REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FOR THE
FORMER MANUFACTURED GAS PLANT SITE

ONEIDA, NY

(SCONONDOA STREET)

SUBMITTED TO:

NIAGARA MOHAWK POWER CORPORATION
300 ERIE BLVD. WEST
SYRACUSE, NEW YORK 13202

PREPARED BY:

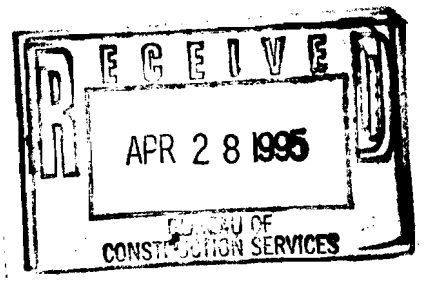
PARSONS ENGINEERING SCIENCE, INC.
290 ELWOOD DAVIS ROAD, SUITE 312
LIVERPOOL, NEW YORK 13088

APRIL 1995

Reviewed and Approved by:

Project Manager

Technical Manager



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INTRODUCTION

1.1 PROJECT BACKGROUND

The New York State Department of Environmental Conservation (NYSDEC) is requiring Niagara Mohawk Power Corporation (NMPC) to perform a Remedial Investigation/Feasibility Study (RI/FS) at NMPC's Oneida (Sconondoa Street) former manufactured gas plant (MGP) site, City of Oneida, Madison County, New York. The RI/FS is required due to the apparent off-site presence of MGP residuals in soils and groundwater adjacent to the site.

The first step in the RI/FS process is development of this work plan, which is designed to meet requirements established in the Order on Consent (#DO-001-9210) between NYSDEC and NMPC. This work plan describes the proposed RI/FS activities and includes a quality assurance plan, field sampling plan, citizen participation plan, cultural resources management plan, and health and safety plan. The CERCLA process used in New York State meets all of the USEPA CERCLA and National Contingency Plan (NCP) requirements and guidance and includes additional NYSDEC requirements, as specified herein.

1.2 PROJECT OBJECTIVES

The RI/FS Work Plan addresses all elements of a RI/FS as set forth in the CERCLA of 1980, 42 U.S.C. Sections 9601 et seq., as amended, the current NCP, and the USEPA Interim Final Guidance document entitled "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA", dated October 1988 (USEPA, 1988a) and any subsequent revisions thereto, and appropriate technical and administrative guidelines.

The RI/FS has the following objectives:

1) to determine the nature and extent of contamination, including delineation and characterization of waste sources, waste materials, and potential contaminant migration pathways;
2) to determine potential human health and environmental risks and applicable or relevant and appropriate requirements (ARARs);
3) to determine appropriate remedial alternatives/costs, including waste treatment technologies and candidate treatment vendors/facilities (NMPC's ongoing R&D program shall be considered in making such determinations);
4) to determine the impacts of remedial action upon on-site and off-site buildings, structures and facilities, and;
5) to support and facilitate a comprehensive remedial design.

1.3 ORGANIZATION OF THIS WORK PLAN

This Work Plan includes the following (please note that the figures and tables follow the text within each section):

- A review of current site conditions, site history, and results of previous investigations (Section 2).
- Descriptions of RI/FS tasks (Section 3) including site characterization, data validation and evaluation, assessment of risks to the public and the environment via habitat-based and human health-based risk assessments, analysis of remedial technologies, selection of the most appropriate remedy, and report preparation.
- A Project Management Approach (Section 4) including project organization and schedule.
- A Sampling and Analysis Plan (Appendix A) which consists of a Field Sampling Plan (Appendix A.1) and a Quality Assurance Project Plan (Appendix A.2). The Field Sampling Plan provides procedures and forms to be used during field activities. The Quality Assurance Project Plan specifies methods to be used to assure that data from the proposed site investigation are precise, accurate, representative, comparable, and complete.
- A Site Health and Safety Plan (Appendix B), in compliance with Occupational Safety and Health Administration Standards under 29 CFR Parts 1910.120 and 1926, to protect personnel conducting the field investigation.
- The Citizen Participation Plan (Appendix C) which outlines the community relations activities. The purpose of this plan is to develop a public relations and communications program tailored to the needs of the community.
- A Cultural Resources Management Plan (Appendix D).
- A list of references for the Work Plan (Appendix E).

SECTION 2

SITE BACKGROUND AND DESCRIPTION

Section 2 presents background information including the site location, site history, and regional setting including regional geology, regional hydrology and groundwater usage. A summary of a previous site investigation is also included.

2.1 SITE LOCATION

The Oneida (Sconondoa Street) former MGP site is located in the City of Oneida, Madison County, New York (Figure 2.1). The triangular site is bordered to the west by Tailrace Creek (a tributary to Oneida Creek), to the east by a gravel road which was the former route of the New York Ontario and Western Railroad, and to the south by Sconondoa Street (Figure 2.2). The site is presently owned by NMPC which operates a service center on the property for gas and transmission line service. The last remnants of the Sconondoa Street former MGP were demolished in 1963.

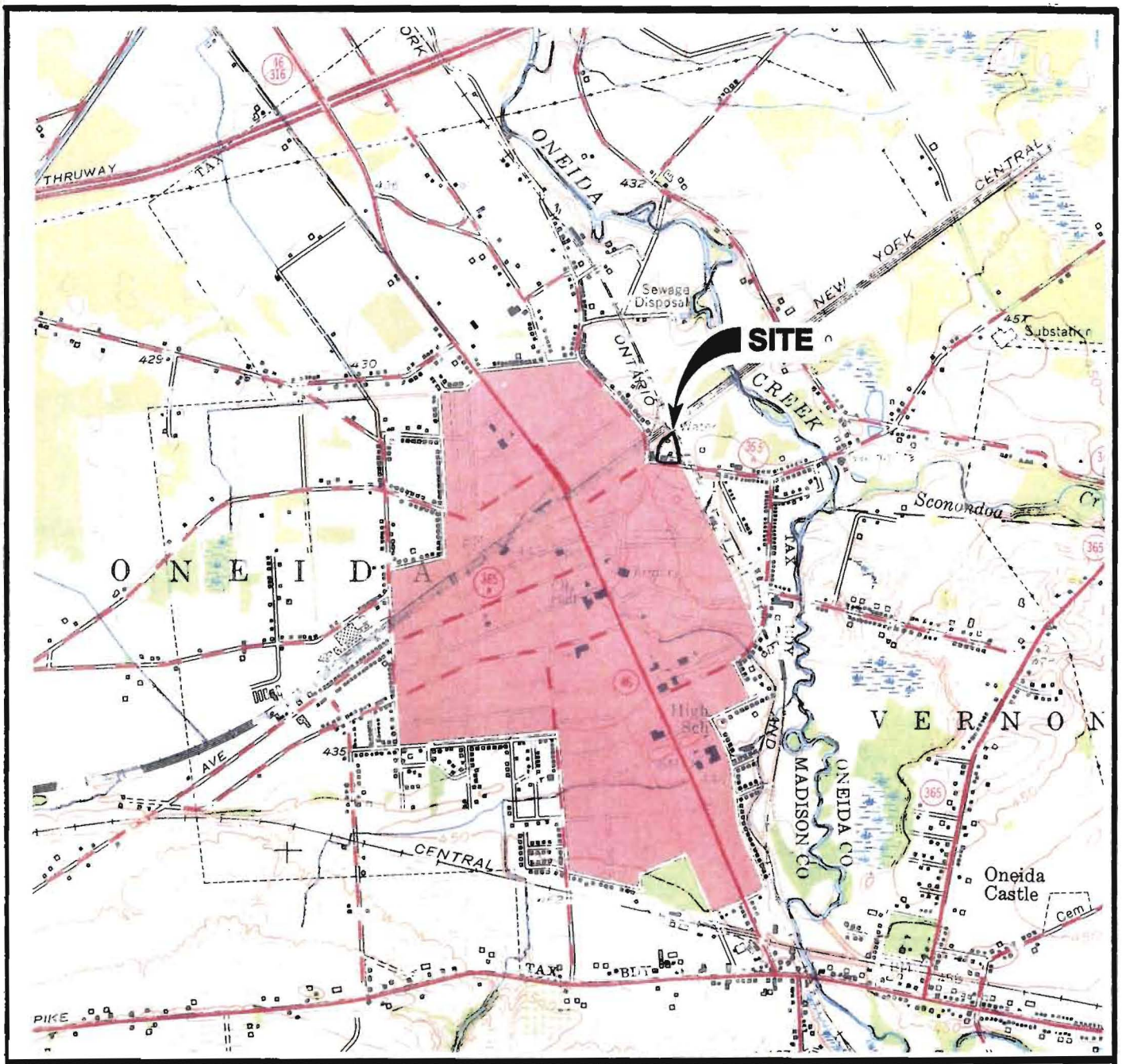
The 1.84-acre site is secured by a fence at the property perimeter which is locked after working hours. The site is generally flat with a gentle slope to the north. Gravel covers the site except on the south end where there is a small lawn. Tailrace Creek is situated at the base of a five-foot embankment along the west and north sides of the site. North of Tailrace Creek is an abandoned elevated New York Central Railroad right of way.

The site is located in an area characterized by industrial and commercial land use. Figure 2.3 shows current land usage near the site. The City of Oneida recycling center is located east of the site. Asphalt stockpiling has been observed behind the recycling center. A beverage distributing company is located west of the site. A Goodyear tire distributorship and an apartment building which also houses an electrical and plumbing contractor are located south of the site. There is additional commercial and industrial land use upstream of the site along Tailrace Creek. Two residences and the Oneida Highway Department are located east of the site between Tailrace Creek and Sconondoa Street. A small tank farm is located southeast of the site, south of Sconondoa Street along a small tributary to Tailrace Creek. The Oneida sewage disposal facility is located approximately 1,700 feet north of the site.

The nearest park is the Sconondoa Playground located approximately 900 feet east of the site on Sconondoa Street. The nearest school is located approximately 2,200 feet west of the site on Broad Street. City Hall is located on State Route 46 approximately 1,600 feet southwest of the site, on the north side of downtown Oneida. The Armory is located 1,700 feet south-southwest of the site.

On the north side of the abandoned railroad right of way, approximately 400 feet northeast of the site is an apparent former disposal area (Figure 2.3). Solid wastes including several crushed automobiles, whole and crushed drums, scrap lumber and concrete, and automobile tires were apparently dumped from the top of the railroad

FIGURE 2.1



SCALE
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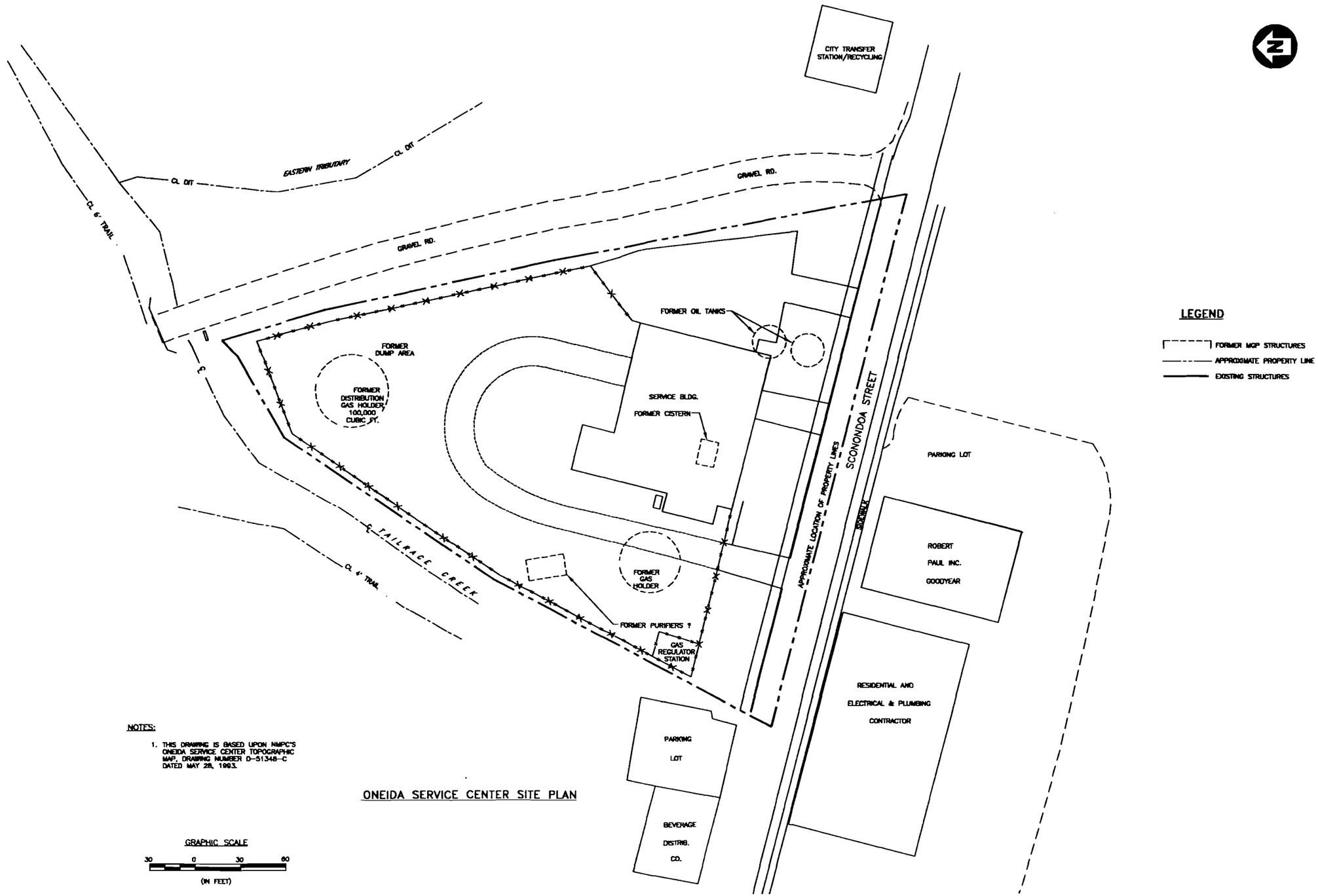
NEW YORK

QUADRANGLE LOCATION

ENGINEERING-SCIENCE

SITE LOCATION MAP

ONEIDA FORMER MGP SITE NIAGARA MOHAWK POWER CORP.



NOTES:

1. THIS DRAWING IS BASED UPON NMPC'S ONEIDA SERVICE CENTER TOPOGRAPHIC MAP, DRAWING NUMBER D-51348-C DATED MAY 28, 1993.

ONEIDA SERVICE CENTER SITE PLAN

GRAPHIC SCALE

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ENGINEER – –
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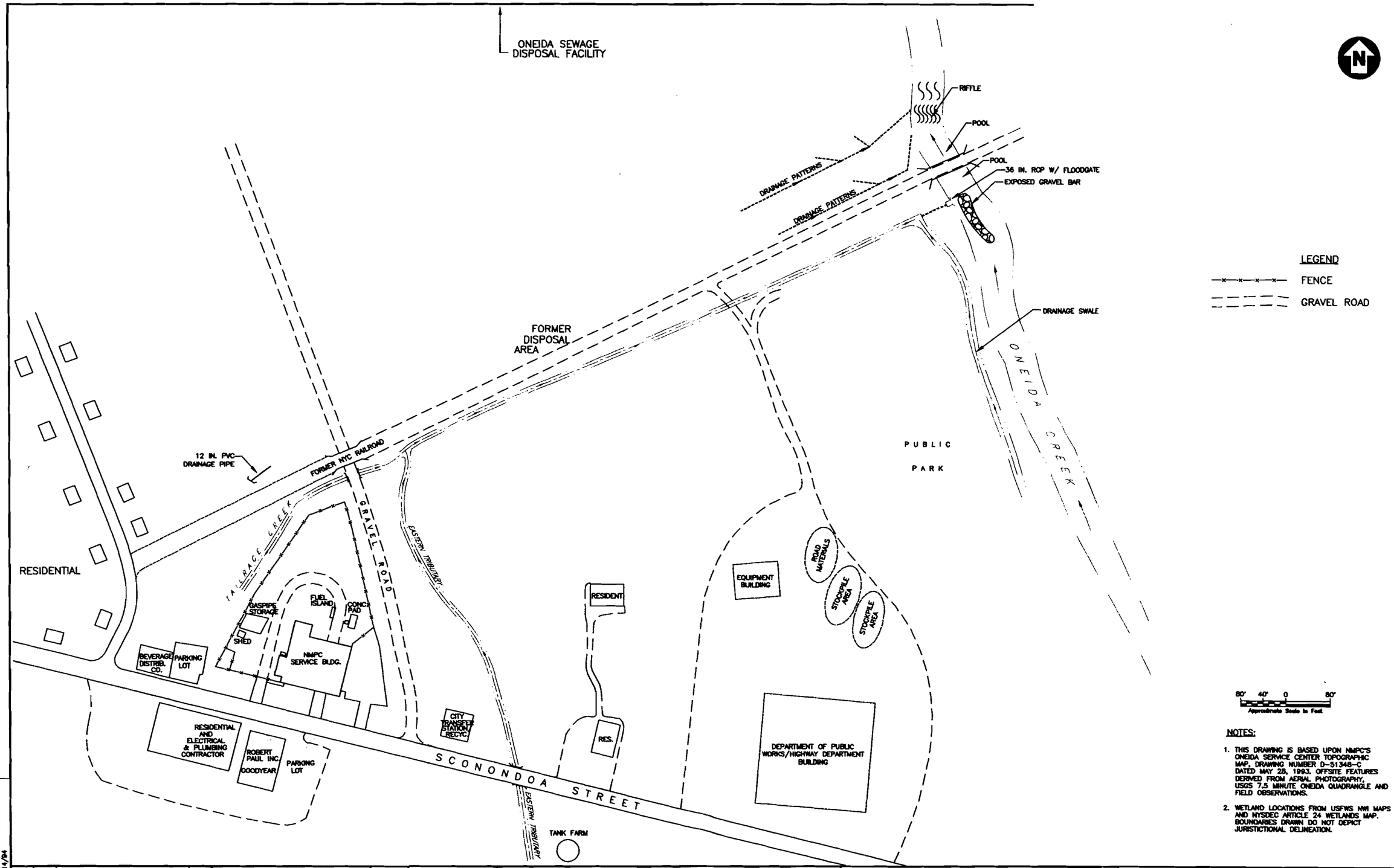
MADISON COUNTY NEW YORK

SITE PLAN

SCALE AS SHOWN
FIGURE NO. 2.2
FILE NO. 723829



NOTES:

1. THIS DRAWING IS BASED UPON NMPC'S ONEIDA SERVICE CENTER TOPOGRAPHIC MAP, DRAWING NUMBER D-51348-C DATED MAY 28, 1993. OFFSITE FEATURES DERIVED FROM AERIAL PHOTOGRAPHY, USGS 7.5 MINUTE ONEIDA QUADRANGLE AND FIELD OBSERVATIONS.
2. WETLAND LOCATIONS FROM USFWS NWI MAPS (1991) AND NYSDEC ARTICLE 24 WETLANDS MAP. BOUNDARIES DRAWN DO NOT DEPICT JURISTICTIONAL DELINEATION.

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PROJECT NUMBER	723829.03000
DESIGNED BY	R.W. YOUNGMAN
DRAWN BY	J.H. GOLDTHWAIT
CHECKED BY	S.B. DILLMAN
ENGINEER	NA
REGISTRATION NUMBER	NA

DATE: 3/24/94; 4/13/94; 4/14/94; NA

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NIAGARA MOHAWK

CITY OF ONEIDA
MADISON COUNTY, NEW YORK STATE

CURRENT LAND USAGE

ISSUE: AS SHOWN

2.3

right of way into the wetland area below. These wastes appeared to be of recent origin and apparently are unrelated to the Oneida MGP Site.

2.2 SITE HISTORY

The Oneida Gas Light Company purchased the Sconondoa Street property from the G. Berry Tannery in 1896. By 1899 the Sconondoa Street gas works buildings replaced the tannery structures. The following is a summary of industrial ownership of the Sconondoa Street property:

G. Berry Tannery	1857 - 1896
Oneida Gas Light Company	1896 - 1902
Oneida Light and Power Company	1897 - 1901
Madison County Gas and Electric Company (acquired both Oneida companies)	1901 - 1911
Adirondack Electric and Power Corporation	1911 - 1927
New York Power and Light Corporation	1927 - 1950
Niagara Mohawk Power Corporation	1950 - Current

The early Oneida Gas Light Company gas works consisted of coal retorts, a scrubber room, a purifier room, lime storage room, coal house, and a 25,000-cubic-foot gas holder. The Oneida Light and Power Company, formed separately, built a building on the eastern portion of the gas works property which housed six dynamos. Various modifications to the site operations and layout took place over time. The electric plant was decommissioned by 1914 and a 100,000-cubic-foot gas distribution holder was added to the north end of the site. Between 1909 and 1914, purification operations were converted from lime sludge to wood shavings. The 25,000 cubic-foot gas holder may have been converted to a relief holder, however this has not been confirmed.

The Adirondack Electric Power and Light Corporation converted operations to water (carbureted) gas in 1920. Two superheaters and a separator were installed in the former electric room and the former coal gas building was converted for storage. Two oil tanks, a cistern and three purifiers were installed to support the water gas operations.

The New York Power and Light Corporation phased out gas manufacturing operations between 1928 and 1930. The 25,000- and 100,000-cubic-foot gas holders were used to store gas piped in from a MGP in Utica. In 1930, the 25,000-cubic-foot gas holder, cistern, oil tanks, and purifiers were removed. The carbureted gas production room was demolished in 1942. Final demolition of MGP structures, including the 100,000-cubic-foot distribution holder took place between 1963 and 1964 to make way for the Niagara Mohawk Power Corporation service center. The site has remained essentially unchanged since the construction of a service center addition in 1974. Figure 1.2 shows the approximate locations of the former holders and other structures.

A more detailed description of site history is available in the Oneida (Sconondoa Street) PSA/IRM Work Plan (1993) and Preliminary Historical Profile prepared by NMPC (1992).

2.3 REGIONAL SETTING

2.3.1 Regional Geology

The site is located in the Oneida Plain of the Ontario Lowlands physiographic province. The Oneida Plain extends from the shore of Oneida Lake to the Helderberg Escarpment, south of the site. The Ontario Lowlands were formed as a result of glaciation. Native soils beneath the site consist of glacial lacustrine deposits. Soils south and southeast of the site are derived from glacial outwash terraces and lacustrine beaches (E. H. Muller and D.H. Cadwell, 1986).

Regional glacial deposits are underlain by Silurian-age bedrock. Regional dip of bedrock is to the south, resulting in the exposure of progressively older formations moving from south to north. The site is underlain by the Upper Silurian-age Lockport dolomite. The Lockport dolomite is underlain by the Lower Silurian age Herkimer sandstone (L.V. Rickard and D.W. Fisher, 1970). Bedrock depth at the site is more than 50 feet based on borings drilled on-site. However, one well within 0.5 miles east of the site reportedly encountered a grey shale at 30 feet below ground surface (USGS, 1992).

2.3.2 Regional Hydrology

Tailrace Creek, located adjacent to the west and northwest boundary of the site, is the closest surface water body. Tailrace Creek originates within the City of Oneida. It runs through culverts upstream of the site and emerges from the culverts adjacent to the southwest corner of the site. Tailrace Creek is not a classified surface water body. It flows approximately 1,300 feet east to Oneida Creek. Oneida Creek is classified as a Class C water body suitable for fishing and fish propagation. A culverted tributary enters Tailrace Creek from the north adjacent to the northwest side of the site. A second tributary (designated the "Eastern Tributary") joins Tailrace Creek downstream from and to the east of the site. There are no known water intakes in Tailrace Creek or Oneida Creek (NYSDOH, 1982). Sconondoa Creek is westerly flowing and joins Oneida Creek at a point about 2,000 feet southeast (upstream) of the site.

Oneida Creek flows northwest and enters Oneida Lake at South Bay. Oneida Lake discharges into the Oneida River approximately 20 miles west of South Bay. The Oneida River flows west approximately 8 miles and joins the Oswego River. The Oswego River flows north approximately 21 miles and discharges into Lake Ontario.

2.3.3 Groundwater Usage In Site Vicinity

Residents of the City of Oneida, Vernon and Durhamville receive public water from the City of Oneida Water Department (City of Oneida Water Department Superintendent, 1994a). The Hill Road area east of Oneida Creek and north of Sconondoa Creek does not have access to the City of Oneida water system (City of Oneida Water Department Superintendent, 1994b).

Four wells registered with the U.S. Geological Survey database (1994) were identified between 0.5 and one mile of the site. Figure 2.4 shows the locations of the four known groundwater supply wells, all of which are located across Oneida Creek. The data base is intended to provide historic geology and hydrogeologic data. Three wells are located in the Hill Road area east of Oneida Creek. The fourth well is also located on the east side of Oneida Creek to the northeast. Oneida Creek likely forms a groundwater boundary within the upper aquifer. Wells 1 and 4 are domestic wells. Well 2 is owned by the Sconondoa Fire Department and Well 3 is owned by NMP&L Corporation, now NMPC. Wells 1 and 2 are reportedly set in bedrock. Well 4 is set in Quaternary sand. The depth and unit in which Well 3 is screened is not reported, however bedrock is indicated to be at 20 feet. Reported well yields ranged from four gallons per minute in Well 4 to 50 gallons per minute in Well 2 at the Sconondoa Fire Department.

The nearest public drinking water supply well serves a trailer park located three miles east of the site, across Oneida Creek (NYSDOH, 1982). The municipal water supply for the City of Oneida comes from Florence Creek and Glen Moore Reservoir located approximately twenty miles to the north of the site (NYSDOH, 1982; City of Oneida Water Department Superintendent, 1994b).

Groundwater provides domestic water supplies for one-third of Oneida County's inhabitants, mostly in western Oneida County. Water hardness and the presence of salt in the deeper bedrock formations prevent groundwater usage in some portions of Oneida County. A number of communities in Madison County are supplied by groundwater (NYSDOH, 1982).

2.4 RESULTS OF PREVIOUS PSA/IRM STUDY

2.4.1 Objectives

On December 7, 1992, NMPC and NYSDEC executed an Order on Consent for implementing an investigation and remediation program for 21 former MGP sites. The initial phase at each site is the performance of a preliminary site assessment (PSA)/interim remedial measures (IRM) study. The PSA/IRM study was performed between June 24, 1993 and February 24, 1994 at the Oneida (Sconondoa Street) former MGP site.

The objectives of the PSA/IRM study were to: 1) characterize the nature and extent of hazardous substances, including MGP residues on-site and off-site; 2) determine whether such substances constitute a significant threat to public health or the environment necessitating remediation; and; 3) determine whether any IRMs are appropriate.

2.4.2 Hydrogeological Investigation Results

The geologic stratigraphy beneath the site can be characterized as fill from site demolitions and landfilling, overlying organic peat with interbedded silt and clay, overlying silt, sand, and fine to coarse gravel, overlying an apparently continuous lacustrine silty-clay layer beneath the site. Groundwater is found at depths of about 5 to 11 feet below the ground surface. Surface water in Tailrace Creek flows northeast

toward Oneida Creek. Groundwater in the vicinity of the site also flows toward the northeast.

2.4.3 Test Pit Investigation Results

Thirteen test pits were excavated to locate and define the extent of residues associated with known MGP sources (gas holders, purifiers, tanks, etc.) and to investigate the possible presence of MGP residues off-site. Some visible evidence of MGP residues and wastes was identified in on-site test pits, however no distinct, extensive tar layers were identified. Visual evidence included odors, sheens, black staining, and tar-like material. Benzene, toluene, ethylbenzene, and total xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), metals and non-site-related pesticides were detected in two MGP source material samples collected from test pits (Figure 2.5). Pesticides are not associated with MGP processes. The two samples were also analyzed by the toxicity characteristic leaching procedure (TCLP) and for hazardous waste characteristics. The samples were found to be non-toxic, non-corrosive, non-ignitable, non-reactive and are considered non-hazardous.

2.4.4 Subsurface Soil Investigation Results

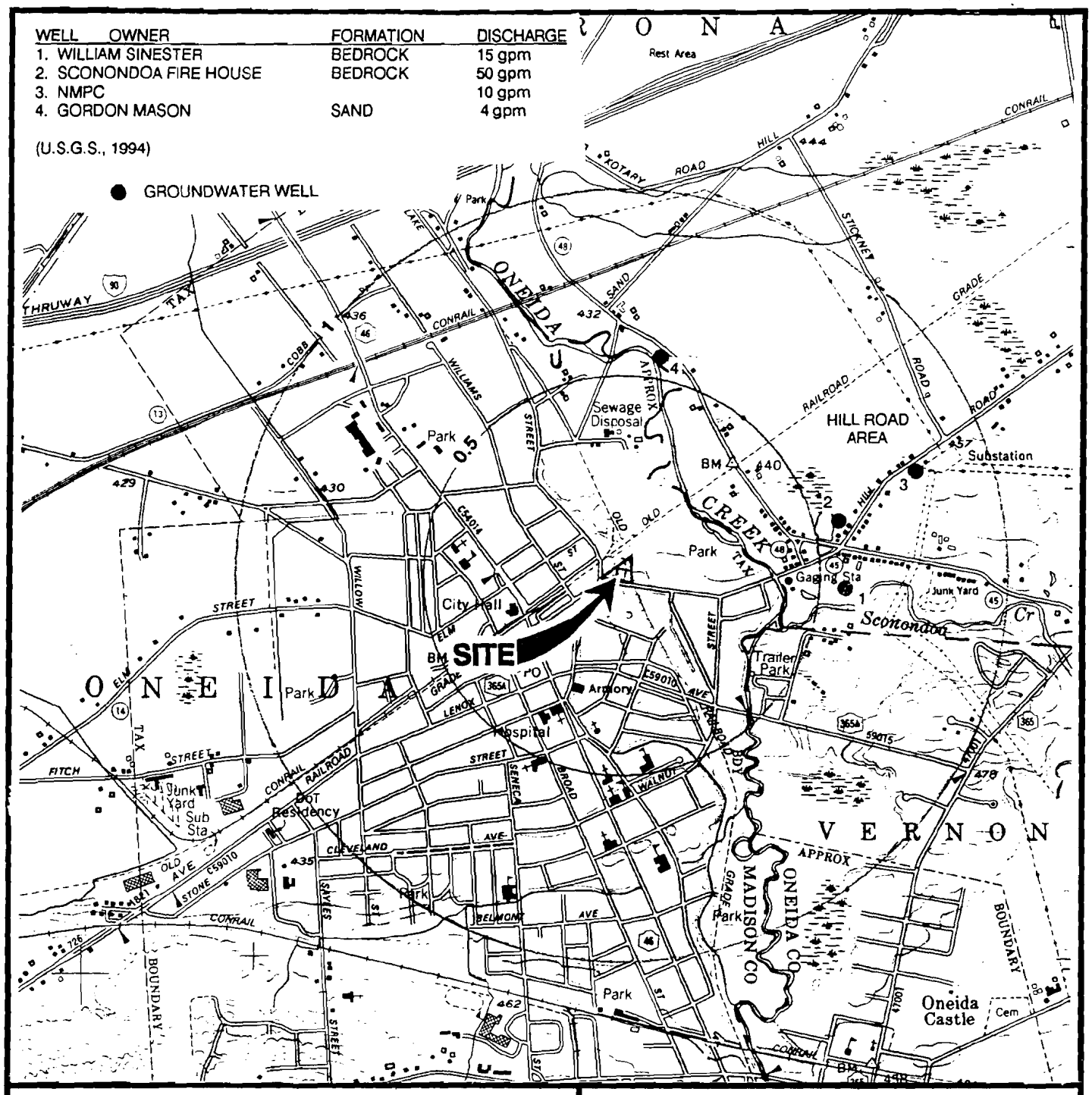
No extensive deposits of free product tar were identified. Visibly impacted soils appear to be of limited extent, and are primarily within the site property lines (Figure 2.6). Visual impacts included sheens, black stains, and tar-like material in some subsurface soil samples. Visual evidence of MGP-related compounds decreased rapidly with distance from the site. The visually impacted material was greatest in the area of the former 25,000 cu. ft. gas holder, gas plant, and purifiers. Sheens and stains were also observed north and east of the former 100,000 cu. ft. distribution holder. The principal compounds of interest identified in analytical samples were BTEX and PAHs.

