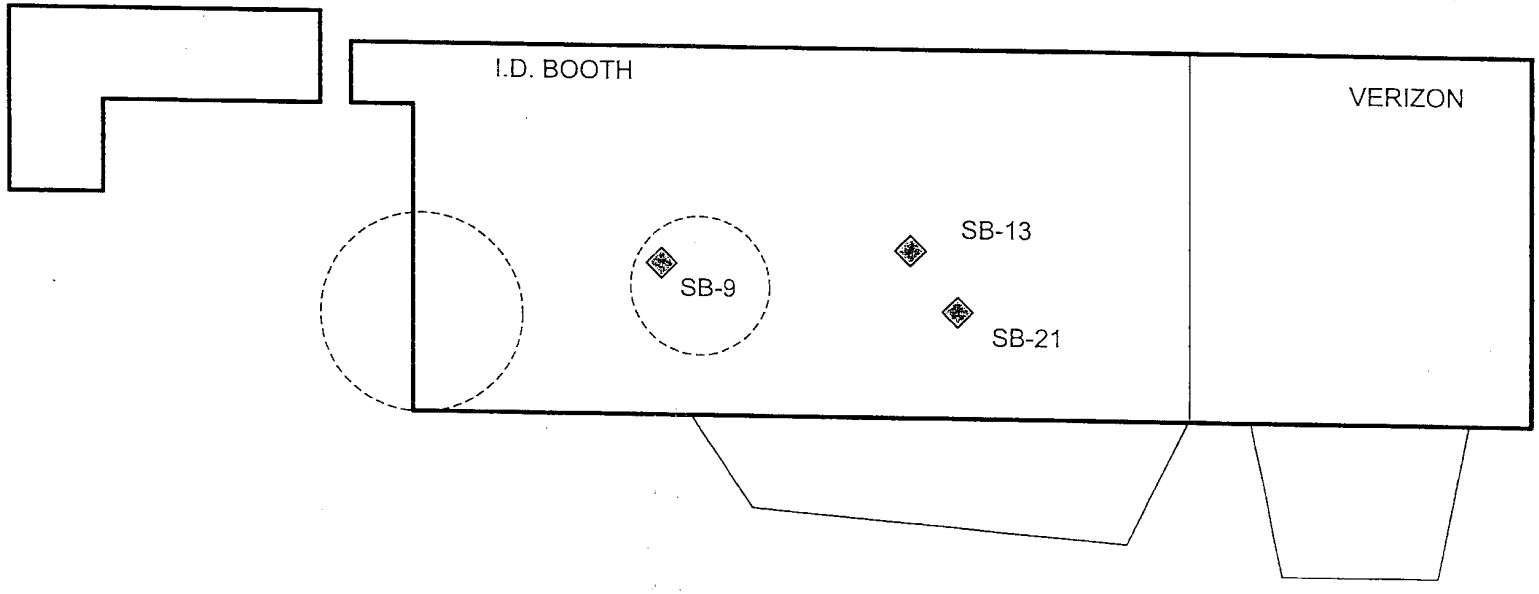


Stearns & Wheler Companies

DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 3-4
SEDIMENT SAMPLE LOCATIONS, PHASE 2 SRI



Phase 2 SRI Suma canister – Grab sample below floor slab

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Companies

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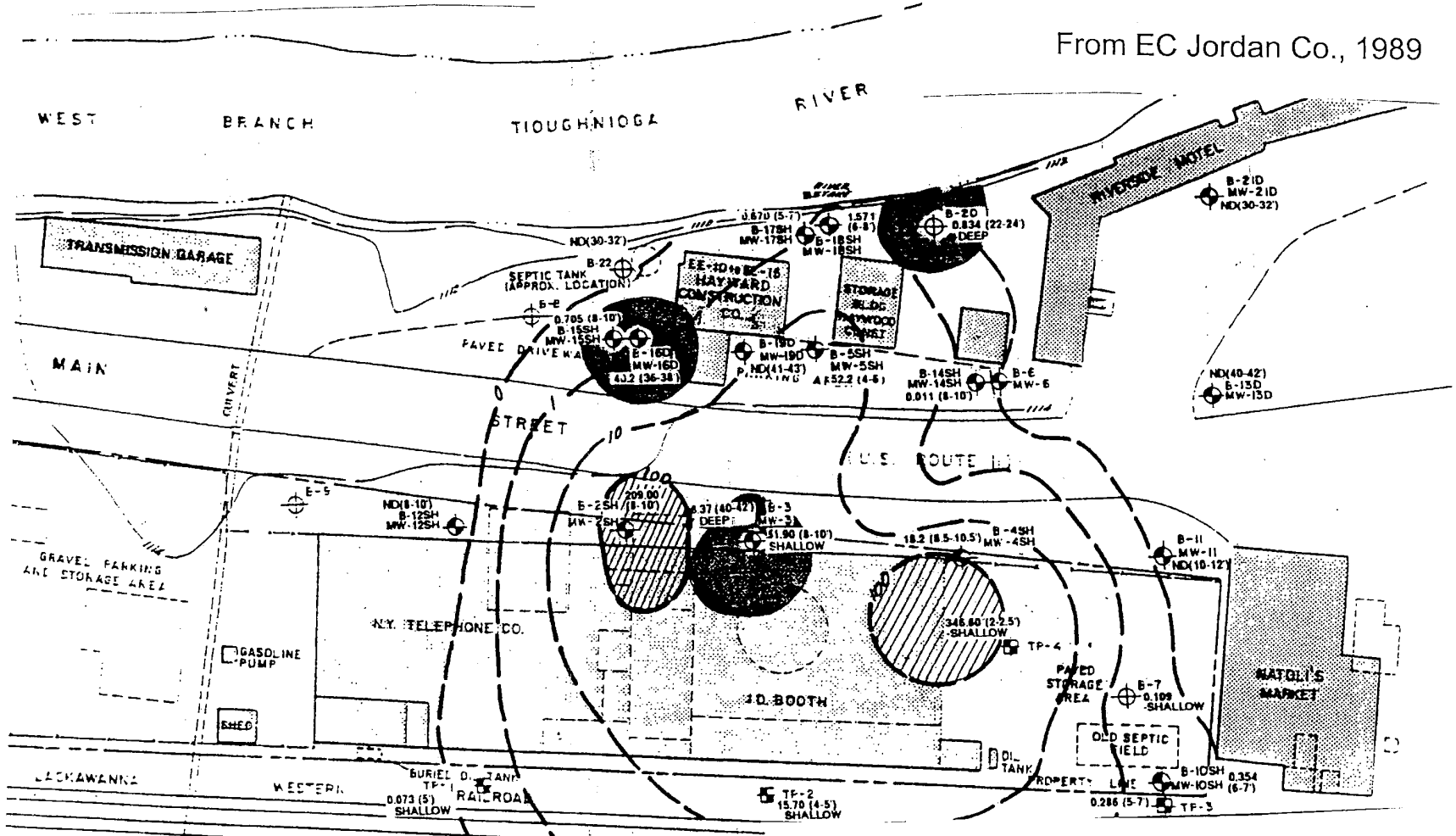
NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 3-5
INDOOR AIR SURVEY
PHASE 2 SRI

DEC-02623

DEC-02624

From EC Jordan Co., 1989



Stearns & Wheler Companies

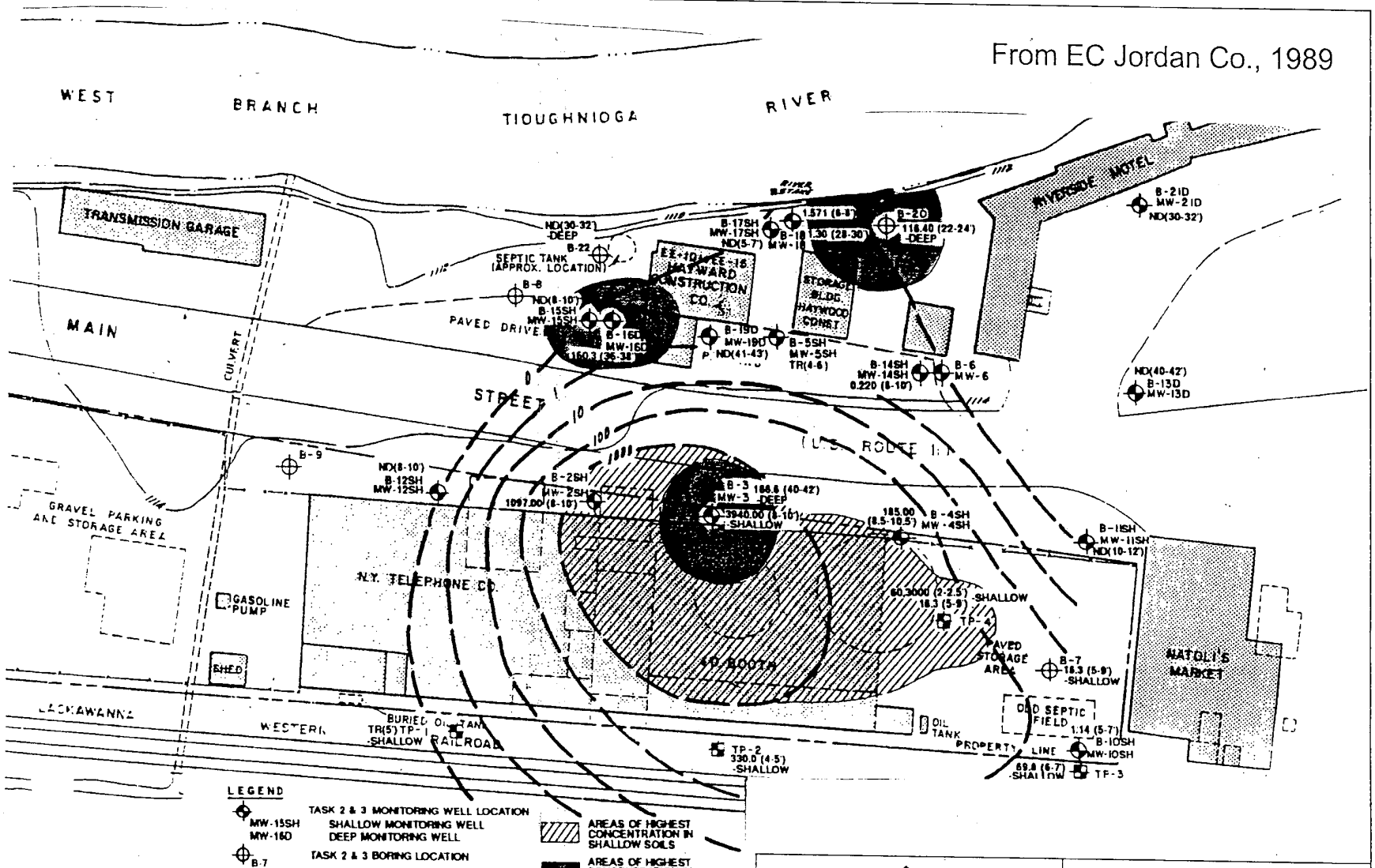
DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 4-1
VOC DISTRIBUTION IN SOILS, TASK 3 INVESTIGATION

DEC-02625

From EC Jordan Co., 1989

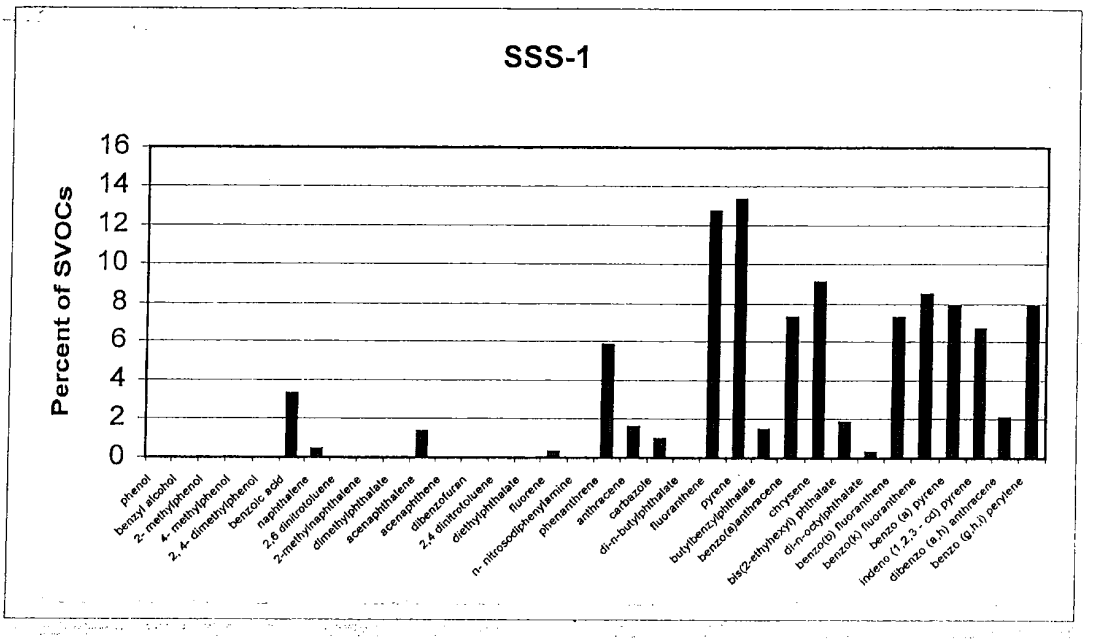


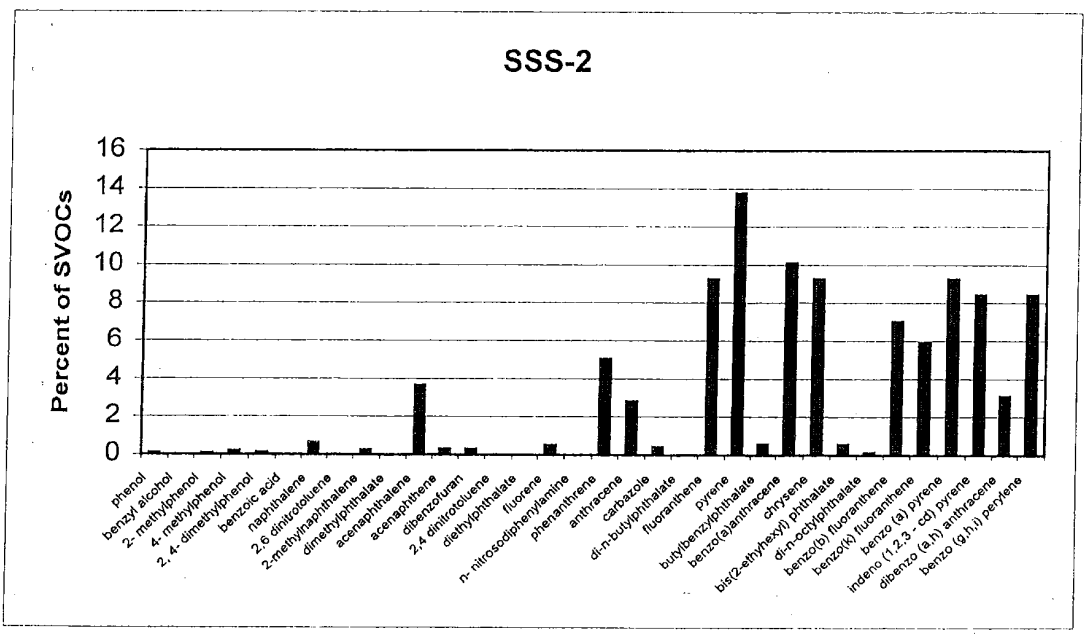
Stearns & Wheler Companies

DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 4-2
SVOC DISTRIBUTION IN SOILS, TASK 3 INVESTIGATION



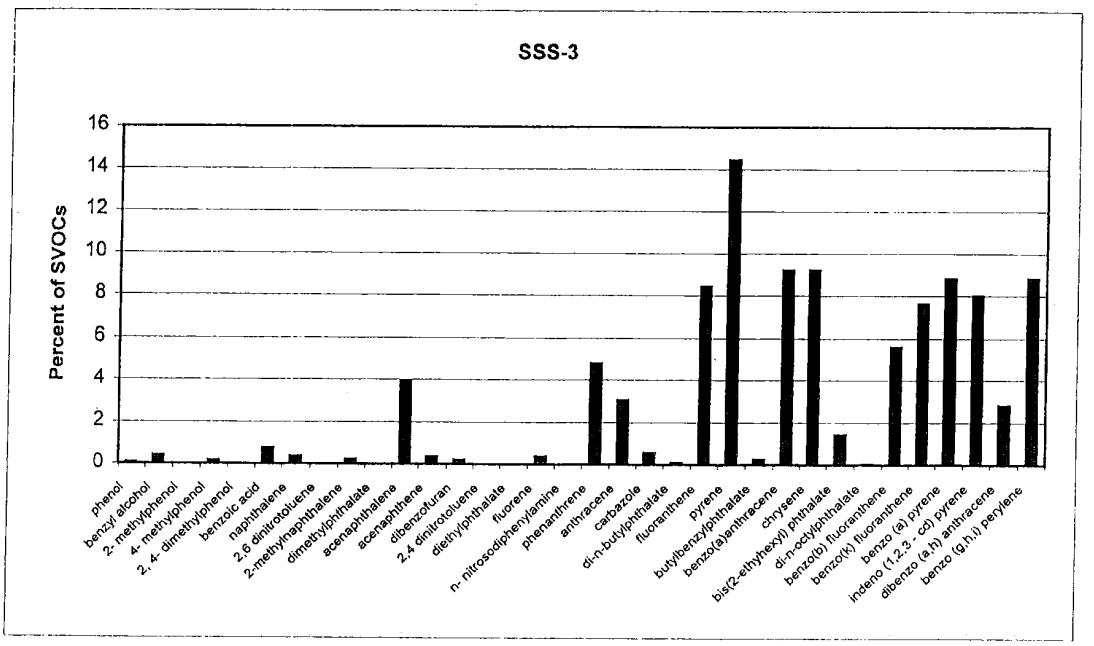


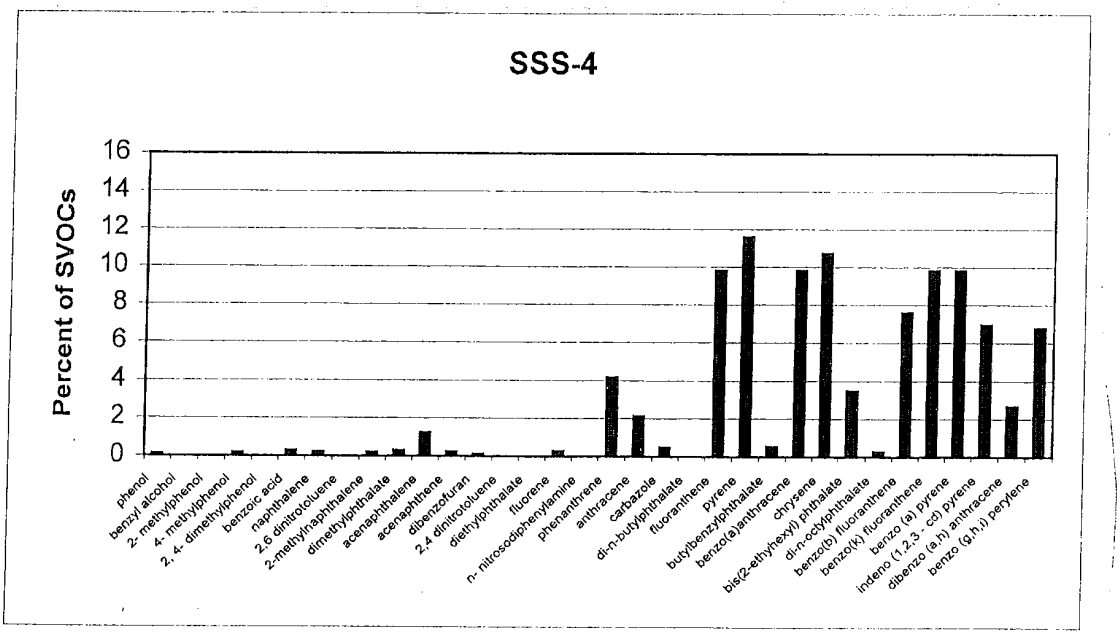
Stearns & Wheler
Companies

DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 5-1
SVOC DISTRIBUTION IN
SURFACE SOILS