2.4.5 Surface Soil Investigation Results

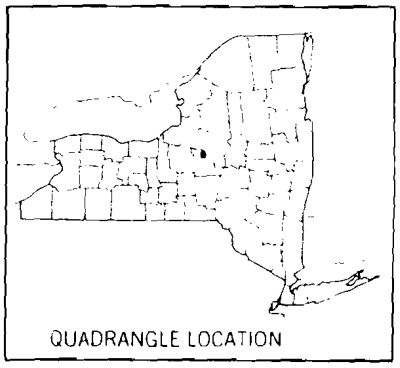
Five surface soil samples were collected along Tailrace Creek to characterize dredge spoil areas and areas of stressed vegetation. BTEX, PAHs, and cyanide were detected in surface soil samples (Figure 2.7). Total BTEX concentrations ranged from not detected to 0.054 ppm and PAH concentrations ranged from 17.05 ppm to 2,030 ppm. Cyanide was detected at 2.2 ppm in one sample (SS-03). Impacted surface soil samples likely resulted from deposition of impacted sediments on the bank of Tailrace Creek during past dredging/maintenance activities.

2.4.6 Sediment Investigation Results

Sediments in Tailrace Creek were spot checked with a hand shovel for visible evidence of compounds of interest from adjacent to the site to Oneida Creek. Oily sheens, tars and odors were observed in Tailrace Creek sediments between the site and Oneida Creek. BTEX concentrations in sediments ranged from not detected to 59.86 ppm, and PAH concentrations ranged from 0.56 ppm to 4,655 ppm (Figure 2.8). Sediment samples collected in Tailrace Creek upstream of the site also contained PAHs at concentrations about an order of magnitude less than the maximum concentrations downstream. The sediment analyses indicate low concentrations of BTEX, PAHs and cyanide exist near the upgradient end of the site. Relative to those samples, the BTEX and PAH concentrations increase by an order of magnitude adjacent to and



SOURCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC MAP; ONEIDA, NEW YORK QUADRANGLE, 1981.



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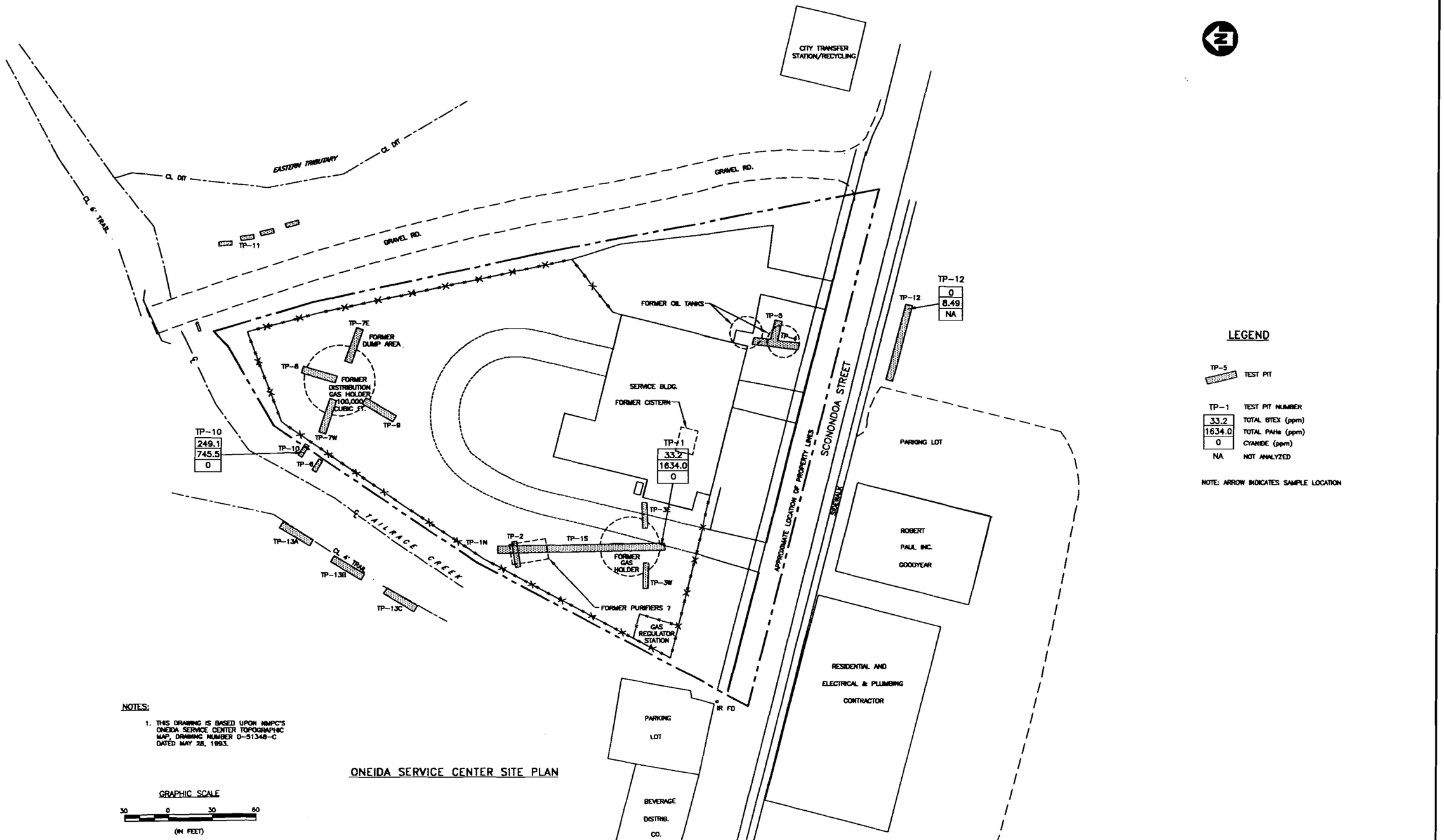
WELL LOCATION MAP
ONEIDA FORMER MGP SITE
NIAGARA MOHAWK POWER CORP.



LEGEND

TP-5 — TEST PIT

TP-1 — TEST PIT NUMBER
33.2 — TOTAL BTEX (ppm)
1634.0 — TOTAL PAHs (ppm)
0 — CYANIDE (ppm)
NA — NOT ANALYZED

NOTE: ARROW INDICATES SAMPLE LOCATION

NOTES:

1. THIS DRAWING IS BASED UPON NMPC'S ONEIDA SERVICE CENTER TOPOGRAPHIC MAP, DRAWING NUMBER D-51348-C DATED MAY 28, 1993.

GRAPHIC SCALE

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ONEIDA SERVICE CENTER SITE PLAN

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DESIGNED BY – — –
DRAWN BY J.H. GOLDTHWAIT — 4/14/94
CHECKED BY S.B. DILLMAN — –
ENGINEER – —
REGISTRATION NO. – — DATE –

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TEST PIT SAMPLE ANALYTICAL RESULTS

SCALE AS SHOWN
FIGURE NO. 2.5
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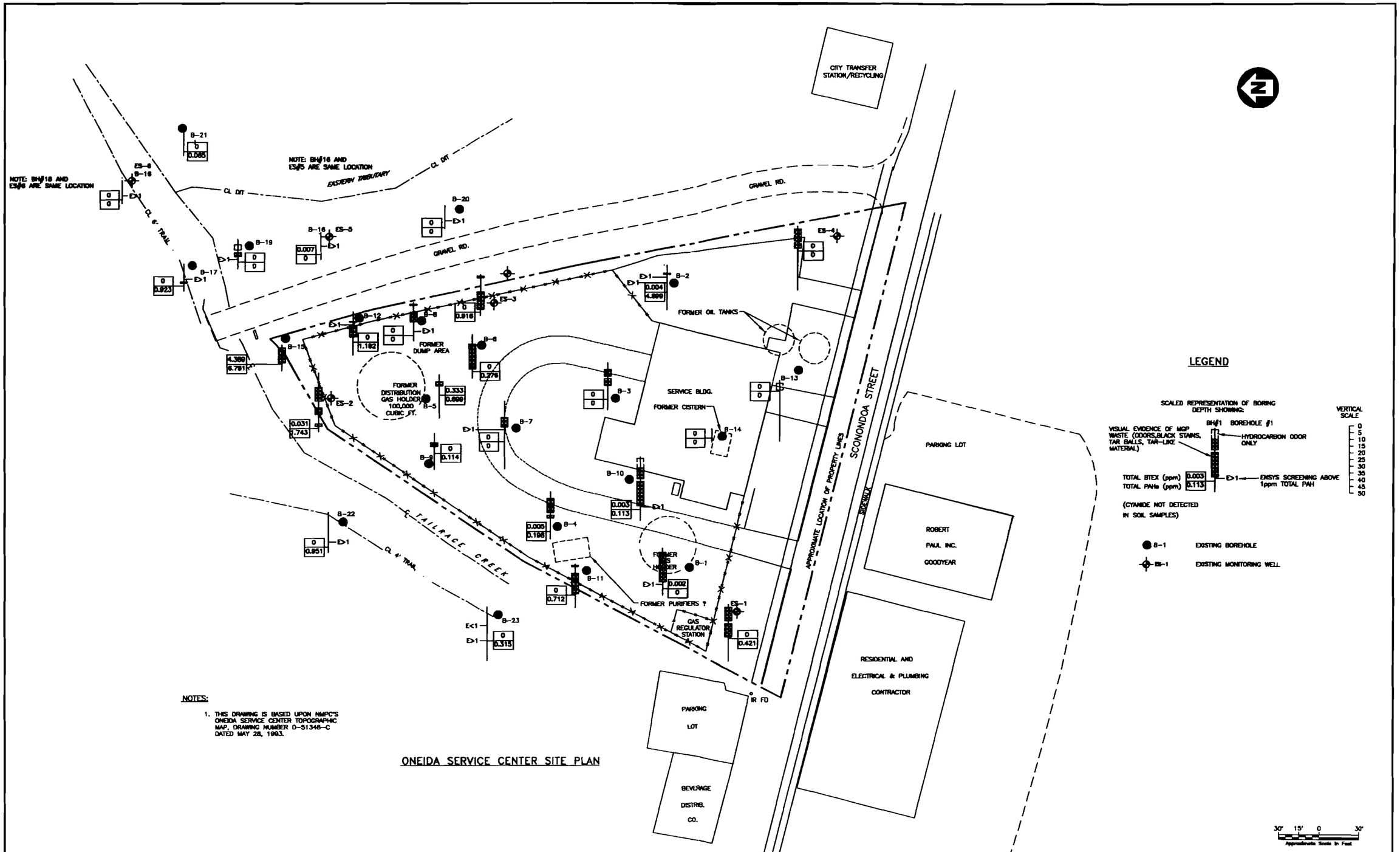

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1. THIS DRAWING IS BASED UPON NMPC'S ONEIDA SERVICE CENTER TOPOGRAPHIC MAP, DRAWING NUMBER D-51346-C DATED MAY 28, 1993.

ONEIDA SERVICE CENTER SITE PLAN

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SOIL BORING ANALYTICAL RESULTS

SCALE AS SHOWN
FIGURE NO. 2.6
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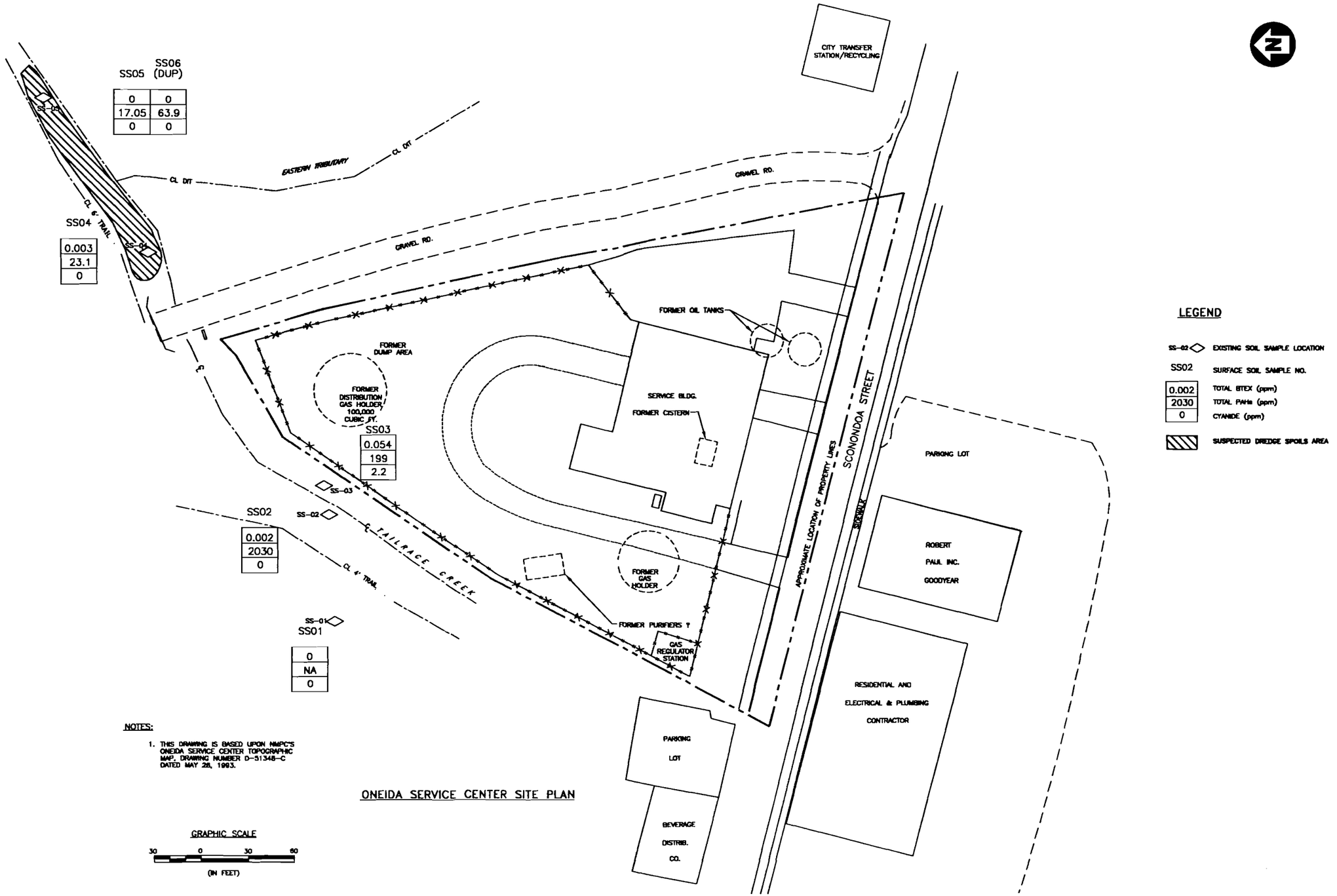

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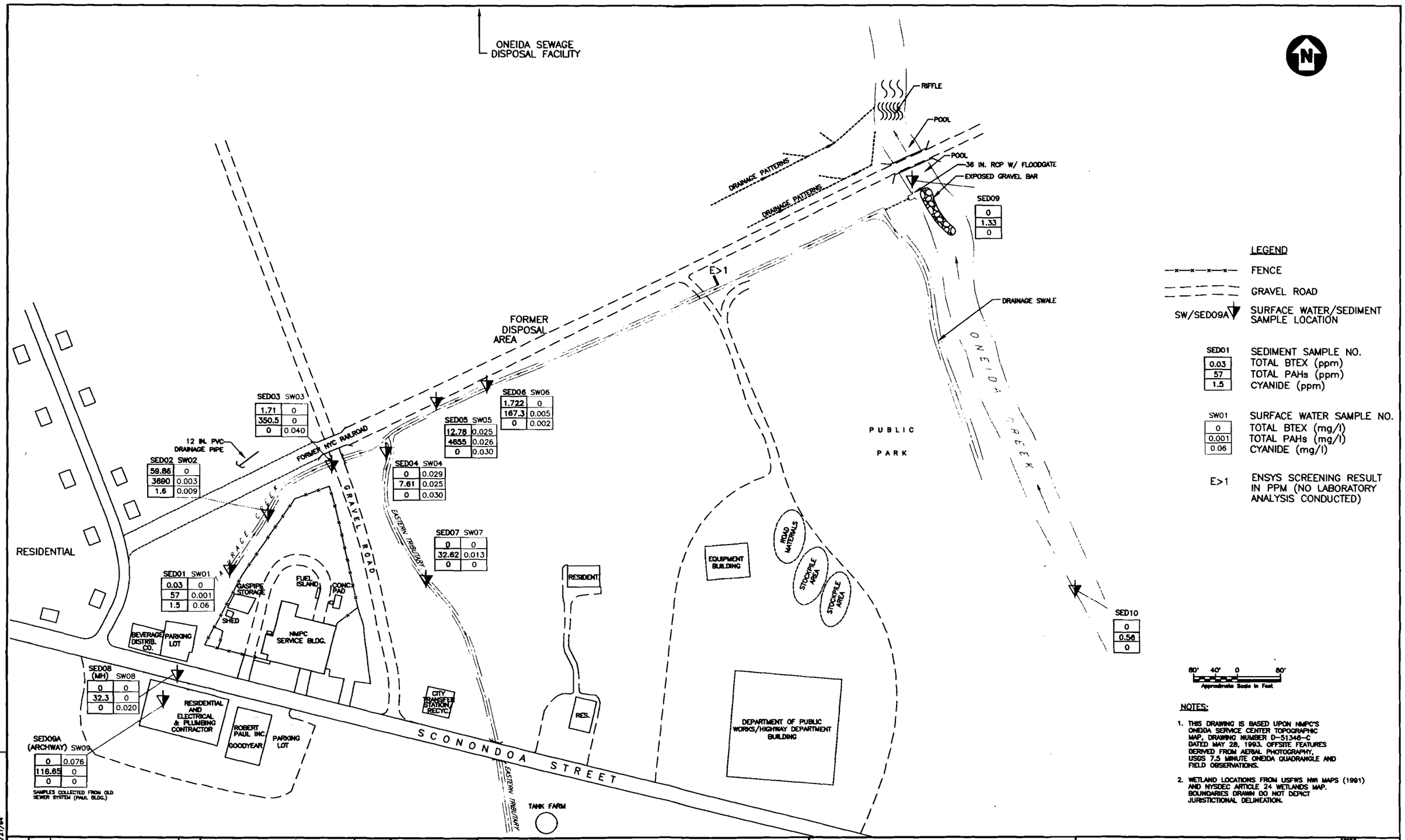
SURFACE SOIL ANALYTICAL RESULTS

SCALE AS SHOWN
FIGURE NO. 2.7
FILE NO. 723829



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DRAWN BY J.H. GOLDTHWAIT — 4/13/94
CHECKED BY S.B. DILLMAN — 4/14/94
ENGINEER NA
REGISTRATION NUMBER NA DATE NA

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CITY OF ONEIDA
MADISON COUNTY, NEW YORK STATE

SEDIMENT/SURFACE WATER ANALYTICAL RESULTS

SCALE AS SHOWN
DRAWING NUMBER 2.8

downgradient from the site in Tailrace Creek. Sediment samples were also collected in Oneida Creek. The concentrations in samples downstream from the confluence with Tailrace Creek were of the same order of magnitude as those upstream.

2.4.7 Groundwater Investigation Results

BTEX, PAHs, and various metals were detected above Class GA groundwater standards or guidance values in groundwater on-site and downgradient (Figure 2.9). BTEX and PAH concentrations (BTEX 4.24 ppm and PAH 4.14 ppm) were highest in the area of the former distribution holder at the north end of the site. The downgradient groundwater concentrations of BTEX and PAHs are also above Class GA standards and guidance values, however there are no known users of groundwater between the site and the presumed aquifer boundary, Oneida Creek. The number and concentrations of metals were generally higher downgradient than on-site, indicating the presence of non-site related metals sources. No obvious metals sources were identified on-site.

The constituents observed in groundwater samples were consistent with those present in subsurface soils, and indicate that the on-site soils associated with former MGP structures (distribution holder, gas holder, purifier, and gas plant) are probable sources for groundwater contamination. On-site upgradient well locations were also impacted by MGP constituents. Off-site access permission to install groundwater monitoring wells on the south side of Sconondoa Street was denied. Therefore, no upgradient groundwater quality data are available.

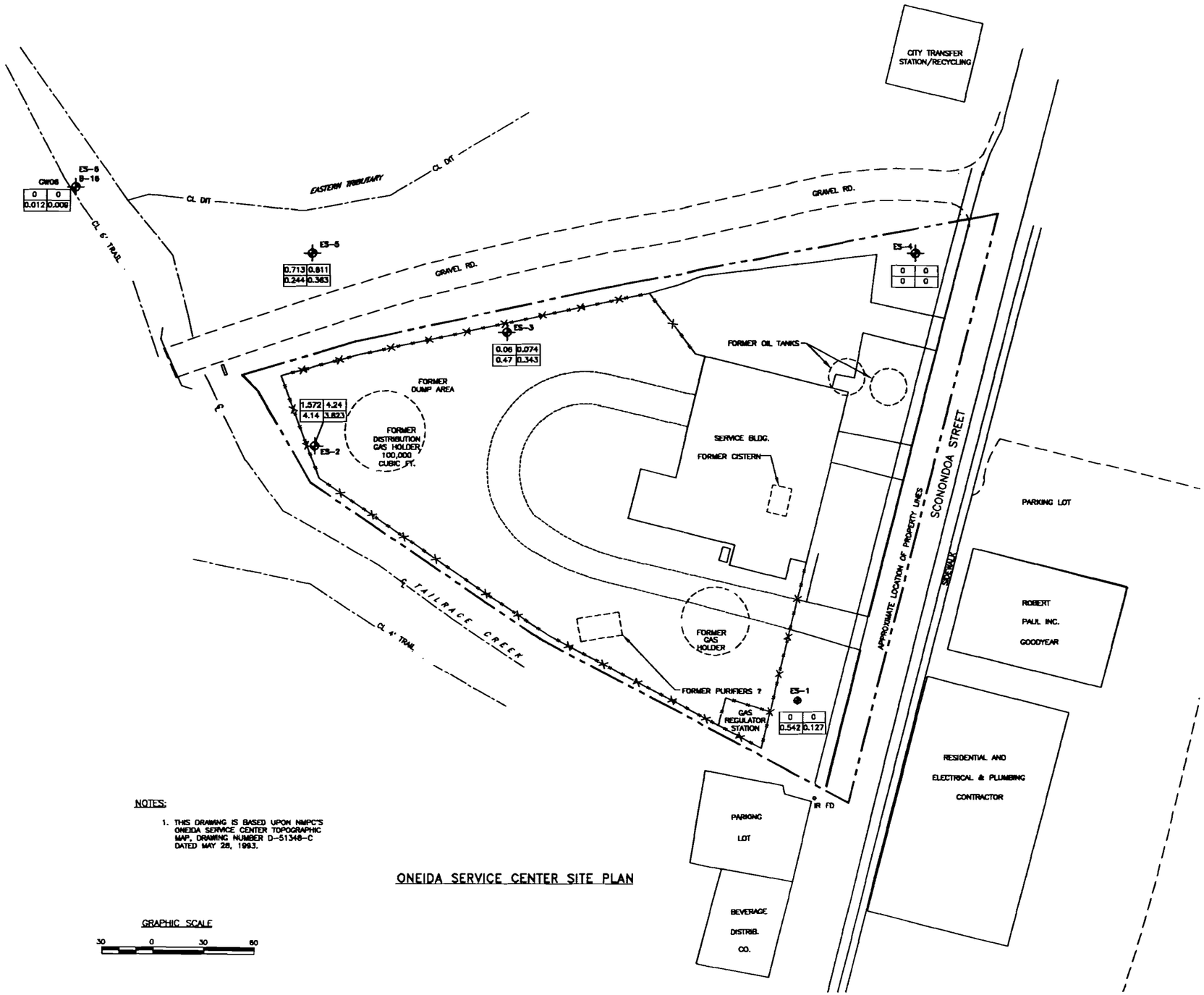
2.4.8 Surface Water Investigation Results

Tailrace Creek is an unclassified surface water body which is primarily a storm water discharge route originating from the city's downtown section. Tailrace Creek receives storm water run-off from a 96-acre area bounded by Walnut Street on the south, Stephen Street on the east and Main Street on the west. Within this area are past and present industrial and commercial operations including used car dealerships, a former shingle factory, machine shops, paint shops, furniture and sleigh manufacturing. Surface water analytical results were compared to Class D surface water standards as a conservative benchmark.

Volatile organic compounds were not detected above Class D surface water standards in the nine surface water samples collected (Figure 2.8). PAHs were detected adjacent to the site, in the eastern tributary, and downstream. PAH concentrations were an order of magnitude higher in the eastern tributary and downstream of the eastern tributary than upstream and adjacent to the site in Tailrace Creek. Four to nine metals were detected above NYS Class D surface water standards, however, there was not a significant difference between metals concentrations adjacent to the site and those upstream. Elevated metal concentrations and the presence of PAHs may be attributed, in part, to sources upstream of the eastern tributary.

2.4.9 Preliminary Qualitative Risk Assessment Results

MGP-related constituents were identified in surface soil, subsurface soil, surface water, sediment and groundwater on-site, and to a lesser extent downgradient of the site. There are no known groundwater or surface water users who would be impacted



LEGEND

ES-1 ⊕ ES MONITORING WELL LOCATION

GW01
BOARD 1 | BOARD 2
0 | 0 — GROUNDWATER SAMPLE NO.
0.421 | 0.13 — TOTAL BTEX (mg/l) / TOTAL PAHs (mg/l)

NO CYANIDE DETECTED IN GROUNDWATER

NOTE: WHERE SAMPLES WERE DILUTED AND REANALYZED, THE HIGHER CONCENTRATION HAS BEEN REPORTED.

NOTES:

1. THIS DRAWING IS BASED UPON NMPC'S ONEIDA SERVICE CENTER TOPOGRAPHIC MAP, DRAWING NUMBER D-51348-C DATED MAY 28, 1993.

ONEIDA SERVICE CENTER SITE PLAN

GRAPHIC SCALE

30 0 30 60

DATE: 10/21/94
M:\CAD\723829\03000G10.DWG (1=30)

NO.	DATE	REVISIONS	BY
4			
3			
2			
1			
0			

PROJECT NO. 723829 — DATE
DESIGNED BY –
DRAWN BY JTS, JHG
CHECKED BY –
ENGINEER –
REGISTRATION NO. – DATE –

ENGINEERING-SCIENCE
DESIGN * RESEARCH * PLANNING
290 ELWOOD DAVIS ROAD • SUITE 312 • LIVERPOOL, NEW YORK 13088 • 315/451-9560
OFFICES IN PRINCIPAL CITIES

ES | NIAGARA MOHAWK

NIAGARA MOHAWK POWER COMPANY
SYRACUSE, NEW YORK

ONEIDA SERVICE CENTER
CITY OF ONEIDA
MADISON COUNTY NEW YORK
GROUNDWATER ANALYTICAL RESULTS

SCALE AS SHOWN
FIGURE NO. 2.9
FILE NO. 723829

by site-related constituents. The area is serviced by a municipal water supply system which has its source, a reservoir located approximately 20 miles north of the site.

Access to surface soils and sediments along Tailrace Creek is not restricted. The site is fenced and covered with gravel, so potential exposure to MGP residues on-site would be limited to workers conducting excavation activities.

2.4.10 Preliminary Qualitative Habitat-Based Assessment Results

The Sconondoa Street MGP site is located in a developed area, with no native vegetation or wildlife populations on-site. Off-site terrestrial ecological communities include developed and ruderal communities, hardwood forests, and agricultural land. Aquatic communities are found in Tailrace Creek and Oneida Creek. Wetlands are found along Tailrace Creek.

Analytical results indicate the site-related constituents are present in some off-site soil, groundwater, surface water, and sediment samples. Terrestrial flora and wildlife, aquatic invertebrates, and aquatic flora may be exposed to site-related constituents in the off-site soil, surface water, and sediment. The primary constituents of concern are PAHs.