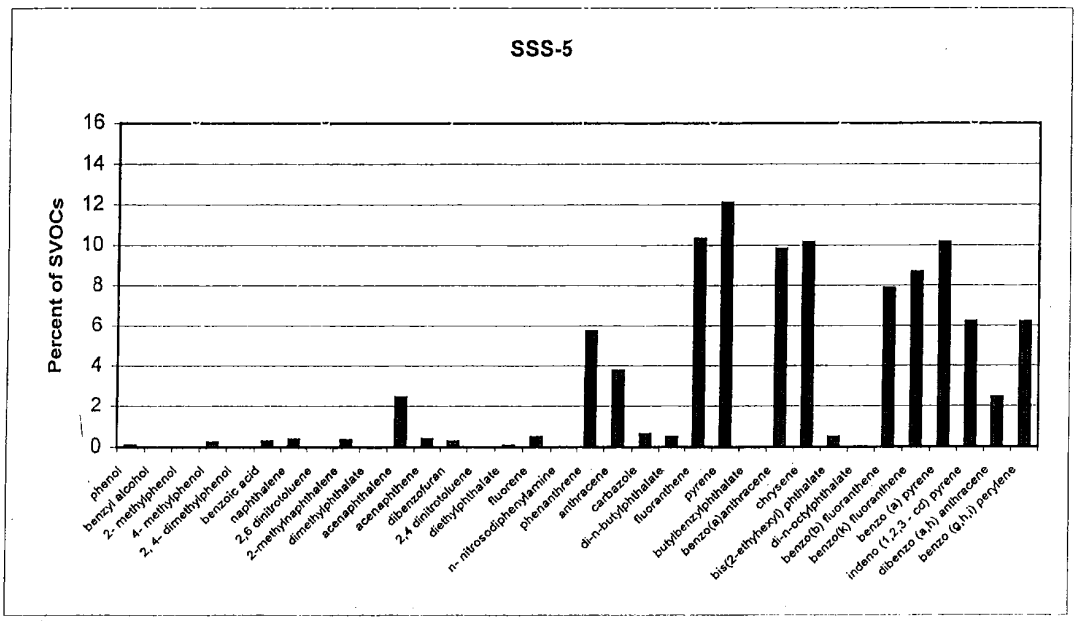


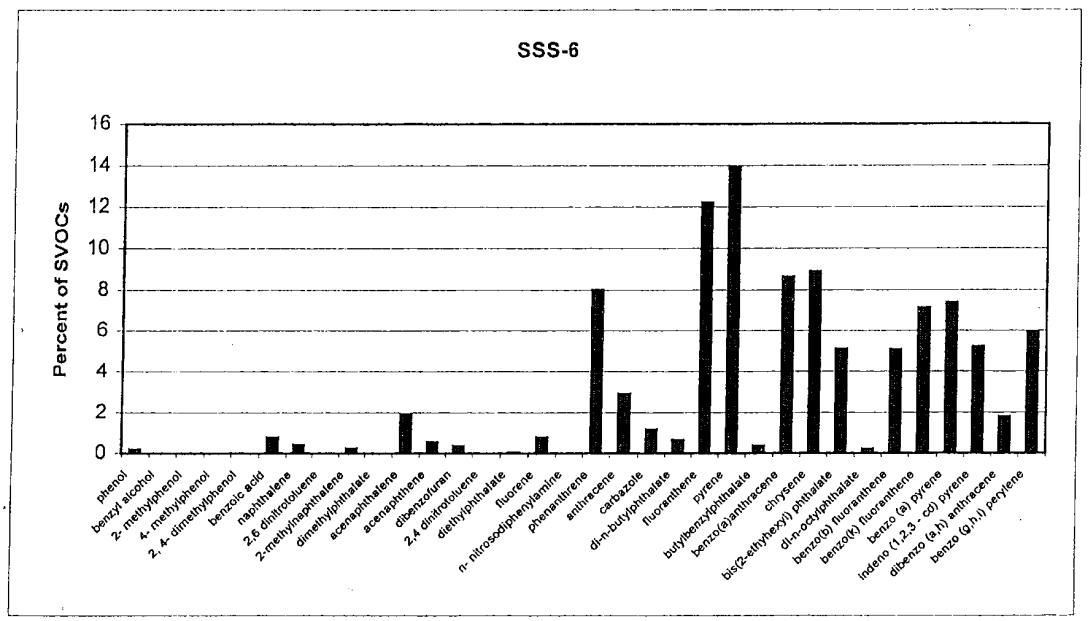
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DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 5-2
SVOC DISTRIBUTION IN
SURFACE SOILS



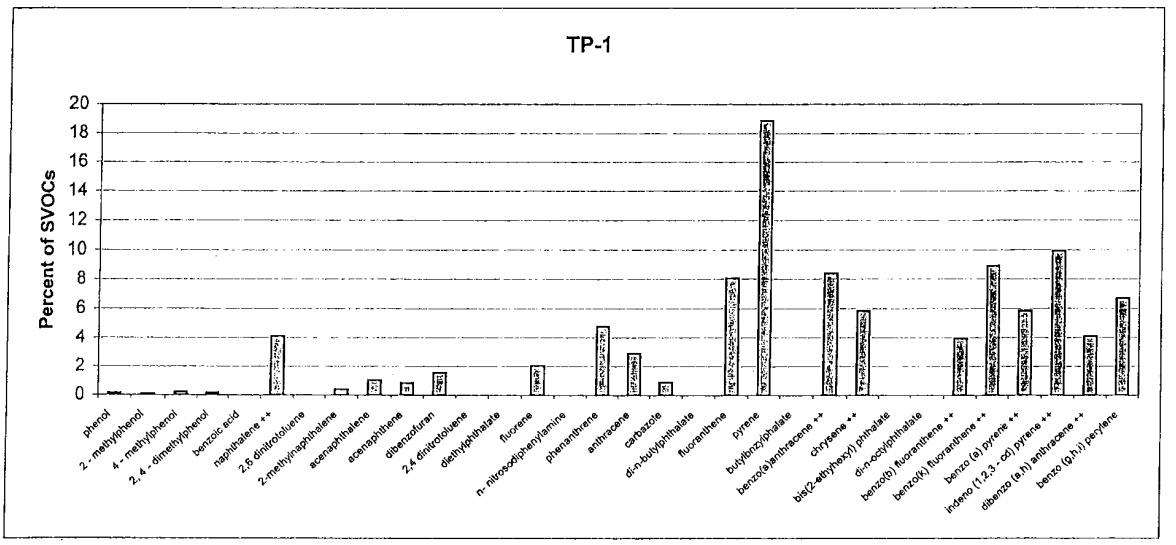


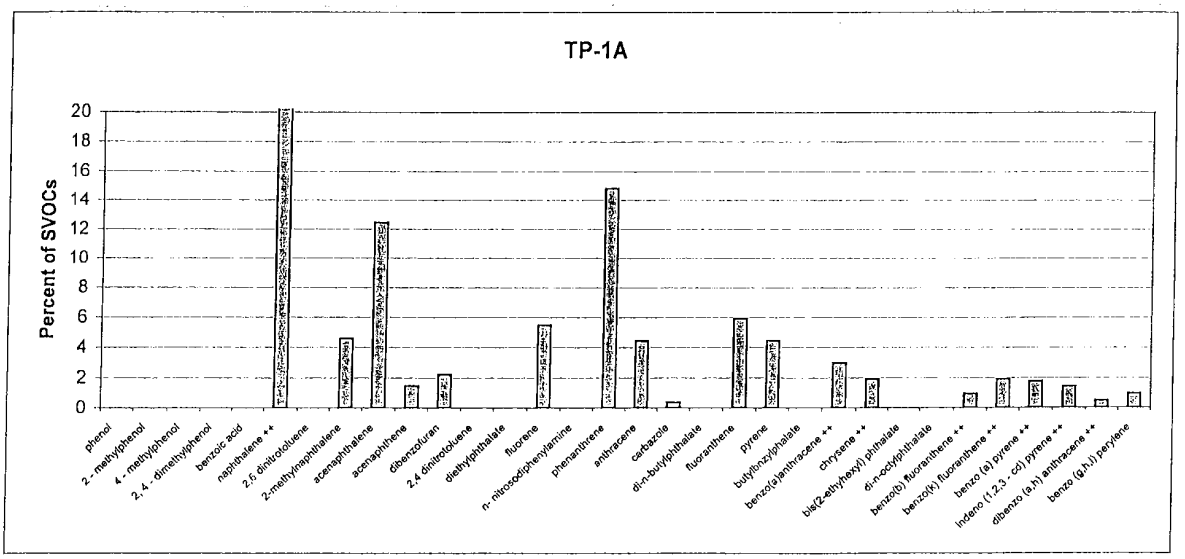
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DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 5-3
SVOC DISTRIBUTION IN
SURFACE SOILS



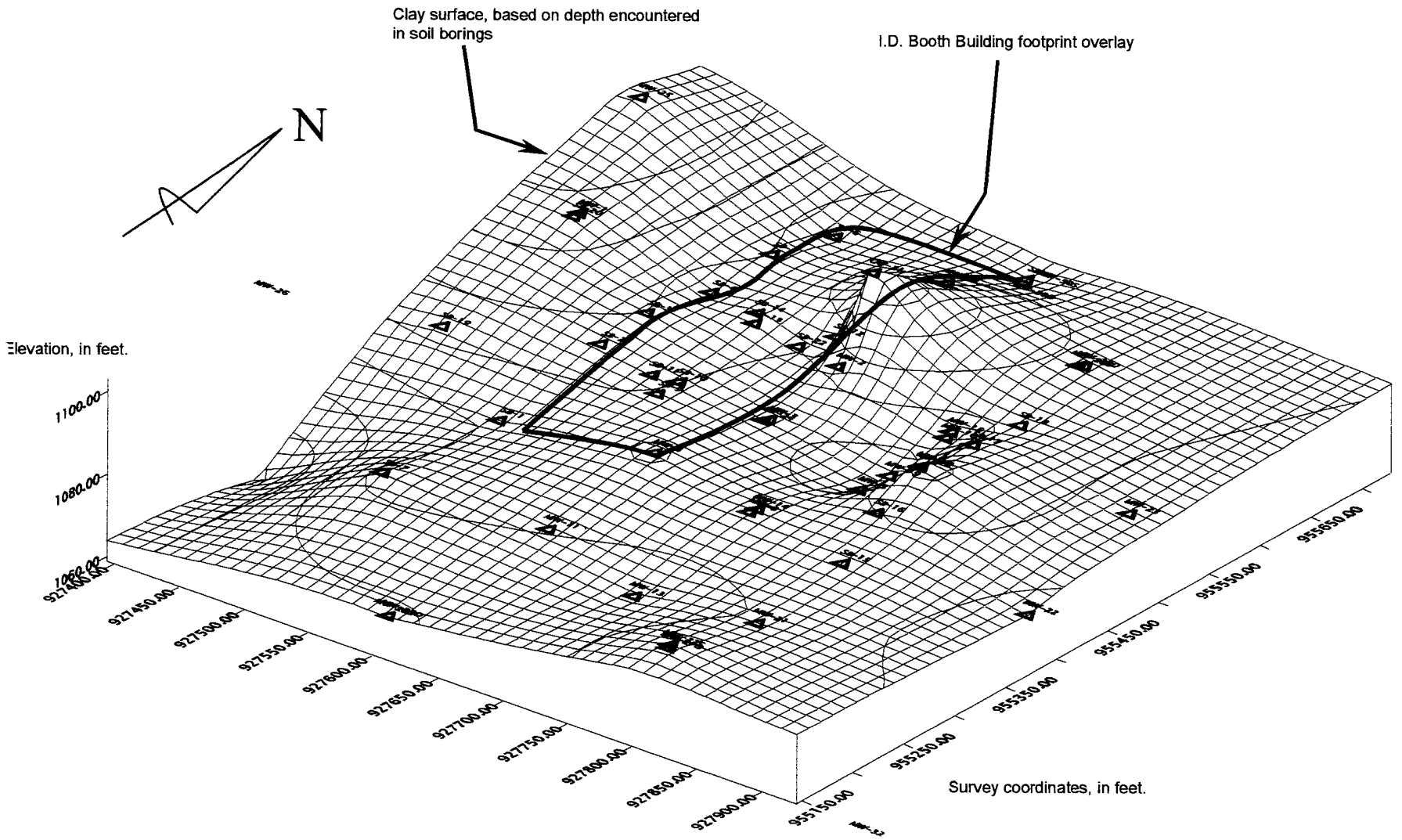


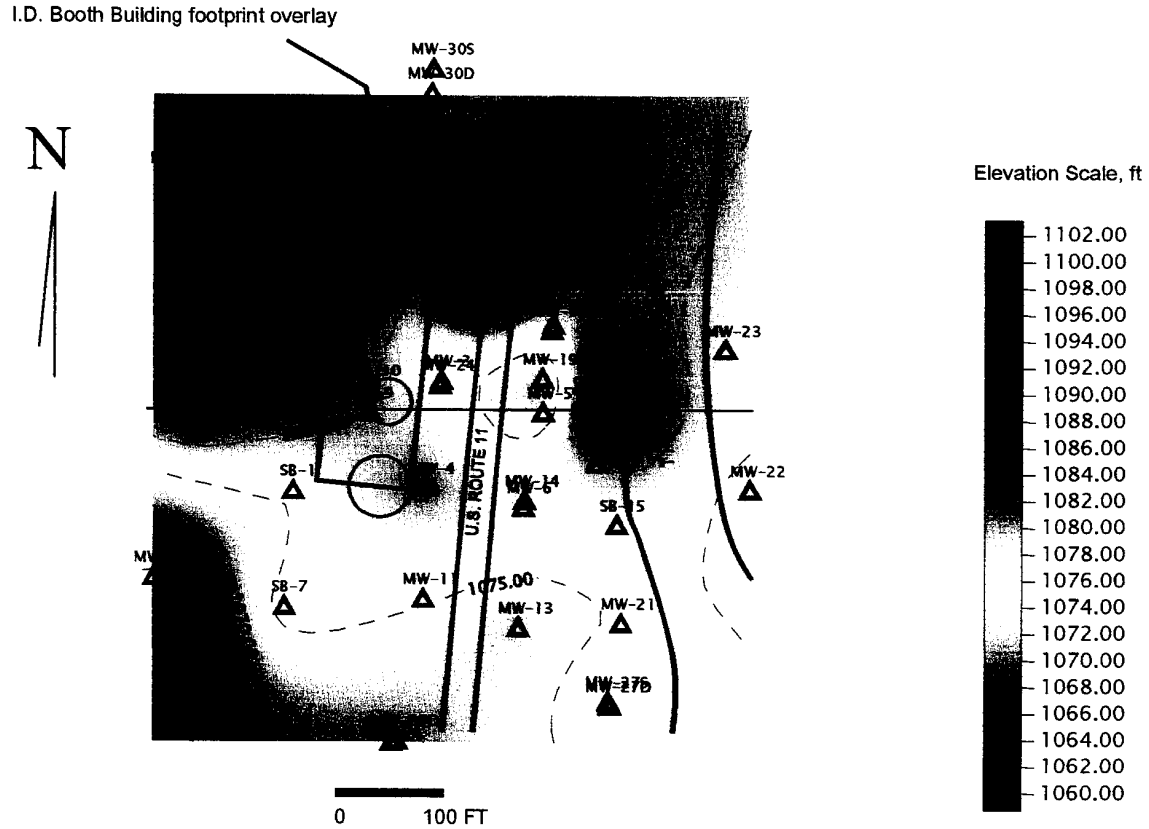
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DATE: MAR 03 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 5-4
SVOC DISTRIBUTION IN
TEST PIT SOILS





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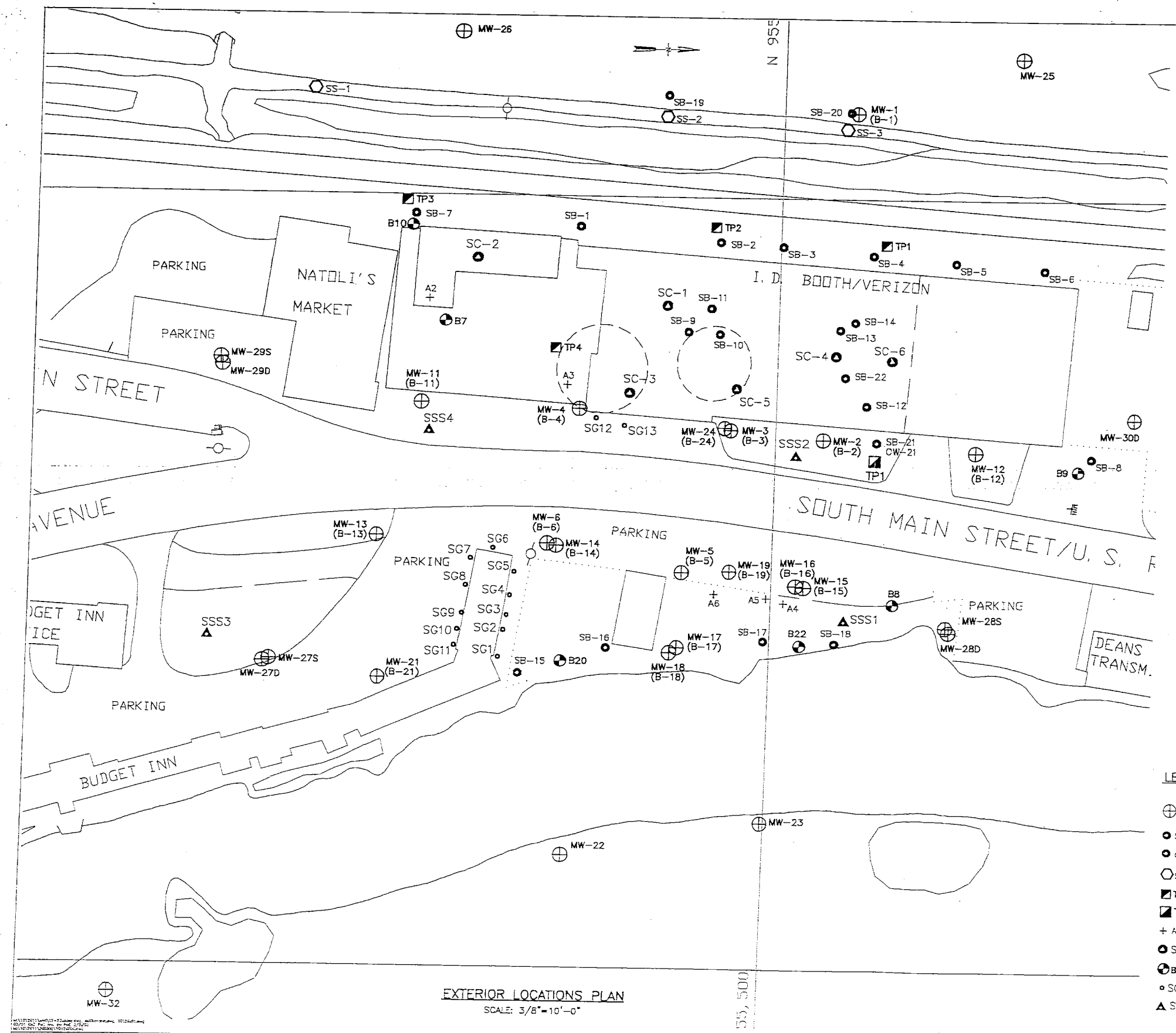
DATE: MAR 02 JOB No: 10126