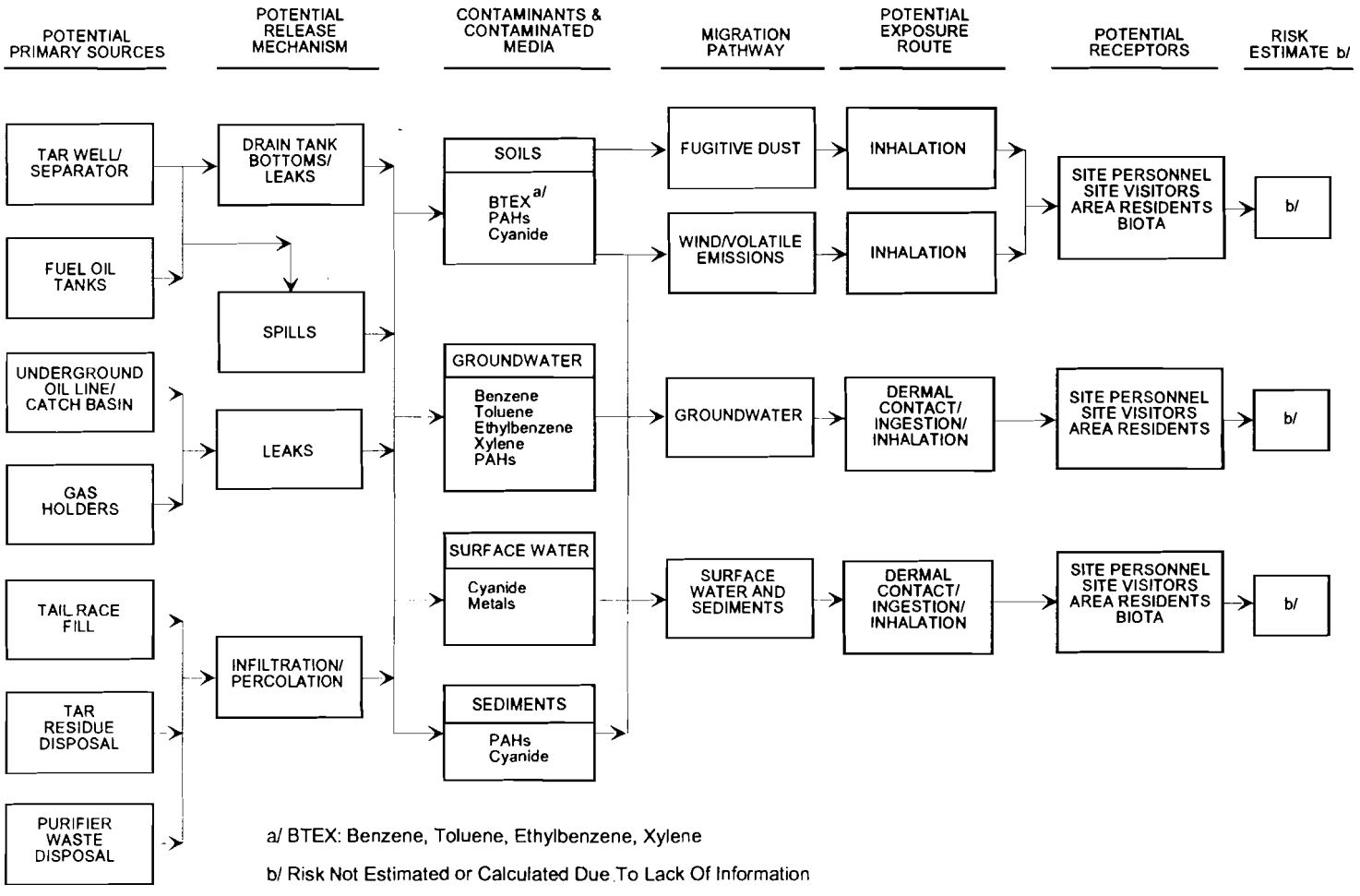
2.4.11 PSA/IRM Study Conclusions

Even though MGP-related constituents were identified in site surface soils, subsurface soils, sediments, surface water, and groundwater, the nature and extent of MGP related waste materials on-site do not lend themselves to an IRM due to the fact that discrete, highly concentrated wastes were not encountered. MGP-related constituents were mostly limited to the site property boundaries.

2.5 PRELIMINARY SITE CONCEPTUAL MODEL

A preliminary site conceptual model has been developed based on the historical data available for the site and the PSA/IRM investigation data (Figure 2.10). The preliminary conceptual model presents the current information on waste sources, release mechanisms, migration pathways, exposure pathways and potential receptors. The preliminary conceptual model has been used to develop the RI/FS scope of work, and will be updated during the RI/FS.

PRELIMINARY SITE CONCEPTUAL MODEL
Oneida (Sconondoa St.) MGP Site



a/ BTEX: Benzene, Toluene, Ethylbenzene, Xylene

b/ Risk Not Estimated or Calculated Due To Lack Of Information

FIGURE 2.10

SECTION 3

REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) TASK DESCRIPTIONS

This section describes the work effort that will constitute the RI/FS. The work effort is divided into a logical sequencing of three main tasks. The general task structure is based on NYSDEC guidance (NYSDEC, 1989) and USEPA guidance (USEPA, 1988a) as follows:

- Task 1 - RI/FS Work Plan Preparation;
- Task 2 - Remedial Investigation;
- Task 3 - Feasibility Study;

The project activities will be carried out in conformance with the National Contingency Plan (40 CFR Part 300) and the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988a). Each of the RI/FS tasks are discussed separately in this section. Task 1 - RI/FS Work Plan preparation will not be discussed.

3.1 REMEDIAL INVESTIGATION - TASK 2

The PSA/IRM study conducted by Parsons ES during 1993 identified site characterization data gaps. The remedial investigation has been designed to address those data gaps and to provide human health and ecological risk assessments to support the feasibility study.

A summary of the Remedial Investigation activities is provided in Table 3.1.

3.1.1 Site Screening - Task 2.1

The primary objectives of the site screening activities are to identify the optimum sampling locations for the remaining site characterization activities. Prior to the start of drilling and sampling, a public meeting will be held by NMPC and NYSDEC to explain the field work program, the schedule of the investigation reports and to receive public input.

The site screening task consists of four subtasks as described in the following paragraphs.

3.1.1.1 Site Reconnaissance - Task 2.1.1

The intent of this task is to coordinate site investigation activities with NMPC operating personnel, to identify initial locations for borings, wells and sampling points, to identify staging areas for equipment, materials and decontamination zones, and to coordinate with underground facilities protective organization (UFPO) and NMPC personnel for clearance of all subsurface utilities and services. The NMPC Project

TABLE 3.1

REMEDIAL INVESTIGATION TASK SUMMARY

Task 2 - Remedial Investigation

- Task 2.1 Site Screening
  - Task 2.1.1 Site Reconnaissance
  - Task 2.1.2 Arrange Off-Site Access Requirements/Permits
  - Task 2.1.3 Clear Sample Locations
  - Task 2.1.4 Mobilization
- Task 2.2 Source Characterization/Migration Pathways Assessment
  - Task 2.2.1 Subsurface Soil
  - Task 2.2.2 Groundwater
  - Task 2.2.3 Sediments
  - Task 2.2.4 Surface Water
  - Task 2.2.5 Surface Soil
- Task 2.3 Hydrogeologic Characterization
  - Task 2.3.1 In Situ Permeability Testing
  - Task 2.3.2 Groundwater Sampling
- Task 2.4 Site Survey
- Task 2.5 Data Validation and Evaluation
- Task 2.6 Risk Assessment
  - Task 2.6.1 Baseline Human Health Evaluation
  - Task 2.6.2 Fish and Wildlife Impact Analysis
- Task 2.7 Prepare Remedial Investigation Report

Manager will arrange a site reconnaissance meeting that may include the Field Team Leader, the Project Geologist and the drilling company representative at least one week prior to the scheduled start date of on-site activities to ensure that all of these necessary arrangements are completed prior to the start of work. This will allow adequate time for current NMPC operations to be alerted and modified, for locating all subsurface utilities and services, and for moving any stored equipment or materials for access to the proposed drilling/sampling locations.

3.1.1.2 Arrange Off-Site Access Requirements/Permits - Task 2.1.2

After the on-site and off-site sampling/boring locations are finalized during the site reconnaissance, NMPC will be responsible for identifying off-site property owners and arranging access permission. To the extent practicable, access arrangements will allow for flexibility in placing the sample/boring locations in case of subsurface interferences or other conditions requiring minor changes in sample/boring locations.

Any permits needed to access the work locations or to conduct the work will be secured by the consultant prior to the start of work.

3.1.1.3 Clear Sample Locations - Task 2.1.3

The on-site and off-site utilities must be identified for the health and safety of field personnel and to prevent damage to underground utilities during drilling. Public and privately-owned utilities will be located by contacting responsible agencies to provide mark-outs of underground utilities. The site reconnaissance team will evaluate these utility locations in planning the field surveys, particularly soil boring and monitoring well locations. Locations for subsurface investigations must be clear of underground utilities prior to boring or drilling.

A supplemental metal detector screening may be conducted prior to sampling or drilling to confirm the absence of underground utilities and possible buried drums or tanks. The metal detector screening is intended as a precautionary, supplemental health and safety measure only.

If there is no indication of buried utilities, drums or tanks, then subsurface sampling will proceed. However, if the presence of a buried object is in question, activities will not proceed in that location until the type of buried object is determined. If the object cannot be identified from surface or shallow digging, a test pit may be needed to determine the identity of the buried object. If a test pit is needed, the procedure and scope will be reviewed with the NMPC Project Manager prior to conducting the work.

3.1.1.4 Mobilization - Task 2.1.4

The Consultant will provide to NMPC a schedule of mobilization events and a site plan showing the approximate location of all set-down and decontamination areas. The mobilization schedule and site plan will be provided following the site reconnaissance and associated discussions with site personnel about impacts on site operations.

3.1.2 Source Characterization/Migration Pathways Assessment - Task 2.2

The overall objective of this task is to define the horizontal and vertical extent of contamination on-site and off-site (i.e. free-phase tar, oily materials or purifier wastes), and to characterize their nature through laboratory analyses. Each of the subtasks below are described in terms of their objectives and methods. Table 3.2 contains a summary of the chemical and geotechnical parameters to be analyzed during the Remedial Investigation.

3.1.2.1 Subsurface Soil - Task 2.2.1

Soil Borings - Task 2.2.1.1

Objective:

Subsurface soil samples conducted during the PSA/IRM Study were assumed to be impacted based upon visual observation. Further analytical characterization of impacted soils is needed to support the evaluation of remedial alternatives.

Methods:

Drill shallow soil borings to obtain analytical samples of visibly contaminated zone - nine borings to 25 feet deep near existing borings where visible contamination was noted (Figure 3.1 and Table 3.3). Boring B-10R will extend to 30 to 35 feet for sample collection to confirm the presence of a sheen in deep samples from B-10 during the PSA/IRM. Analyze two samples per boring; 15 for MGP indicators and three for TCL/TAL and treatability characteristics analyses (Table 3.4). Analyze five samples for total organic carbon (TOC).

Creekside Borings - Task 2.2.1.2

Objective:

Determine the source of MGP residues visible in PSA/IRM borings along Tailrace Creek. Determine whether the residues have migrated downward from Tailrace Creek sediments or have migrated laterally from the site.

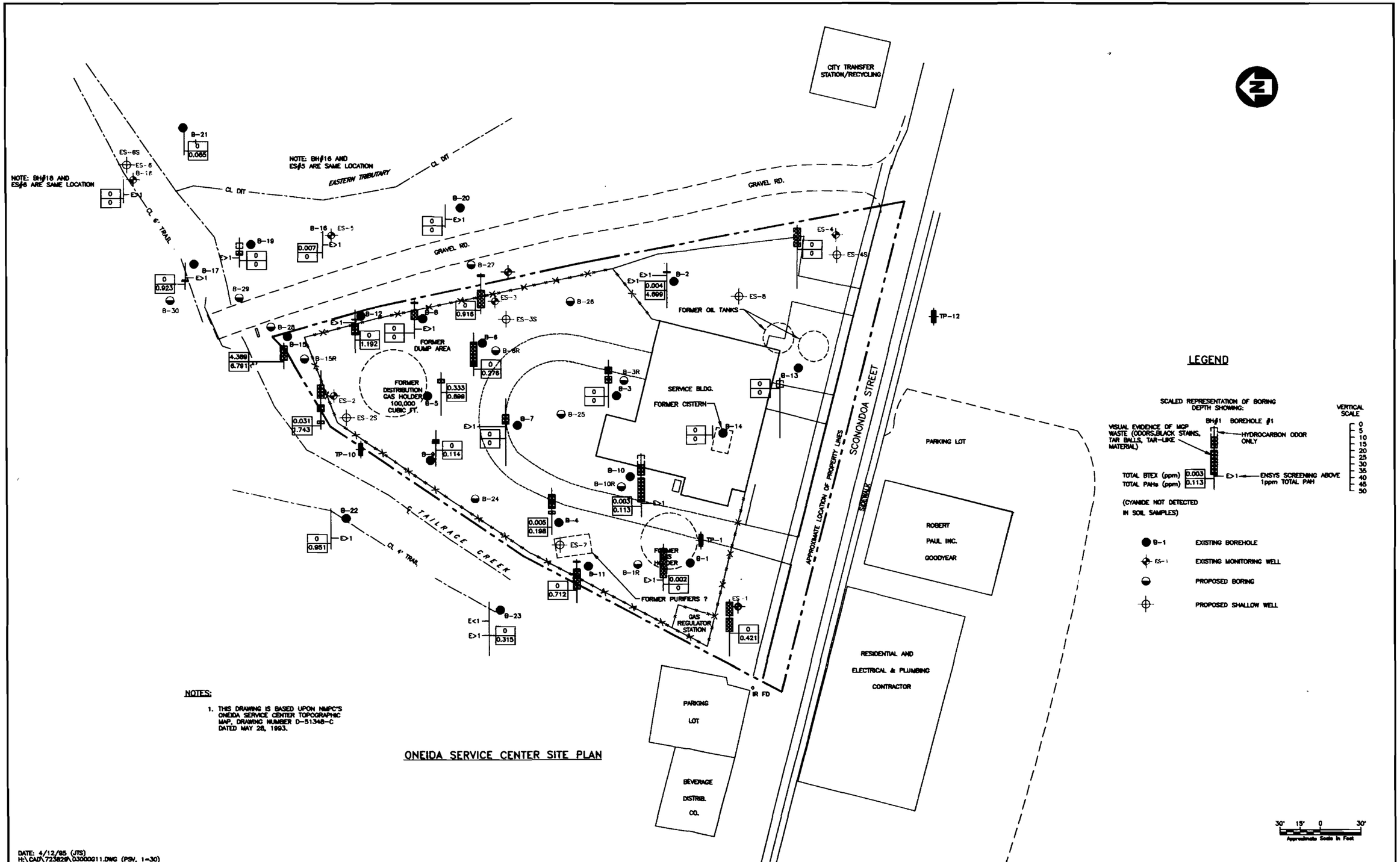
Methods:

Drill two closely-spaced 15-foot borings adjacent to the creek, between the site and B-19 (Figure 3.1). Determine whether the visibly contaminated zone is thicker near the creek or near the site. Drill one boring west of creek and B-17 to assess extent of contamination in gravel lens at B-17. One sample from the contaminated zone in each boring will be analyzed for MGP indicators.

The borings will be drilled with hollow-stem augers as subsurface conditions permit. If borings encounter conditions which do not permit the effective of hollow stem augers, an alternate method (such as spin casing) will be employed. Situations which may require alternate methods include flowing sands or dense gravel or till layers at depths greater than 50 feet below ground surface. Borings will be continuously sampled with split-spoons, except for the borings adjacent to the PSA/IRM borings (designated with the "R" suffix as shown on Figure 3.1 and Tables 3.3 and 3.4).

TABLE 3.2
SUMMARY OF ANALYTICAL PARAMETERS
ONEIDA FORMER MGP RI/FS

ANALYSES	PARAMETERS
TCL/TAL	TARGET COMPOUND LIST ORGANICS: -- VOLATILE ORGANIC COMPOUNDS -- SEMIVOLATILE ORGANIC COMPOUNDS -- PESTICIDES -- POLYCHLORINATED BIPHENYLS (PCBs) TARGET ANALYTE LIST METALS AND CYANIDE (TOTAL AND AMENABLE)
WASTE CHARACTERIZATION (W.C.)	TCLP VOLATILES, SEMIVOLATILES, METALS IGNITABILITY CORROSIVITY REACTIVITY
TREATABILITY CHARACTERISTICS (T.C.)	BTU CONTENT TOTAL SULFUR TOTAL PETROLEUM HYDROCARBONS (TPH) TOTAL ORGANIC HALOGENS (TOX) PERCENT ASH
MGP INDICATORS	BTEX POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs) CYANIDE (TOTAL AND AMENABLE)
CONVENTIONAL WATER QUALITY PARAMETERS (CONV)	SULFIDE SULFATE NITRITE NITRATE CHLORIDE CARBONATE HARDNESS TOTAL DISSOLVED SOLIDS (TDS) BOD5 COD pH OIL & GREASE POTASSIUM SODIUM MAGNESIUM ALKALINITY
TOC	TOTAL ORGANIC CARBON



NOTES:

1. THIS DRAWING IS BASED UPON NMPC'S ONEIDA SERVICE CENTER TOPOGRAPHIC MAP, DRAWING NUMBER D-51348-C DATED MAY 28, 1993.

ONEIDA SERVICE CENTER SITE PLAN

DATE: 4/12/95 (JTS)
H:\CAD\723829\03000911.DWG (PSV, 1=30)

NO.	DATE	REVISIONS	BY
4			
3			
2			
1			
0			

PROJECT NO. 723829.03000 — DATE
DESIGNED BY – — –
DRAWN BY J.H. GOLDTHWAIT — 4/14/94
CHECKED BY S.B. DILLMAN — –
ENGINEER —
REGISTRATION NO. – DATE –

ENGINEERING-SCIENCE
DESIGN * RESEARCH * PLANNING
290 ELWOOD DAVIS ROAD * SUITE 312 * LIVERPOOL, NEW YORK 13088 * 315/451-9560
OFFICES IN PRINCIPAL CITIES

ES

NIAGARA MOHAWK

NIAGARA MOHAWK POWER COMPANY
SYRACUSE, NEW YORK

ONEIDA SERVICE CENTER
CITY OF ONEIDA
MADISON COUNTY NEW YORK
PROPOSED BORING LOCATIONS

SCALE AS SHOWN
FIGURE NO. 3.1
723829

TABLE 3.3

SOIL BORING AND MONITORING WELL LOCATION RATIONALE
ONEIDA FORMER MGP RI/FS

Boring/ Well I.D	Task Number	Location	Rationale
B-1R	2.2.1.1	Adjacent to B-1	To characterize visibly contaminated soils found in PSA/IRM Study.
B-3R	2.2.1.1	Adjacent to B-3	To characterize visibly contaminated soils found in PSA/IRM Study.
B-6R	2.2.1.1	Adjacent to B-6	To characterize visibly contaminated soils found in PSA/IRM Study.
B-10R	2.2.1.1	Adjacent to B-10	To characterize visibly contaminated soils found in PSA/IRM Study.
B-15R	2.2.1.1	Adjacent to B-15	To characterize visibly contaminated soils found in PSA/IRM Study.
B-24	2.2.1.1	West side of site	To characterize subsurface soils on site.
B-25	2.2.1.1	Center of site	To characterize subsurface soils on site.
B-26	2.2.1.1	East side of site	To characterize subsurface soils on site.
B-27	2.2.1.1	Adjacent to east side of site	To determine whether visibly contaminated soils extend off-site to the east.
B-28	2.2.1.2	North end of site	To determine whether visible contamination is migrating from the site or from Tailrace Creek sediments.
B-29	2.2.1.2	North end of site	To determine whether visible contamination is migrating from the site or from Tailrace Creek sediments.
B-30	2.2.1.2	West of creek and B-17	To assess extent of contamination in gravel lens at B-17.
ES-2S	2.2.2.3	Adjacent to ES-2	To monitor shallow groundwater quality at ES-2.
ES-3S	2.2.2.3	Adjacent to ES-3	To monitor shallow groundwater quality at ES-3.
ES-4S	2.2.2.3	Adjacent to ES-4	To monitor shallow groundwater quality at ES-4.
ES-6S	2.2.2.3	Adjacent to ES-6	To monitor shallow groundwater quality at ES-6.
ES-7	2.2.2.3	West side of site	To monitor shallow groundwater quality near former purifier area.
ES-8	2.2.2.3	East side of site	To monitor shallow groundwater quality downgradient of former oil tanks.
ES-9/9S	2.2.2.1	Off-site, to west	To monitor upgradient groundwater conditions.
ES-10/10S	2.2.2.1	Off-site, to south	To monitor upgradient groundwater conditions.
ES-11/11S	2.2.2.2	Off-site to east	To monitor downgradient groundwater conditions.
ES-12/12S	2.2.2.2	Off-site to northeast	To monitor downgradient groundwater conditions.
Hand Auger Transects	2.2.1.3	Along Tailrace Creek	To determine extent of dredge spoils area.
P-1	2.2.2.4	West of site and Tailrace Creek	To determine groundwater/surface water flow relationship.
P-2	2.2.2.4	East side of Tailrace Creek.	To determine groundwater/surface water flow relationship.
P-3S/3D	2.2.2.4	Adjacent to Oneida Creek at Tailrace Creek discharge point	To determine groundwater/surface water flow relationship. To determine groundwater/surface water flow relationship.
P-4	2.2.2.4	Northeast of site near public park	To determine groundwater/surface water flow relationship.

Notes: Locations of borings, wells, and well screens are subject to geologist's discretion based on field conditions.
Locations of borings and wells are shown on Figures 3.1 and 3.2.

Table 3.4

Summary of Soil Analyses from Soil and Well Borings
Oneida Former MGP RI/FS

Boring/ Well ID	Total Depth (FT)	Sample Analyses						Rationale
		TCL/ TAL	MGP Indicators	Ensys PAHs	Grain Size	T.C.	TOC	
B-1R	25	1	1	–	–	1	1	Characterize visibly contaminated material.
B-3R	25	–	2	–	–	–	–	Characterize visibly contaminated material.
B-6R	25	1	1	–	–	1	1	Characterize visibly contaminated material.
B-10R	35	–	2	–	–	–	–	Characterize visibly contaminated material.
B-15R	25	1	1	–	–	1	1	Characterize visibly contaminated material.
B-24	25	–	2	–	–	–	–	Characterize visibly contaminated material.
B-25	25	–	2	–	–	–	–	Characterize visibly contaminated material.
B-26	25	–	2	–	–	–	–	Characterize visibly contaminated material.
B-27	25	–	2	–	–	–	–	Characterize visibly contaminated material.
B-28	15	–	1	–	–	–	–	Characterize visibly contaminated material.
B-29	15	–	1	–	–	–	–	Characterize visibly contaminated material.
B-30	15	–	1	–	–	–	1	Characterize visibly contaminated material.
ES-2S	15	–	2	–	–	–	–	Characterize visibly contaminated material.
ES-3S	15	1	1	–	–	–	–	Characterize visibly contaminated material.
ES-4S	15	–	2	–	–	–	–	Characterize visibly contaminated material.
ES-6S	15	–	2	–	–	–	–	Characterize visibly contaminated material.
ES-7	15	–	2	–	–	–	–	Characterize visibly contaminated material.
ES-8	15	1	1	–	–	–	–	Characterize visibly contaminated material.
ES-9	75	–	1	–	1	–	–	Characterize visibly contaminated material.
ES-9S	25	–	–	–	–	–	–	
ES-10	75	–	1	–	1	–	–	Characterize visibly contaminated material.
ES-10S	25	–	–	–	–	–	–	
ES-11	50	–	1	–	1	–	–	Characterize visibly contaminated material.
ES-11S	25	–	–	–	–	–	–	
ES-12	50	–	1	–	1	–	1	Characterize visibly contaminated material.
ES-12S	25	–	–	–	–	–	–	
Hand Auger Transects	5	1	9	35	–	–	–	Characterize clean and visibly contaminated material.
P-1	10	–	–	–	–	–	–	
P-2	10	–	–	–	–	–	–	
P-3S	10	–	–	–	–	–	–	
P-3D	25	–	–	–	–	–	–	
P-4	10	–	–	–	–	–	–	

T.C. = Treatability Characteristics
TOC = Total Organic Carbon
See Table 3.2 for complete list of analyses for each group.
TCL/TAL, T.C. and Ensys analyses may be allocated at the discretion of the field geologist. This summary is provided as guidance only.
All well and soil borings will be continously sampled with the following exceptions:

- Borings designated with "R" suffix will be drilled to the depth that its corresponding PSA/IRM boring encountered contamination.
- Shallow well borings in well pairs (those designated with "S" suffix) will be drilled without sampling.

These borings will be advanced to the depth that the PSA/IRM borings encountered contamination and spilt-spoon sampling will commence at that point.

Split-spoon samples will be screened for total volatile organic compounds (VOCs) with a photoionization detector (PID), visually inspected, and geologically logged. At completion, the boreholes will be grouted to the surface.

Samples from each of the borings will be analyzed in a laboratory for the analytes shown on Tables 3.4 and 3.5.

All drilling equipment, including the back of the drill rig, will be decontaminated by steam cleaning as described in Section A.1.2.1 of Appendix A supplemented by the use of Citraclean, if necessary. All drill cuttings, fluids and decontamination water will be contained in plastic tanks (or a roll-off for soils) and staged on-site for subsequent disposal by NMPC. The roll-offs or tanks will be labelled with respect to their contents (development water, decon water, personnel protective equipment, etc.) and origin (well or boring number) where practical. The tanks and roll-offs will be labelled as non-hazardous pending subsequent composite sampling and analysis of the contents.

Dredge Spoils Borings - Task 2.2.1.3

Objective:

Define the vertical and horizontal extent of MGP-related constituents in dredge spoil areas along Tailrace Creek.

Methods:

Use hand auger borings (to maximum depth of five feet) to complete 10 transects (three borings per transect) across areas where dredge spoils appear to or reportedly have been deposited (boring locations are shown on Figure 3.2). Use visual evidence and PAH field screening (up to 35 samples) to assess limits of MGP-contaminated dredge spoils. Collect at least five samples for MGP indicator analyses and one sample for full TCL/TAL to characterize contaminated spoils. In addition, at least four samples will be collected for MGP indicator analyses to demonstrate that the extent of contamination has been defined. A total of ten samples will be collected during this task. The hand auger will be decontaminated between borings.

EnSys PAH field analysis kits will be used to screen the soil samples and ensure that the samples selected to demonstrate the lower boundary of contamination do not contain PAHs in excess of approximately 1 part per million (ppm). The *EnSys* immunoassay field analysis system is semiquantitative and will provide a positive/negative response for two concentration end points; in this case, 1 ppm and 100 ppm. The field analysis results will indicate whether the total PAH concentration of a sample is less than 1 ppm, between 1 ppm and 100 ppm, or above 100 ppm. Use of this system will provide real time data confirming that a sample with no visual evidence of PAH contamination has, in fact, a total PAH concentration of less than 1 ppm.

TABLE 3.5
SUMMARY OF ANALYTICAL PROGRAM

ONEIDA FORMER MGP RI/FS

SUBTASK	MATRIX / PARAMETER	METHOD (SW-846)	FIELD SAMPLES	FIELD AND LAB QC SAMPLES					TOTAL SAMPLES
				TRIP BLK (1)	FIELD DUP (2)	WASH BLK (3)	MS/MSD (TOTAL)	MSB/LCS (TOTAL)	
2.2.1.1	**Soil**								
	T.C.	Various SW-840	3	–	–	–	–	–	3
	BTEX	8240	15	–	1	1	2	1	20
	PAHs	8270	15	–	1	1	2	1	20
	CN	9010	15	–	1	1	2	1	20
	Full TCL/TAL	Various SW-846	3	–	–	–	2	1	6
2.2.1.2	**Soil**								
	BTEX	8240	3	–	–	–	2	1	6
	PAHs	8270	3	–	–	–	2	1	6
	CN	9010	3	–	–	–	2	1	6
2.2.1.3	**Soil**								
	BTEX	8240	9	–	–	–	2	1	12
	PAHs	8270	9	–	–	–	2	1	12
	CN	9010	9	–	–	–	2	1	12
	Full TCL/TAL	Various SW-846	1	–	–	–	2	1	4
	Ensys	–	35	–	–	–	–	–	35
2.2.2.1	**Soil**								
	W.C.	Various SW-846	4	–	–	–	–	–	4
	Grain Size	–	2	–	–	–	–	–	2
	BTEX	8240	2	–	1	–	2	1	6
	PAHs	8270	2	–	1	–	2	1	6
	CN	9010	2	–	1	–	2	1	6
2.2.2.2	**Soil**								
	Grain Size	–	2	–	–	–	–	–	2
	BTEX	8240	2	–	–	–	2	1	5
	PAHs	8270	2	–	–	–	2	1	5
	CN	9010	2	–	–	–	2	1	5
2.2.2.3	**Soil**								
	BTEX	8240	10	–	1	–	2	1	14
	PAHs	8270	10	–	1	–	2	1	14
	CN	9010	10	–	1	–	2	1	14
	Full TCL/TAL	Various SW-846	2	–	1	–	2	1	6
2.2.2.3	**Water**								
	Full TCL/TAL	Various SW-846	1	1	–	–	2	1	5
2.2.3.1	**Sediment**								
	BTEX	8240	11	–	1	1	2	1	16
	PAHs	8270	11	–	1	1	2	1	16
	CN	9010	11	–	1	1	2	1	16
	TOC	Lloyd Kahn	11	–	–	–	–	–	11
2.2.3.2	**Sediment**								
	BTEX	8240	22	–	–	–	4	2	28
	PAHs	8270	22	–	–	–	4	2	28
	CN	9010	22	–	–	–	4	2	28
	Ensys	–	22	–	–	–	–	–	22
2.2.3.3	**Sediment**								
	BTEX	8240	6	–	1	–	2	1	10
	PAHs	8270	6	–	1	–	2	1	10
	CN	9010	6	–	1	–	2	1	10
2.2.4	**Surface Water**								
	BTEX	8240	3	1	1	–	2	1	8
	PAHs	8270	3	–	1	–	2	1	7
	CN	9010	3	–	1	–	2	1	7
2.2.5	**Surface Soil**								
	BTEX	8240	12	–	1	–	2	1	16
	PAHs	8270	12	–	1	–	2	1	16
	CN	9010	12	–	1	–	2	1	16
	Full TCL/TAL	Various SW-846	3	–	1	–	2	1	7
	TOC	Lloyd Kahn	5	–	1	–	–	–	6
2.3.2	**Groundwater**								
	BTEX	8240	22	10	2	1	4	2	41
	PAHs	8270	22	–	2	1	4	2	31
	CN	9010	22	–	2	1	4	2	31
	Conventionals	Various EPA 600/4-79-020	5	–	–	–	–	–	5
	Full TCL/TAL	Various SW-846	22	–	2	1	4	2	31

FOOTNOTES:

(1) Trip blanks – VOC only – Analysis will be consistent with field sample analysis (i.e., either BTEX or TCL volatiles).

(2) Field duplicates, MS/M(S)D, MSB, LCS = same matrix as field sample

(3) Wash Blanks – water only

(T.C.) Treatability characteristics

(W.C.) Waste characteristics – Samples will also be collected for characterization of investigation – derived waste, at the discretion of the field geologist, in accordance with the Work Plan text.

ONEIDA SEWAGE DISPOSAL FACILITY

RIFFLE

POOL

POOL

36 IN. RCP W/ FLOODGATE

EXPOSED GRAVEL BAR

DRAINAGE PATTERNS

DRAINAGE PATTERNS

P-3S

P-3I

DRAINAGE SWALE

FORMER DISPOSAL AREA

ES-12
ES-12S

12 IN. PVC DRAINAGE PIPE

FORMER NYC RAILROAD

ES-6
ES-6S

ES-5

ES-2
ES-2S

OAK BRANCH CREEK

GRAVEL ROAD

EASTERN TRIBUTARY

ES-11
ES-11S

ES-3
ES-3S

RESIDENTIAL

ES-9
ES-9S

ES-7

GASPIPE STORAGE

FUEL ISLAND

CONC. PAD

SHED

NMPC SERVICE BLDG.

BEVERAGE DISTRIB. CO.

PARKING LOT

ES-1

ES-8

RESIDENT

EQUIPMENT BUILDING

ROAD MATERIALS

STOCKPILE AREA

STOCKPILE AREA

PUBLIC PARK

P-4

ONEIDA CREEK

ES-10
ES-10S

RESIDENTIAL AND ELECTRICAL & PLUMBING CONTRACTOR

ROBERT PAUL INC GOODYEAR

PARKING LOT

ES-4
ES-4S

CITY TRANSFER STATION/ RECYC.