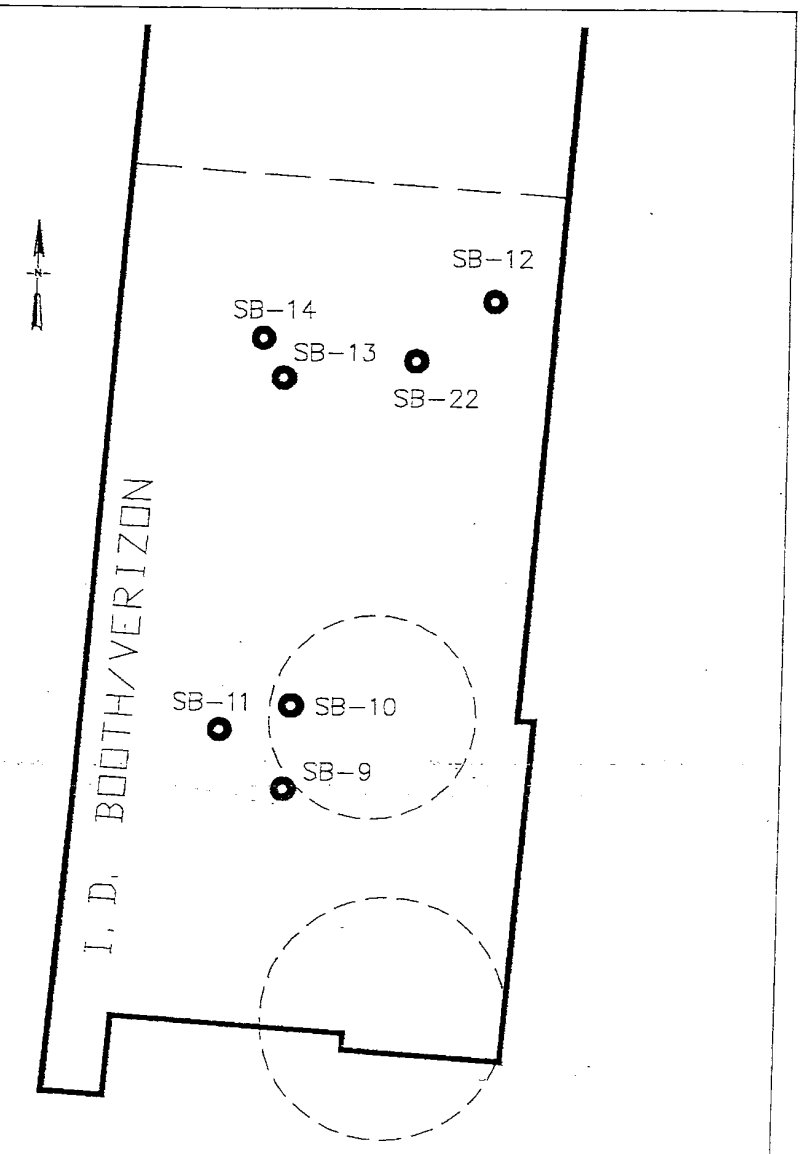
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FORMER MGP SRI

FIGURE 5-5
TOP OF SILT/CLAY UNIT

DEC-02630

DEC-02631





INTERIOR LOCATIONS PLAN
SCALE: 1"=20'-0"

LEGEND

MW-1 (B-1)	MONITORING WELL (BORING)
SB-7	SOIL BORING (PHASE 2 SRI)
ow--21	OBSERVATION WELL
SS-3	SURFACE SAMPLE (PHASE 2 SRI)
TP3	TEST PIT (PRE--SRI)
TP1	TEST PIT (SRI)
A2	AIR SAMPLE (PRE--SRI)
SC-2	AIR SAMPLE (PHASE 1 SRI)
B7	SOIL BORING (PRE--SRI)
SG12	SOIL GAS SAMPLE (PHASE 1 SRI)
SSS4	SURFACE SOIL (PHASE 1 SRI)

1"=20'-0"

3/8"=10'-0" (1:32)

NOTES:

Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

It is a violation of New York State Education Law for any person, unless acting under the direction of a licensed professional engineer, to alter an item on this drawing in any way. If an item is altered, the altering engineer shall affix to the item his/her seal and the notation "altered by" followed by his/her signature and the date of such alteration, and a specific description of the alteration.

REVISION NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
1	FOR APPROVAL					
	PME	03/03		DRO		

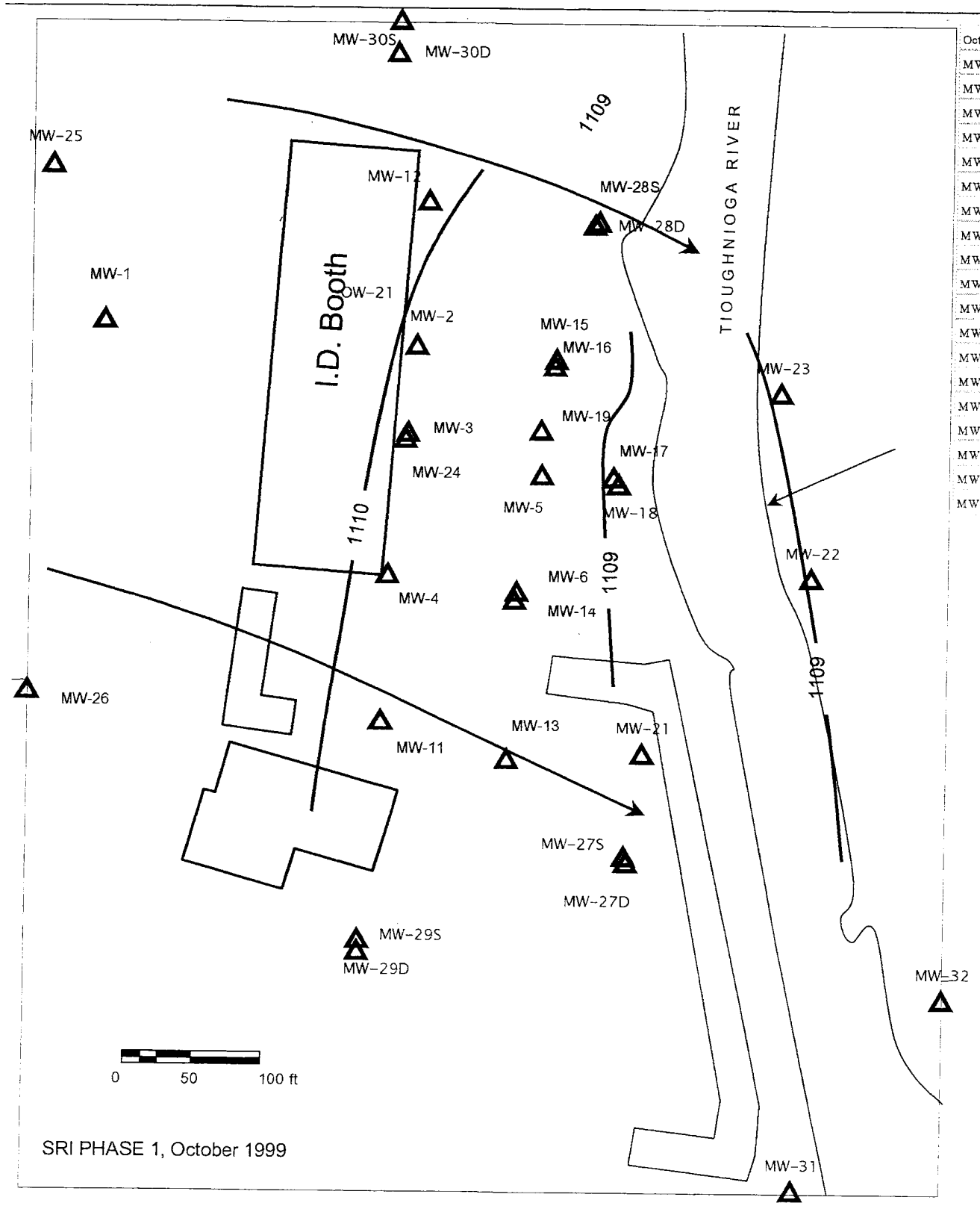
PROJECT SUPERVISOR | DEPARTMENT SUPERVISOR

Stearns & Wheler, LLC
Environmental Engineers and Scientists

NYSEG
CORTLAND HOMER MGP SITE

FIGURE 5-6
SAMPLING LOCATIONS

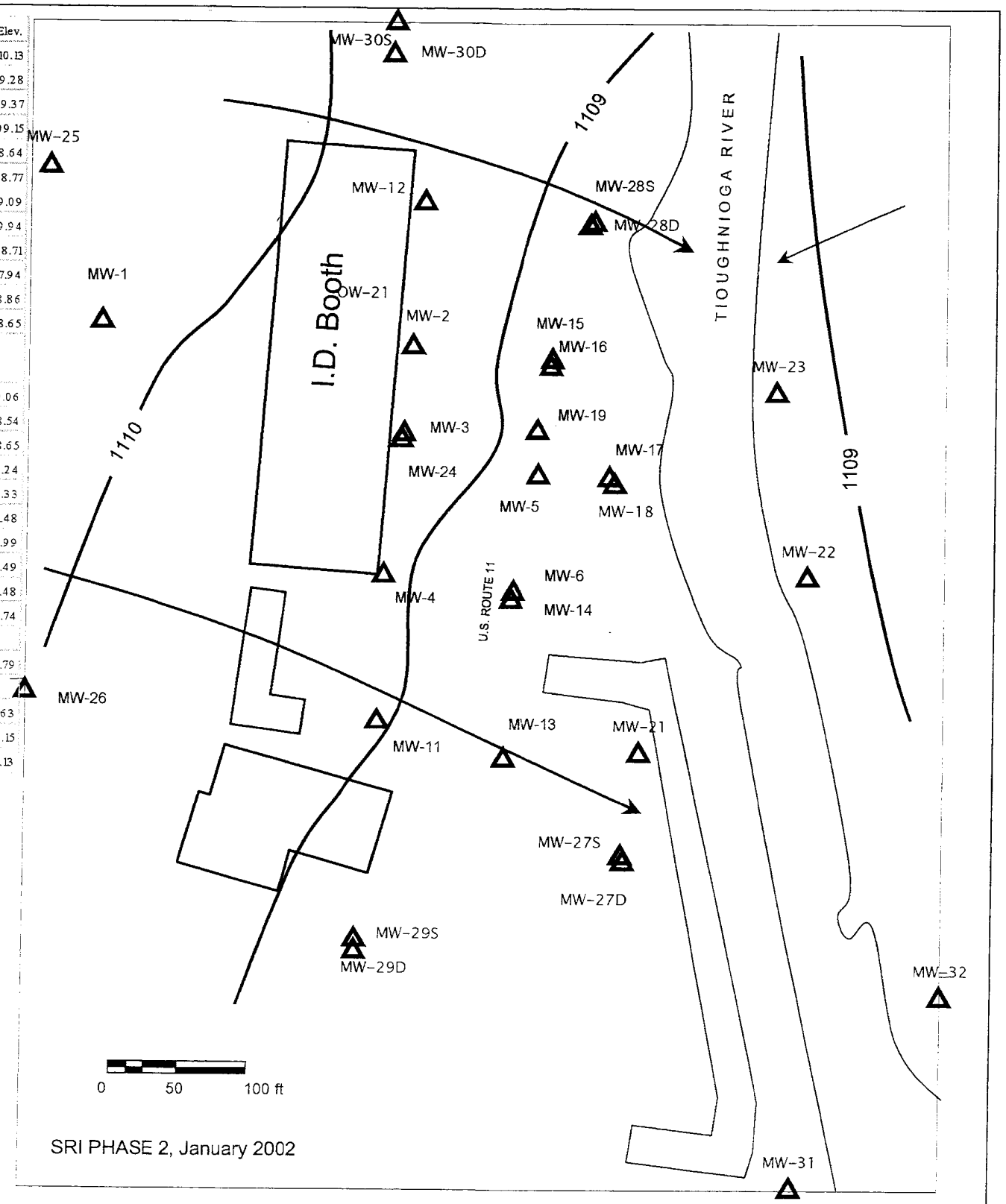
Figure 5-7
See attached sheets



SRI PHASE 1, October 1999

October, 1999	GW Elev.
MW-1	1110.76
MW-2	1109.84
MW-3	1109.84
MW-4	1109.77
MW-5	1108.16
MW-6	1109.40
MW-11	1109.54
MW-12	1110.15
MW-13	1107.85
MW-14	1109.32
MW-15	1109.44
MW-16	1109.28
MW-17	1107.88
MW-18	1107.88
MW-19	1109.55
MW-21	1107.89
MW-22	1109.23
MW-23	1108.95
MW-24	1109.81

Janary 2002	GW Elev.
MW-1	1110.13
MW-2	1109.28
MW-3	1109.37
MW-4	1109.15
MW-5	1108.64
MW-6	1108.77
MW-11	1109.09
MW-12	1109.94
MW-13	1108.71
MW-14	1107.94
MW-15	1108.86
MW-16	1108.65
MW-17	-
MW-18	-
MW-19	1109.06
MW-21	1108.54
MW-22	1108.65
MW-23	1108.24
MW-24	1109.33
MW-25	1111.48
MW-26	1109.99
MW-27S	1108.49
MW-27D	1108.48
MW-28S	1108.74
MW-28D	
MW-29S	1108.79
MW-29D	
MW-30S	1109.63
MW-30D	1109.15
MW-32	1108.13



SRI PHASE 2, January 2002

Stearns & Wheler
Companies

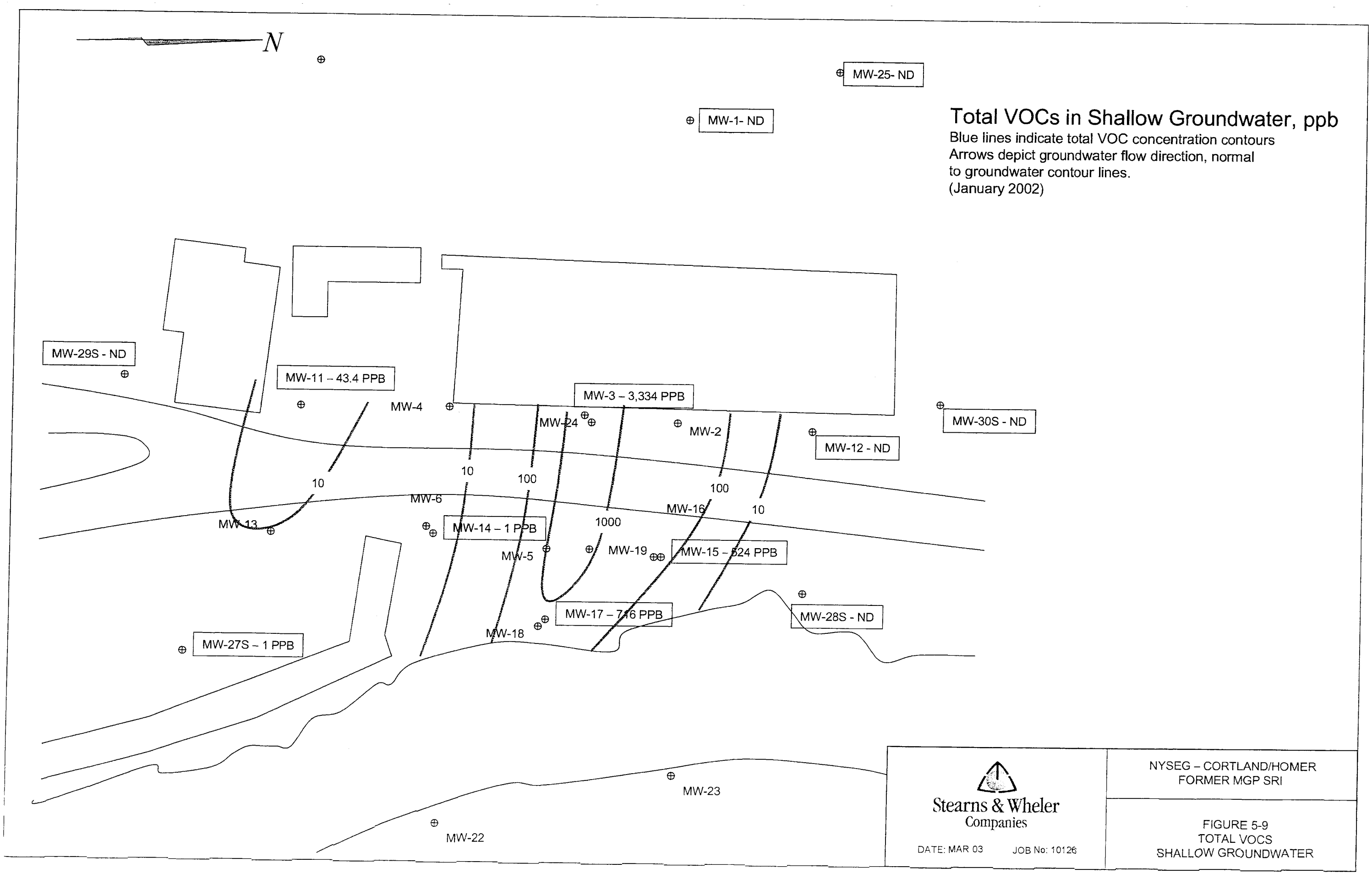
DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 5-8
GROUNDWATER CONTOURS

DEC-02633

DEC-02634



Total VOCs in Shallow Groundwater, ppb

Blue lines indicate total VOC concentration contours
Arrows depict groundwater flow direction, normal
to groundwater contour lines.
(January 2002)

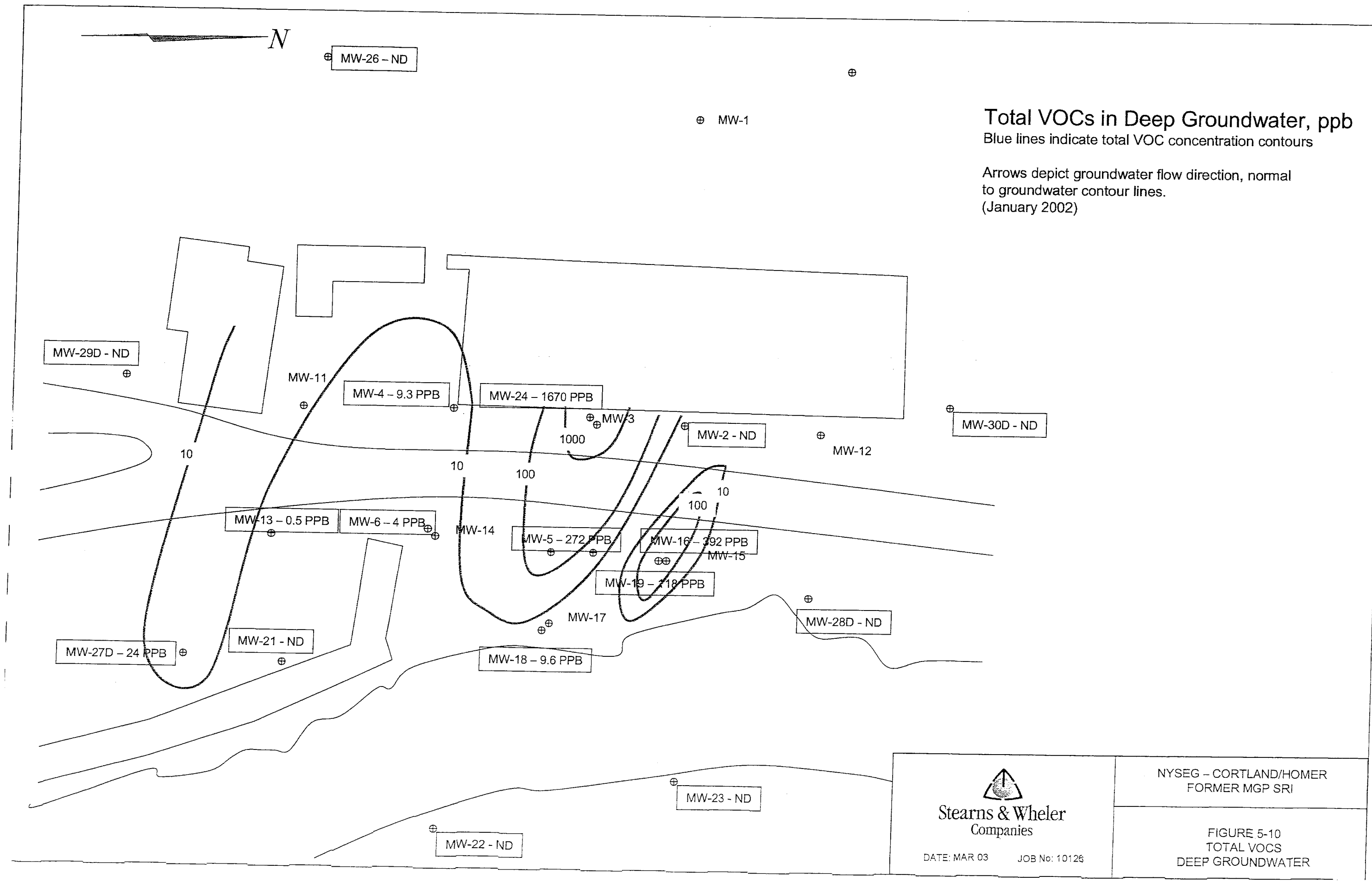
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NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 5-9
TOTAL VOCS
SHALLOW GROUNDWATER

DEC-02635



Total VOCs in Deep Groundwater, ppb

Blue lines indicate total VOC concentration contours

Arrows depict groundwater flow direction, normal to groundwater contour lines.
(January 2002)

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NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 5-10
TOTAL VOCS
DEEP GROUNDWATER

DEC-02636

N

MW-25 - ND

MW-1 - ND

Total SVOCs in Shallow Groundwater, ppb

Blue lines indicate total SVOC concentration contours
Arrows depict groundwater flow direction, normal
to groundwater contour lines.
(January 2002)

MW-29S – 0.4 PPB

MW-11 – 32 PPB

MW-4

MW-3 – 5,795 PPB

MW-24

MW-2

MW-30S - ND

MW-12 – 4 PPB

100

1000

100

10

MW-6

MW-5

MW-16

MW-13

10

MW-14 – 49.8 PPB

MW-19

MW-15 – 1,500 PPB

MW-17 – 3,280 PPB

MW-28S – 3.5 PPB

MW-18

MW-27S - ND

MW-23

MW-22

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FIGURE 5-11
TOTAL SVOCS
SHALLOW GROUNDWATER

DEC-02637

N

MW-26 – ND

MW-1

Total SVOCs in Deep Groundwater, ppb

Blue lines indicate total SVOC concentration contours
Arrows depict groundwater flow direction, normal
to groundwater contour lines.
(January 2002)

MW-29D - ND

MW-11

MW-24 – 6362 PPB

MW-4 – 50.9 PPB

MW-3

MW-2 – 18 PPB

MW-30D - ND

MW-12

1000

100

10

MW-6 – 34.9 PPB

MW-14

MW-13 - ND

MW-19 – 41 PPB

MW-15

MW-5 – 223 PPB

MW-16 – 952 PPB

MW-17

MW-28D – 5 PPB

MW-27D – 857 PPB

MW-21 - ND

MW-18 – 54.9 PPB

MW-23 - ND

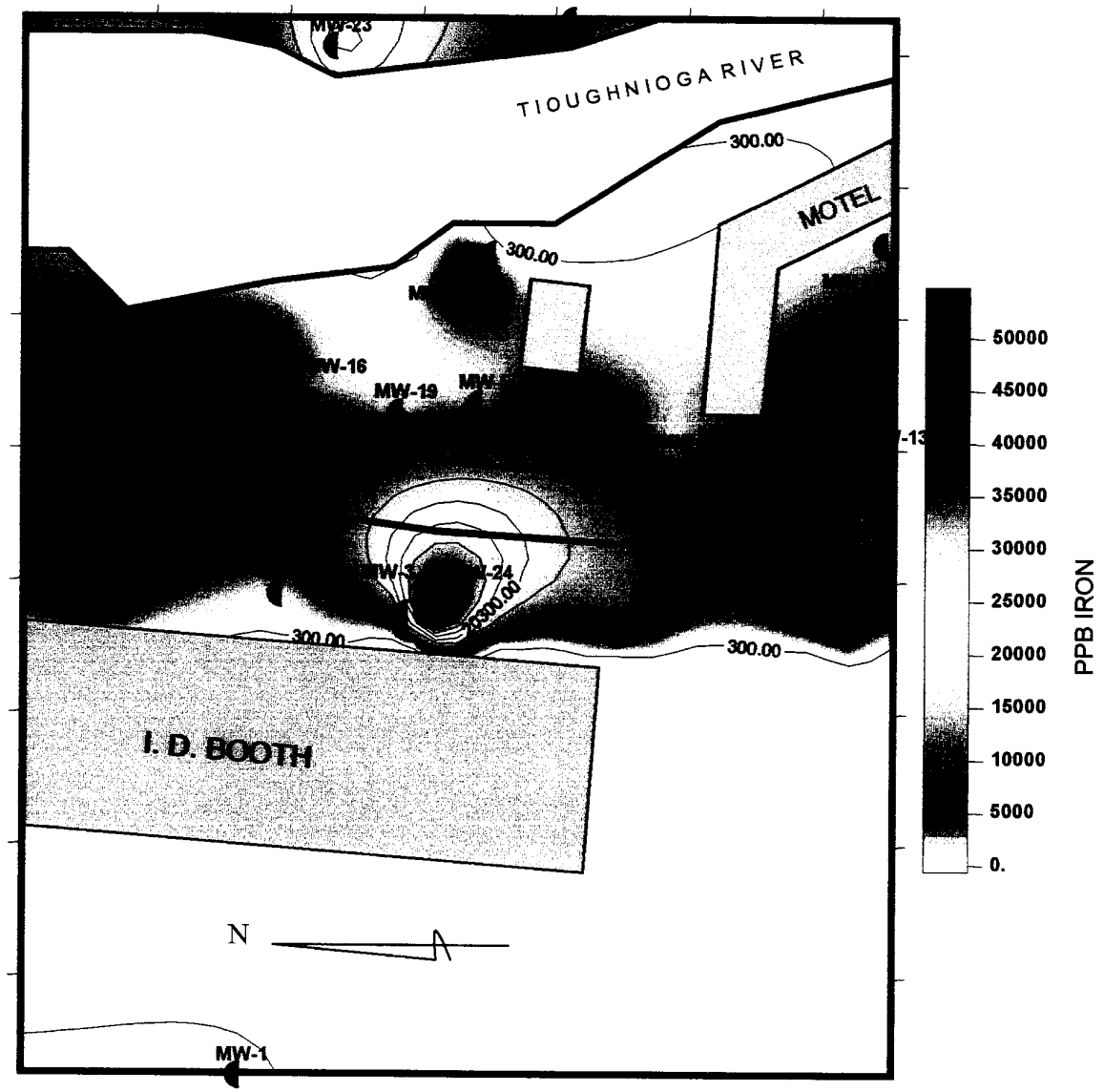
MW-22 - ND

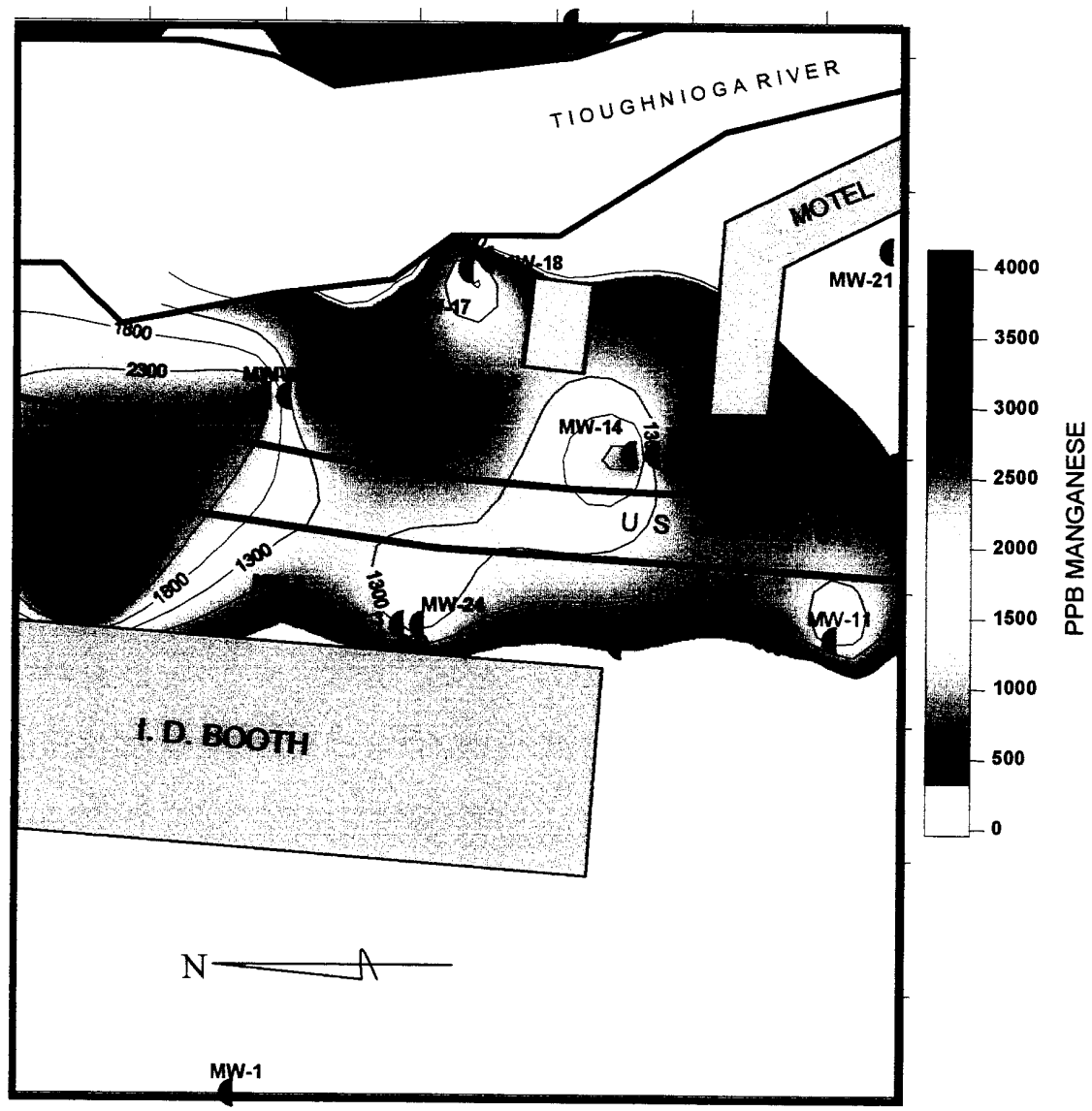
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FORMER MGP SRI

FIGURE 5-12
TOTAL SVOCS
DEEP GROUNDWATER





Scale is approximate

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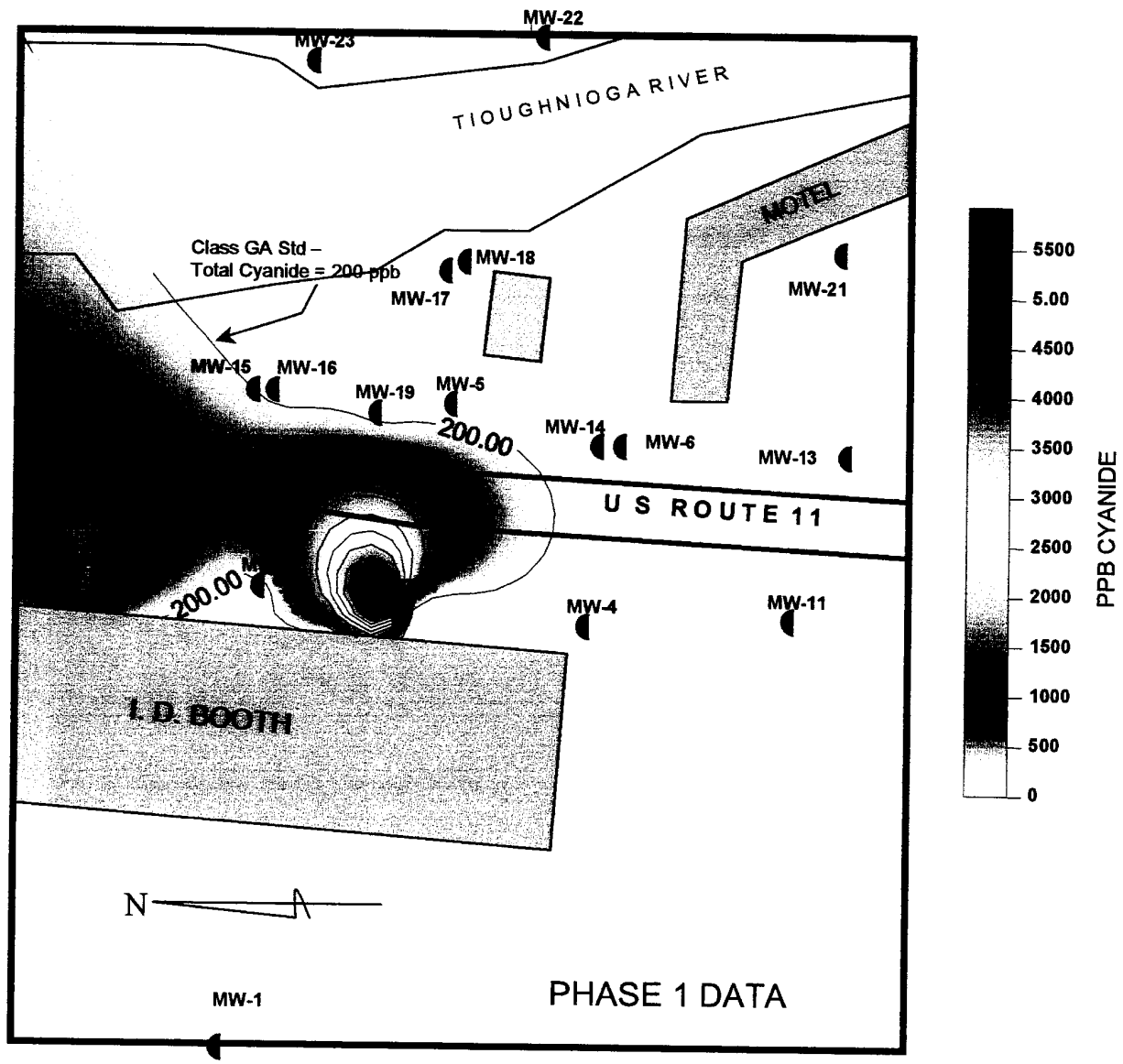
DATE: MAR 02 JOB No: 10126

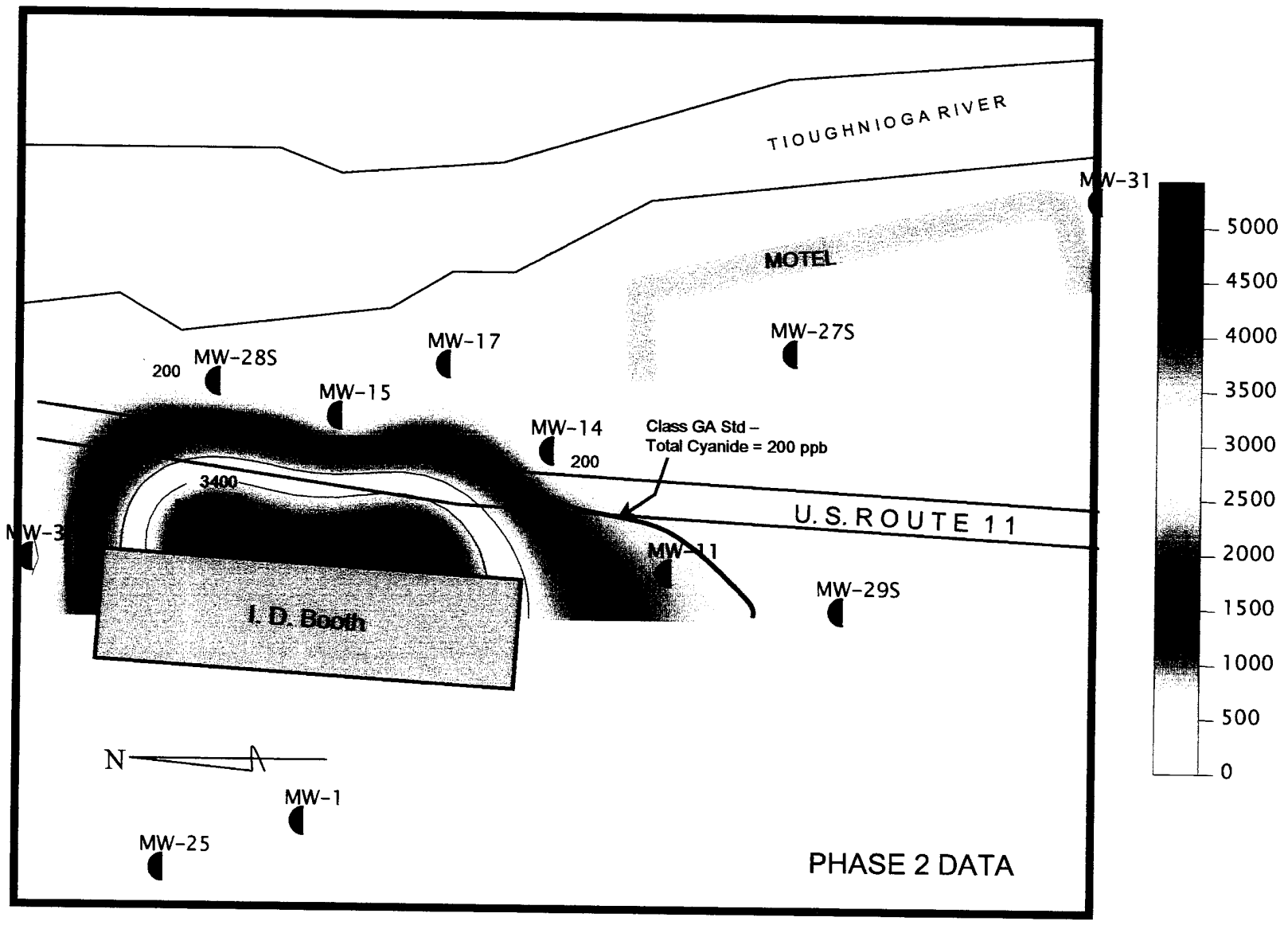
NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 5-13
IRON AND MANGANESE
IN GROUNDWATER (PHASE 1)