P-2

RES.

DEPARTMENT OF PUBLIC WORKS/HIGHWAY DEPARTMENT BUILDING

SCONONDOA STREET

EASTERN TRIBUTARY

TANK FARM

N

LEGEND

- FENCE
- GRAVEL ROAD
- SW/SED09A — EXISTING SURFACE WATER/ SEDIMENT SAMPLE LOCATION
- PROPOSED SHALLOW WELL
- PROPOSED WELL PAIR
- PROPOSED SEDIMENT SAMPLE LOCATION
- PROPOSED PIEZOMETER
- EXISTING DEEP MONITORING WELL
- EXISTING DEEP WELL TO BE PAIRED WITH PROPOSED SHALLOW WELL
- PROPOSED HAND AUGER TRANSECT
- PROPOSED SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- PROPOSED SURFACE WATER SAMPLE LOCATION

80' 40' 0 80'
Approximate Scale in Feet

NOTES:

1. THIS DRAWING IS BASED UPON NMPC'S ONEIDA SERVICE CENTER TOPOGRAPHIC MAP, DRAWING NUMBER D-51346-C DATED MAY 28, 1993. OFFSITE FEATURES DERIVED FROM AERIAL PHOTOGRAPHY, USGS 7.5 MINUTE ONEIDA QUADRANGLE AND FIELD OBSERVATIONS.
2. WETLAND LOCATIONS FROM USFWS NWI MAPS (1991) AND NYSDEC ARTICLE 24 WETLANDS MAP. BOUNDARIES DRAWN DO NOT DEPICT JURISTICTIONAL DELINEATION.

FILE NAME: M:\CAD\723829\02380005.DWG
DATE PLOTTED: 4/12/95 (JTS)

NO.	DATE	REVISION	BY

PROJECT NUMBER	723829.03000
DESIGNED BY	R.W. YOUNGMAN
DRAWN BY	J.H. GOLDTHWAIT
CHECKED BY	S.B. DILLMAN
ENGINEER	NA
REGISTRATION NUMBER	NA

DATE: 3/24/94; 4/13/94; 4/14/94; DATE NA

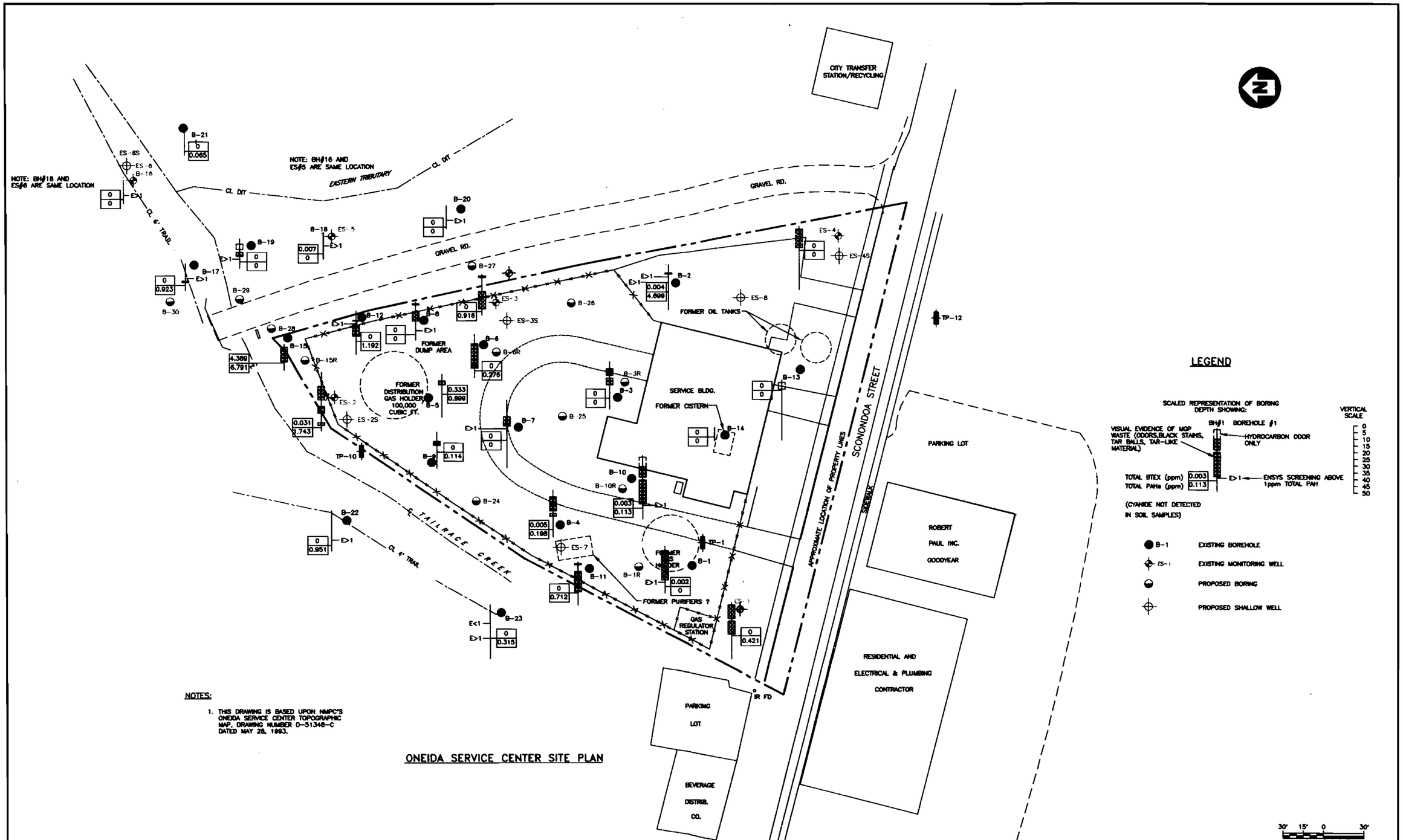
ENGINEERING-SCIENCE
DESIGN • RESEARCH • PLANNING
401 HARRISON OAKS BLVD. • SUITE 210 • CARY, NC 27513 • 919/677-0080
OFFICES IN PRINCIPAL CITIES

NIAGARA MOHAWK

CITY OF ONEIDA
MADISON COUNTY, NEW YORK STATE

PROPOSED SEDIMENT AND MONITORING WELL LOCATIONS

SCALE: AS SHOWN
DRAWING NUMBER: 3.2



LEGEND

SCALED REPRESENTATION OF BORING DEPTH SHOWING:

BH#1 BOREHOLE #1

VISUAL EVIDENCE OF MGP WASTE (ODORS,BLACK STAINS, TAR BALLS, TAR-LIKE MATERIAL)

HYDROCARBON ODOR ONLY

TOTAL BTEX (ppm) 0.003
TOTAL PAHs (ppm) 0.113

E>1 — ENSYS SCREENING ABOVE 1ppm TOTAL PAH

VERTICAL SCALE 0 5 10 15 20 25 30 35 40 45 50

(CYANIDE NOT DETECTED IN SOIL SAMPLES)

- B-1 — EXISTING BOREHOLE
- ES-1 — EXISTING MONITORING WELL
- PROPOSED BORING
- PROPOSED SHALLOW WELL

30' 15' 0 30'
Approximate Scale in Feet

NOTES:

1. THIS DRAWING IS BASED UPON NMPC'S ONEIDA SERVICE CENTER TOPOGRAPHIC MAP, DRAWING NUMBER D-51348-C DATED MAY 28, 1993.

ONEIDA SERVICE CENTER SITE PLAN

DATE: 4/12/95 (JTS)
H:\CAD\723829\03000G11.DWG (PSV, 1=30)

NO.	DATE	REVISIONS	BY
4			
3			
2			
1			
0			

PROJECT NO. 723829.03000 — DATE
DESIGNED BY – — –
DRAWN BY J.H. GOLDTHWAIT — 4/14/94
CHECKED BY S.B. DILLMAN — –
ENGINEER –
REGISTRATION NO. – DATE –

ENGINEERING-SCIENCE
DESIGN * RESEARCH * PLANNING
290 ELWOOD DAVIS ROAD * SUITE 312 * LIVERPOOL, NEW YORK 13088 * 315/451-9560
OFFICES IN PRINCIPAL CITIES

NIAGARA MOHAWK POWER COMPANY
SYRACUSE, NEW YORK

ONEIDA SERVICE CENTER
CITY OF ONEIDA
MADISON COUNTY NEW YORK
PROPOSED BORING LOCATIONS

SCALE AS SHOWN
FIGURE NO. 3.1
723829

The person conducting the PAH field tests will be experienced in their use, or under the supervision of an experienced test kit operator.

3.1.2.2 Groundwater - Task 2.2.2

Upgradient Wells - Task 2.2.2.1

Objective:

Install wells upgradient (south of Sconondoa Street) to further define background conditions.

Methods:

Install two upgradient well pairs; one on the south side of Sconondoa Street and one on the west side of the site (Figure 3.1). Use pairs to screen top (water table) and bottom (top of clay) of aquifer. Analyze one sample from each deep well boring for MGP indicators and grain size. Assume well pair depths of 75 and 25 feet.

Downgradient Wells - Task 2.2.2.2

Objective:

Install one well pair north of the former railroad to establish downgradient groundwater conditions and flow directions. Analyze soils from deep well boring for evidence of MGP-related constituents.

Methods:

Install one well pair north of former railroad and Tailrace Creek. Install a second downgradient well pair east of the eastern tributary (Figure 3.2). Use pairs to screen top and bottom of aquifer. Analyze one sample from each deep well boring for MGP indicators and grain size. Assume well pair depths of 50 and 25 feet.

Shallow Wells - Task 2.2.2.3

Objective:

Install shallow wells paired with selected existing, deep wells to define the vertical extent of constituents in groundwater and to better evaluate BTEX concentrations at the top of the water table.

Methods:

Install six shallow wells, about 15 feet deep with 10-foot screens to pair with four of the existing, deeper wells (ES-2, 3, 4 and 6). Two shallow wells will be installed in new locations downgradient of the former purifiers and the former oil tanks. Analyze two samples from visibly contaminated zone in each boring (total 12 samples) for MGP indicators (10 samples) or for full TCL/TAL (2 samples).

Two-inch diameter PVC monitoring wells will be installed as indicated on Figures 3.1 and 3.2 and Table 3.3. The screen slot size will be 0.01 inch (10-slot), or 0.02-inch (20-slot) in order to permit DNAPL flow into the well, if present. Steam cleaning

of the well screen and pipe will not be done as long as the pipe and screen are sealed in their original packaging.

Well screen placement will be dependent on visual observations, the PID screening results and geologic stratum to be monitored. Well screen placement rationale is indicated on Table 3.3. At the discretion of the field geologist, the deep wells will have a two-foot sump beneath the screen to allow collection and measurement of any dense NAPL present. Well screens will be a maximum of 10 feet in length. Those shallow well borings that are paired with existing deep wells will be augered to the desired depth without soil sampling.

If necessary, double-cased monitoring wells will be designed and installed in accordance with NYSDEC-approved methods and specifications. The decision to install double-cased wells will be made on a boring-specific basis by the field geologist in consultation with the project manager or technical director. Double-cased wells may be installed when the boring for the monitoring well penetrates a presumed confining layer. The confining layer shall be defined as a minimum 5-foot thick, predominantly clay unit which has been shown to be laterally continuous across the site. In the event that the field geologist and project manager or technical director decide a reasonable possibility exists for contamination to be deposited in deeper, clean zones during the drilling and installation of a monitoring well, the well may be double-cased. The purpose of the double-casing is to ensure that residual contamination is not deposited at the depth of the screened interval during the drilling process.

Double-cased wells will be installed in a separate boring, at a minimum distance of 5 feet from the soil boring in which the presumed confining layer or contamination was identified. Five-inch diameter steel outer casing will be installed to a depth of at least 5 feet below the lower limit of observed or measured contamination. This casing will be grouted in place with cement to inhibit downward migration of shallow contamination.

The 5-inch steel diameter casing will be installed through 6.25-inch hollow stem augers or other equipment as authorized by the field geologist. The augers or casing will be filled with grout prior to their removal to ensure the integrity of the borehole and the grout seal. The 5-inch diameter steel casing then will be installed into the grout and hydraulically pushed approximately 1 foot beyond the bottom of the boring. Potable water will be tremied to the bottom of the inside of the casing to dilute the grout and allow the grout to be more easily pumped out of the casing. The grout pumped out of the inside of the casing will be drummed and staged on-site for proper disposal.

The cement grout remaining in the annulus between the casing and the formation will be allowed to set for at least 48 hours before drilling is continued. The drilling will then continue using potable water and 4-inch diameter flush-joint spin casing or other equipment as authorized by the field geologist. All lubricant water will be contained with the well development water.

The well will be constructed of 2-inch diameter PVC riser pipe and screen, sand pack, bentonite seal, cement/bentonite grout, concrete, and surface casing as specified for single-cased monitoring wells, and in accordance with NYSDEC requirements. The bentonite seal may consist of pellets or a mixture of bentonite slurry in proportions relative to 30 gallons of water to 25-30 pounds of bentonite. The grout will consist of the appropriate amount of the following proportional mix: 30 gallons water to three 94-pound bags cement to 25 pounds granular bentonite.

Either a standpipe or flush-mounted protective outer casing construction will be used depending on the location of the well.

As previously noted, drill cuttings and liquids will be placed in a roll-off container and drums, respectively, and staged on-site. At the completion of the subsurface investigation, composite samples of each will be collected. Samples will be analyzed for waste characterization to determine the proper handling and disposal required for the materials. NMPC will coordinate disposal.

The potable water source used in drilling operations will be sampled and analyzed for TCL/TAL constituents.

Piezometers/Staff Gauges - Task 2.2.2.4

Objective:

Investigate the flow relationship between the site groundwater system and Tailrace Creek. Determine whether Oneida Creek is a groundwater boundary.

Methods:

Install staff gauges in Tailrace Creek at two locations. Install one staff gauge in eastern tributary. Install staff gauge in Oneida Creek. Install two shallow (10 feet maximum) piezometers, one each along Tailrace Creek and the eastern tributary (Figure 3.2). Install piezometer pair adjacent to Oneida Creek (25 feet maximum on deep piezometer, 10 feet maximum on shallow). Install one shallow piezometer southwest of Oneida Creek. Piezometers will be constructed with one-inch PVC using a drilling rig.

3.1.2.3 Sediments - Task 2.2.3

Shallow Sediment Sampling - Task 2.2.3.1

Objective:

Define the horizontal extent of MGP-related constituents along Tailrace Creek. Collect samples for analysis.

Methods:

Conduct sampling at 150-foot intervals along Tailrace Creek and in drainage swale west of Oneida Creek (Figure 3.2). Analyze 11 samples from top six inches of sediment for MGP indicators and TOC (Table 3.5).

Deep Sediment Sampling - Task 2.2.3.2

Objective:

Define the vertical extent of MGP-related constituents along Tailrace Creek.

Methods:

At each location referenced in Task 2.2.3.1 above, sample to approximately 24 inches deep, or deeper as needed to the extent the sampling method allows. Use visual observations and PID/PAH field screening (up to 22 samples) to assess the vertical extent of contamination. Collect two samples for laboratory analysis from each of the 11 locations at depths between six and 24 inches, or deeper as noted above.

One of the laboratory analysis samples from each of the eleven locations will focus on characterizing the visibly contaminated material. Analyze 10 of those samples for MGP indicators and one for full TCL/TAL. The other laboratory analysis sample from each location will be used to characterize the visibly clean material, as indicated by the Ensys screening. Analyze 10 of those samples for MGP indicators and one for full TCL/TAL. The Ensys screening will focus on demonstrating that the lower extent of contamination has been defined.

Oneida Creek Sediments - Task 2.2.3.3

Objective:

Define the presence and extent of MGP-related constituents in Oneida Creek.

Methods:

Conduct two sampling transects across Oneida Creek; one upstream (near existing PSA/IRM location SED 10) and one just downstream of the confluence with Tailrace Creek (Figure 3.2). Collect samples from the top 12 inches of sediment at three locations across the creek within each transect. Analyze a total of six samples for MGP indicators. Sediment samples will be collected after surface water sampling.

3.1.2.4 Surface Water Sampling - Task 2.2.4

Objective:

Collect one upstream and one downstream sample in Oneida Creek to determine if Tailrace Creek is impacting water quality in Oneida Creek.

Methods:

Collect one surface water sample from the center location of both transects in Oneida Creek noted in Task 2.2.3.3. Collect one sample at the mouth of Tailrace Creek (between the culvert exit and Oneida Creek). Analyze for MGP indicators. Surface water sampling will be conducted prior to any sediment sampling.

3.1.2.5 Surface Soil Sampling - Task 2.2.5

Objective:

Assess presence of potential surface soil impacts from MGP or other wastes to determine potential health risks to on-site personnel.

Methods:

Collect 10 surface soil samples on-site; analyze nine for MGP indicators and one full TCL/TAL (Figure 3.3). Analyze five samples for TOC. Collect five background samples; three for MGP indicators and two for full TCL/TAL. The locations of background samples will be field located and subsequently reviewed with NYSDEC for their approval.

3.1.3 Hydrogeologic Characterization - Task 2.3

3.1.3.1 In Situ Permeability Testing - Task 2.3.1

Objective:

Rising and falling head slug tests will be conducted on five well pairs and two single wells to characterize the hydraulic properties of the aquifer.

Methods:

In-situ permeability testing will be performed on twelve selected monitoring wells, in accordance with procedures presented in Appendix A, to obtain estimates of groundwater velocities and potential groundwater recovery rates for the aquifer in the vicinity of each well. The objective of the hydrologic testing is to characterize the hydraulic properties of the aquifer in the vicinity of the site.

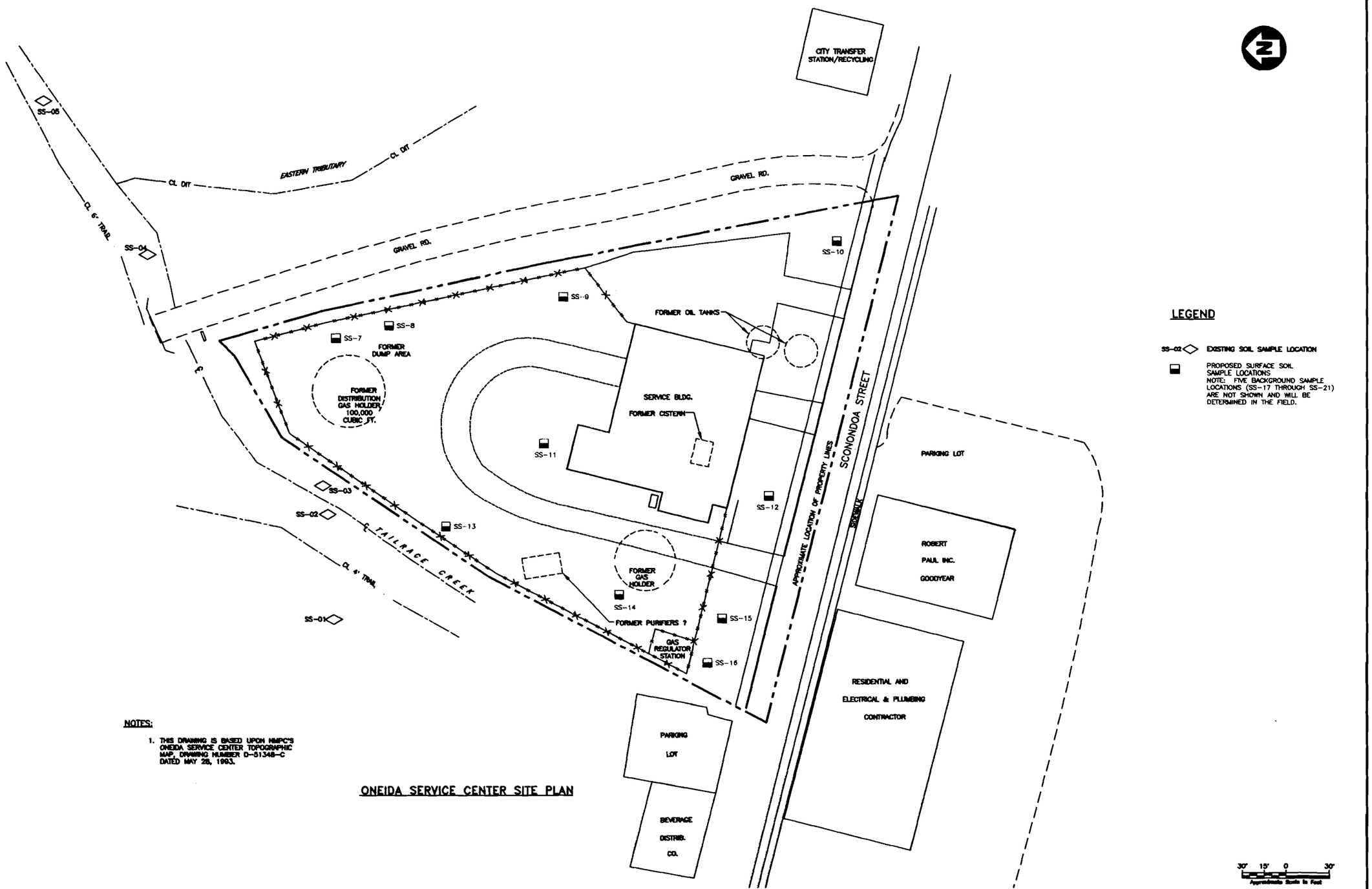
Slug tests will be conducted in selected monitoring wells utilizing the rising and/or falling head slug test techniques. The slug tests will be performed by subjecting water bearing units in the screened interval of monitoring wells to a stress caused by the sudden injection or withdrawal of a stainless steel or PVC slug. Falling head tests will not be conducted in those monitoring wells where the screen straddles the water table.

The slug test data will be analyzed using either the Cooper, Bredehoeft, and Papadopulos (1967) type curve method or the Bouwer and Rice (1976, 1989) method. The Cooper et al. analysis assumes that the well penetrates a confined aquifer, and the Bouwer and Rice method applies where unconfined conditions are prevalent.

3.1.3.2 Groundwater Sampling - Task 2.3.2

Two rounds of groundwater samples will be collected from all RI/FS and existing PSA/IRM wells. The first round will be analyzed for TCL/TAL constituents, and selected wells will also be analyzed for conventionals. In the second round, the wells will be analyzed for MGP indicators (Table 3.5).

The wells will be adequately developed (see Appendix A.1) such that field filtering will not be necessary. Each well will be monitored with an interface probe for NAPL prior to sampling.



LEGEND

SS-02 ◇ EXISTING SOIL SAMPLE LOCATION

▬ PROPOSED SURFACE SOIL SAMPLE LOCATIONS NOTE: FIVE BACKGROUND SAMPLE LOCATIONS (SS-17 THROUGH SS-21) ARE NOT SHOWN AND WILL BE DETERMINED IN THE FIELD.

NOTES:

1. THIS DRAWING IS BASED UPON NMPC'S ONEIDA SERVICE CENTER TOPOGRAPHIC MAP, DRAWING NUMBER D-51348-C DATED MAY 28, 1993.

ONEIDA SERVICE CENTER SITE PLAN

DATE: 10/21/94
M:\CAD\723829\03000001.DWG (1=30)

NO.	DATE	REVISIONS	BY
4			
3			
2			
1			
0			

PROJECT NO. 723829 DATE
DESIGNED BY – –
DRAWN BY JTS, JHQ –
CHECKED BY – –
ENGINEER – –
REGISTRATION NO. – DATE –

ENGINEERING-SCIENCE
DESIGN * RESEARCH * PLANNING
290 ELWOOD DAVIS ROAD • SUITE 312 • LIVERPOOL NEW YORK 13088 • 315/451-9560
OFFICES IN PRINCIPAL CITIES

ES

NIAGARA MOHAWK

NIAGARA MOHAWK POWER COMPANY
SYRACUSE, NEW YORK

ONEIDA SERVICE CENTER
CITY OF ONEIDA
MADISON COUNTY NEW YORK
SURFACE SOIL LOCATIONS

SCALE AS SHOWN
FIGURE NO. 3.3
FILE NO. 723829

3.1.4 Site Survey - Task 2.4

After the sampling activities are completed, a licensed NMPC land surveyor will survey the monitoring wells, sample points, and any other features pertinent to the investigation. A map will be prepared showing the locations and appropriate elevations (i.e., ground surface, top of monitoring well casing, and top of protective well casing, etc.) for each boring, monitoring well, sampling point, and other key points. Vertical control to the nearest 0.01 foot will be established for the ground surface at each boring and the top of each monitoring well PVC casing. Elevations will be determined relative to a regional, local, or project-specific datum point. Horizontal control for exploratory borings, monitoring wells, and sampling points will be located by ties (location and distance) relative to one another and the specified datum point. USGS benchmarks will be used whenever available. A site boundary and topographic survey of the site will also be performed. NMPC will be responsible for all surveying activities, and providing the survey on computer disk for consultant use.

3.1.5 Data Validation and Evaluation - Task 2.5

Data received from the laboratory from the RI efforts will be validated using USEPA guidelines (USEPA, 1991a, 1991b) by a NYSDEC-approved data validator. Data validation reports will be available along with the reported data.

Following data validation, the data from the RI efforts will be reduced, tabulated and evaluated. Sample analysis data and QA/QC results will be included in the data evaluation effort. All tabulated data will be included in the applicable RI/FS reports.

The raw analytical data will be compiled onto spreadsheets and submitted with the boring logs to NYSDEC as an interim RI data submittal. No interpretation or evaluation of the data will be included. This document will be submitted prior to the Phase II RI activities, if they are necessary, and prior to the RI report. Fifteen copies will be provided to NMPC for distribution.

3.1.6 Risk Assessment - Task 2.6

3.1.6.1 Baseline Human Health Evaluation - Task 2.6.1

The purpose of the baseline human health evaluation (HHE) is to assess the potential risks to human health which may be caused by chemicals originating from the site in the absence of any actions to control or mitigate their impact. The most up-to-date versions of USEPA guidance available will be used to conduct the baseline HHE. The primary references to be used will include the following:

(1) Superfund Exposure Assessment Manual ("SEAM," USEPA, 1988b);

(2) Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual Part A ("RAGS Part A," USEPA, 1989);

(3) Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual, Part B ("RAGS Part B," USEPA, 1991c);

(4) Exposure Factors Handbook (USEPA, 1990);

(5) Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" (USEPA, 1991d);

(6) Guidance on Risk Characterization for Risk Managers and Risk Assessors (USEPA, 1992a);

(7) Dermal Exposure Assessment: Principles and Applications (USEPA, 1992b);

(8) Guidelines for Exposure Assessment (USEPA, 1992c);

(9) Supplemental Guidance to RAGS: Calculating the Concentration Term (USEPA, 1992d);

(10) Integrated Risk Information System ("IRIS," USEPA, 1994a); and

(11) Health Effects Assessment Summary Tables ("HEAST," USEPA, 1994b).

As currently required (USEPA, 1992a), the central tendency and reasonable maximum exposure (RME) or "high end" portions of the hazard and risk distributions will be quantified. Ultimately, the RME hazard indices and risks will be used for decision-making purposes at the site.

The data base to be used for the baseline HHE will consist of validated analytical data. On-site data will be compared to background data, as available, in order to justify the elimination of certain inorganic chemicals from the quantitative evaluation, if appropriate. All organic compounds detected on site will be considered for inclusion in the quantitative evaluation. Any chemicals lacking appropriate USEPA toxicity values will not be retained.

A representative concentration, also known as the "concentration term," will be calculated for each chemical in each pathway. The representative concentration is the basis for calculating both the central tendency and RME hazard indices and risks. The representative concentration will be calculated according to current USEPA guidance (USEPA, 1992d). If the data are lognormally distributed, they will be transformed prior to further statistical manipulation. If the data are normally distributed, they will not be transformed. The non-detects for a given chemical of potential concern in a given medium will be averaged in at one-half the sample quantitation limit (SQL). The representative concentration will usually be the upper 95 percent confidence limit (UCL) on the arithmetic mean of the transformed data (UCL_T). If there are three or fewer data points, or if the UCL equals or exceeds the maximum concentration detected, the maximum concentration detected will be used for the representative concentration.

The baseline HHE will evaluate the following exposure pathways, depending on the outcome of an exposure pathway analysis:

(1) ingestion of groundwater (future residents);

(2) dermal contact with groundwater (future residents);

(3) inhalation of volatiles released from groundwater (future residents);

(4) dermal contact with surface water (current and future residents);

(5) ingestion of soil (current and future residents);

(6) ingestion of soil (future workers);

(7) dermal contact with soil (current and future residents);

(8) dermal contact with soil (future workers);

(9) ingestion of sediment (current and future residents);

(10) dermal contact with sediment (current and future residents);

(11) inhalation of volatiles released from soil (future workers);

(12) inhalation of fugitive dust (future workers); and

(13) ingestion of fish (current and future residents).

Any pathways found to be incomplete will not be evaluated. Evaluation of fish ingestion will be performed only if fish tissue is obtained for analysis.

Inhalation of volatiles and fugitive dust will not be evaluated for residential receptors. This pathway is incomplete for current residents due to the presence of pavement, building foundations, and vegetation. For future residents, it is highly likely that this pathway will contribute only a very small or insignificant portion of any risk present.

The evaluation of future worker exposure to volatiles and fugitive dusts will be carried out using a variation of the method presented in RAGS Part B (USEPA, 1991a). An ambient air concentration will be estimated by dividing the chemical concentration in soil by the particulate emission factor (for dust) or by the soil-to-air volatilization factor (for volatiles). The use of computer modeling to estimate air concentrations is beyond the scope of this task.

The types of EPA toxicity values to be used in the baseline HHE may include oral reference doses (RfDs), inhalation reference concentrations (RfCs), oral slope factors (SFs), and inhalation and oral unit risk factors (URFs). RfDs and RfCs are used to evaluate noncarcinogenic effects. SFs and URFs are used to evaluate carcinogenic effects.

The noncarcinogenic effects of site-related chemicals will be evaluated by calculating a hazard quotient for each chemical/medium/receptor combination, as well as a cumulative hazard index. Lead will be evaluated, if necessary, by use of the USEPA's Uptake Biokinetic Model (USEPA, 1994c). Carcinogenic effects will be evaluated by calculating the chemical-specific and cumulative risks.

3.1.6.2 Fish and Wildlife Impact Analysis - Task 2.6.2

The principal objectives of the proposed study are to :

(1) Conduct an ecological impact analysis to determine the potential impacts on fish and on human health due to fish consumption; and

(2) Determine whether any contamination found in fish tissue is related to the Oneida MGP site.

Aquatic Ecological Impact Analysis

An ecological impact analysis will be performed on target game fish species in Oneida Creek in the vicinity of the Oneida MGP site. Game fish are any species whose catch is regulated by law (i.e., size minimums, possession limits, and season restrictions). The objective of the analysis is to determine the contaminant levels in fish tissue (fillets and whole fish) and the potential impacts to fish using the indicator species approach. Piscivorous fish, in a system with lipophilic contaminants, act as integrators of contaminant effects resulting from bioconcentration and biomagnification. Species at higher trophic levels tend to suffer the most from persistent contaminants that can not be readily detoxified or excreted. Indicator species are selected which exhibit a logical or apparent susceptibility resulting from their life history and trophic position. Additional criteria for indicator species selection include availability, amenability to sampling, tendency to remain in a location, and ability to survive the levels of contaminants being monitored. High body burdens in fish commonly sought by anglers represent a possible vector to man.

Site Description

A site description of the study area will be developed to address the existing environmental conditions, characterize resources, and identify hazard thresholds. Most of this work has already been completed as part of the habitat assessment for the Oneida PSA/IRM study. The site description will be expanded to provide more site-specific information regarding the Oneida Creek fish community and habitat conditions.

Fish Tissue Sampling And Analysis

Fish tissue samples will be collected in the Oneida Creek in the vicinity of the Oneida MGP. Fish will be collected at three stations: one station at the confluence of Tailrace Creek and Oneida Creek, one station in Oneida Creek upstream of the site, and one downstream of the Oneida Creek/Tailrace Creek confluence. Rather than representing a specific location, each station will consist of a zone in which sampling will be conducted. The position, length, and characteristics of each sampled stream segment will be recorded in the field to aid in interpreting the catch results. Adjustments will be made during the course of the field work to modify the positions of the sampling zones to acquire the target species.

Sample fillets will be removed from the specimens in accordance with the NYSDEC fish filleting methodology. Skins of the fillets will be removed or left in place dependent upon the species in accordance with the NYSDEC methods. For most game species, scales are removed, but skins are left in place. A minimum of 30 grams of tissue should be collected for chemical analysis. The weight of each fillet (to the nearest gram) will be recorded. Fillets will be stored on ice during sample collection and placed in a freezer thereafter until sampling is discontinued. Each sample will be wrapped in aluminum foil and labeled externally with the sample identification number and total weight.

Data collected from game fish fillet tissue analysis will supplement the human health risk assessment as well as the ecological impact analysis. Whole body analysis of smaller game fish and forage fish will be used to evaluate contaminant distribution among several trophic levels.

Large game fish species will be targeted for collection (brown trout, smallmouth bass, walleye, brown bullhead, rock bass, etc.). NYSDEC Region 7 will be consulted to derive a minimum size criteria to identify and eliminate recently stocked fish. Game fish species will be collected by electroshocking as the primary method. Based on the catch per unit effort, alternative methods including seining, gill netting, and angling may be employed to obtain the target biomass. Depending on availability, two individual fillet samples of each of three gamefish species will be collected and composited at each station for chemical analysis (three fillet analytical samples per station). An attempt will be made to collect like species from each station to afford a meaningful comparison of analytical results among stations. In addition to fillets, one sample from each of the three species will be collected at each station for whole body analysis (three whole body analyses per station).

Seine netting will be conducted to obtain smaller individuals and smaller species of fish comprising the forage base for larger piscivores. Seine netting, within the zones sampled previously with gill nets, is intended to capture multiple small individuals and provide a composite sample of each of three species (if available). A composite sample of individuals of each species will be at least 30 grams live weight for whole body analysis. Three composite samples will be targeted from each of the three sampling zones yielding a total of nine composite samples.

Following completion of the sampling program, selected samples will be submitted to the laboratory for analysis of the following compounds and analytes: PAHs, PCBs, arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, and percent lipids.

Terrestrial Ecologic Impact Analysis

An assessment of possible contaminant-related impacts to terrestrial receptors will be conducted utilizing the results of surface water, shallow sediment, and surface soil sample analysis (Tasks 2.2.4, 2.2.3, and 2.2.5, respectively). Levels of compounds detected in these media will be compared to values published in the toxicological literature to determine whether site concentrations have potentially adverse impacts on selected target organisms via various exposure pathways. No tissue samples are proposed to be obtained from resident terrestrial biota. The analysis is expected to focus on piscivorous wildlife, and on the resident muskrat population inhabiting bank burrows along Tailrace Creek. Muskrats represent a likely small mammal exposure scenario via multiple exposure pathways.

Contaminant-Specific Impact Analysis

The impact analysis consists of a pathway analysis and a criteria-specific analysis. The criteria-specific analysis will focus on comparing contaminant concentrations in soil, surface water, and sediment to applicable threshold screening values such as Ambient Water Quality Criteria, NYSDEC EP method sediment screening values,

Great Lakes Water Quality Initiative values, and USEPA and NOAA screening criteria for sediments. Soil contamination thresholds for fish and wildlife are largely unavailable. The assessment of threshold values in surface soil will rely on the review of appropriate toxicological literature sources.

An analysis will also be conducted to determine if there are significant differences in concentrations of target compounds in edible game fish and forage fish caught adjacent to the site versus upstream and downstream of the site. Contaminant concentrations, if any, in fillet and whole body tissue samples will be evaluated and compared to toxicological literature describing the effects thresholds of the detected compounds.

Physical media contaminant concentrations will be utilized, to the extent possible, to estimate adverse effects levels to selected terrestrial receptors.

3.1.7 Prepare Remedial Investigation Report - Task 2.7

A Draft RI Report will present data collected during the remedial investigation and previous site activities such as the PSA/IRM, and assess the nature, extent, and potential impacts of the contamination to human health or the environment. The report will also document all work performed and present results of chemical analyses. The RI Report will be organized in accordance with EPA's 1988 RI/FS guidance. The report will be organized into the following sections:

- Section 1 - Introduction, including purpose and background;
- Section 2 - Study Area Investigation, including source identification and data collection methods;
- Section 3 - Physical Characteristics of the Study Area, including surface features, hydrology, geology, etc. Groundwater elevation contour maps for two dates will be included;
- Section 4- Nature and Extent of Contamination, including potential contaminant sources, analytical results, and contamination assessment;
- Select 5 - Contaminant Fate and Transport, including potential routes of migration, persistence, and migration;
- Section 6 - Baseline Risk Assessment, including human health evaluation and ecological assessment; and
- Section 7 - Summary, Conclusions, and Recommendations.

Four copies of a preliminary draft will be provided to NMPC. NMPC comments will be addressed and 15 copies of the Draft RI Report will be submitted to NMPC for distribution.

Following submission of the Draft RI Report, a meeting with NMPC and NYSDEC will be conducted to review the conclusions and recommendations. The review will include a discussion of any additional data needs which may be necessary in evaluating the alternatives.

This meeting will form the basis for the finalizing the RI Report. During the meeting, the direction of the FS will be discussed. Public involvement during this effort is described in the Citizen Participation Plan (Appendix C).

Following NYSDEC review, the department's comments will be addressed and incorporated into the Final RI Report. Fifteen copies will be submitted to NMPC for distribution.

3.2 CONDUCT FEASIBILITY STUDY - TASK 3

This section consists of task descriptions for the Oneida MGP Site Feasibility Study. The Task 3 activities are summarized in Table 3.6. The FS report will be prepared in accordance with "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (USEPA, 1988a) and NYSDEC TAGMs HWR-89-4025 "Guidelines for Remedial Investigation/Feasibility Studies" and HWR-90-4030 "Selection of Remedial Actions at Inactive Hazardous Waste Sites". However, the TAGM HWR-90-4030 scoring sheets will not be used, which is consistent with our FS procedures at other sites.

3.2.1 Identify SCGs and Remedial Objectives - Task 3.1

This task includes the identification of standards, criteria, and guidelines (SCGs) such as those listed in Table 3.7, and other potential action levels such as for metals and PAHs in soils. Federal and state criteria, advisories, and guidance which are applicable to the contaminated substances of concern at the site will be identified. If suitable SCGs are not available that account for the potential exposures to each target contaminant, available dose response information will be identified for use in Task 2.6.1.

Remedial objectives will also be developed for soils, sediment, groundwater, and other media as needed, specifying the contaminants of interest, exposure pathways and remediation goals. The objectives may vary from one media to another depending upon, for example, the contaminants present in each media and the significance of each exposure pathway. These objectives will be based on contaminant-specific removal, cleanup levels and the results of the site-specific risk assessment. The guidance for cleanup criteria include the NYSDEC Hazardous Waste Remediation HWR-94-4046 "Determination of Soil Cleanup Objectives and Cleanup Levels" (NYSDEC, January 1994) and the Division of Fish and Wildlife's "Technical Guidance for Screening Contaminated Sediments" (NYSDEC, November 1993). The remedial action objectives will be described in the FS report as the basis for developing remedial alternatives.

3.2.2 Develop Alternatives - Task 3.2

Based on the results of the RI efforts and on the site-specific remedial objectives, the areas and volumes of contaminated media requiring remedial action will be estimated. These estimates may require refinement following the Phase II RI efforts.

TABLE 3.6

FEASIBILITY STUDY TASK SUMMARY

ONEIDA FORMER MGP SITE

Task 3 Feasibility Study
Task 3.1 Identify SCGs and Remedial Objectives
Task 3.2 Develop Alternatives
Task 3.3 Evaluate Alternatives
Task 3.4 Prepare Draft FS Report
Task 3.5 Formulate Conceptual Plan
Task 3.6 Prepare Draft Final and Final FS Reports
Task 3.7 FS Meetings

Note: Treatability testing may not be necessary, therefore a treatability testing task is not included.

TABLE 3.7

TYPICAL POTENTIALLY APPLICABLE STANDARDS, CRITERIA AND GUIDLINES (SCGS)

- Federal and State solid and hazardous waste rules and regulations under RCRA, CERCLA/SARA.
- Applicable requirements under the Federal Toxic Substances Control Act (TSCA) (e.g., for PCBs).
- Federal and State surface water and groundwater quality standards and criteria.
- Ambient air quality standards.
- Discharge permit requirements under the State Permit Discharge Elimination System (SPDES) program.
- Drinking water maximum contaminant levels.
- Limits for protection of human health developed by the Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH).
- Federal and State regulations for protection of wetlands, endangered and threatened species and other specially designated natural resources.
- Location-specific requirements (eg. wetlands, flood plains, and historical areas).

Remedial technologies which have the potential for satisfying each of the identified remedial objectives will then be identified based largely on results from FS' already initiated at NMPC's Saratoga and Harbor Point sites. Technologies proven effective will be considered and will be used during development of site-specific remedial alternatives. Emerging technologies, such as those currently being evaluated by EPA will be included as information about such technologies becomes available.

Technologies for remediation of other media besides soil-sediment or groundwater (i.e. buildings) will not be needed.

Basic MGP site remedial alternatives include no-action, media treatment, media containment, media removal and combinations thereof. Technologies which meet remedial objectives and are applicable to the site will be incorporated into a limited number (four to six) of remedial alternatives. These remedial alternatives may include the use of different technologies at different areas of the site.

Once alternatives are developed, they will be screened in order to narrow the list of potential remedial actions for the detailed alternatives evaluation effort. The preliminary screening of the alternatives will be accomplished using NYSDEC TAGM HW-90-4030, considering effectiveness and implementability. Effectiveness will include an evaluation of the action from the following perspectives: (1) ability to meet the ARARs and protect human health and the environment (degree of protection), (2) ability to significantly and permanently reduce contaminant toxicity, mobility or volume (accomplish performance objectives), (3) ability to provide a permanent solution or remedy and thereby limit operation and maintenance requirements, (4) technical reliability, (5) demonstrated performance, and (6) ability to comply with Federal, state and local laws and regulations. Implementability will include the following: (1) constructability (technical and administrative feasibility), (2) concerns for worker and public health and safety during construction, (3) the period of time for the alternative to become operational and effective, and (4) availability of components or treatment facilities.

Innovative alternatives will be carried through this screening, if these actions offer a potential for better treatment performance or implementability, fewer adverse impacts, or lower costs than demonstrated technologies. The retained actions will also include a containment alternative and the no action alternative.

Several potentially applicable technologies have already been tested at the bench-scale by Niagara Mohawk at the Harbor Point site and pilot-scale testing is currently underway. It is anticipated that this testing will minimize additional testing requirements. However, additional bench-scale and/or pilot-scale testing may be required to test specific technologies under site-specific conditions, however costs for testing efforts are not included herein because the need for such tests can not currently be defined. Technologies not evaluated at the Harbor Point site may also be considered.

If it is determined that treatability testing is needed, a work plan for such testing would be submitted to NMPC for its review and approval. The treatability study work

plan would, as needed, contain the same three elements as the RI/FS Work Plan: The main body of the work plan, a sampling and analysis plan, and a health and safety plan. The main body of the work plan would include objectives, procedures, methods, conditions to be tested, and methods for data analysis, and include specific identification of criteria for judging possible acceptance for full scale application. The sampling and analysis plan and the health and safety plan, if needed, would prescribe supplemental field, quality assurance and health and safety procedures not specified in this RI/FS Work Plan.

After any treatability work is completed, a treatability study evaluation would be submitted to NMPC as part of the Draft FS Report. If conducted, this evaluation would include a presentation and analysis of the treatability study results including an evaluation of the suitability of the tested technology(ies) for the site.

3.2.3 Evaluate Alternatives - Task 3.3

Individual alternatives will be evaluated against the criteria and factors in Table 3.8 using NYSDEC guidance (NYSDEC, 1990) procedures. Cost estimates will be presented as spreadsheets using a level of detail appropriate for defining a basis for remedy selection. Cost estimate accuracies will typically be minus 30 percent to plus 50 percent. The other evaluation criteria listed in Table 3.8 can be addressed for this site without sophisticated numerical modeling, statistics, or similar techniques. Following the individual evaluations, a comparative analysis will be conducted to evaluate the relative performance of each alternative in relation to each specific evaluation criterion. This comparative analysis will identify the advantages and disadvantages of each alternative relative to one another so that the key trade-offs to be evaluated by the decision maker can be identified.

3.2.4 Prepare Draft FS Report - Task 3.4

Four copies of a Draft FS Report will be submitted for NMPC review. The Draft FS Report will summarize the remedial investigation data, document the recommendations made, and describe all preceding FS tasks performed and assist the decision maker in selecting the final remedy. The report will describe the remedial technologies and alternatives that were evaluated and the rationale for selection. The most cost-effective alternative, that is protective of public health and the environment will be identified along with its projected cost and regulatory impact.

The report will be consistent with the suggested FS report format in the 1988 EPA guidance document. The report will consist of the sections listed below:

Section 1 Introduction - Includes site background and project objectives, including a description of the field activities carried out as part of the site investigation, site characteristics such as geology, hydrogeology, meteorology, surface features, the nature and extent of contamination, contaminant fate and transport, discussion and conclusions of the baseline human health evaluation and habitat-based assessment;

TABLE 3.8

NYSDEC CRITERIA FOR DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

Short-Term Impacts and Effectiveness	Long-Term Effectiveness and Performance	Reduction of Toxicity, Mobility and Volume	Implementability
• Protection of Community During Remedial Actions	• Magnitude of Residual Risk	• Treatment Process Used and Materials Treated	• Ability to Construct and Operate the Technology
• Protection of Workers During Remedial Actions	• Adequacy of Controls	• Amount of Hazardous Materials Destroyed or Treated	• Reliability of the Technology Based on its Acceptable Demonstrations
• Environmental Impacts	• Reliability of Controls	• Degree of Expected Reductions in Toxicity, Mobility and Volume	• East of Undertaking Additional Remedial Actions, if Necessary
• Time Until Remedial Action Objectives are Achieved		• Degree to Which Treatment is Irreversible	• Ability to Monitor Effectiveness of Remedy
		• Type and Quantity of Hazardous Residuals Remaining After Treatment	• Availability of Necessary Equipment and Specialists
			• Timing of New Technology Under Consideration

TABLE 3.8, CONTINUED

NYSDEC CRITERIA FOR DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

Compliance With ARARs	Protection of Human Health and the Environment	Cost
• Compliance With Contaminant-Specific ARARs	• Environmental Impacts	• Immediate Capital Costs
• Compliance With Action-Specific ARARs	• Transport of Hazardous Materials	• Operating and Maintenance Costs
• Compliance With Location-Specific ARARs	• Health Impacts	• Cost to Future Land Use
• Compliance With Other Criteria, Advisories and Guidances		• Present Worth Cost
		• Future System Upgrade Costs

Reference: NYSDEC, 1989b

Section 2 Identification and Screening of Technologies - This section will include remedial action objectives and ARARs along with the technology screening;

Section 3 Development and Screening of Alternatives - Describes screening of the remedial alternatives considered for the site;

Section 4 Detailed Analysis and Ranking of Alternatives - The alternatives are analyzed and ranked;

Section 5 Recommended Remedy; and

Section 6 Conceptual Plan - Includes a conceptual plan for implementation of the recommended remedial alternative.

3.2.5 Formulate Conceptual Plan - Task 3.5

A conceptual plan will be developed for implementing the recommended alternative and verifying that it is effectively implemented.

This conceptual plan will include:

- Preliminary Design Calculations
- Process Flow Diagrams
- Sizing of Key Process Components
- Preliminary Site Layout
- Cost Estimates for Implementation
- Expected Performance
- Implementation Schedule
- Health and Safety
- Description of Design and Operational Features
- Protection of the Public and Environment.

Design drawings are not included in this task.

3.2.6 Prepare Draft Final FS and Final FS Reports - Task 3.6

Fifteen copies of a Draft Final FS Report will be prepared for NMPC which will be distributed to NYSDEC following NMPC review. The final report will incorporate those changes to the Draft FS Report recommended and approved by NMPC, including responses to comments on the Draft FS Report. Fifteen copies of the final FS Report will be submitted to NMPC once the Draft Final FS Report has been reviewed and after responses to any final comments are reviewed in advance with the person(s) that generated each comment.

3.2.7 FS Meetings - Task 3.7

A FS kick-off meeting with NMPC and if possible with NYSDEC and local citizens will be held to understand NMPC's expectations for the FS effort.

Following completion of the submission of the Draft FS Report, a meeting with NMPC and NYSDEC will most likely be conducted to review the analysis and discuss how the alternatives comply with the established ARARs and objectives. The detailed analysis and discussion meeting will form the basis for the finalization of the FS Report. The community involvement in this process is described in the Citizen Participation Plan included in Appendix C.

A total of three FS meetings (or sets of meetings on the same day) are anticipated as part of the FS.

SECTION 4

PROJECT MANAGEMENT APPROACH

4.1 PROJECT ORGANIZATION

The management and technical staff required to execute this project and their areas of responsibility are identified in Figure 4.1 The responsibilities of key personnel are further described as follows:

Technical Advisory Committee

The committee of technical advisors will provide technical support and overall quality assurance. The primary objective of quality assurance is to ensure compliance with all regulatory guidance and regulations. The technical advisors will address the broad range of technical activities and disciplines needed for successful support of this RI/FS. Individually, each representative will be a recognized expert in a technical field.

Project Manager

The project manager is responsible for maintaining schedule, keeping the project within budget, and ensuring the technical adequacy of the work performed.

Health and Safety Officer

The Health and Safety Officer is responsible for the preparation of the Health and Safety Plan, and for verifying that all subcontractors have adequate H&S Plans. If the Health and Safety Officer observes unsafe conditions, the Officer will have stop work authority.

QA/QC Officer

The quality assurance/quality control (QA/QC) officer is responsible for verifying that all QA requirements are followed by the field teams, laboratory and other subcontractors.

RI Team Leader

The RI Team Leader is responsible for controlling activities at the site, including the activities of the drilling and surveying subcontractors, and will be responsible for preparation of the RI report.

FS Team Leader

The FS Team Leader will be responsible for the development, screening, and detailed analysis of alternatives, and for recommendation of a remedy and the preparation of the final RI/FS report.

4.2 PROJECT SCHEDULE

The schedule of major deliverables is presented on Table 4.1. The project schedule is shown in bar chart form on Figure 4.2.

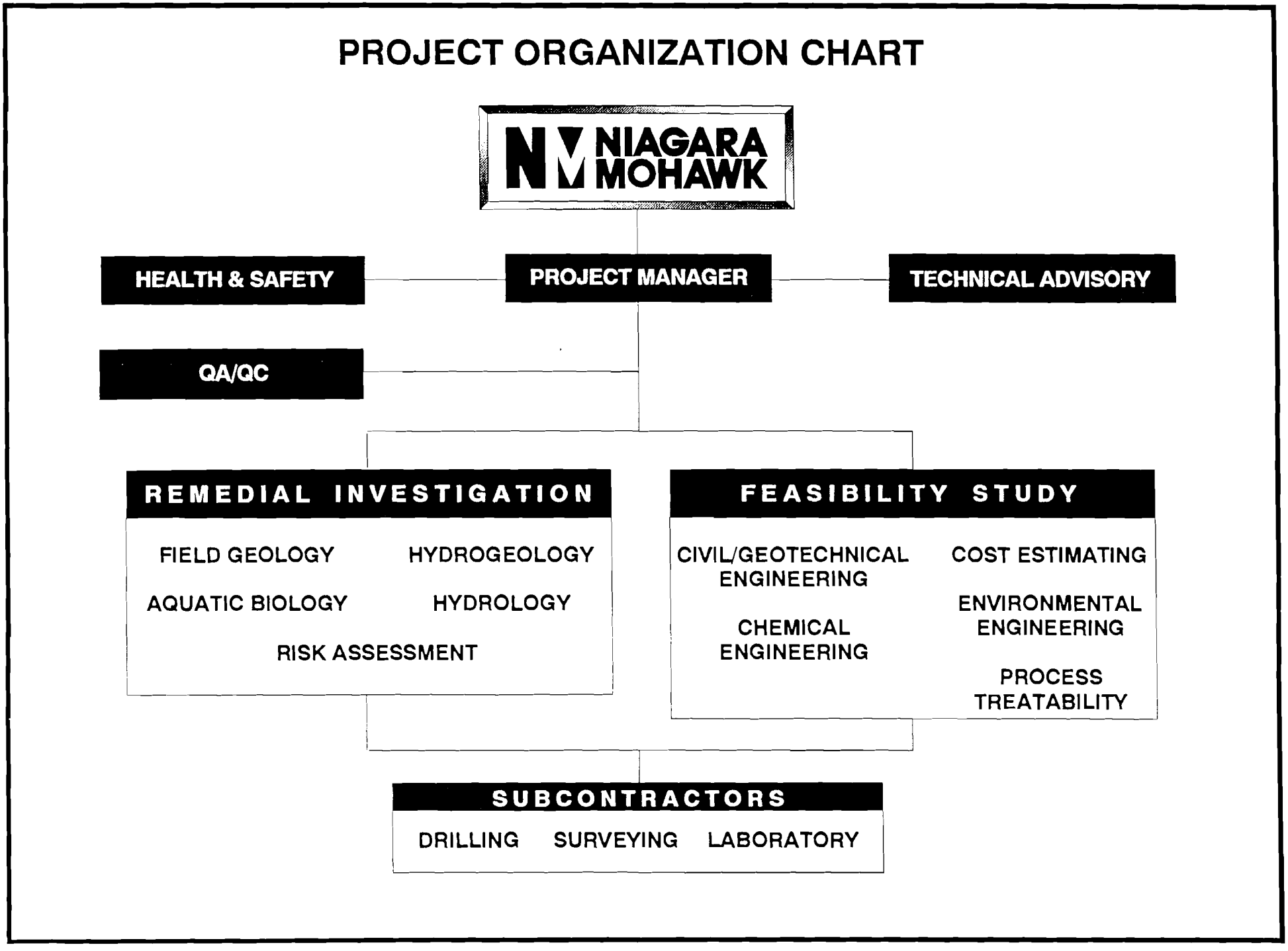

PROJECT ORGANIZATION CHART
NIAGARA MOHAWK
HEALTH & SAFETY
PROJECT MANAGER
TECHNICAL ADVISORY
QA/QC
REMEDIAL INVESTIGATION
FIELD GEOLOGY
HYDROGEOLOGY
AQUATIC BIOLOGY
HYDROLOGY
RISK ASSESSMENT
FEASIBILITY STUDY
CIVIL/GEOTECHNICAL ENGINEERING
COST ESTIMATING
ENVIRONMENTAL ENGINEERING
CHEMICAL ENGINEERING
PROCESS TREATABILITY
SUBCONTRACTORS
DRILLING
SURVEYING
LABORATORY

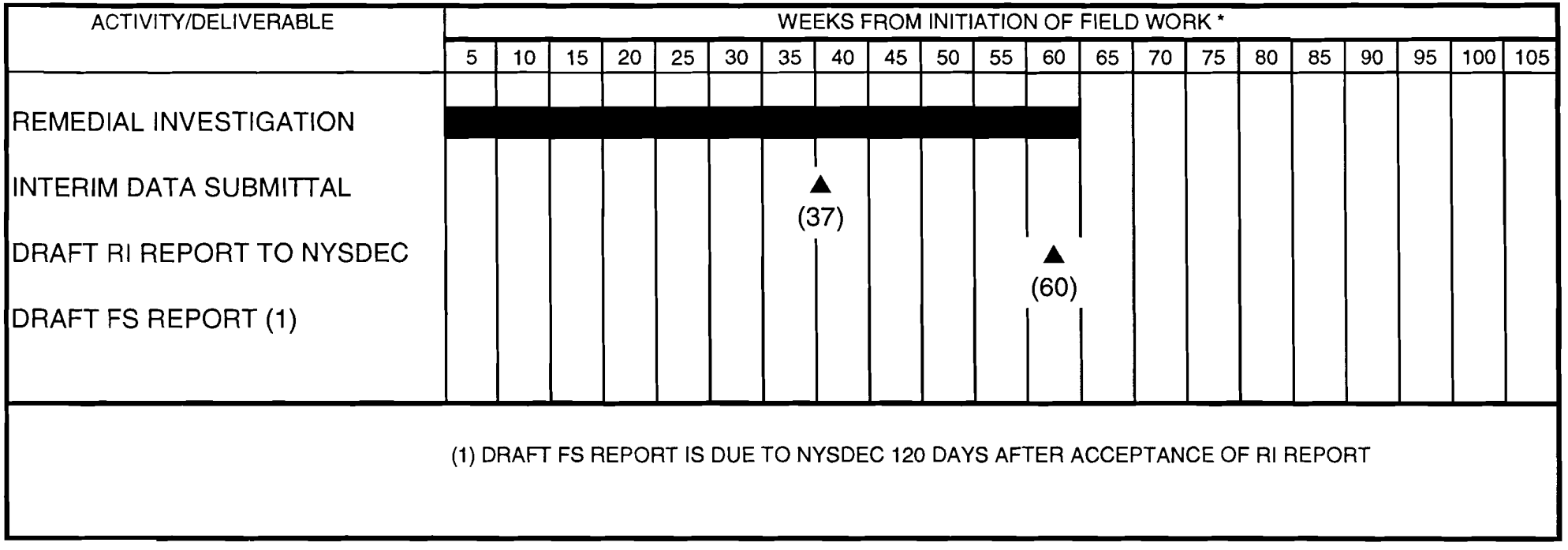
FIGURE 4.1

TABLE 4.1

PROJECT SCHEDULE
ONEIDA FORMER MGP RI/FS

Deliverable	Deadline for Submission (in weeks from field work initiation)
A) Interim Data Submittal	Week 37 (includes only Round 1 groundwater results)
B) Draft Remedial Investigation Report (submittal to NYSDEC)	Week 60
C) Draft Feasibility Study Report (submittal to NYSDEC)	120 days after NYSDEC acceptance of Remedial Investigation Report

FIGURE 4.2
PROJECT SCHEDULE
ONEIDA FORMER MGP SITE
RI/FS



* Two weeks notice will be provided to NYSDEC prior to the start of field work.

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4.3 IDENTIFICATION OF SUBCONTRACTING REQUIREMENTS

It is anticipated that three subcontractors may be required for this work assignment as shown on Figure 4.1. MBE/WBE subcontractors should be utilized to the extent practicable for these services. The laboratory must use deliverable formats specified in the NYSDEC Analytical Services Protocols (ASP), September, 1989 (revised 1991) and be a New York State Department of Health Environmental Laboratory Approval Program (NYSDOH ELAP)-approved laboratory in all categories of solid and hazardous wastes. The drilling subcontractor must be experienced in the installation of monitoring wells and decontamination procedures at NYSDEC inactive hazardous sites and former MGP sites. The surveying contractor must be a NYS licensed surveyor. However, the surveying may be performed directly by NMPC.

APPENDIX A

SAMPLING AND ANALYSIS PLAN

APPENDIX A.1

FIELD SAMPLING PLAN

APPENDIX A.1
FIELD SAMPLING PLAN

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APPENDIX A.1
FIELD SAMPLING PLAN

A.1.1 GENERAL FIELD GUIDELINES

All underground utilities will be identified prior to any drilling and sampling. Public and privately owned utilities will be located by contacting responsible agencies by phone so their underground utilities can be marked at the site. Other potential on-site hazards such as sharp objects, overhead power lines, and building hazards will be identified during the site reconnaissance visit.

Each sample will be given a unique identification as shown in Table A.1.1. With this type of identification, no two samples will have the same label. Labels or tags identified as shown in Table A.1.1 will be attached to each sample container.

The following is a general list of equipment necessary for sample collection.

- Stainless steel spoons and bowls for compositing soil and sediment samples.
- Appropriate sample containers provided by the laboratory.
- Sample bottles (kept closed and in the laboratory-shipped coolers until the samples are collected).
- Reagent-grade preservatives and pH paper (or prepreserved sample containers) for aqueous samples.
- Chain-of-Custody labels, tags, seals, and record forms.
- Log book, field sampling records, and indelible ink markers.
- Laboratory grade decontamination soaps (such as Alconox), reagent-grade solvents, and deionized, organic-free water to be used for decontaminating equipment between sampling stations.
- Buckets, plastic wash basins, and scrub brushes to be used for decontaminating equipment.
- Camera and film to document sampling procedures and sample locations.
- Stakes to identify sampling locations.
- Shipping labels and forms.
- Knife.
- Vermiculite or other packing/shipping material for sample bottles.
- Strapping tape.
- Clear plastic tape.
- Duct tape.

TABLE A.1.1

METHOD FOR IDENTIFYING AND LABELING SAMPLES

	LL*	NN*	L	LL
	Sample Type	Sample Number	Depth Code	QC Identifier

Sample Type:	Monitoring Well (MW), Surface Soil (SS), Subsurface Soil (SB), Sediment (SD), Surface Water (SW), Waste Water (WW), Solid Waste (WA)
Sample Number:	Number referenced to a sample location map.
Depth Code:	Depth in feet of sample interval (i.e. A=0 to 6 inches; B=6 to 12 inches, etc.).
QC Identifier:	Matrix Spike (MS), Matrix Spike Duplicate (MD), Matrix Blank (MB).

* L = Letter
N = Number

- Aluminum Foil.
- Recloseable plastic bags.
- Portable field instruments, including a photoionization detector, pH meter, conductivity meter and water level indicator.

The Project Manager will control all field log books. Each field log book will receive a serialized number and be issued to the field team leader. Field log books will be maintained by the field team leader and other team members to provide a daily record of significant events, observations, and measurements during the field investigation. All entries will be signed and dated.