DEC-02638

DEC-02639





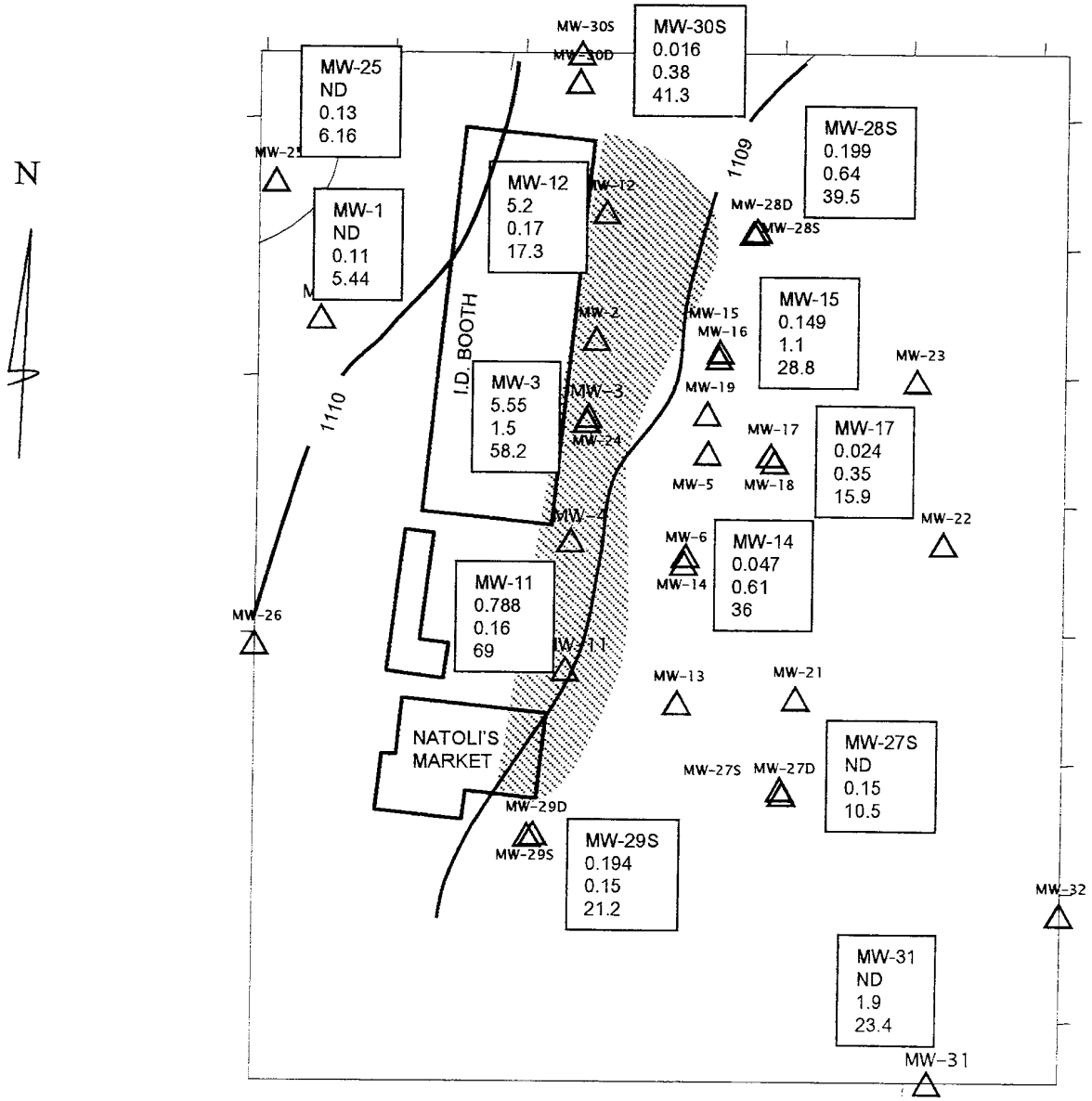
Scale is approximate

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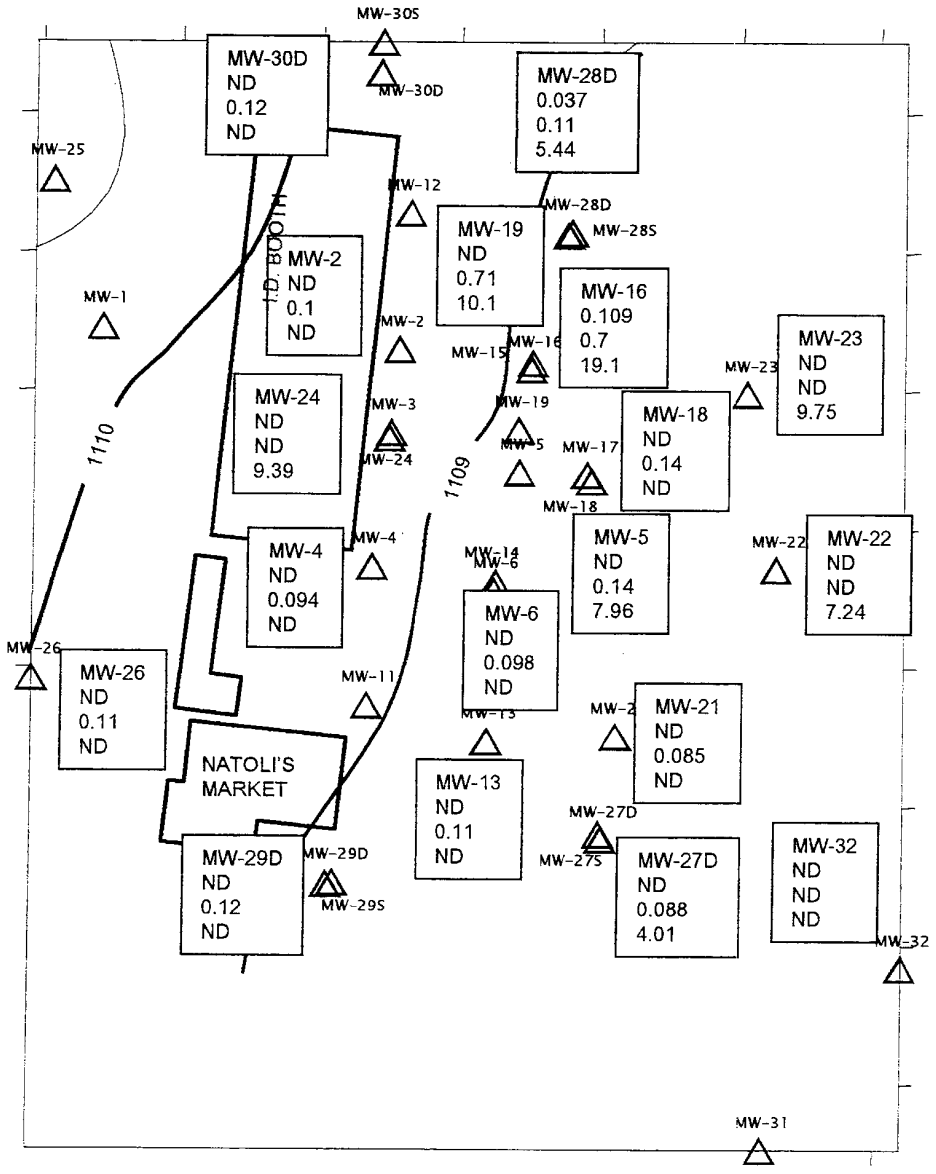
FIGURE 5-14
TOTAL CYANIDE IN GROUNDWATER
(PHASES 1 & 2)



SHALLOW

Shaded area represents where cyanide exceeds Class GA groundwater standard (0.2 ppm)

0 100 ft



DEEP

WELL I.D.
TOTAL CYANIDE (PPM)
AMMONIA (PPM)
COD (PPM)

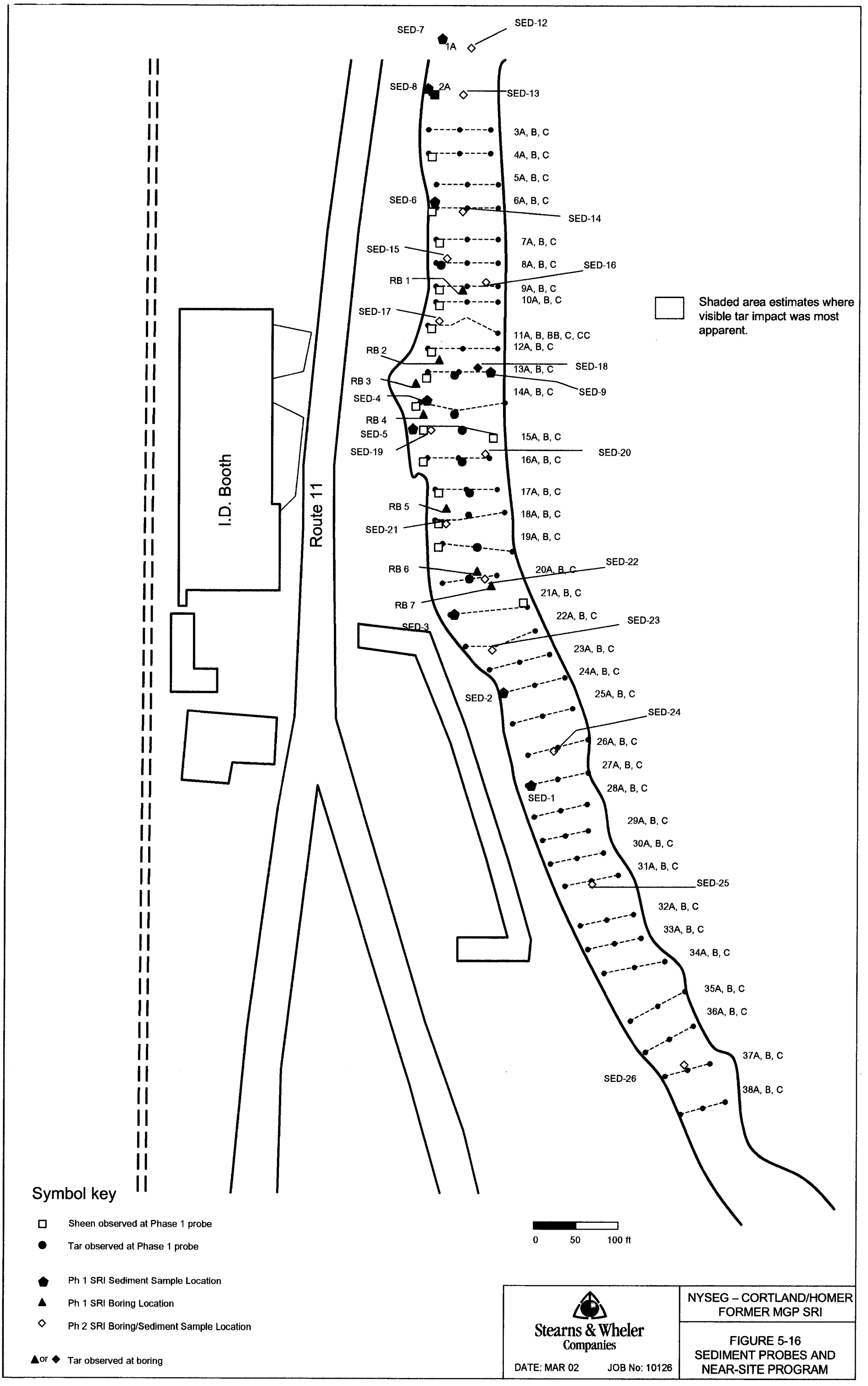
Stearns & Wheler
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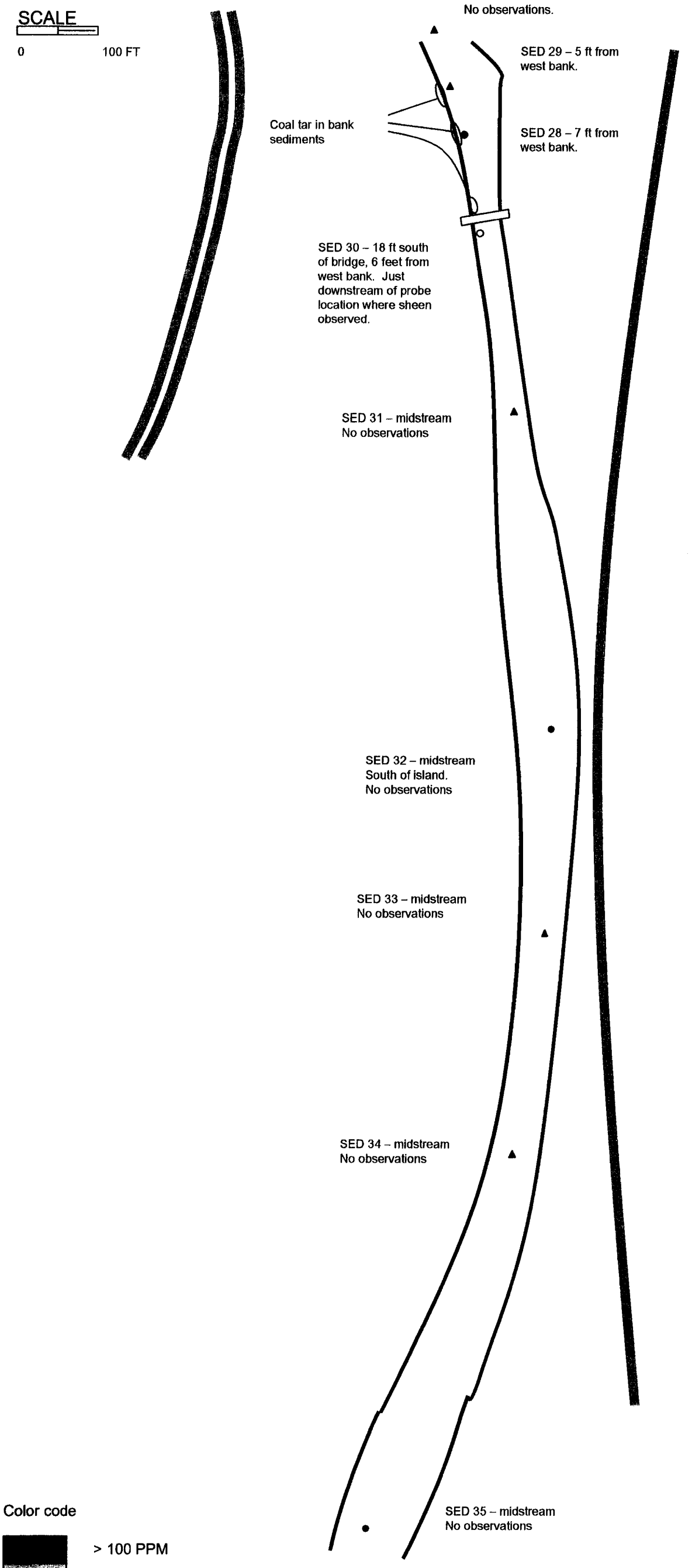
DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 5-15
INORGANIC PARAMETERS
IN GROUNDWATER

DEC-0264C


SED-7
1A
SED-12
SED-8
2A
SED-13
3A, B, C
4A, B, C
5A, B, C
SED-6
6A, B, C
SED-14
7A, B, C
SED-15
8A, B, C
SED-16
RB 1
9A, B, C
10A, B, C
SED-17
11A, B, BB, C, CC
12A, B, C
RB 2
13A, B, C
SED-18
RB 3
14A, B, C
SED-9
SED-4
RB 4
SED-5
15A, B, C
SED-19
SED-20
16A, B, C
17A, B, C
RB 5
18A, B, C
SED-21
19A, B, C
RB 6
20A, B, C
SED-22
21A, B, C
RB 7
22A, B, C
SED-3
SED-23
23A, B, C
24A, B, C
SED-2
25A, B, C
SED-24
26A, B, C
27A, B, C
28A, B, C
SED-1
29A, B, C
30A, B, C
31A, B, C
SED-25
32A, B, C
33A, B, C
34A, B, C
35A, B, C
36A, B, C
37A, B, C
SED-26
38A, B, C
I.D. Booth
Route 11
Shaded area estimates where visible tar impact was most apparent.
Symbol key
Sheen observed at Phase 1 probe
Tar observed at Phase 1 probe
Ph 1 SRI Sediment Sample Location
Ph 1 SRI Boring Location
Ph 2 SRI Boring/Sediment Sample Location
▲or ◆ Tar observed at boring
0
50
100 ft
Stearns & Wheler
Companies
DATE: MAR 02
JOB No: 10126
NYSEG – CORTLAND/HOMER
FORMER MGP SRI
FIGURE 5-16
SEDIMENT PROBES AND
NEAR-SITE PROGRAM



Results by sample

	Total PAH (ppm)
SED27A	0
SED27B	0
SED 28A	11.7
SED 28B	0
SED 28C	0
SED29A	4.393
SED29B	0.104
SED29C	0
SED30A	30.463
SED30B	2.602
SED31B	1.764
SED32A	0.823
SED32B	6.136
SED33A	0.186
SED33B	0.687
SED34A	0.112
SED34B	0.043
SED35A	128.02
SED35B	10.782

▲ Triangle indicates where no sample contained more than 4 ppm total PAH

Color code

- > 100 PPM
- 76 - 100 PPM
- 26 - 75 PPM
- 11 - 25 PPM
- 5 - 10 PPM
- < 4 PPM

Refer to Figure 5-19 for location of sampling sequence with respect to site.

Stearns & Wheler Companies

DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 5-17
SEDIMENT PROGRAM
DOWNSTREAM RESULTS

SCALE
0 100 FT

RAILROAD

SED 36 – midstream.
No observations.

SED 37 – midstream.
No observations.

SED 38 – 8 ft from west bank
Just south of probe where
sheen was observed.

Sediment deposit.

SED 39 – midstream.
No observations.

SED 40 – 20 ft from west bank
South of sediment deposit.
No observations.

Sediment deposit.

SED 41 – 14 ft from east bank.
Along length of sed. deposit bank
where sheen was observed during probing.

SED 42 – Midstream. South of
Sed. deposit bank. No observations

SED 43 – Midstream. Tar observed.

Sediment Trap.

SED 44 – Midstream. No observations.

RAILROAD

Dry Creek

Results by sample

	Total PAH (ppm)
SED36A	22.892
SED36B	1.156
SED37A	196.98
SED37B	14.837
SED38A	100.42
SED38B	15.668
SED38C	36.97
SED40A	22.77
SED40B	34.634
SED41A	34.71
SED41B	296.45
SED42A	20.257
SED42B	57.52
SED43A	23.654
SED43B	3570.3
SED43C	86.94
SED44A	4.456
SED44B	7.862

▲ Triangle indicates where no sample contained more than 4 ppm total PAH



Looking south

Color code

> 100 PPM
76 - 100 PPM
26 - 75 PPM
11 - 25 PPM
5 - 10 PPM
< 4 PPM

Refer to Figure 5-19 for location of sampling sequence with respect to site.

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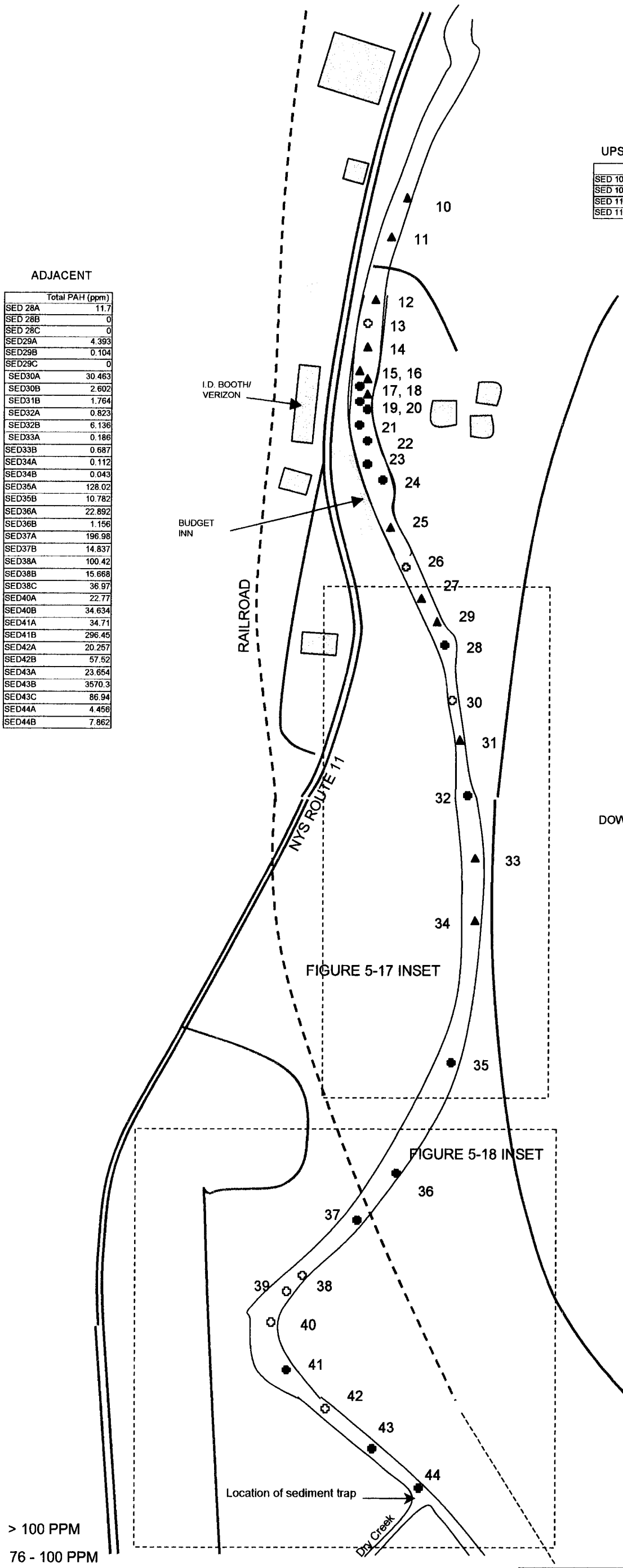
DATE: MAR 02 JOB No: 10126

NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 5-18
SEDIMENT PROGRAM
DOWNSTREAM RESULTS

ADJACENT

	Total PAH (ppm)
SED 28A	11.7
SED 28B	0
SED 28C	0
SED29A	4.393
SED29B	0.104
SED29C	0
SED30A	30.463
SED30B	2.602
SED31B	1.764
SED32A	0.823
SED32B	6.136
SED33A	0.186
SED33B	0.687
SED34A	0.112
SED34B	0.043
SED35A	128.02
SED35B	10.782
SED36A	22.892
SED36B	1.156
SED37A	196.98
SED37B	14.837
SED38A	100.42
SED38B	15.668
SED38C	36.97
SED40A	22.77
SED40B	34.634
SED41A	34.71
SED41B	296.45
SED42A	20.257
SED42B	57.52
SED43A	23.654
SED43B	3570.3
SED43C	86.94
SED44A	4.456
SED44B	7.862



UPSTREAM

	Total PAH (ppm)
SED 10A	4.12
SED 10B	0
SED 11A	2.44
SED 11B	2

▲ Triangle indicates where no sample contained more than 4 ppm total PAH

● Indicates sample location. Color code Indicates total PAH concentration

DOWNSTREAM

	Total PAH (ppm)
SED12A	1.186
SED12B	0.036
SED12C	0.061
SED13A	59.894
SED13B	0
SED13C	0
SED14A	0.557
SED14B	0.009
SED15A	0
SED15B	0
SED15C	0
SED16A	1.566
SED16B	0
SED16C	0.05
SED17A	3523.9
SED17B	30.595
SED17C	1.106
SED18A	2.439
SED18B	0.201
SED18C	0.041
SED19A	86.64
SED19B	676.7
SED19C	38.15
SED20A	11.384
SED20B	0.505
SED20C	0.563
SED21A	18.73
SED21B	2.193
SED21C	1.808
SED22A	7.93
SED22B	13.44
SED22C	0.74
SED 23A	125.58
SED 23B	16.106
SED23C	2.157
SED24A	10.301
SED24B	0.339
SED25A	0.224
SED25B	0.061
SED25C	0
SED26A	87.01
SED26B	0.893
SED27A	0
SED27B	0

Color code

> 100 PPM

76 - 100 PPM

26 - 75 PPM

11 - 25 PPM

5 - 10 PPM

< 4 PPM

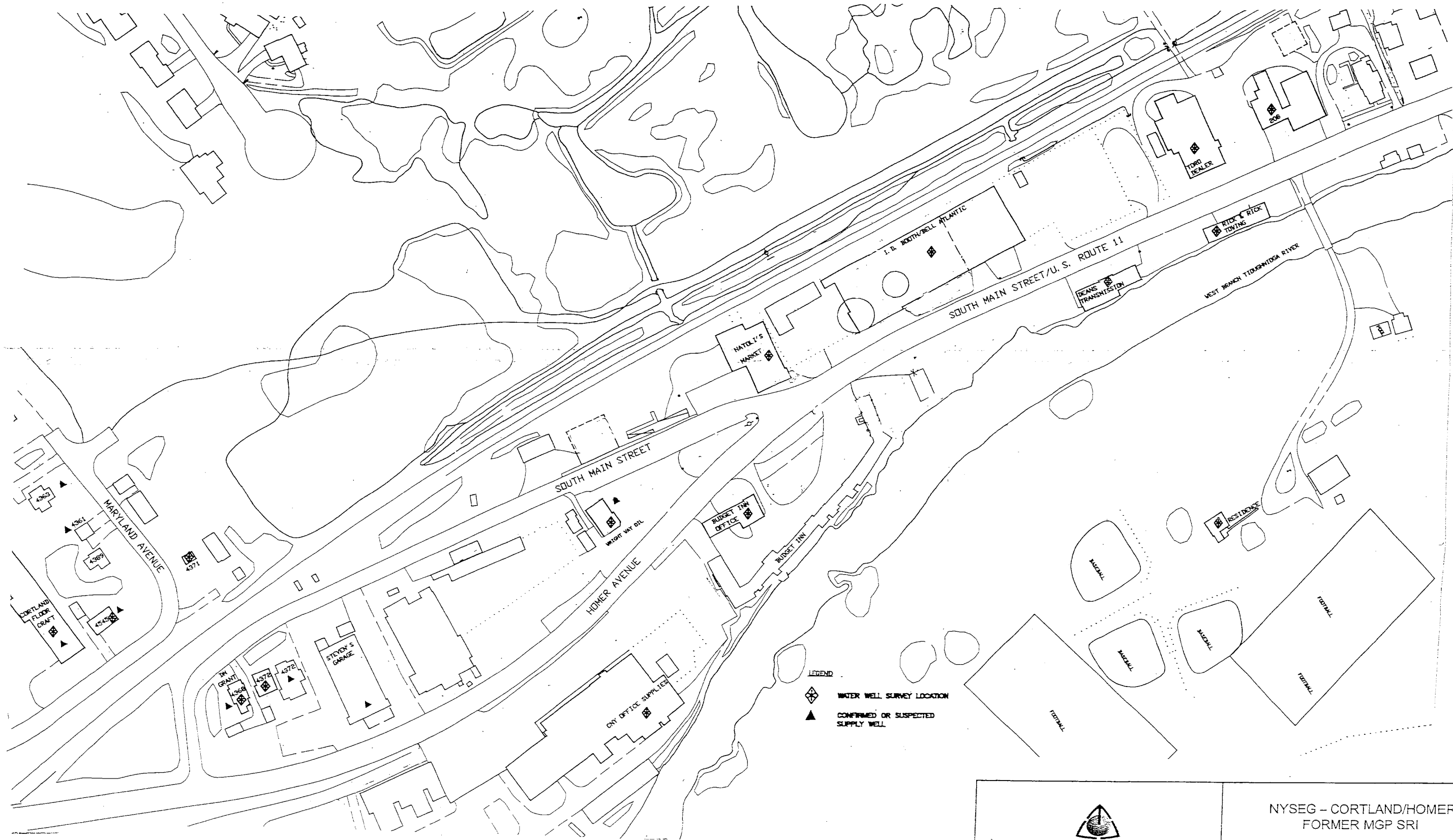
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NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 5-19
SEDIMENT PROGRAM RESULTS

DEC-02645

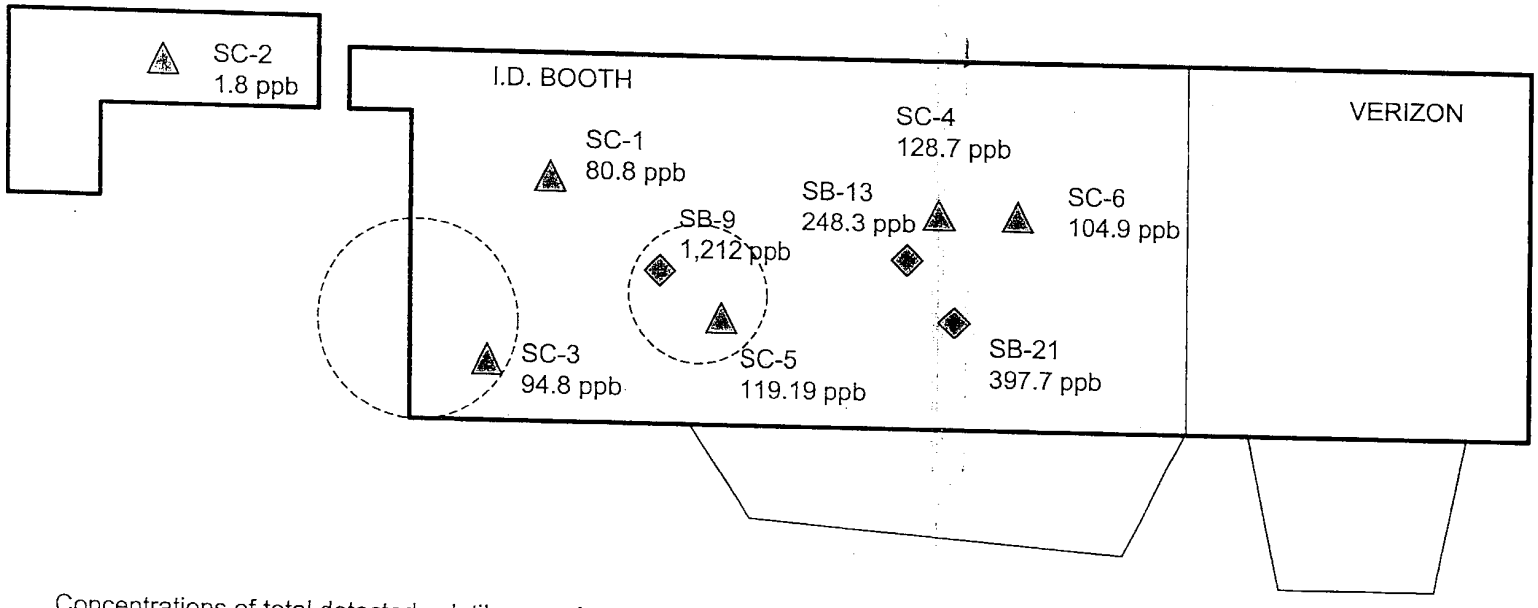


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NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 5-20
WATER WELL SURVEY LOCATIONS



Concentrations of total detected volatile organic compounds (VOCs).

Phase 1 SRI Suma canister – 24 hr time-weighted average from ambient air (December, 1999)

Phase 2 SRI Suma canister – Grab sample below floor slab (October, 2001).

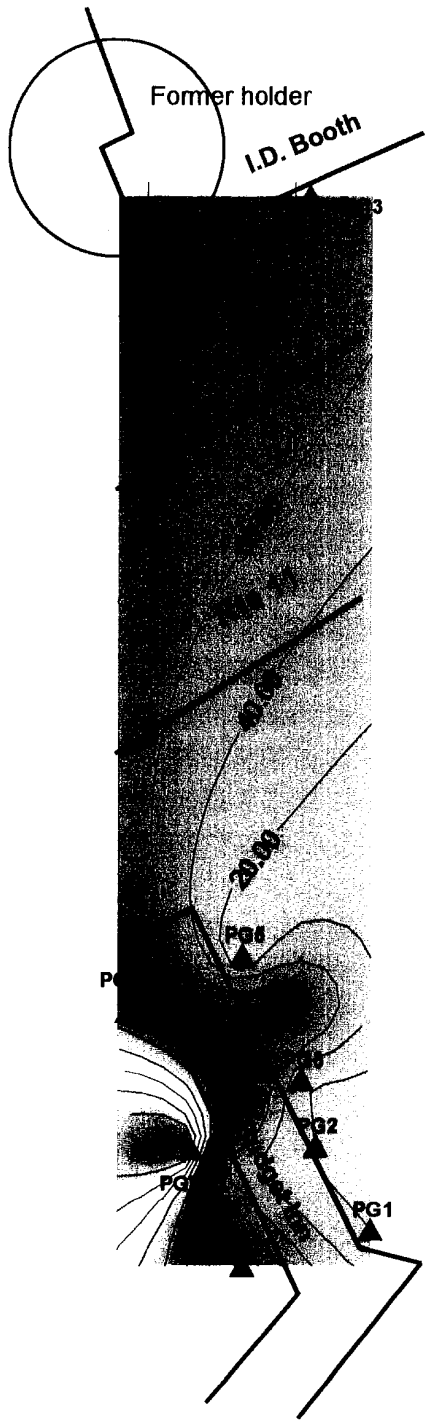
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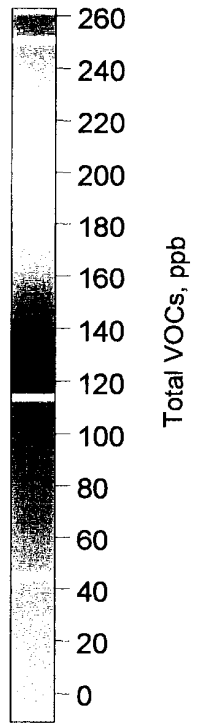
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NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 5-21
INDOOR AIR SURVEY RESULTS

DEC-02646





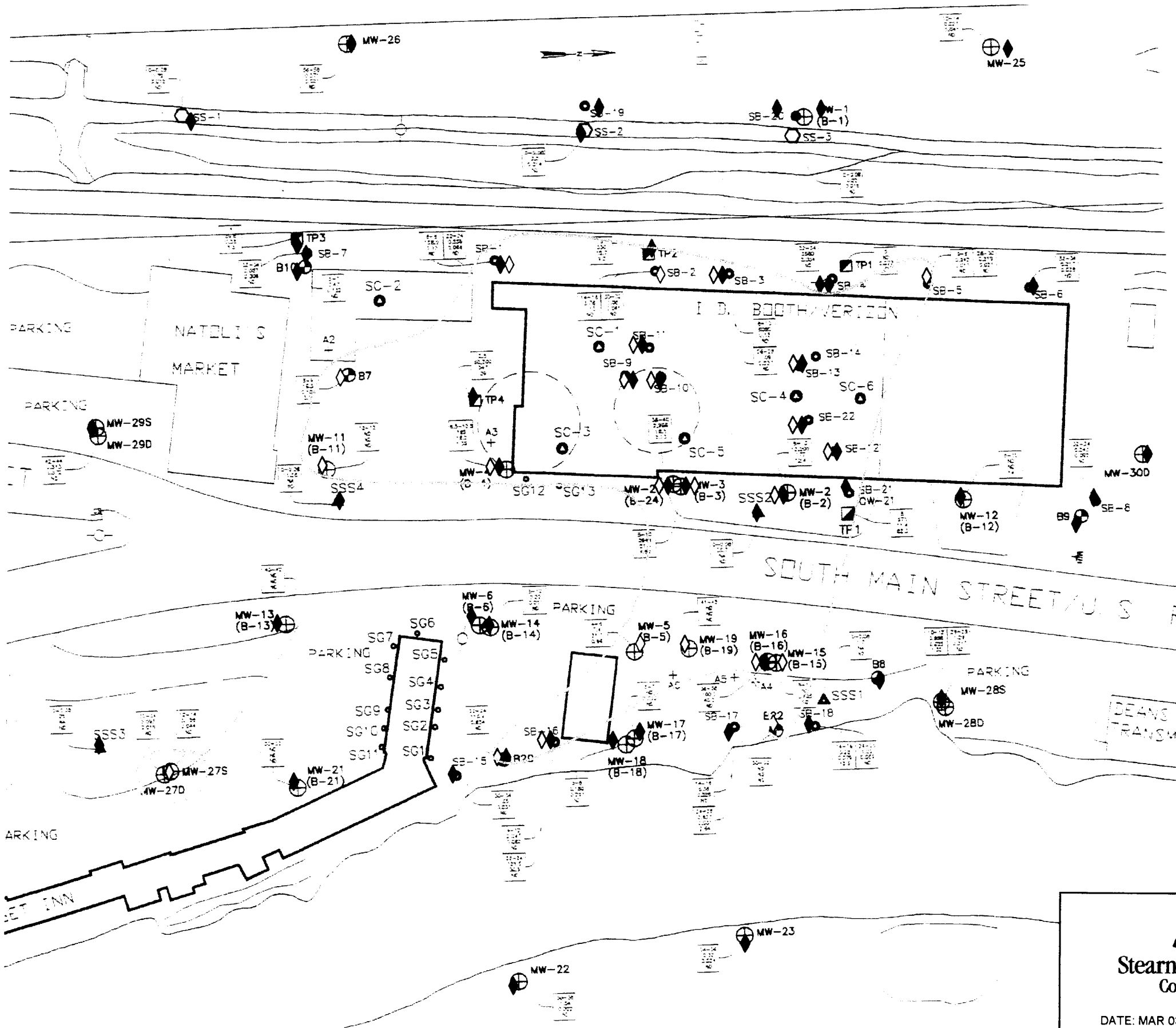
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NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 5-22
PASSIVE SOIL GAS SURVEY
TOTAL VOCS

DEC-0264



Area of impact delineated based On:

- Soil sample locations that encountered visible NAPL tar or sheen
- ♦ SVOC TAGM exceeded
- ◊ Visible NAPL
- ♦ No visible NAPL
- ◊ Visible petroleum evidence

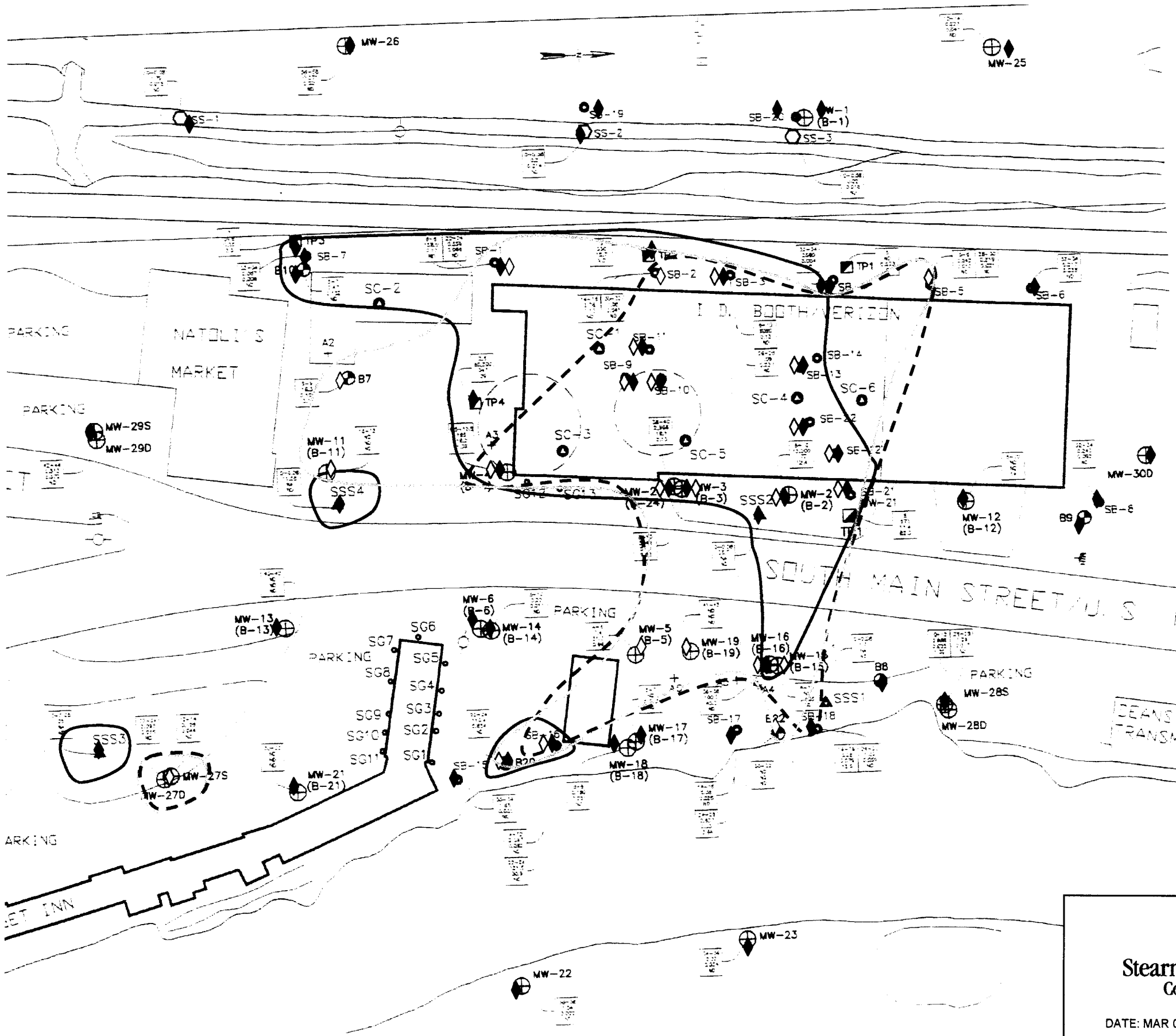
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NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 5-23
EXTENT OF VISIBLE IMPACTS IN SOIL SAMPLES

DEC-02649



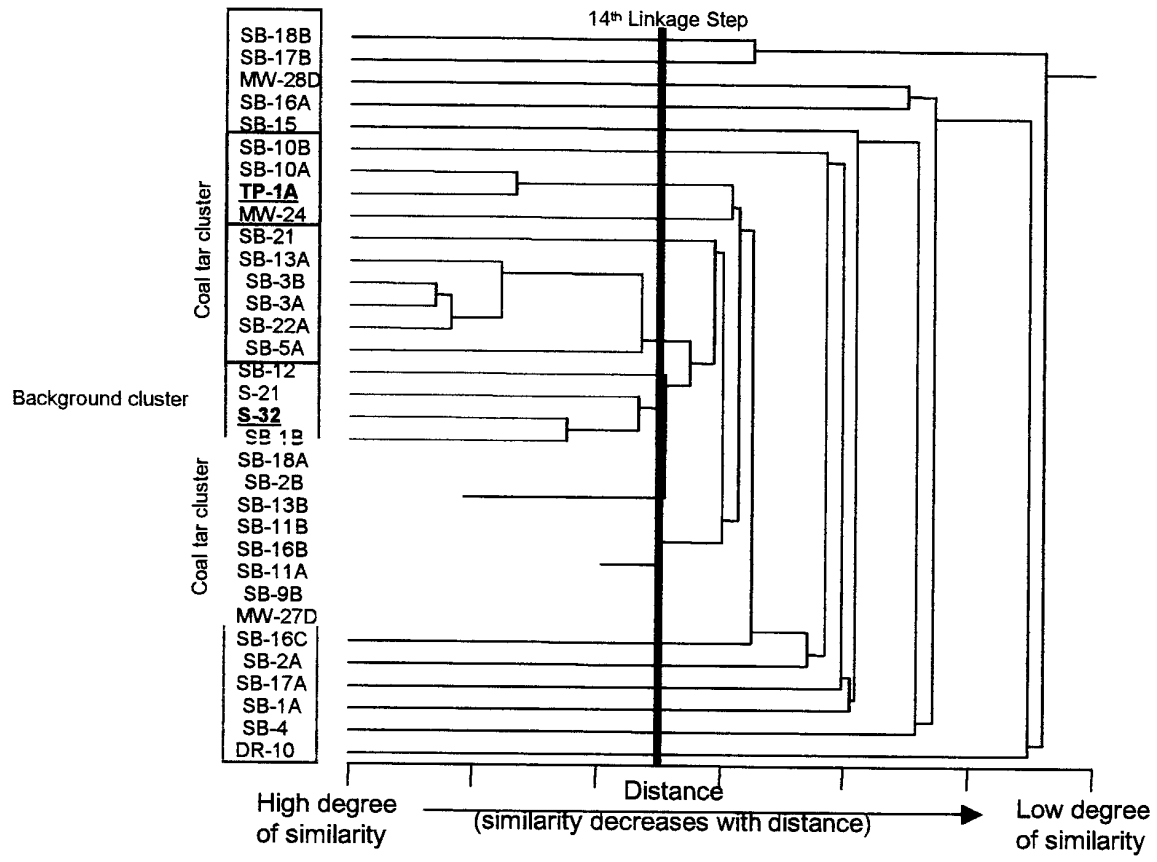
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NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 6-1
DELINEATED IMPACTS IN SOIL SAMPLES

Cluster Tree

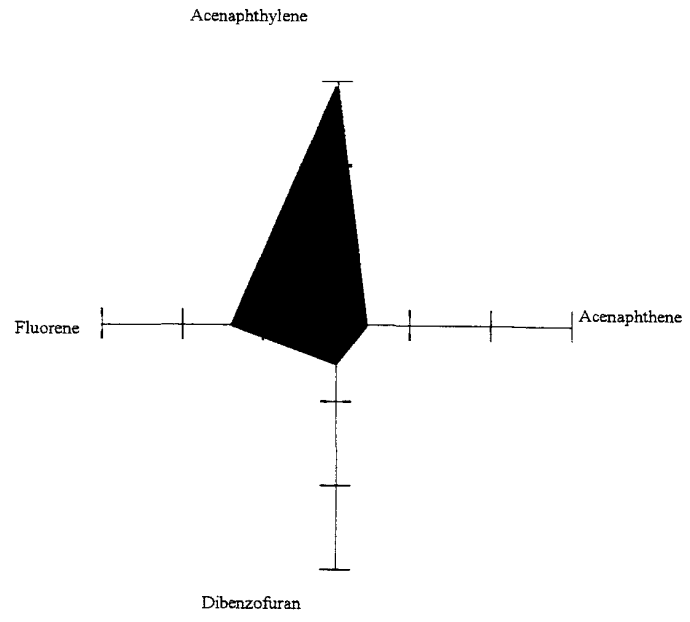


The cluster tree is an arrangement of samples based on how similar each sample is to each other sample. "Distance" is a reflection of the degree of similarity between samples. Samples that are linked at lower distances are more similar than those linked at greater distances. The above tree depicts the similarity between the soil samples based on the relative proportions of acenaphthalene, acenaphthene, dibenzofuran, and fluorene. The relative proportions can be represented by characteristic shapes (right), that provide a visual distinction, or "fingerprint", for each sample.

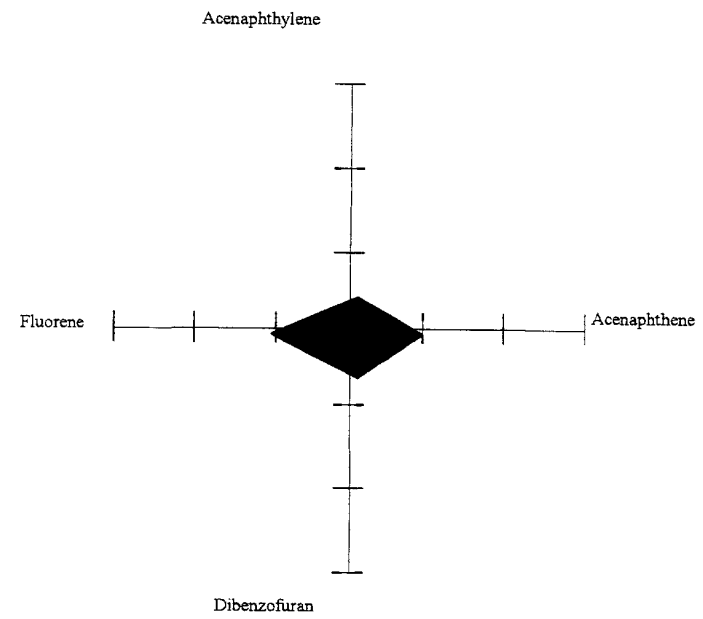
The 14th linkage step is the point at which a the background cluster is linked to on-site samples with MGP impacts.

Red and orange clusters denote samples from MGP area with evidence of tar Impacts.

Blue clusters are linked at large distances that indicate very little statistical similarity To any of the previously formed clusters.



TP-1A



S-32

A soil sample from a test pit (TP-1A) is visually distinct from a background surface soil sample (S-32). Thus, they are separated on the cluster tree to the left.

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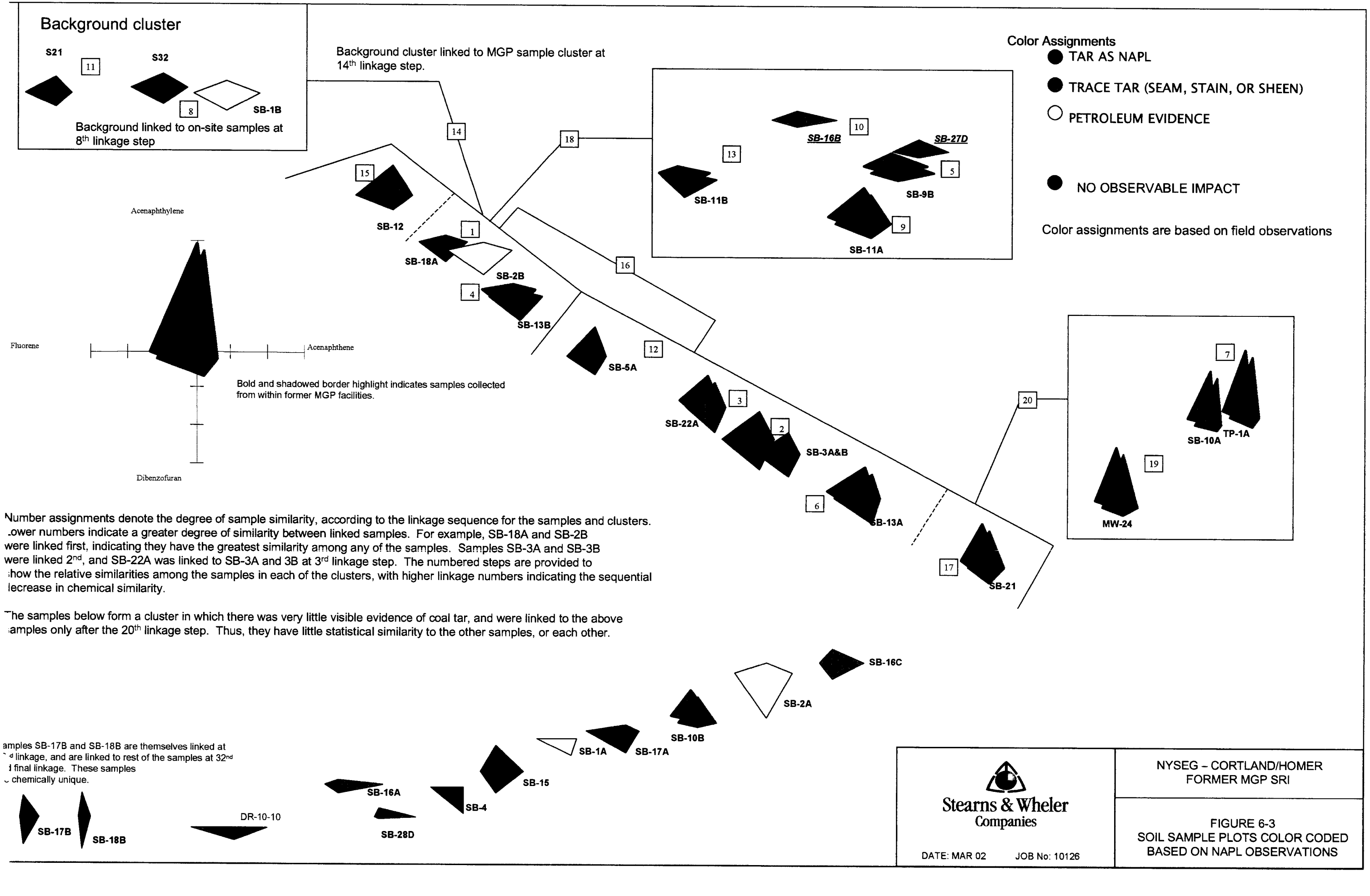
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NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 6-2
RADIAL PLOTS AND CLUSTERING RESULTS FOR SOIL SAMPLES

DEC-02650

DEC-02651



Number assignments denote the degree of sample similarity, according to the linkage sequence for the samples and clusters. Lower numbers indicate a greater degree of similarity between linked samples. For example, SB-18A and SB-2B were linked first, indicating they have the greatest similarity among any of the samples. Samples SB-3A and SB-3B were linked 2nd, and SB-22A was linked to SB-3A and 3B at 3rd linkage step. The numbered steps are provided to show the relative similarities among the samples in each of the clusters, with higher linkage numbers indicating the sequential decrease in chemical similarity.

The samples below form a cluster in which there was very little visible evidence of coal tar, and were linked to the above samples only after the 20th linkage step. Thus, they have little statistical similarity to the other samples, or each other.

Samples SB-17B and SB-18B are themselves linked at [illegible] linkage, and are linked to rest of the samples at 32nd [illegible] final linkage. These samples [illegible] chemically unique.

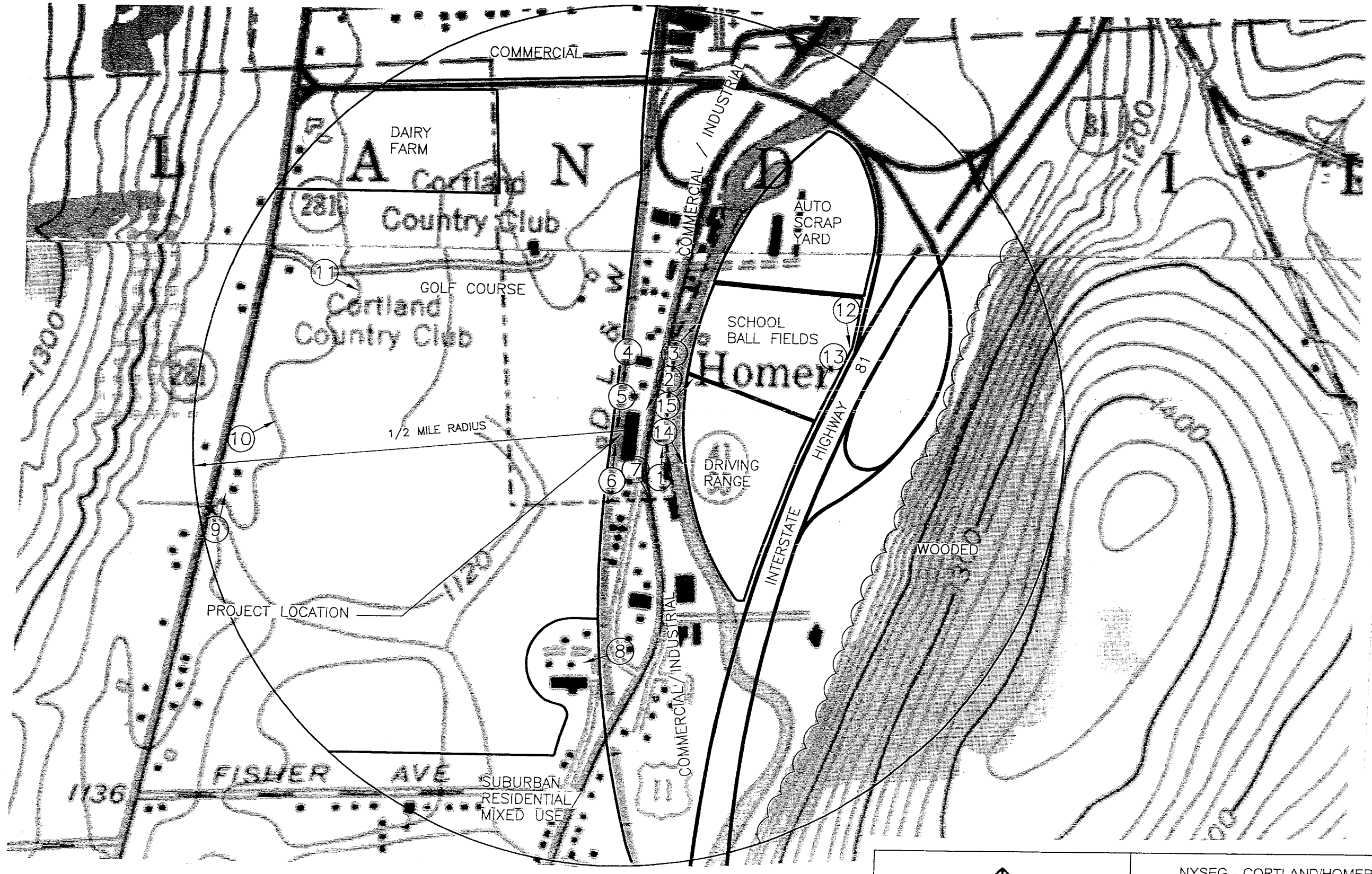
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NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 6-3
SOIL SAMPLE PLOTS COLOR CODED BASED ON NAPL OBSERVATIONS

DEC-02652



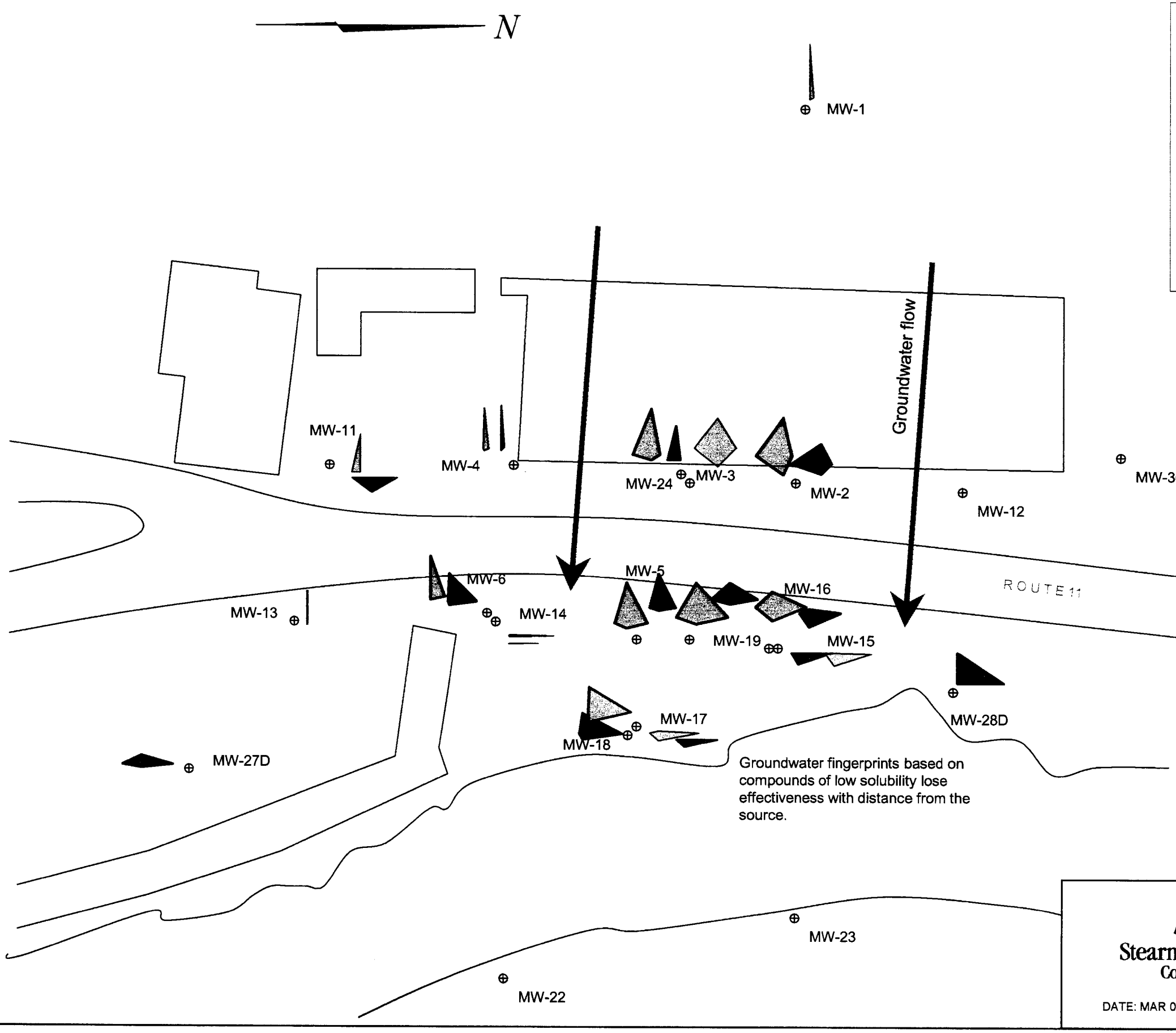
Stearns & Wheler Companies

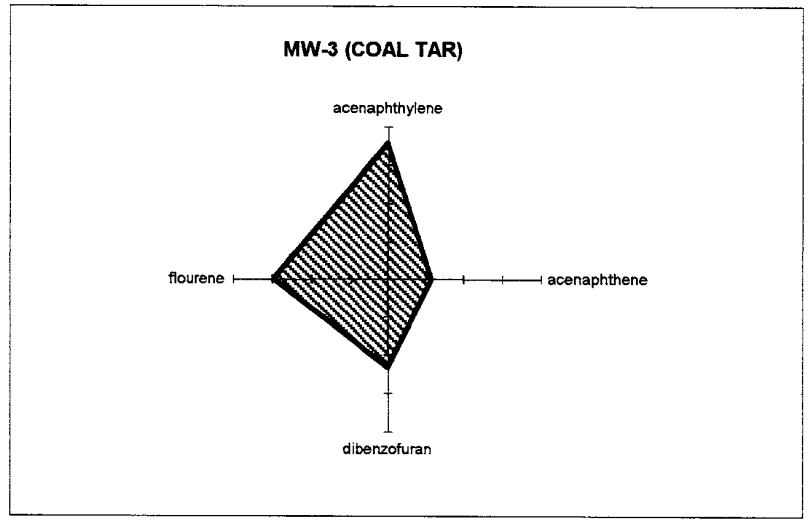
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NYSEG – CORTLAND/HOMER
FORMER MGP SRI

FIGURE 7-1
FWIA STUDY AREA

DEC-02653





DR-10-10

Note: DR-10-10 is the chemical signature of a soil sample in connection with highway construction work. The sample was apparently affected by petroleum product, unrelated to the site.