Information pertinent to the field investigation and/or sampling activities will be recorded in the log books. The books will be bound with consecutively numbered pages. Entries in the log book will include, at a minimum, the following information:

- Name and title of author, date and time of entry, and physical/environmental conditions during field activity.
- Purpose of sampling activity.
- Location of sampling activity.
- Name and address of field contact.
- Name and title of field crew members
- Name and title of any site visitors.
- Sample media (soil, sediment, groundwater, etc.).
- Sample collection method.
- Number and volume of sample(s) taken.
- Description of sampling point(s).
- Volume of groundwater removed before sampling.
- Preservatives used.
- Date and time of collection.
- Sample identification number(s).
- Sample distribution (e.g., laboratory).
- Field observations.
- Any field measurements made, such as pH, temperature, conductivity, water level, etc.
- References for all maps and photographs of the sampling site(s).
- Information pertaining to sample documentation such as:
  - Bottle lot numbers.
  - Dates and method of sample shipments.

- Chain-of-Custody Record numbers.
- Federal Express Air Bill Number.

All original data recorded in Field Log Books, Sample Tags, and Chain-of-Custody Records will be written with waterproof ink. None of these accountable, serialized documents will be destroyed.

If an error is made on an accountable document assigned to one individual, that individual will make all corrections simply by crossing a single line through the error and entering the correct information. The erroneous information will not be erased. Any subsequent error discovered on an accountable document will be corrected by the person who made the entry. All subsequent corrections will be initialed and dated.

A.1.2 EQUIPMENT DECONTAMINATION

A.1.2.1 Drill Rig and Back Hoe Decontamination

All drilling and test pit equipment including backhoe, drilling rig, augers, bits, rods, tools, split-spoon samplers and tremie pipe will be cleaned with a high-pressure steam cleaning unit and scrubbed with a wire brush to remove dirt, grease, and oil before beginning work in the project area. Tools, drill rods, and augers will be placed on sawhorses or polyethylene plastic sheets following steam cleaning. Direct contact with the ground will be avoided. The back of the drill rig and all augers, rods, and tools will be decontaminated between each drilling location according to the above procedures. The backhoe bucket, arm, and any other part of the equipment which may have contacted excavated soil will be decontaminated between each test pit location. Tools, augers, and rods will be decontaminated between drilling monitoring wells. Decontamination water will be contained in a plastic tank which has been located on-site for this purpose.

Unless sealed in manufacturers packaging, polyvinyl chloride (PVC) monitoring well casing and screens will be decontaminated by the above procedures immediately before installation. The screen and casing shall then be wrapped in polyethylene plastic and transported from the designated decontamination area to the well location. A decontamination pad will be constructed of high density polyethylene sheeting on a prepared surface sloped to a sump. The sump must also be lined and of sufficient volume to contain at least 20 gallons of decon water. The size of the pad shall be sufficient to drive the drill rig on without tearing the sides or bottom of the plastic sheet. Sides of the pad will be bermed so that all decon water is contained. If possible, the existing pad will be used.

A.1.2.2 Sampling Equipment Decontamination

Prior to sampling, all non-dedicated bowls, spoons, augers, bailers, and filtering equipment will be washed with potable water and a detergent (such as Alconox). Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, etc. The sampling equipment will then be rinsed with potable water followed by a pesticide-grade methanol rinse and finally a deionized water rinse. When sampling for inorganic constituents in an aqueous phase, decontamination of sampling equipment will include a nitric acid rinse as a first step.

Between rinses, equipment will be placed on polyethylene sheets or aluminum foil if necessary. At no time will washed equipment be placed directly on the ground. Equipment will be wrapped in polyethylene plastic or aluminum foil for storage or transportation from the designated decontamination area to the sampling location.

A.1.3 SITE SCREENING

A.1.3.1 Metal Detector Survey

A metal detector survey may be conducted using the magnetic cable locator model MAC-51B (or equivalent), to locate unidentified underground utilities and possible buried drums or tanks. The area around each proposed subsurface investigation point may be checked with the MAC-51B (or equivalent) prior to any subsurface investigation. Initially, the locator will be tested on known locations of underground utilities to verify that it is functioning properly.

If there is no indication of buried utilities, drums, or tanks, then subsurface sampling will proceed. However, if the locator indicates the presence of a buried object, activities will not proceed in that location until the type of buried object is determined. If the object cannot be identified from surface or shallow digging, a test pit may be required to determine the identity of the buried object. If a test pit is required, the procedure and scope will be reviewed with the NMPC Project Manager prior to conducting the work.

The local site manager will be kept informed of planned site activities either by the NMPC project manager or consultant's project manager.

A.1.3.2 PAH Field Screening

PAH screening of soil samples will be performed to determine the extent of possible PAH contamination in soil at the site and to optimize the location of samples for confirmatory laboratory analysis.

The field screening will be conducted using a PAH-specific immunoassay test. The test is a simple procedure designed to test any type of soil sample for polycyclic aromatic hydrocarbons. The test uses a semi-quantitative, colorimetric method that incorporates immunoassay technology. The test is performed using tubes which are coated with a chemical that specifically binds to PAHs. To perform the test, the standards, samples and reagents are added in a step-wise manner to the coated tubes. The entire procedure takes approximately 20 minutes and results in a color change within each tube inversely proportional to the concentration of PAHs. The color in the tubes is read by inserting the tubes in a comparative photometer.

The test consists of the following three steps.

1. Sample Preparation: First, PAHs are extracted from the soil using a solvent. The extract is clarified using a disposable 0.45 micron filter tip.
2. Testing: After sample preparation, the PAH standards and the sample and the enzyme are added to the coated tubes. After 10 minutes incubation, the tubes are rinsed and color-developing reagents are added. Within a few minutes, color development occurs in the tubes.

3. Results Interpretation: The color of the sample tube is compared against the color of the standard tube using a photometer to determine if PAHs are present in the sample. The result will indicate concentrations in three ranges; less than 1 ppm, between 1 and 100 ppm, and over 100 ppm.

A.1.3.3 PCB Field Screening

The field screening may be conducted using a PCB-specific immunoassay test. The test is a simple procedure designed to test any type of soil sample for polychlorinated biphenyls. The test uses a semi-quantitative, colorimetric method that incorporates immunoassay technology. The test is performed using tubes which are coated with a chemical that specifically binds to polychlorinated biphenyls. To perform the test, the standards, samples and reagents are added in a step-wise manner to the coated tubes. The entire procedure takes approximately 20 minutes and results in a color change within each tube proportional to the concentration of PCB. The color in the tubes is read by inserting the tubes in a comparative photometer.

The test consists of the following three steps.

1. Sample Preparation: First, PCBs are extracted from the soil using a solvent. The extract is clarified using a disposable .45 micron filter tip.
2. Testing: After sample preparation, the PCB standards and the sample are added to the coated tubes using dropper bottles. After 10 minutes incubation, the tubes are rinsed and color developing reagents are added. Within a few minutes, color development occurs in the tubes.
3. Results Interpretation: The color of the sample tube is compared against the color of the standard tube using a photometer to determine the concentration of the sample. The result will indicate concentrations in 3 ranges; less than 5 ppm, between 5 and 50 ppm, and over 50 ppm. Also, with a dilution samples can be tested for over 500 ppm.

A.1.4 SUBSURFACE SOIL - SPLIT-SPOON SAMPLING METHOD

The Standard Penetration Test (ASTM D-1586-84) and hollow-stem augers or flush-joint casing will be used during most drilling to collect split-spoon samples from the unconsolidated sediments beneath the site. Soil retrieved from the borehole will be visually classified for texture and screened for the evolution of organic vapors with a PID. Samples will be chosen for laboratory analysis based on PAH field screening results (immunoassay method) and/or visual inspection.

Split-spoons will be decontaminated as specified in Section A.1.2.2 after each sample is collected. Sample descriptions, Photovac readings, and location will be recorded in the field book.

A.1.5 DRILLING, MONITORING WELL INSTALLATION AND DEVELOPMENT

A.1.5.1 Scope of Work

Soil borings and monitoring wells will be installed as identified in Section 3 of the Work Plan. After completion of drilling and well installation, all wells will be developed to prepare them for groundwater sampling. The following procedures will be used to drill, install, and develop the three monitoring wells.

A.1.5.2 Drilling and Geological Logging Methods

- Boreholes will usually be drilled with hollow stem augers or flush-joint casing. Alternative methods may be used at the geologist's discretion with the authorization of NMPC and NYSDEC.
- After collecting each split-spoon sample, the borehole will be drilled at least to a depth equal to the top of the next sampling interval, unless the geologist authorizes otherwise.
- Split-spoon sampling will be conducted in accordance with ASTM Specification D-1586-84 for standard penetration test and split barrel sampling, unless otherwise authorized by the field geologist.
- The designated field geologist will log borehole geology and monitoring well specifications in the field book and field forms.
- Soil cuttings will be placed in a roll-off for subsequent sampling. Decontamination water will be placed in plastic tanks for subsequent sampling.

Results from the drilling efforts will be recorded on the drilling record and well installation checklist forms shown on Figures A.1.1 and A.1.2. Figure A.1.1 presents an example of a completed drilling record form.

A.1.5.3 Monitoring Well Specifications

Figure A.1.3 shows details of a typical monitoring well construction for shallow wells installed in unconsolidated sediments. Monitoring wells will be installed according to the following specifications:

- PVC two-inch diameter threaded, flush-joint casing and screens will be installed.
- Wells will be screened in the unconsolidated deposits. Screens will usually be ten feet long, and slot openings will be 0.010 inch. Alternatives may be used at the discretion of the field geologist, based on site conditions.
- A sump, two feet in length, may be attached to the bottom of the screen to collect dense nonaqueous phase liquids (DNAPLs), if they exist.
- The top of the casing will extend to approximately two feet above ground surface where possible, given site-specific considerations. Otherwise, flush-mount casings will be used.

Figure A.1.1

ENGINEERING–SCIENCE DRILLING RECORD

BORING GW–1

Contractor: XYZ Boring Company
Driller: J. Driller
Inspector: N.A. Smith
Rig Type: Mobile B–57 4.25" HSA

PROJECT NAME: NMPC Queensbury
PROJECT NUMBER: SY290.01
Sheet 1 of 1
Location: Northeast corner of property

Weather: Partly cloudy, 70s
Date/Time Start: June 13, 1992 / 10:00
Date/Time Finish: June 13, 1992 / 15:00

Plot Plan: Adjacent Property; Corneth Road; Well GW–1; Former Camp; HUDSON RIVER; ↑ N

GROUNDWATER OBSERVATIONS

Water Level	7.94			
Date	6/13/92			
Time	9:08			
Meas. From	Top of SS	Top of SS		

Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	COMMENTS
Headspace		0		SS			
0.0	•		37.5	1 for			Locking Steel Curb Box
	•	1		12"	TILL–medium sand and gravel, boulders (wet)		Locking Gripper Cap
	•			9			Sand
	•	2		9			Cement Grout
0.0	•		50	6	TILL–sand and gravel, some boulders (dry)		(0–2')
	•	3		5			Bentonite Pellets
	•			8			(2–4')
	•	4		9			
0.0	•		62.5	6			2" ID Stainless
	•	5		6	SAND–brown, fine, some silt and (dry)		Steel Riser (0.5 – 6')
	•			10	coarse gravel		
	•	6		15			
			0	17			3Q Sand Pack
		7		31			(4–16')
				27			
		8		22			0.010" Slot Prepacked
0.0	•		100	33	SAND & GRAVEL –brown, medium to very coarse (moist)		Stainless Steel Screen
	•	9		15			(6–16')
	•			14			
	•	10		17			
0.0	•		62.5	3	no odor (wet)		
	•	11		3			
	•			6			
	•	12		4			
			0	4			
		13		6			
				5			
		14		6			
0.0	•		62.5	4	SAND & GRAVEL –brown, fine to medium (wet)		
	•	15		6			
	•			4			
	•	16		4	CLAY–brown, some silt (wet)		Stainless Steel
0.0	•		50	14	gray (moist–wet)		End Cap
	•	17		4			
	•			3			
	•	18		5			

Augering terminated at 16 feet. Sampling terminated at 18 feet.
• Sample I.D.: XXXXXXX. Analysis for VOA, BNA, PCBs.
Environmental samples composited from 8 to 16 feet. MS/MSD samples composited from 0 to 18 feet.

STANDARD PENETRATION TEST
SS = SPLIT SPOON
A = AUGER CUTTINGS
C = CORED

SUMMARY: Till 0–4.5'; Sand & Gravel 4.5–15.5'; Clay 15.5–18'

WELL INSTALLATION CHECKLIST

Site Name:_____ Date:_____
Job Number:_____ By:_____
Boring Number:_____

Depth of Hole:_____ Comments

Diameter of Hole:_____

All Materials Inspected Prior to Installation?

Yes____ No____

Screen
Material:_____
Slot Size:_____
Length:_____
Threaded: Yes____ No____

Riser Pipe
Material:_____
Total Length of Well - Screen Length =_____
Threaded: Yes____ No____

End Cap
Material:
Threaded: Yes____ No____

All Joints Teflon Taped? Yes____ No____

Total Length Of Well Casing (Includes screen and stick-up)

Sand Pack
Type/Size:_____
Amount (Calcuated):_____
Amount (Actual):_____
Installed with Tremie: Yes____ No____

Bentonite Seal(s):
Type/Size:_____
Amount (Calcuated):_____
Amount (Actual):_____
Installed with Tremie: Yes____ No____
Secondary Seal(s) Used: Yes____ No____

Explain:_____
_____
_____

Bentonite allowed to swell at least 30 minutes? Yes____ No____

WELL INSTALLATION CHECKLIST (cont'd)

Grout/Cement
- Mixture (#Cement/#Bentonite):_____
- Mixture (Gal. water/#dry mix):_____
- Amount (Calculated)_____
- Amount (Actual)_____
- Installed with TREMIE: Yes____ No____

Locking Protectve Casing Installed? Yes_____ No_____
- Locked immediately after installation: Yes_____ No_____
- Grout sloped at surface to allow run-off: Yes_____ No_____
- Drain hole drilled prior to development: Yes_____ No_____
- Stick-up:

Any Foreign Objects Lost in the Well: Yes_____ No_____
- **If Yes:**
- (1) What was lost
- (2) Depth
- (3) Stage of well installation
- (4) Was object retrieved: Yes_____ No_____
- (All or part/how)

_____

_____

Well Capped: Yes____ No____

Well Identified: Yes____ No____

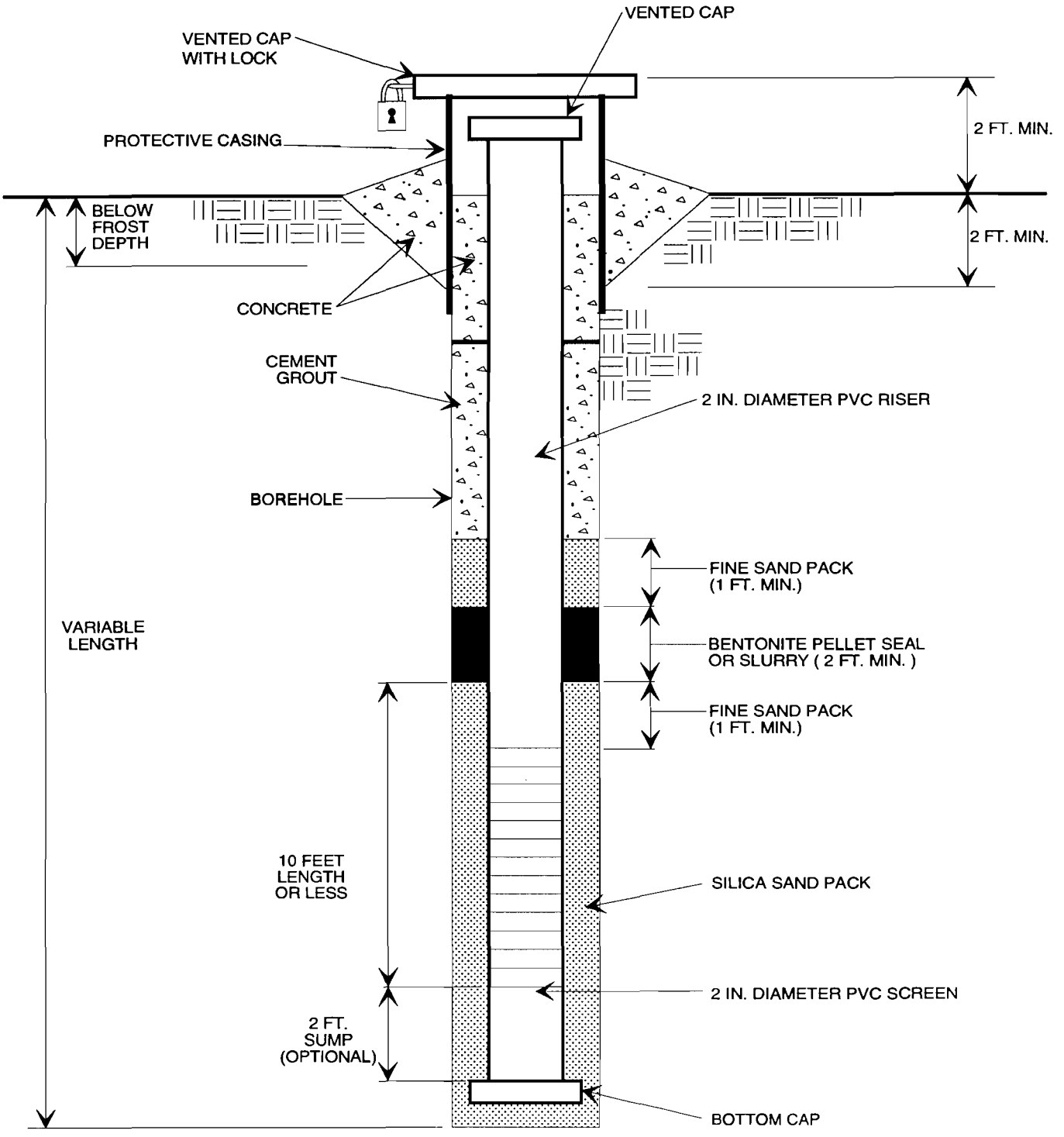
Disposal of Cuttings
- Left in Pile:_____
- Spread out:_____(Hnu reading:___ppm)
- Containerized:_____
- Other:_____

Disposal of Fluids:
- Run off on ground surface:_____
- Containerized:_____
- Other:_____

_____
Engineering-Science

_____
Date

TYPICAL MONITORING WELL CONSTRUCTION



NOT TO SCALE

- The annulus around the screens will be backfilled with an appropriate size of silica sand such as Morie #1 sand to a minimum height of two feet above the top of the screen.
- A bentonite pellet seal or slurry (30 gallons water to 25-30 pounds bentonite, or relative proportions) will be placed above the sand pack. The pellet seal will be allowed to hydrate before placement of grout above the seal.
- A fine sand pack approximately one foot thick will be placed above and below the bentonite seal to isolate it and to prevent mixing of components.
- The remainder of the annular space will be filled with a cement grout to just below the frost line. The grout will be pumped from the bottom up. The grout will be mixed in the following relative proportions: 30 gallons of water to three 94-pound bags of cement to 25 pounds granular bentonite. The grout will be allowed to set for a minimum of 48 hours before wells are developed. Concrete will be used to secure the protective casing in place.
- Each monitoring well will have a vented cap and a four-inch diameter, steel casing with a hinged, locking cap placed over the monitoring well. The protective casing will extend at least two feet below ground surface and be placed in concrete. In some areas, it may be necessary to provide flush mounted casings.
- The concrete seal or pad will be sloped to channel water away from the well, and be deep enough to remain stable during freezing and thawing of the ground.
- A weep hole will be drilled at the base of the protective standpipe casing to allow any water between the inner and outer casing to drain.
- The top of the PVC well casing and outer protective casing will be marked and surveyed to 0.01 foot, and elevations will be determined relative to a fixed benchmark or datum.
- The measuring point on all wells will be on the innermost PVC casing.

Characteristics of each newly installed well will be recorded on the well installation checklist (Figure A.1.2).

A.1.5.4 Monitoring Well Development

After a minimum of 48 hours after completion, the monitoring wells will be developed by surging, bailing, using a centrifugal pump and dedicated polyethylene tubing or by Waterra positive displacement pumps and dedicated polyethylene tubing, or other methods at the discretion of the field geologist. Development water will initially be monitored for organic vapors with a PID. The development water will be contained in the tank on-site. The wells will be developed until the water in the well is reasonably free of visible sediment. If elevated turbidity levels persist, a peristaltic pump or other device will be used to remove water at very low flow rates until the discharge is reasonably sediment-free. Following development, wells will be allowed to recover for at least one week before groundwater is purged and sampled. All monitoring well development will be overseen by a field geologist and recorded in the field book.

A.1.5.5 Boring and Well Abandonment

All borings not used for monitoring wells will be fully sealed with bentonite slurry or bentonite grout in the relative proportion previously referenced to preclude the formation of a conduit for contamination migration from surface infiltration.

If necessary, wells will be abandoned in the following manner:

1) Remove the protective casing and pad.
2) Overdrill the well casing using hollow-stem augers or casing to at least one foot below the depth of the well as indicated on the boring log.
3) Remove the well casing from the hole. If the casing cannot be removed while the augers are in place, cut off the casing at least two feet, and if possible five feet, below ground surface.
4) Add cement/bentonite grout via tremie from the bottom of the augers as the augers are withdrawn. If the well casing cannot be overdrilled and removed, the well casing will be filled with grout, from the bottom up. The grout mixture will be as specified for the well installation.
5) Add grout to the point where the casing was cut off. From that point up to ground surface, backfill with the native material surrounding the boring.

A.1.6 GROUNDWATER SAMPLING

The following is a step-by-step sampling procedure to be used to collect groundwater samples from the monitoring wells. Well sampling procedures will be recorded on the form shown in Figure A.1.4.

- Prior to sampling, measure the static water level from the surveyed well elevation mark on the top of the PVC casing with an electric probe. Record measurement to nearest 0.01 foot and record in the field book.
- Decontaminate the probe.
- A round of groundwater elevations will be collected prior to start of sample collection. The measurement will be made from the top of the PVC casing with an electric probe. The measurements will be made in as short a time frame as pratical to minimize temporal fluctuations in hydraulic conditions.
- Place a plastic sheet on the ground to prevent contamination of the bailer rope.
- Purge the well by removing water until pH temperature and specific conductivity stabilize. At least one volume of saturated sand pack will be removed. Purging will be conducted with a teflon, stainless steel or disposable polyethylene bailer, or a centrifugal pump and dedicated polyethylene tubing, or other methods at the discretion of the field geologist and with the approval of NMPC and NYSDEC.

  If the well goes dry before the required volumes are removed, the well may be sampled when it recovers sufficiently.

WELL SAMPLING RECORD

Site Name_____ Well_____ Date_____

Samplers:_____ of_____

_____ of_____

Intial Static Water Level (from top of well protective casing)_____

Evacuation:

Using: Submersible_____ Centrifugal _____ 2" Casing:__ft. of water x .16 =_____gals
Airlift _____ Positive Displacement_____ 3" Casing:__ft. of water x .36 =_____gals
Bailed _____ _____Times 4" Casing:__ft. of water x .65 =_____gals

Depth to intake from top of protective well casing _____

Volume of water removed_____Gals. (> 3 Well Volumes)

Sampling: Time_____ _____a.m.
_____p.m.

Bailer Type: Stainless Steel _____
Teflon _____
From Pos. Dis. Discharge Tube _____
Other_____ _____

	No. of Bottles Filled	I.D. No.	Analyses
Trip Blank	_____	_____	_____
Field Blank - Wash / Atmospheric (cirle one)	_____	_____	_____
Groundwater Sample	_____	_____	_____

Physical Appearance and Odor_____

_____

_____

Refrigerate: Date: _____ Time_____

Field Tests:

Temperature (C/F) _____ _____
pH _____ _____
Spec. Conduc (umhos/cm) _____ _____

Weather_____

_____

Comments_____

_____

_____

- Collect samples with a teflon, stainless steel or dedicated polyethylene bailer lowered by a dedicated polypropylene line or other methods as indicated. Measure temperature, pH and conductivity, and record results in the field book.
- Fill sample containers for VOCs first. Sample containers for SVOCs and other analytes are then filled.
- After all samples are collected, dispose of polypropylene line and bailer, or other dedicated equipment.

A.1.7 SURFACE WATER SAMPLING

Surface water samples will be collected as described in the Work Plan. A stainless steel cup may be used to collect the water for these samples or the sample bottles may be directly dipped into the water. The stainless steel cup will be decontaminated following the procedures outlined in Section A.1.2.2. Surface water samples will be collected downstream first, upstream last. Field data will be recorded on the surface sampling record (Figure A.1.5). Samples will be collected prior to sediment sampling.

A.1.8 SURFACE SOIL/SEDIMENT SAMPLING

Surface soil samples will be collected as described in the Work Plan. Samples will be collected with decontaminated stainless steel equipment.

The sediment samples will be collected after the surface water samples with a Wildco core sampler, clam shell, lexane tubes or split spoons and manually segregated with depth. Where possible, rocks and vegetative material will be discarded, and care will be taken to retain fine materials which tend to disperse when disturbed. Sampling personnel will stand downstream of the sampling point to minimize disturbance of the bottom during collection. Equipment will be decontaminated between samples following procedures outlined in Section A.1.2.2. Field data will be recorded on the field sampling records.

A.1.9 AIR MONITORING

Air monitoring will be conducted with a Photovac Tip-II photoionization detector (PID) or equivalent during all drilling and sampling activities. The PID will be used to monitor for organic vapors in the breathing zone and borehole, and to screen samples for analysis.

The PID readings will be recorded in the field book and on the boring log during drilling activities. The PID is calibrated at least once each day, and more frequently if needed, with 100 ppm isobutylene calibration gas. The detailed procedure for the PID operation and calibration is included in the Site Health and Safety Plan.

A.1.10 FIELD INSTRUMENTS

All field analytical equipment will be calibrated immediately prior to each day's use and more frequently if required. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is

SURFACE SAMPLING RECORD

Site Name:_____ Date:_____

Samplers: _____of_____

_____of_____

SAMPLING: Time_____A.M.

_____P.M.

Sample Type:_____

Sampling Method:_____

Depth of Sample:_____

Description of Sampling Point

Drainage Direction:_____

Upstream From:_____

Physical Appearance/Odor:_____

_____

Wildlife Observed:_____

Sampling Description:

Suspended Matter:_____

Color/Stain:_____

Odor:_____

Other:_____

Texture:_____

Analyze For:_____

Refrigerated: Date:_____ Time_____A.M.

_____P.M.

Field Tests:

Temperature: (C/F) _____ Weather_____

pH _____ _____

Conductivity _____ _____

Comments_____

_____

functioning within the allowable tolerances established by the manufacturer and required by the project. Records of all instrument calibration will be maintained by the Field Team Leader and will be subject to audit by the Project Quality Assurance Manager (PQAM). Copies of all of the instrument manuals will be maintained on-site by the Field Team Leader.

A.1.10.1 Portable Photoionization Analyzer

The photoionization analyzer will be a Photovac (or equivalent), equipped with a 10.6 eV lamp. The Photovac is capable of ionizing and detecting compounds with an ionization potential of less than 10.6 eV. This accounts for up to 73% of the volatile organic compounds on the Target Compound List. Calibration will be performed at the beginning and end of each day of use with a standard calibration gas having an approximate concentration of 100 parts per million of isobutylene. If the unit experiences abnormal perturbation or erratic readings, additional calibration will be required. All calibration data will be recorded in field notebooks and on calibration log sheets to be maintained on-site.

A battery check will be completed at the beginning and end of each working day. If erratic readings are experienced, the battery will be checked for proper voltage. This information will also be recorded in field notebooks and on the calibration log sheets.

A.1.10.2 pH Meter

Calibration of the pH meter will be performed at the start of each day of use, and after very high or low readings as required by this plan. National Institute of Standards and Technology - traceable standard buffer solutions which bracket the expected pH range will be used. The standards will most likely be pH of 7.0 and 10.0 standard units. The use of the pH calibration and slope knobs will be used to set the meter to display the value of the standard being checked. The calibration data will be recorded on calibration sheets maintained on-site.

A.1.10.3 Specific Conductivity Meter

Calibration checks using the conductivity standard will be performed at the start of each day of use, after five to ten readings or after very high or low readings as required by this plan. The portable conductivity meter will be calibrated using a reference solution of 0.01 KCl (specific conductance, 1413 umhos/cm at 25 C) on a daily basis. Readings must be within five percent to be acceptable. The thermometer of the meter will be calibrated against the field laboratory thermometer on a weekly basis.

A.1.10.4 In Situ Permeability Testing

In-situ permeability testing will be performed on selected monitoring wells to obtain estimates of groundwater velocities and potential groundwater recovery rates for the aquifer in the vicinity of each well. The objective of the hydrologic testing is to characterize the hydraulic properties of the aquifer in the vicinity of the site.

Slug tests will be conducted in selected monitoring wells utilizing the rising and/or falling head slug test techniques. The slug tests will be performed by subjecting water bearing units in the screened interval of monitoring wells to a stress caused by the

sudden injection or withdrawal of a stainless steel or PVC slug. Falling head tests shall not be used in those wells whose screen straddles the water table.

The tests will be conducted using slugs generally consisting of 4- or 10-foot lengths of 1-inch PVC or stainless steel. Slugs and any other down-hole equipment will be decontaminated before and after each test by methods described herein.

Prior to conducting each slug test, the static water level in the well will be measured to the nearest hundredth of a foot. Water levels will be measured during the test with an electric sounder (water level indicator) graduated to the nearest hundredth of a foot, and also with pressure transducers attached to a digital data logger, thereby providing water level measurements by two independent devices.

A weighted slug will be inserted gently into the well below the water table. The water level will be measured until the water level returns to the pre-insertion level. The slug will be suddenly withdrawn from the well and the water level recovery will be monitored at appropriate intervals until recovery is complete.

Wells which were bailed dry during development (or redevelopment of existing wells) may not be able to provide meaningful data through slug tests. Tests will be terminated in wells which do not recover significantly within 30 minutes to one hour. These wells will be bailed dry, and their recovery measured with an electronic water level indicator while slug tests are conducted in other wells.

The slug test data will be analyzed using either the Cooper, Bredehoeft, and Papadopulos (1967) type curve method or the Bouwer and Rice (1976, 1989) method. The Cooper et al. analysis assumes that the well penetrates a confined aquifer, and the Bouwer and Rice method applies where unconfined conditions are prevalent.