MW-30S/D

Upgradient data from MW-1.

Red highlight indicates deep well.
Orange indicates 1999 SRI data
Blue indicate 2001 SRI data

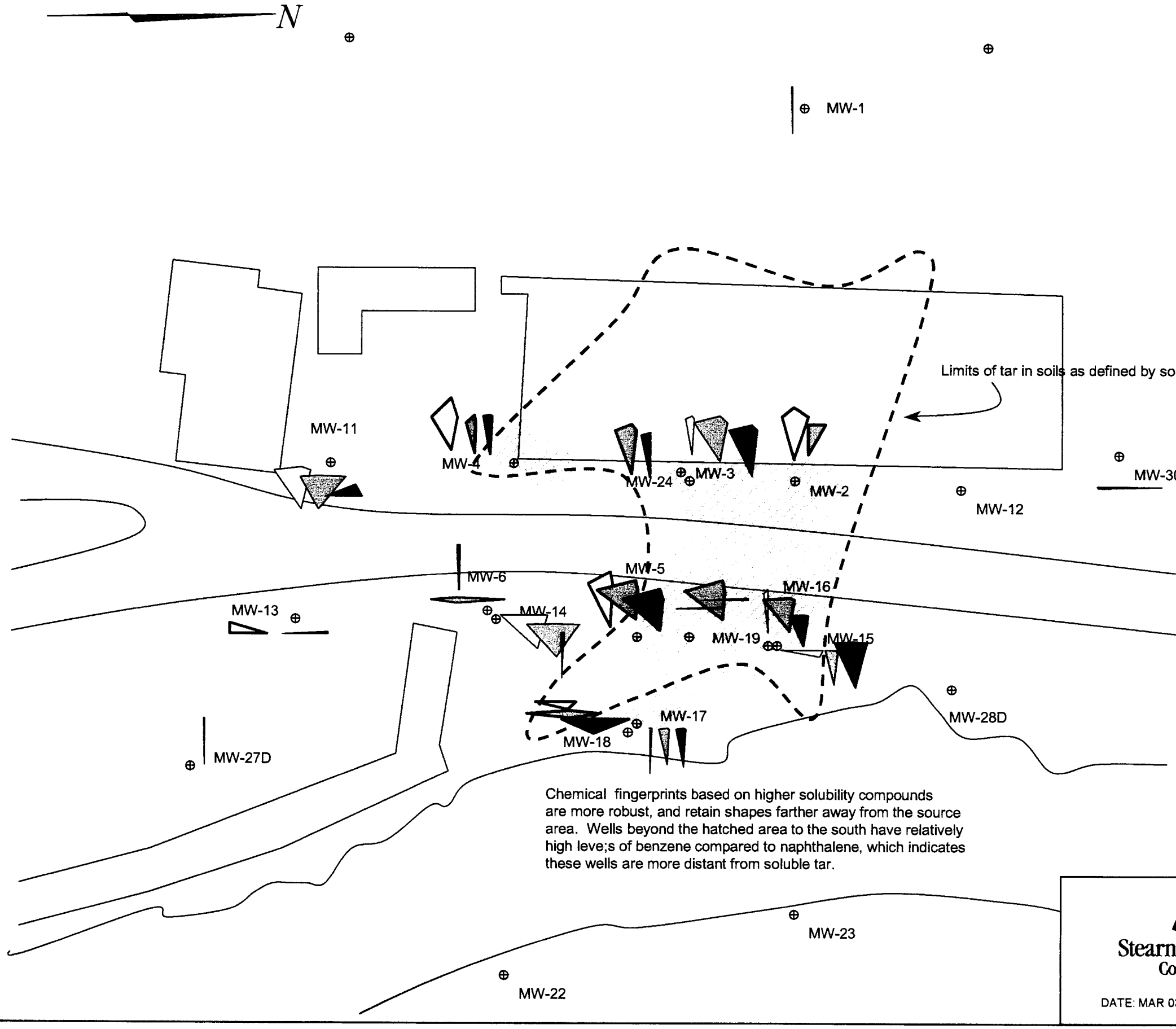
Stearns & Wheler Companies

DATE: MAR 03 JOB No: 10126

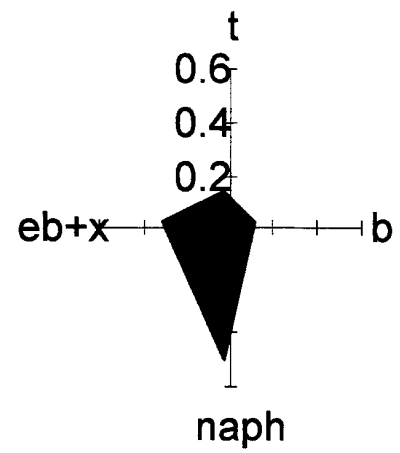
NYSEG – CORTLAND/HOMER FORMER MGP SRI

FIGURE 6-4
GROUNDWATER CHEMICAL FINGERPRINTS

DEC-02654



Chemical fingerprints based on higher solubility compounds are more robust, and retain shapes farther away from the source area. Wells beyond the hatched area to the south have relatively high leve;s of benzene compared to naphthalene, which indicates these wells are more distant from soluble tar.

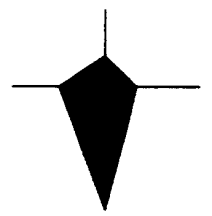


Red highlight indicates deep well.

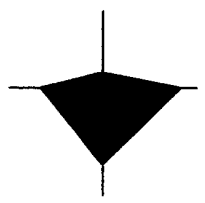
Yellow indicates Task 2/3 data
Orange indicates 1999 SRI data
Blue indicates 2001 SRI data

Relative proportion of naphthalene is highest
In wells affected by coal tar (spike-like fingerprint).

Relative proportion of benzene and ethylbenzene increases along groundwater flow path, as naphthalene is preferentially sorbed to soils, producing a more cone-like or inverted triangle shape farther away from coal tar source:



Coal tar fingerprint with high relative proportion of naphthalene close to source.



Higher relative proportions of BTEX compared to naphthalene farther from source.

Area of most likely coal tar presence.

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DATE: MAR 03 JOB No: 10126

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FORMER MGP SRI

FIGURE 6-5
GROUNDWATER CHEMICAL
FINGERPRINTS

DEC-02655

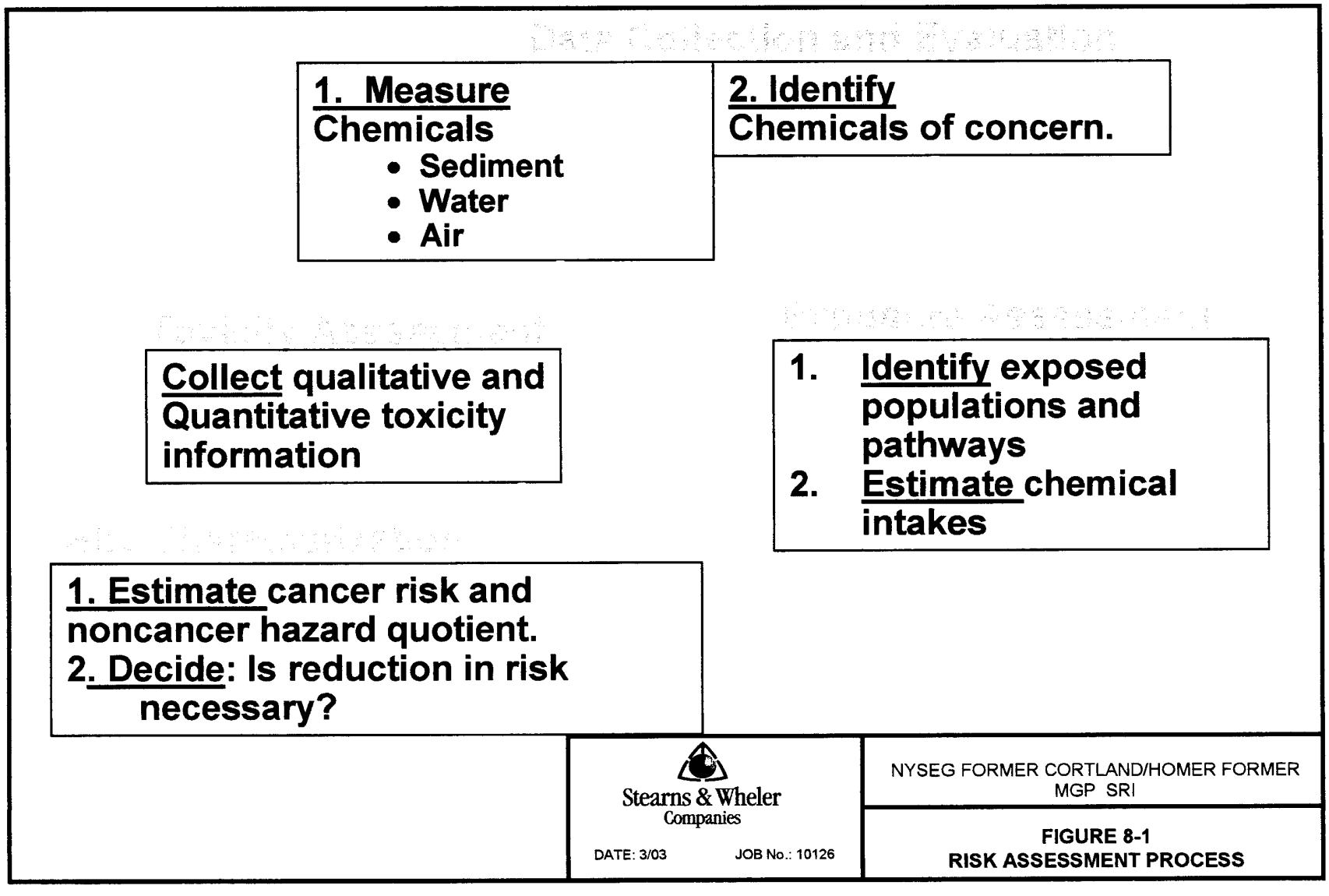


Stearns & Wheler
Companies

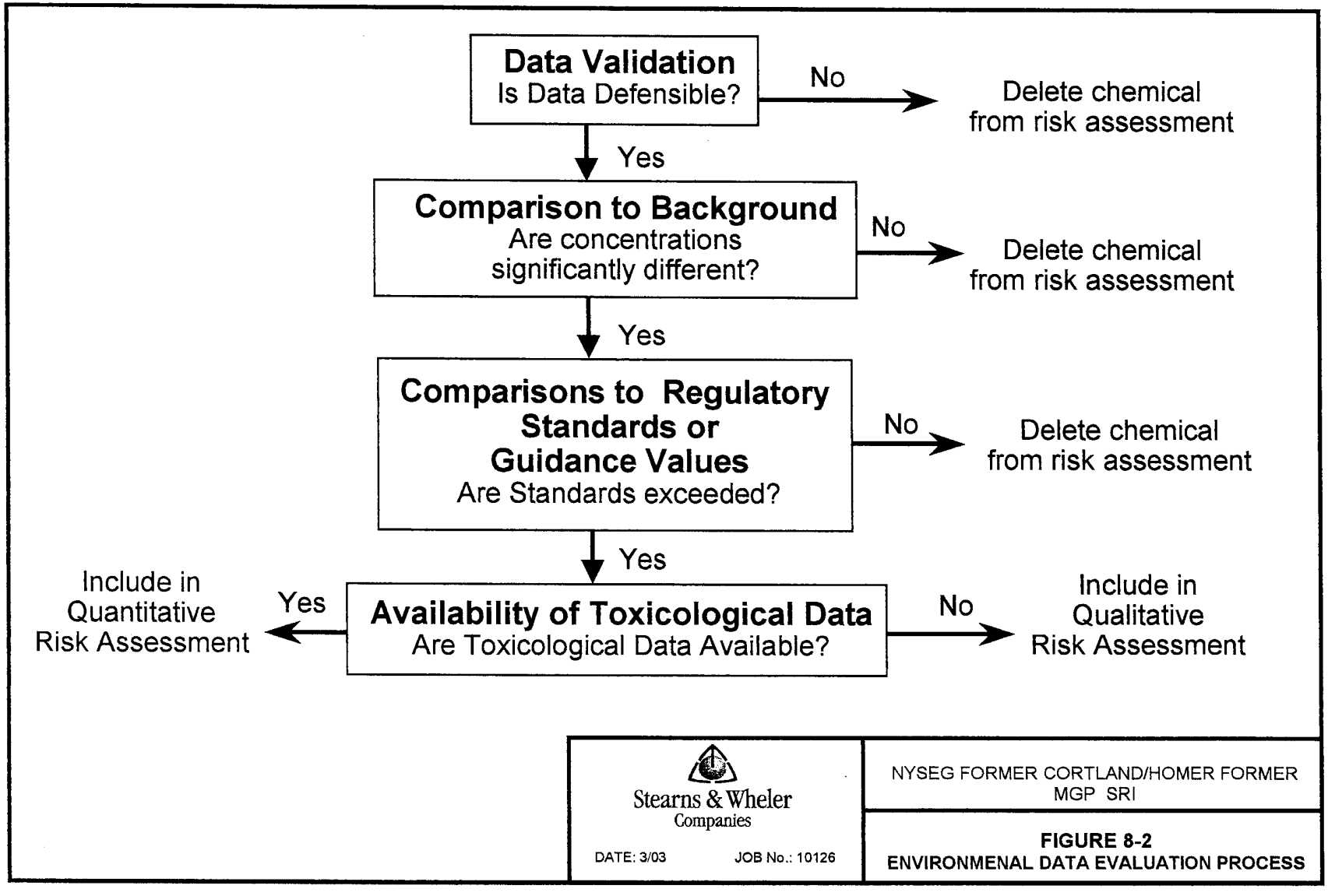
DATE: MAR 02 JOB No: 10126

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FORMER MGP SRI

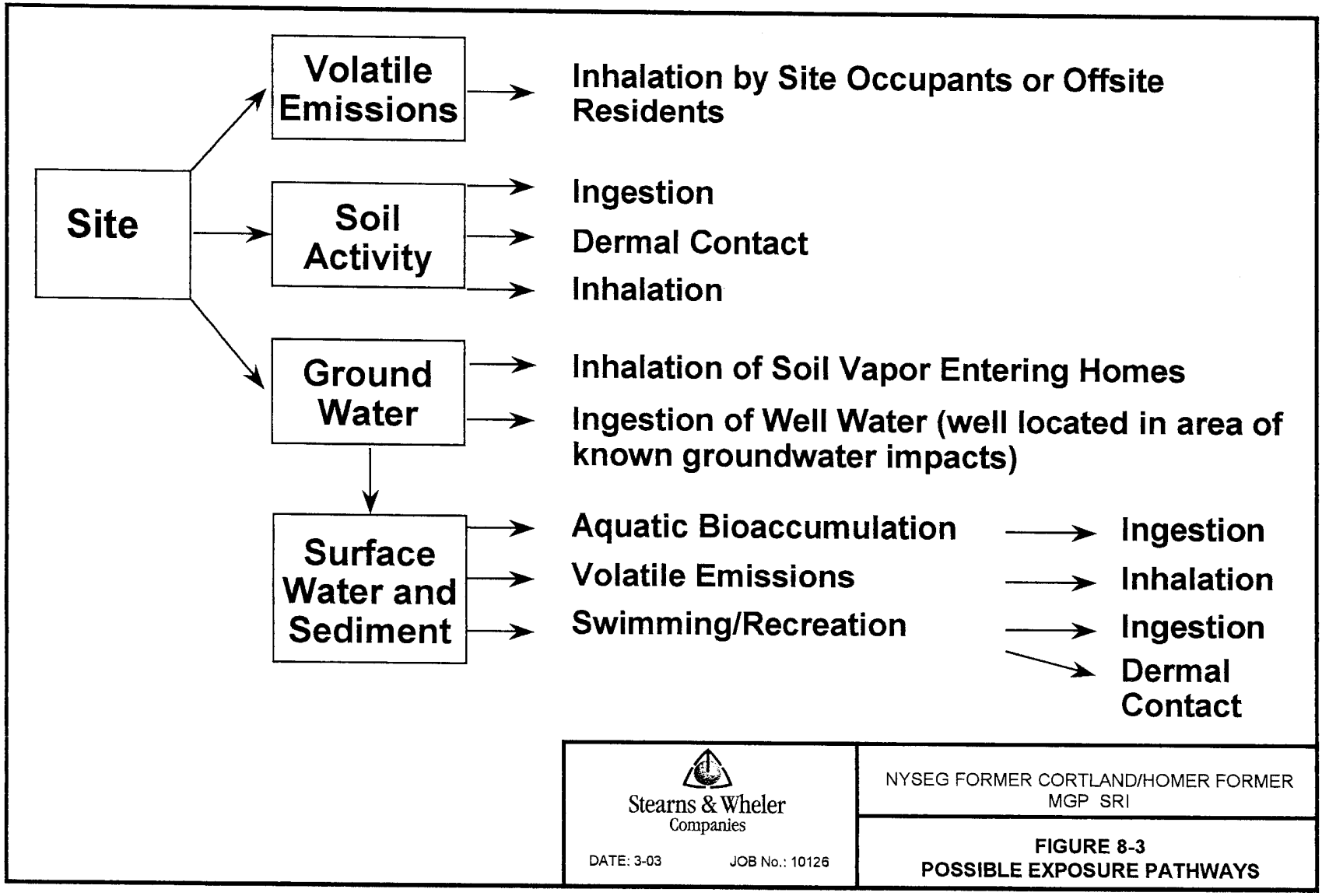
FIGURE 7-2
FWIA STUDY AREA


1. Measure
Chemicals
• Sediment
• Water
• Air
2. Identify
Chemicals of concern.
Collect qualitative and
Quantitative toxicity
information
1. Identify exposed
populations and
pathways
2. Estimate chemical
intakes
1. Estimate cancer risk and
noncancer hazard quotient.
2. Decide: Is reduction in risk
necessary?
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MGP SRI
FIGURE 8-1
RISK ASSESSMENT PROCESS

DEC-02656


Data Validation
Is Data Defensible?
No
Delete chemical from risk assessment
Yes
Comparison to Background
Are concentrations significantly different?
No
Delete chemical from risk assessment
Yes
Comparisons to Regulatory Standards or Guidance Values
Are Standards exceeded?
No
Delete chemical from risk assessment
Yes
Availability of Toxicological Data
Are Toxicological Data Available?
Yes
Include in Quantitative Risk Assessment
No
Include in Qualitative Risk Assessment
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FIGURE 8-2
ENVIRONMENAL DATA EVALUATION PROCESS

DEC-02657


Site
Volatile Emissions
Soil Activity
Ground Water
Surface Water and Sediment
Inhalation by Site Occupants or Offsite Residents
Ingestion
Dermal Contact
Inhalation
Inhalation of Soil Vapor Entering Homes
Ingestion of Well Water (well located in area of known groundwater impacts)
Aquatic Bioaccumulation
Ingestion
Volatile Emissions
Inhalation
Swimming/Recreation
Ingestion
Dermal Contact
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JOB No.: 10126
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FIGURE 8-3
POSSIBLE EXPOSURE PATHWAYS

DEC-02658