APPENDIX A.2

QUALITY ASSURANCE PROJECT PLAN

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APPENDIX A.2 QUALITY ASSURANCE PROJECT PLAN

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QUALITY ASSURANCE PROJECT PLAN
Prepared by
Engineering-Science
290 Elwood Davis Road, Liverpool, NY 13088

Quality Assurance Project Plan
Effective Date: April 1995
Revision No.: 1

ONEIDA (SCONONDOA STREET) RI/FS

CITY OF ONEIDA

MADISON COUNTY, NEW YORK

CLIENT: NIAGARA MOHAWK POWER CORPORATION

LOCATION: SYRACUSE, NEW YORK

Approved by:
(Project Manager) _____ (Signature) 4/17/95 (Date)

Approved by:
(Project Quality Assurance Manager) _____ (Signature) 4/20/95 (Date)

A.2.2 PROJECT ORGANIZATION

The organization of the project team is described in Section 4 of the Work Plan. The Project Quality Assurance Manager (PQAM) will be responsible for review of data upon receipt from the analytical laboratory. The PQAM will assure that data validation screening is performed by trained and experienced data validators using the applicable criteria specified in the NYSDEC Analytical Services Protocol (ASP) dated December 1991. For the purposes of this document, all references to ASP indicate the NYSDEC Analytical Services Protocol dated December 1991. The specific requirements for data validation screening are given in Section A.2.8.3. The PQAM will be responsible for ensuring that all analytical data are in conformance with requirements of this QAPP.

Name, Title	Address/Phone
Mr. Steven Stucker Niagara Mohawk Power Corp. Project Manager	300 Erie Blvd. Syracuse, NY 13202 (315) 428-5652
Mr. John Spellman NYSDEC Project Manager	Hazardous Waste Remed. Div. of Cons. Services 50 Wolf Road Albany, NY 13202 (518) 457-9285

A.2.3 QA/QC OBJECTIVES FOR MEASUREMENT OF DATA

The overall quality assurance (QA) objective for the Oneida (Sconondoa Street) RI/FS is to develop and implement procedures which will provide data of known, documented quality, and which will be legally defensible, should that need arise. Field and laboratory quality assurance/quality control (QA/QC) requirements defined in the NYSDEC ASP and other applicable guidelines ensure acceptable levels of data quality are maintained throughout the sampling and analysis program. The QA/QC objectives for all measurement data include precision, accuracy, representativeness, completeness, and comparability. The data reduction, validation, and reporting scheme is presented in Figure A.2.1. The quality assurance samples to be collected (frequency of collection) are specified in the Work Plan.

A.2.3.1 Precision

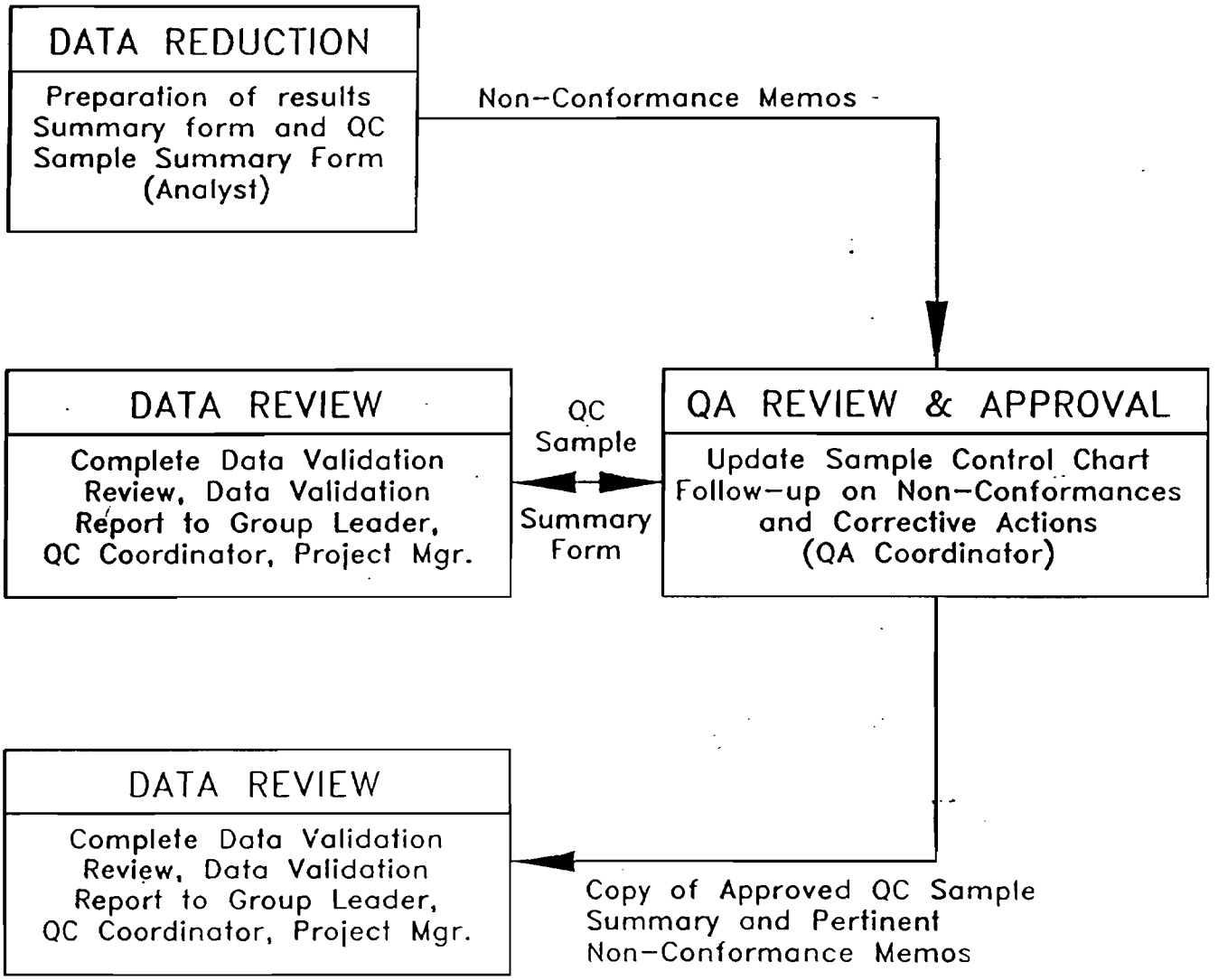
Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), and relative range are common. For this project, precision will be evaluated by recording duplicate measurements of the same parameter on similar sample aliquots under the same conditions and calculating the relative percent difference (RPD) between the values. The formula for calculating RPD is presented in Section A.2.12.2.

If the analyte is present at a concentration below the detection limit, then RPD cannot be calculated. Instead, the analysis results of the two spiked laboratory samples will be used to calculate the RPD.

Measurement data for this project will include field data as well as laboratory analytical data. The field measurement data include pH, conductivity, temperature, organic vapor readings, and water level measurements. The objective for precision of field data collection methods is to take replicate (minimum of two for every 20 samples) measurements for field parameters to determine the reproducibility of the measurements.

For the pH meter, precision will be tested by multiple readings in the medium of concern. Consecutive readings should agree within $\pm$ 0.1 pH units after the instrument has been field calibrated with standard buffers before each use. The thermometer will be visually inspected prior to each use to ensure its condition is satisfactory. Consecutive measurements of a given sample should agree to within $\pm$ 1 degree Celsius. The organic vapors will be measured using a Photovac Microtip (or equivalent) photoionization detector (PID). Daily background and upwind readings of drilling and sampling activities will be measured prior to commencing work and at periodic intervals throughout each day's activities. The natural variation/fluctuation in measurements at background or upwind locations will be used for baseline background values, and the variability will be noted. Water level indicator readings will be precise within $\pm$ 0.01 feet for duplicate measurements or additional water level measurements will be taken to determine whether the difference is due to operator or instrument error.

DATA REDUCTION, VALIDATION & REPORTING SCHEME



A.2.3.2 Accuracy

Accuracy is a measure of the difference between a measured value and the "true" or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material and is expressed as the percent of the known quantity which is recovered, or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes which are close to the detection limits are less accurate because they are affected by such factors as instrument "noise". Higher concentrations will not be as affected by instrument or other variables and thus will be more accurate.

The accuracy of laboratory-measured data will be evaluated by determining the percent recovery of both matrix and blank spike samples as described in Section A.2.12.1. For the measurement of organics by gas chromatography (GC) or GC/mass spectroscopy (MS), the recovery of a surrogate spiked into each sample, blank, and standard will also be used to assess accuracy.

The objective for accuracy of field measurements is to achieve and maintain factory equipment specifications for the field equipment. Field measurements cannot be assessed for accuracy by spiking the medium with the analytical parameter and measuring the increase in response; therefore, these instruments can only be assessed for accuracy by the response to a known sample (such as a calibration standard) used to standardize them. The pH meter and conductivity meters are calibrated with solutions traceable to the National Institute of Standards and Technology (NIST, formerly the National Bureau of Standards).

All volatile organic detectors (such as the PID) will be calibrated prior to use in the field and also calibrated daily during use in the field.

A.2.3.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program. Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, and analysis. Decontamination of sampling devices and digging equipment will be performed between samples as outlined in Appendix A.1. Laboratory sample containers will be thoroughly cleaned in accordance with procedures outlined in Section A.2.4.2. Analysis of field blanks, trip blanks, and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated

through the analysis of field duplicate samples, coded to ensure the samples are treated and analyzed as separate samples. The analytical laboratory will make every reasonable effort to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received. Many means of homogenization expose the sample to significant risk of contamination or loss through volatilization, and these should be avoided if possible.

Chain-of-custody procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank/duplicate and chain-of-custody procedures are presented in Sections A.2.4.3 and A.2.5.1.

A.2.3.4 Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested. See Section A.2.12.3 for calculation of completeness.

A.2.3.5 Comparability

Comparability expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Ensuring traceability of all analytical standards and/or source materials to USEPA or NIST;
- Verifying all calibrations with an independently prepared standard from a source other than that used for calibration;
- Using standard reporting units and reporting formats including the reporting of QC data;
- The validation of all analytical results, including the use of data qualifiers in all cases where appropriate; and
- The requirement that all validated flags be used any time an analytical result is used for any purpose whatsoever.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

A.2.4 SAMPLING PROCEDURES

A.2.4.1 Sampling Program

One objective of the sampling program is to provide current data concerning the nature and extent of contamination of groundwater, surface water, soils, and sediment. Sampling and analysis will include:

- groundwater samples
- surface water samples

- sediment samples
- surface and subsurface soil samples

Details of the sampling program are presented in the Work Plan.

A.2.4.2 Sampling Procedures And Handling

Sample Container Preparation

Sample containers will be properly washed and decontaminated by the factory or laboratory prior to use. All preservatives will be added to containers prior to sample shipment. The types of containers and preservation techniques are shown in Table A.2.1. Records of the sources of bottles and preservatives will be kept by the analytical laboratory.

Methods of Sampling

As a minimum, sampling procedure standards will be in accordance with the most recent NYSDEC and USEPA guidelines and/or regulations. Appropriate and acceptable procedural techniques based on sample type and location will be utilized when such guidelines and/or regulations are non-existent.

Referenced sampling standards are listed below. All standards will be the latest in effect at the time of writing.

- USEPA - 600-4-79-020, "Methods for Chemical Analysis of Water and Wastes"
- National Water Well Association - "Manual of Ground-water Sampling Procedures"
- USEPA - 600-4-83-040, "Characterization of Hazardous Waste Sites - a Methods Manual: Volume II. Available Sampling Methods"
- USEPA - OSWER - 9950.1 "RCRA Ground-water Monitoring Technical Enforcement Guidance Document"

All sampling methods are explained in detail in the Field Sampling Plan, Appendix A.1.

A.2.4.3 Quality Assurance Samples

Field Quality Control Samples

To assess field sampling and decontamination performance, two types of "blanks" will be collected and submitted to the laboratory for analyses. The blanks will include:

Trip Blanks - A Trip Blank will be prepared before the aqueous sample containers are sent by the laboratory. The trip blank will consist a 40-ml VOA vial containing distilled, deionized water which accompanies the other sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of water samples for which analysis for TCL volatiles or BTEX is planned. The Trip Blank will be analyzed for TCL volatile organic compounds or BTEX to access any contamination from sampling and transport, and internal laboratory procedures.

TABLE A.2.1
SAMPLE CONTAINERIZATION

Analysis	Bottle Type	Preservation[1]	Holding Time[2]
Aqueous Samples			
Volatile Organics (BTEX)	40 ml glass vial	Cool to 4°C	7 days
PCBs/Pesticides	1000 ml amber glass	Cool to 4°C	5 days*
Semivolatile Organics (PAHs)	1000 ml amber glass	Cool to 4°C	5 days*
Metals	1000 ml amber glass	HNO_3 to pH <2	6 months (mercury 26 days)
Cyanide	1000 ml amber glass	NaOH to pH >12	12 days
Soil & Sediment Samples			
Volatile Organics (BTEX)	Wide-mouth glass w/ teflon cap	Cool to 4°C	7 days
Semivolatile Organics (PAHs)	Wide-mouth glass w/ teflon cap	Cool to 4°C	5 days*
Pesticide/PCBs	Wide-mouth glass w/ teflon cap	Cool to 4°C	5 days*
Metals, Cyanide	Wide mouth glass w/ teflon cap	Cool to 4°C	Metals - 6 months Mercury - 26 days Cyanide - 12 days

[1] All samples to be preserved in ice at 4°C during collection and transport.

[2] Days from validated time of sample receipt (VTSR) by the laboratory. Samples will be shipped from the field daily via overnight courier.

* Extraction of water samples for pesticides/PCB analysis by separating funnel must be completed within five days of VTSR. Continuous liquid-liquid extraction is the required extraction for water samples for semivolatiles. Continuous liquid-liquid extraction of water samples, or sonication or soxhlet procedures for semivolatile and pesticides/PCB analyses, shall be started within five days. If a re-extraction and reanalysis must be performed, the extraction must start within 10 days and completed within 12 days of VTSR. Extracts of either water or soil/sediment samples must be analyzed within 40 days after the extraction.

Wash Blanks - Wash Blanks will be taken at a minimum frequency of one per 20 field samples per sample matrix or as specified in the Work Plan. Wash blanks are used to determine the effectiveness of the decontamination procedures for sampling equipment. It is a sample of deionized, distilled water provided by the laboratory which has passed through a decontaminated bailer or other sampling apparatus. It is usually collected as a last step in the decontamination procedure, prior to taking an environmental sample. The field blank will be analyzed for the same parameters as the field samples.

In addition, the precision of field sampling procedures will be assessed by collecting coded field duplicates and matrix spike/matrix spike duplicates.

The duplicates will consist of:

Coded Field Duplicate - To determine the reproducibility and homogeneity of samples, coded field duplicates will be collected. The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are a duplicate sample. This will eliminate any possible bias that could arise. The frequency of collection of these samples is one per 20 field samples or as specified in the Work Plan. The criteria for assessing coded field duplicates is given in Section A.2.8.

Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate (MS/MSD/MD) - MS/MSD/MD samples (MSD for organics; MD for inorganics) will be taken at a frequency of one pair per 20 field samples per seven day sample delivery group (SDG). The reproducibility and homogeneity of the samples can be assessed by determining the RPD for both spike and non-spike compounds as described in Section A.2.8. The MS, MSD, and MD samples should be site-specific, unless otherwise authorized by the ES Project Manager.

A.2.5 SAMPLE TRACKING AND CUSTODY

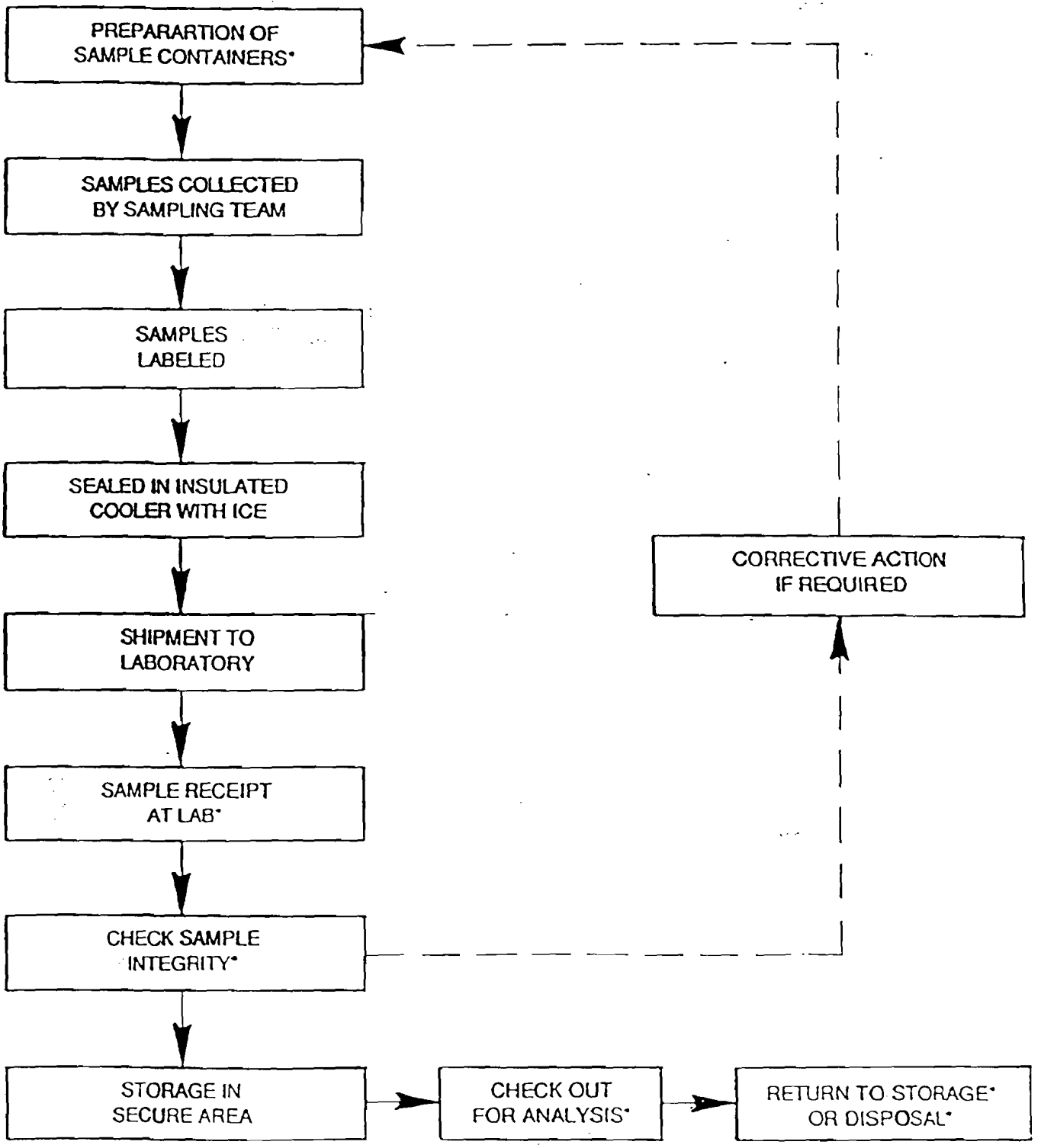
Sample chain-of-custody (COC) is initiated by the laboratory with selection and preparation of the sample containers. To reduce the chance for error, the number of personnel handling the samples is minimized.

In situ or on-site monitoring data will be controlled and entered in permanent log books. Personnel involved in the COC and transfer of samples will have been trained on the purpose and procedures prior to implementation.

Evidence of sample traceability and integrity is provided by COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. The sample custody flowchart is shown in Figure A.2.2. A sample is considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented;
- Locked and tagged with custody seals so that no one can tamper with it after having been in physical custody; or
- In a secured area which is restricted to authorized personnel.

SAMPLE CUSTODY



* Requires sign-off on Chain of Custody Form.

A.2.5.1 Field Sample Custody

A COC record accompanies the sample from time of collection to receipt by the analytical laboratory. If samples are split and sent to different laboratories, COC records will be sent with each sample. Figure A.2.3 is a typical example of a chain-of-custody record. The "remarks" column is used to record specific considerations associated with sample acquisition such as: sample type, container type, sample preservation methods, and analyses to be performed. Two copies of this record accompany the samples to the laboratory. The laboratory maintains one file copy, and the completed original is returned to the Consultant's Project Manager.

Individual sample containers, provided by the laboratory, are used for shipping samples. The shipping containers are insulated, and water ice is used to maintain samples at approximately four degrees Celsius until samples are returned and in the custody of the laboratory. All sample bottles within each shipping container are individually labeled and controlled.

Each sample shipping container is assigned a unique identification number by the laboratory, and is marked with indelible ink on the outside of the shipping container. This number is recorded on the COC record. The field sampler will indicate each individual sample designation/location number in the space provided on the appropriate COC form for each sample collected. The shipping container is closed, and a seal provided by the laboratory is affixed to the latch. This seal must be broken to open the container, and this indicates possible tampering if the seal is broken before receipt at the laboratory. The laboratory will contact the field team leader or Project Manager, and the sample will not be analyzed if tampering is apparent.

A.2.5.2 Laboratory Sample Custody

The site investigation team leader notifies the laboratory of upcoming field sampling activities and the subsequent transfer of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The laboratory sample program meets the following criteria:

- The laboratory has designated a sample custodian who is responsible for maintaining custody of the samples and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check the original chain-of-custody documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian signs the COC record and records the date and time received.
- Care is exercised to annotate any labeling or descriptive errors. In the event of any discrepancy in documentation, the laboratory will immediately contact the Project Manager as part of the corrective action process. A qualitative assessment of each sample container is performed to note any anomalies, such as broken or leaking bottles. This assessment is recorded as part of the incoming COC procedure.

CHAIN OF CUSTODY RECORD

No. 0560

CLIENT:	PROJECT NO.	PROJECT MGR:	TYPES OF ANALYSES REQUESTED	Send results to:
PROJECT NAME:	NOTES - (Reference QAPP and/or analytical protocols to be used):			ENGINEERING-SCIENCE, INC. 290 Elwood Davis Road Liverpool, NY 13088 Telephone: (315) 451-9560 Fax: (315) 451-9570
SAMPLERS:				Lab Submitted to:

FIELD SAMPLE ID: TYPE / NUMBER / DEPTH CODES / QC IDENTIFIERS	Location Description	Date	Time	GRAB	COMP	NO OF Bottles	Matrix / Preservative / Remarks
XX 0001 001-002							

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	SHIPPED VIA: AIRBILL NO:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	SHIPPED VIA: AIRBILL NO:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	SHIPPED VIA: AIRBILL NO:

TYPE CODES:

SOLID
- SD - Sediment
- SS - Surface Soil
- SB - Subsurface Soil
- MW - Monitoring Well Boring
- TP - Test Pit/Tank Pit
- DR - Drum Waste
- WA - Solid Waste
- OS - Other Solid (eg. wipe samples, asbestos, etc.)

WATER
- MW - Monitoring Well
- LC - Leachate
- SW - Surface Water
- DW - Drill Water
- FD - Fuel Dispenser
- MH - Manhole
- OW - Oil Water Separator
- PR - Piping Run
- ST - Storm Water
- WW - Waste Water
- OL - Other Liquid (eg. Drum liquid)

QUALITY CONTROL
- FB - Field Blank (number each)
- TB - Trip Blank (number each)
- WB - Wash Blank (number each)

Figure A.2.3

- The samples are stored in a secured area at a temperature of approximately four degrees Celsius until analyses are to commence.
- A laboratory tracking record accompanies the sample or sample fraction through final analysis for control.
- A copy of the tracking form will accompany the laboratory report and will become a permanent part of the project records.

A.2.5.3 Sample Tracking System

A sample tracking system will be implemented to monitor the status of sampling events and laboratory analysis of samples. Sample numbers, types, analytical parameters, sampling dates, and sample delivery group (SDG) designations for samples, and required due dates for receipt of analytical results are entered into the system. The Consultant Project Manager will use the tracking system to monitor the project sampling schedules and the status of analytical reports, and to implement any penalty clauses for late delivery per standard laboratory subcontracts when necessary.

A description of the sample tracking system follows:

1. An employee will be assigned as the Data Tracker (DT). COC forms will be obtained from the DT. They will be sequentially numbered, and a sign-out sheet will be used by the DT and/or field personnel (FP). FP will sign-out all COC forms to use in the field.
2. FP will send the samples and the completed white and yellow copies of the numbered COCs to the laboratory. The serial numbers of all the COCs that were either sent to the laboratory or voided will be recorded in the field log book.
3. All COCs will be accounted for. The FP will bring back and leave the following with DT: (1) the completed pink copies of the COCs that were sent to the lab; (2) any voided COCs; (3) any unused COCs. The DT will maintain a file of the completed COCs for each project, and will keep an inventory of all the numbered COCs. For projects that require several days of sample shipment, FP should call the DT and provide the information described below following each shipment.
4. The DT will enter the following information into a database or logbook: (1) COC numbers (including voided or unused numbers); (2) names of FP; (3) site name; (4) project/job number; (5) sampling date(s); (6) shipping date; (7) numbers of samples per matrix; (8) analytical parameters requested; and (9) the laboratory name, address, and phone number.
5. DT will call the laboratory on the work day following receipt of the COCs to confirm the time, date, and condition of the samples shipped; the number and laboratory ID numbers of SDGs; and the contract-mandated due date for receipt of analytical results (confirmed by the Consultant Project Manager prior to calling laboratory).
6. The DT will enter the information from the logbook and the laboratory into a Lotus database. This database will allow all data to be sorted site name, dates, project number, laboratory, etc. during database searches.
7. The DT will send out a copy of the Sample Tracking Report (Figure A.2.4) from the database every two weeks or as necessary.

SAMPLE TRACKING REPORT
MO/DAY/YR:08/13/92

COC #	FP	PROJECT/JOB#	PM	SAMPLING DATE	SHIPMENT REC.DATE	SAMPLE MATRIX	LAB SDG #	PARAMETERS	LAB	REPORT DUE DATE	REPORT RCD.DATE	DISK DUE DATE	DISK RCD.DATE	CCS DATE	VAL. DATE	DISK CHECK	COMMENTS
0195	HF	PSA SITE 1	DC	05/27/92	05/27/92	GW	#12643	V,S,M	ABC	06/26/92	06/29/92	06/26/92	06/29/92	06/29/92	07/05/92	06/29/92	30 day T.A.
0196	HF	PSA SITE 1	DC	05/27/92	05/27/92	GW	#12643	V,S,M	ABC	06/26/92	06/29/92	06/26/92	06/29/92	06/29/92	07/05/92	06/29/92	30 day T.A.
0197	HF	PSA SITE 1	DC	05/28/92	05/28/92	GW	#12667	V,S,M	ABC	06/26/92	06/30/92	06/26/92	06/30/92	06/29/92	07/05/92	06/29/92	30 day T.A.
0198	HF	PSA SITE 1	DC	05/28/92	05/28/92	GW	#12667	V,S,M	ABC	06/26/92	06/30/92	06/26/92	06/30/92	06/29/92	07/05/92	06/29/92	30 day T.A.
0173	HF	PSA SITE 2	DC	07/02/92	07/06/92	Soil	#12331	V,S,P,M	ABC	08/05/92	08/05/92	08/05/92	08/05/92	08/06/92	08/13/92	08/06/92	30 day T.A.
0174	HF	PSA SITE 2	DC	07/02/92	07/06/92	Soil	#12331	V,S,P,M	ABC	08/05/92	08/05/92	08/05/92	08/05/92	08/06/92	08/13/92	08/06/92	30 day T.A.
0175	HF	PSA SITE 2	DC	07/02/92	07/06/92	Soil	#12331	V,S,P,M	ABC	08/05/92	08/05/92	08/05/92	08/05/92	08/06/92	08/13/92	08/06/92	30 day T.A.

taw:tracking.wk1

KEY TO PARAMETERS
Volatiles: V
Semi-volatiles: S
P-Pest./PCBs
Metals: M
Wet-Chemistry: W

Figure A.2.4

8. The DT will contact the Consultant Project Manager every Friday to check on the status of analytical results for the week and to confirm the dates for contract compliance screening and data validation (Section A.2.8).
9. The Project Manager will be responsible for delivering the analytical results to the DT and the data validator for CCS and data validation when they are received from the laboratory.
10. Upon receipt of the results, the Project Manager will retain the shipping receipt to document the date of arrival. This must be given to the Data Validator with the analytical package.

The Project Manager or a designated representative will maintain day-to-day contact with the laboratory concerning specific samples and analyses directly or by assignment.

A.2.6 CALIBRATION PROCEDURES AND FREQUENCY

A.2.6.1 Field Instruments

All field analytical equipment will be calibrated immediately prior to each day's use and more frequently if required. Field instrument calibration procedures are detailed in Appendix A.1, the Field Sampling Plan.

A.2.6.2 Laboratory Instruments

The laboratory will follow all calibration procedures and schedules as specified in the analytical method and as discussed in the following section.

A.2.7 ANALYTICAL PROCEDURES

All samples will be analyzed according to the methods given in Exhibit D of the NYSDEC ASP. QA/QC procedures given in Exhibit E and I of the ASP will be followed. Regardless of the method used, all analytical and extraction holding times must meet the NYSDEC ASP requirements for that analytical group (i.e. volatile analyses, including BTEX has a holding time of seven days if unpreserved. For water samples preserved with HCl, the holding time is 10 days. Semivolatile analyses including PAHs have an extraction holding time of five days). The analytical laboratory chosen for this project will be certified, and must maintain certification, under the New York State Department of Health's Environmental Laboratory Approval Program for analyses of solid and hazardous waste. The breakdown for investigative samples is detailed in the Work Plan. The methods to be used for the laboratory analysis of samples and the quantitation limits for each analyte are presented in Table A.2.2 and A.2.3. The method detection limits (MDLs) for the analytes will be specified by the laboratory selected for this project based on its most recent MDL studies, and subject to approval by the NYSDEC.

Technical guides and user instructions for the ENSYS PAH and PCB field screening test kits are presented in Attachment A.2.1.

TABLE A.2.2

SCOPE OF THE LABORATORY ANALYSIS PROGRAM

Matrix	Parameter [1]	Analytical Method [2]
Water	BTEX	8240
	VOC	8240
	PCBs and Pesticides	8080
	PAHs [3]	8270
	SVOC	8270
	Metals	6000/7000 (various for individual metals)
	Cyanide	9010
	Conventionals	
	Sulfide	376.1*
	Sulfate	375.4*
	Sulfite	377.1*
	Nitrate/Nitrite	353.2*
	Chloride	325.2*
	Carbonate	Use pH & Alkalinity results and formulas from Standard Method 17th edition 1989 part 4500-D
	Hardness	130.2*
	TDS	160.1*
	BOD	405.1*
	COD	410.4 410.2*
	pH	150.1*
	Oil and Grease	413.1*
	Potassium	200.7*
	Sodium	200.7*
	Magnesium	200.7*
	Alkalinity	310.1*
Soil & Sediments		
	VOCs	8240
	BTEX	8240
	SVOCs	8270
	PAHs	8270
	Pesticides and PCBs	8080
	Metals	6000/7000 (various for individual metals)
	Cyanide	9010
	TOC	Lloyd Kahn Method
	Waste Characteristics	
	TCLP	1311; 6000, 7000, 8000 (various for individual analytes)
	Ignitability	1020A
	Corrosivity	1110
	Reactivity	Chapter 8 Section 8.3
	Treatability Characteristics	
	Sulfur Total (S04+S03+S)	D129**
	BTU Content	D240**
	TPH	418.1*
	TOX	9020
	Ash Content	D482**
	Moisture	CLP 3/90***

1 Abbreviations: VOCs = volatile organic compounds; SVOCs = semivolatile organic compounds.

2 NYSDEC Analytical Services Protocol, December 1991, Category B deliverables.
Analyses must meet NYSDEC ASP holding time specified for Methods in Exhibit I Part II.

3 All methods are referenced to SW-846 except where noted by the following:
For list of PAHs see Table A.2.3 (semivolatiles).

* EPA 600/4-79-020 March 1979 Revised 1983.

** ASTM method.

*** USEPA CLP dated 3/90.

TABLE A.2.3
NMPC ONEIDA (SCONONDOA STREET) SITE
RI/FS
TARGET ANALYTES AND CRQ LIMITS[1]

	Contract Required Quantitation Limit Water Samples (ug/L)	Contract Required Quantitation Limit Soil Samples (ug/kg)
NYSDEC ASP TCL - Volatile Organic Compounds (by Method 8240)		
Acetone	10	10
Benzene	10	10
Bromodichloromethane	10	10
Bromoform	10	10
Bromomethane	10	10
2-Butanone	10	10
Carbon disulfide	10	10
Carbon tetrachloride	10	10
Chlorobenzene	10	10
Chloroethane	10	10
Chloroform	10	10
Chloromethane	10	10
Dibromochloromethane	10	10
1,1-Dichloroethane	10	10
1,2-Dichloroethane	10	10
1,1-Dichloroethene	10	10
1,2-Dichloroethene (cis and trans)	10	10
1,2-Dichloropropane	10	10
cis-1,3-Dichloropropene	10	10
trans-1,3-Dichloropropene	10	10
Ethylbenzene	10	10
2-Hexanone	10	10
4-Methyl-2-pentanone	10	10
Methylene chloride	10	10
Styrene	10	10
1,1,2,2-Tetrachloroethane	10	10
Tetrachloroethene	10	10
Toluene	10	10
1,1,1-Trichloroethane	10	10
1,1,2-Trichloroethane	10	10
Trichloroethene	10	10
Vinyl chloride	10	10
Total Xylenes	10	10

FOOTNOTES:

(1) Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable. Quantitation limits listed for soil are based on wet weight.

TABLE A.2.3 (Cont'd.)
NMPC ONEIDA (SCONONDOA STREET) SITE
RI/FS
TARGET ANALYTES AND CRQ LIMITS[1]

	Contract Required Quantitation Limit Water Samples (ug/L)	Contract Required Quantitation Limit Soil Samples (ug/kg)
NYSDEC ASP TCL - Semivolatile Organic Compounds (by Method 8270)		
Base/Neutral Extractables		
* Acenaphthene	10	330
* Acenaphthylene	10	330
* Anthracene	10	330
* Benzo(a)anthracene	10	330
* Benzo(b)fluoranthene	10	330
* Benzo(k)fluoranthene	10	330
* Benzo(g,h,i)perylene	10	330
* Benzo(a)pyrene	10	330
bis(2-Chloroethoxy)methane	10	330
bis(2-Chloroethyl)ether	10	330
bis(2-ethylhexyl)phthalate	10	330
4-Bromophenyl phenyl ether	10	330
Butyl benzyl phthalate	10	330
Carbazole	10	330
4-Chloroaniline	10	330
2-Chloronaphthalene	10	330
4-Chlorophenyl phenyl ether	10	330
* Chrysene	10	330
* Dibenz(a,h)anthracene	10	330
Dibenzofuran	10	330
Di-n-butylphthalate	10	330
1,2-Dichlorobenzene	10	330
1,3-Dichlorobenzene	10	330
1,4-Dichlorobenzene	10	330
3,3'-Dichlorobenzidine	10	330
Diethyl phthalate	10	330
Dimethyl phthalate	10	330
2,4-Dinitrotoluene	10	330
2,6-Dinitrotoluene	10	330
Di-n-octylphthalate	10	330
* Fluoranthene	10	330
* Fluorene	10	330
Hexachlorobenzene	10	330

FOOTNOTES:

(1) Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable. Quantitation limits listed for soil are based on wet weight.

* PAHs reported as MGP indicators.

TABLE A.2.3 (Cont'd.)
NMPC ONEIDA (SCONONDOA STREET) SITE
RI/FS
TARGET ANALYTES AND CRQ LIMITS[1]

	Contract Required Quantitation Limit Water Samples (ug/L)	Contract Required Quantitation Limit Soil Samples (ug/kg)
NYSDEC ASP TCL - Semivolatile Organic Compounds (by Method 8270, Cont.)		
Base/Neutral Extractables (Cont.)		
Hexachlorobutadiene	10	330
Hexachlorocyclopentadiene	10	330
Hexachloroethane	10	330
* Indeno(1,2,3-cd)pyrene	10	330
Isophorone	10	330
* 2-methylnaphthalene	10	330
* Naphthalene	10	330
2-Nitroaniline	25	800
3-Nitroaniline	25	800
4-Nitroaniline	25	800
Nitrobenzene	10	330
N-Nitroso-diphenylamine	10	330
N-Nitroso-dipropylamine	10	330
2,2' Oxybis(1-chloropropane)	10	330
* Phenanthrene	10	330
* Pyrene	10	330
1,2,4-Trichlorobenzene	10	330
Acid Extractables		
4-Chloro-3-methylphenol	10	330
2-Chlorophenol	10	330
2,4-Dichlorophenol	10	330
2,4-Dimethylphenol	10	330
4,6-Dinitro-2-methylphenol	25	800
2,4-Dinitrophenol	25	800
2-Methylphenol	10	330
4-Methylphenol	10	330
2-Nitrophenol	10	330
4-Nitrophenol	25	800
Pentachlorophenol	25	800
Phenol	10	330
2,4,5-Trichlorophenol	25	800
2,4,6-Trichlorophenol	10	330

FOOTNOTES:

(1) Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable. Quantitation limits listed for soil are based on wet weight.

* PAHs reported as MGP indicators.

TABLE A.2.3 (Cont'd.)
NMPC ONEIDA (SCONONDOA STREET) SITE
RI/FS
TARGET ANALYTES AND CRQ LIMITS[1]

	Contract Required Quantitation Limit Water Samples (ug/L)	Contract Required Quantitation Limit Soil Samples (ug/kg)
NYSDEC ASP TCL Pesticides and PCBs (by Method 8080)		
Aldrin	0.05	1.7
alpha-BHC	0.05	1.7
beta-BHC	0.05	1.7
delta-BHC	0.05	1.7
gamma-BHC (Lindane)	0.05	1.7
Chlordane (alpha &/or gamma)	0.05	1.7
4,4'-DDD	0.10	3.3
4,4'-DDE	0.10	3.3
4,4'-DDT	0.10	3.3
Dieldrin	0.10	3.3
Endosulfan I	0.05	1.7
Endosulfan II	0.10	3.3
Endosulfan sulfate	0.10	3.3
Endrin	0.10	3.3
Endrin Aldehyde	0.10	3.3
Endrin Ketone	0.10	3.3
Heptachlor	0.05	1.7
Heptachlor epoxide	0.05	1.7
Methoxychlor	0.50	17.0
Toxaphene	5.0	170.0
Aroclor-1016	1.0	33.0
Aroclor-1221	2.0	67.0
Aroclor-1232	1.0	33.0
Aroclor-1242	1.0	33.0
Aroclor-1248	1.0	33.0
Aroclor-1254	1.0	33.0
Aroclor-1260	1.0	33.0

FOOTNOTES:

(1) Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable. Quantitation limits listed for soil are based on wet weight.

TABLE A.2.3 (Cont'd.)
NMPC ONEIDA (SCONONDOA STREET) SITE
RI/FS
TARGET ANALYTES AND CRQ LIMITS[1]

	Contract Required Quantitation Level (ug/L)
NYSDEC ASP TAL Metals and Cyanide (by Method series 6000/7000)	
Aluminum	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	3
Magnesium	5000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5000
Selenium	5
Silver	10
Sodium	5000
Thallium	10
Vanadium	50
Zinc	20
Cyanide	10

These CRQLs are the instrument detection limits obtained in pure water that must be met using the procedure in Exhibit E. The quantitation limits for samples may be considerably higher depending on the sample matrix.

FOOTNOTES:

(1) Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable. Quantitation limits listed for soil are based on wet weight.

A.2.8 DATA REDUCTION, VALIDATION, AND REPORTING

The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the ASP.

The data package provided by the laboratory will contain all items specified in the ASP, as appropriate to the analyses performed. Level B reporting will be used.

A.2.8.1 Chain-of-Custody Records

Completed copies of the COC records accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the report of analytical testing.

A.2.8.2 Data Handling

One complete copy and one additional copy of the analytical data summary report will be provided by the laboratory. The Consultant Project Manager will immediately arrange for filing of the complete package, after the QA/QC reviewer checks the package to ensure all deliverables have been provided. The second data summary report will be used to generate summary tables. These tables will form the foundation of a working database for assessment of the site contamination condition.

The Project Manager will maintain close contact with the QA/QC reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA/QC review has been completed, the Project Manager may direct the team leaders or others to initiate and finalize the analytical data assessment.

A.2.8.3 Data Validation Screening

Data validation screening will be performed following guidelines in the most recent USEPA documents (USEPA 1988, 1991a, 1991b) adapted to the QA/QC criteria in the Exhibits E and I of the December 1991 NYSDEC ASP and this QAPP. This validation screening, also called a Contract Compliance Screening, will be limited to a review of conformance to all sample extraction and analysis holding times, a review of laboratory blank sample results, and a review of the analytical case narrative to ensure major analytical problems or deficiencies are not noted.

This work will be performed by trained and experienced data validators who meet the NYSDEC approval criteria. The results of the data validation screening (i.e. missed holding times or data rejected due to blank contamination) will be incorporated into the data summary tables used in the final RI/FS report. A data usability report will be prepared which identifies data gaps caused by non-compliant or rejected data, and indicates what steps have been or will be taken to fill these gaps.

A.2.9 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

A.2.9.1 Quality Assurance Batching

Each set of samples will be analyzed concurrently with calibration standards, method blanks, MS, MSD or MD, and QC check samples (if required by the protocol). The MS/MSD/MD samples will be designated by the field personnel. If no MS/MSD/MD samples have been designated then the laboratory will contact the Project Quality Assurance Officer (PQAO) or Consultant Project Manager for corrective action.

A.2.9.2 Organic Standards And Surrogates

All standard and surrogate compounds are checked by the method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard solutions are replaced monthly or earlier based upon data indicating deterioration.

A.2.9.3 Laboratory Quality Control Samples

The quality control samples included are detailed below.

Method Blanks

Gas Chromatograph/Mass Spectrometer: Analyses for organic compounds include a blank analysis of the laboratory reagent water. The blank is analyzed with each set of samples or more often as required to avoid carry-over between samples. The concentration of target compounds in the blanks must be less than or equal to the method detection limits specified in the ASP for the selected method of analysis.

Matrix Spike/Duplicate Spike Analysis - This analysis is used to determine the effects of matrix interference on analytical results. Spikes of analytes are added to aliquots of sample matrix in the manner specified in the ASP. Selected samples are spiked to determine accuracy as a percentage recovery of the analyte from the sample matrix. A matrix duplicate is prepared in the same manner as the matrix spike sample.

Analytical Replicate Samples - Replicate samples are aliquots of a single sample that are split on arrival at the laboratory, or upon analysis. Since it is anticipated the concentrations of most parameters will be below the laboratory detection limits, precision data on replicate analyses will largely be derived from matrix spike duplicate data for GC/MS analyses. Significant differences between two replicates, split in a controlled laboratory environment will result in flagging the affected analytical results.

Surrogate Spike Analyses - Surrogate spike analyses are used to determine the efficiency of recovery of analytes in the sample preparations and analyses. Calculated percentage recovery of the spike is used as a measure of the accuracy of the total analytical method.

Laboratory Control Sample (Blank Spike) - A laboratory control sample will be prepared along with each quality control batch and analyzed according to criteria specified in the ASP.

A.2.10 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

Quality assurance audits may be performed by the project quality assurance manager (PQAM) or personnel designated by the PQAM. The PQAM and his or her designees function as an independent body and report directly to company quality assurance management. The PQAM may plan, schedule, and approve system and performance audits based upon company procedure customized to the project requirements. These audits may be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). At times, the

PQAM may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits.

Formal audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports may be written by lead auditors after gathering and evaluating all resultant data. Items, activities, and documents determined by lead auditors to be in noncompliance may be identified at exit interviews conducted with the involved management. Noncompliances may be logged, documented, and controlled through audit findings which are attached to and are a part of the integral audit report. These audit finding forms are then directed to management to satisfactorily resolve the noncompliance in a specified and timely manner. All audit checklists, audit reports, audit findings, and acceptable resolutions are to be approved by the PQAM prior to issue. QA verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the PQAM will close out the audit report and findings.

It is the Consultant Project Manager's overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within twenty-four hours.

A.2.10.1 System Audits

System audits, performed by the PQAM or designated auditors, may encompass evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests the PQAM to perform unscheduled audits, these activities will be instituted.

A.2.10.2 Performance Audits

The laboratory shall be required to conduct an analysis of Performance Evaluation samples or provide proof that Performance Evaluation samples submitted by the USEPA or a state agency, such as the New York State Department of Health (NYSDOH) have been analyzed within the past twelve months and analytical results approved by that agency.

Also, one field audit may be performed by the PQAM or designated auditor during collection of the field samples to verify that field samplers are following established sampling procedures.

A.2.11 PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULES

A.2.11.1 Preventive Maintenance Procedures

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

Analytical instruments are serviced at intervals recommended by the manufacturer. Service contracts for regular maintenance and emergency service are maintained for major instruments. An instrument repair/maintenance log book is kept for each instrument. Entries include the date of service, type of problem encountered, corrective action taken, and initials and affiliation of the person providing the service.

The instrument use log book is monitored by the analysts to detect any degradation of instrument performance. Changes in response factors or sensitivity are used as indications of potential problems. These are brought to the attention of the laboratory supervisor and preventive maintenance or service is scheduled to minimize down time. Back-up instrumentation and an inventory of critical spare parts are maintained to minimize delays in completion of analyses.

A.2.11.2 Schedules

Written procedures where applicable will identify the schedule for servicing critical items in order to minimize the downtime of the measurement system. It will be the responsibility of the operator to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. Service to the equipment, instruments, tools, gauges, etc. shall be performed by qualified personnel.

A.2.11.3 Records

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories and by the data and sample control personnel when and if equipment, instruments, tools, and gauges are used at the sites. The field team leader may audit these records to verify complete adherence to these procedures.

A.2.11.4 Spare Parts

A list of critical spare parts will be identified by the operator. These spare parts will be stored for availability and use in order to reduce the downtime. In lieu of maintaining an inventory of spare parts a service contract for rapid instrument repair or backup instruments will be available.

A.2.12 ASSESSMENT PROCEDURES FOR DATA ACCEPTABILITY

Procedures used to assess data precision and accuracy will be in accordance with the appropriate laboratory method, and as periodically updated. Completeness is recorded by comparing the number of parameters initially analyzed for with the number of parameters successfully completed and validated.

A.2.12.1 Accuracy

The percent recovery is calculated as below:

$$\% = \frac{Ss - So}{S} \times 100$$

So = The background value, i.e.; the value obtained by analyzing the sample

S = Concentration of the spike added to the sample

Ss = Value obtained by analyzing the sample with the spike added

% = Percent Recovery

A.2.12.2 Precision

The relative percent difference is calculated as below:

$$RPD = \frac{|V1 - V2|}{0.5\ (V1 + V2)} \times 100$$

V1, V2 = The two values obtained by analyzing the duplicate samples

A.2.12.3 Completeness

Completeness is the measure of the amount of valid data obtained from a measurement system compared to the total amount expected to be obtained under ideal conditions. A target of 90 percent completeness, calculated for each analysis method, has been established as the overall project objective.

$$PC = \frac{N_A}{N_I} \times 100$$

where:

PC = Percent completeness

N_A = Actual number of valid analytical results obtained

N_I = Theoretical number of results obtainable under ideal conditions

A.2.13 CORRECTIVE ACTION

The following procedures have been established to assure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor locations, the cause of the condition will be determined and corrective action taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the Field Team Leader, Project Manager, and involved subcontractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action. All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality.

Corrective actions may be initiated as minimum:

- When predetermined acceptance standards are not attained
- When procedure or data compiled are determined deficient
- When equipment or instrumentation is found faulty
- When samples and test results are questionably traceable
- When quality assurance requirements have been violated
- When designated approvals have been circumvented
- As a result of system and performance audits
- As a result of a management assessment
- As a result of laboratory/interfield comparison studies
- As required by NYSDEC ASP, 1991

Procedure Description

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities.

Work may be audited at the Consultant's office, site, laboratory, and subcontractor locations by the PQAM and/or designated auditor. Items, activities, or documents ascertained to be in noncompliance with quality assurance requirements will be documented and corrective actions mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the PQAM.

Technicians assigned quality assurance functions will also control noncompliance corrective actions by having the responsibility of issuing and controlling the appropriate Corrective Action Request Form (Figure A.2.5). All project personnel can identify a noncompliance; however, the technician is responsible for documenting, numbering, logging, and verifying the closeout action. It is the Project Manager's responsibility to ensure that all recommended corrective actions are produced, accepted, and received in a timely manner.

The Corrective Action Request (CAR) identifies the adverse condition, reference document(s), and recommended corrective action(s) to be administered. The issued CAR is directed to the responsible manager in charge of the item or activity for action. The individual to whom the CAR is addressed returns the requested response promptly to the technician in charge, affixing his signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The technician maintains the log for status control of CARs and responses, confirms the adequacy of the intended corrective action, and verifies its implementation. The technician will issue and distribute CARs to specified personnel, including the originator, responsible project management involved with the condition, the Project Manager, involved subcontractor, and the Field Team Leader, as a minimum. CARs are transmitted to the project file for the records.

Figure A.2.5

CORRECTIVE ACTION REQUEST	CAR NO. _____ DATE _____
PROJECT NO./TITLE _____ _____ _____ _____ TASK NO./TITLE _____ _____	REFERENCE(S) _____ _____ REPLY DUE DATE _____
SUBJECT _____ _____ _____	PREPARED BY _____
DESCRIPTION OF CONDITION	APPROVED BY _____ PROJECT MANAGER
_____ _____ _____ _____ _____	
CAUSE AND CORRECTIVE ACTION (Include Effective Date) _____ _____ _____ _____ _____ _____ _____ _____	
_____ TASK MANAGER DATE	_____ PROJECT QA OFFICER DATE
_____ PROJECT MANAGER DATE	
CLOSEOUT ACTION _____ _____ _____ _____ _____ _____ _____ _____	
_____ PROJECT QA OFFICER DATE	_____ PROJECT MANAGER DATE
SEE REVERSE SIDE FOR INSTRUCTIONS	

FORM P12-1

A.2.14 QUALITY ASSURANCE REPORTS

Quality assurance reports to management may consist of the reports on audits, reports on correction of deficiencies found in audits, a final QA report on field sampling activities and the data validation report.

At the end of the project, the PQAM may submit, at their discretion, a report to the Project Manager which will discuss the QA activities. That report may include discussions of any conditions adverse or potentially adverse to quality, such as responses to the findings of any field or laboratory audits; any field, laboratory, or sample conditions which necessitate a departure from the methods or procedures specified in this QAPP; field sampling errors; and any missed holding times or problems with laboratory QC acceptance criteria; and the associated corrective actions undertaken. This report shall not preclude immediate notification to project management of such problems when timely notice can reduce the loss or potential loss of quality, time, effort, or expense.

These reports, if prepared, shall be reviewed by the Project Manager for completeness and the appropriateness of any corrective actions, and they shall be retained in the project files.

In the final RI/FS report, laboratory and field QC data will be presented, including a summary of QA activities and any problems and/or comments associated with the analytical and sampling effort. Any corrective actions taken in the field, results of any audits, and any modifications to laboratory protocols will be discussed.

ATTACHMENT A.2.1

ENSYS FIELD PAH AND PCB SOIL TEST TECHNICAL GUIDES AND TEST KIT INSTRUCTIONS

PAH RIS© Polyaromatic Hydrocarbons Soil Test
Technical Guide

Contamination of soil with polyaromatic hydrocarbons (PAH) is a serious problem at manufactured gas plant sites, coking operations, wood preserving operations that have used creosote as a wood preservative, and petrochemical plant waste disposal sites. The federal and state regulatory agencies are mandating the clean-up of many of these sites due to the carcinogenic nature of some of the PAHs.

Polyaromatic Hydrocarbons

Polyaromatic hydrocarbons, or polynuclear aromatic compounds (PNAs), are fused ring aromatic compounds classified by the number of carbon rings. Sixteen of these PAHs are listed as hazardous compounds by the EPA (Table 1). They are further divided into carcinogenic and non-carcinogenic PAHs. The two and three ring PAHs are non-carcinogenic, while several of the four, five, and six ring PAHs are carcinogenic. The four ring PAHs, chrysene and benzo[a]anthracene, the five ring PAHs, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, and dibenzo[a,h]anthracene, and the six ring PAH, indeno[1,2,3-cd]pyrene, are carcinogenic PAHs. Benzo[a]pyrene is the most potent carcinogen among the PAHs. Regulatory concern is generally focused on benzo[a]pyrene, total carcinogenic PAHs, and total PAHs.

Existing Laboratory Methods

The laboratory methods usually employed for PAH analysis, EPA methods 8270 (GC/MS) and 8310 (HPLC), are relatively expensive, typically $200-500, and suffer from the same laboratory turnaround time requirements (2-4 weeks) as other lab methods. While the minimum detection levels for these methods can be quite low (10-1500 ppb), PAH-containing samples are usually quite "dirty", routinely resulting in much higher levels of practical quantitation, typically of the order of 1-100ppm. Due to the complicated chemical nature of coal tar or petroleum residues, PAHs are difficult to analyze for accurately.

An example of typical analytical data generated as a consequence of analyzing creosote contaminated soil samples using Method 8270 is given below. The results of analysis of splits of two samples by two highly reputable laboratories using the same method are presented in Table 2. Although these results do not show gross differences between labs, serious discrepancies are evident with the carcinogenic PAHs when they occur at high concentrations.

Test Characteristics

The PAH RIS©® Soil Test serves as a field-based alternative to sending all soil samples for analysis by laboratory-based methods. There are no other viable field tests for PAHs. The EnSys test exhibits broad recognition of three, four, and some five ring PAHs (Table 3). This group of PAHs is the most plentiful of the PAHs found in soil at coal tar and petroleum product contaminated sites. The PAH test also has significant sensitivity for carcinogenic PAHs.

None of the non-PAH hydrocarbons or non-EPA listed PAHs cross-react to a substantial extent (>10%)(Table 4). Creosote gives a sizable response due to its substantial PAH content.

Correlation with Laboratory Methods

As with other EnSys RIS©® tests, the PAH soil test can provide a high degree of accuracy when used to analyze soils contaminated with PAHs. Product validation studies indicate that the test can correctly identify over 95% of samples that are spiked with PAHs at or near the chosen action level (Table 5). The recovery of PAH compounds from spiked soils was independent of the soil used. Three different soils gave identical results.

The Institute of Gas Technology (IGT) evaluated the performance of the PAH RIS©® Soil Test on behalf of the Gas Research Institute. Two operators tested several PAH containing samples from a manufactured gas plant site that was undergoing a bioremediation trial. IGT found excellent agreement between results from the immunoassay-based test and the analytical results obtained using Method 8270 (Table 6). The operators were able to get comparable results and showed the repeatability of the test with duplicates.

The PAH soil test was used to test samples from manufactured gas plant (MGP) sites owned by another utility and the results were compared to laboratory analytical data (Table 7). Correlation of these results with the laboratory HPLC method (8310) was excellent.

The EnSys PAH soil test was used to delineate creosote contaminated soil at a railroad tie treating plant. A comparison of the results obtained using the immunoassay and the GC/MS method (8270) are shown in Table 8. Excellent correspondence between the two methods was shown over a thousand-fold concentration range.

Field Application

The test is similar in format and operation to other EnSys RIS$^{®}$ tests. The operational temperature range for use in the field with full performance as described above is 40°F to 90°F. Up to 12 tubes can be run in one batch, so that several samples can be tested concurrently. The shelf life of the PAH RIS$^{®}$ Soil Test is currently 3 months, with longer shelf life expected when the real-time data is available.

Rather than sending every sample to the laboratory for analysis, samples collected can be analyzed in the field to provide real-time information about PAH levels to guide further sampling or excavation. The appropriate use of field testing can result in relatively substantial savings in project cost due to more efficient use of project resources. All results from field analysis of soil samples using the PAH test should be accompanied by supporting QA data. At the least, method and soil blanks and a performance evaluation sample should be tested daily. In addition, one duplicate sample should be tested for every twenty samples analyzed. Confirmation of a portion of the field results should also be obtained by either Method 8270 or 8310.

The PAH test can be used to screen soil samples for the presence of both carcinogenic and non-carcinogenic PAH compounds. Because the PAH test does not measure all of the sixteen listed PAHs, nor does it measure exclusively the carcinogenic PAHs, it should be viewed as an indicator or screening test for PAHs. In order to ensure that a user is likely to obtain good correspondence with confirming laboratory data, it is advisable to review any analytical data that has been obtained prior to doing extensive field screening. For example, abnormally high levels of naphthalene could lead to underestimation of total PAHs. This will help eliminate user problems before they can occur.

Clean-up levels for PAHs are generally set on a risk analysis basis for benzo[a]pyrene, total carcinogenic PAHs, and total PAHs. An extensive review of analytical data from hundreds of soil samples collected from manufactured gas plant sites and creosote contaminated sites indicates that the PAH compounds detected by the EnSys test are almost always found in conjunction with the five and six ring carcinogenic PAHs. This shows that the EnSys PAH test is a useful indicator for soil contaminated with carcinogenic PAHs.

Table 1
Listed PAH Compounds

acenaphthene	acenaphthylene
anthracene	benzo[a]anthracene
benzo[a]pyrene	benzo[b]fluoranthene
benzo[g,h,i]perylene	benzo[k]fluoranthene
chrysene	dibenzo[a,h]anthracene
fluoranthene	fluorene
indeno[1,2,3-cd]pyrene	naphthalene
phenanthrene	pyrene

Table 2
Sample PAH Analytical Data

	Method 8270 Results			
	Sample 1		Sample 2	
PAH	Lab 1	Lab 2	Lab 1	Lab 2
naphthalene	0.16	<1.23	73	<418
acenaphthene	0.4	<1.23	2500	<418
acenaphthylene	2.1	<1.23	61	2155
phenanthrene	1.7	<1.23	5400	3929
anthracene	3.8	4.2	1200	1394
fluorene	0.16	<1.23	1600	1521
benzo[a]anthracene	2.5	1.6	740	583
chrysene	3.3	3.3	630	6
fluoranthene	5.2	3.6	3500	2915
pyrene	5.9	5.7	2600	2155
benzo[b&k]fluoranthenes	10	10.6	500	4689
benzo[a]pyrene	6.2	4.9	250	2028
dibenzo[a,h]anthracene	1.4	<1.23	49	<418
indeno[1,2,3-cd]pyrene	4.9	2.7	88	<418
benzo[g,h,i]perylene	3.7	2.3	64	<418

Table 3
PAH RIS©® Soil Test Sensitivity to PAH Compounds

PAH Compound	Concentration Necessary to Result in Positive Test (ppm)*
2 rings	
naphthalene	200
3 rings	
acenaphthene	8.1
acenaphthylene	7.5
phenanthrene	1.0
anthracene	0.81
fluorene	1.5
4 rings	
benzo[a]anthracene	1.6
chrysene	1.2
fluoranthene	1.4
pyrene	3.5
5 rings	
benzo[b]fluoranthene	4.6
benzo[k]fluoranthene	9.4
benzo[a]pyrene	8.3
dibenzo[a,h]anthracene	>200
6 rings	
indeno[1,2,3-cd]pyrene	11
benzo[g,h,i]perylene	>200

* Samples with stated concentration will give positive result greater than 95% of the time when tested at stated concentration level.

Table 4
PAH RIS© Soil Test Sensitivity to
Unlisted PAHs and Other Compounds

Compound or Substance	Concentration Necessary to Result in Positive Test (ppm)*
benzene	>200
toluene	>200
chromated copper arsenate (CCA)	>200
phenol	>200
2,4,6-trichlorobenzene	>200
2,3,5,6-tetrachlorobenzene	>200
pentachlorobenzene	>200
pentachlorophenol	>200
bis(2-ethylhexyl)phthalate	>200
Aroclor 1254	>200
Aroclor 1260	>200
creosote	5.4
1-methylnaphthalene	54
2-methylnaphthalene	58
1-chloronaphthalene	59
Halowax 1013	18
Halowax 1051	>200
dibenzofuran	14

* Samples with stated concentration will give positive result greater than 95% of the time when tested at stated concentration level.

Table 5
PAH Spike Recoveries

Compound	Spike Level (ppm)	PAH RIS© Test Results
blank soil	-	<1
phenanthrene	1	≥1 and <10
phenanthrene	10	≥10
benzo[a]anthracene	1.6	≥1 and <10
benzo[a]anthracene	16	≥10
benzo[a]pyrene	8.3	≥1 and <10
benzo[a]pyrene	83	≥10

Table 6
Analysis of Manufactured Gas Plant Samples
Institute of Gas Technology

Sample ID	Operator	PAH RISc® Test Results (ppm)				GC/MS Results
		Result	Evaluation	Result	Evaluation	(ppm)
B4 093091	1	≥ 100	•	< 1000	•	370
B4 093091	2	≥ 100	•	< 1000	•	370
B4 081991	1	≥ 100	•	≥ 1000	FP*	995
B4 081991	2	≥ 100	•	≥ 1000	FP*	995
B4 081991 dup	1	≥ 100	•	≥ 1000	FP*	995
TGS-16	2	≥ 100	•	≥ 1000	FP	300-400
TGS-21	1	≥ 100	•	< 1000	•	160-185
TGS-21	2	≥ 100	•	< 1000	•	160-185
TGS-21 dup	2	≥ 100	•	< 1000	•	160-185
TGS-18 Day 0	1	≥ 100	•	≥ 1000	•	2000-3000
TGS-18 Day 0	2	≥ 100	•	≥ 1000	•	2000-3000
TGS-17	1	≥ 100	•	≥ 1000	•	2000-2256
TGS-17	2	≥ 100	•	≥ 1000	•	2000-2256
TGS-12	1	≥ 100	•	≥ 1000	•	1270-7000
TGS-12 dup	1	≥ 100	•	≥ 1000	•	1270-7000
TGS-12	2	≥ 100	•	≥ 1000	•	1270-7000
TGS-22	1	≥ 100	•	≥ 1000	•	6000-10000
"Blank" soil	1	≥ 1	?	< 10	•	see note
"Blank" soil	2	≥ 1	?	< 10	•	see note

• - Immunoassay and GC/MS (Method 8270) agree
FP - False positive result
FP* - False positive result, but within 25% of GC/MS result
@ Values given represent range of analyses on several subsamples
Blank soil unanalyzed for PAH content, but assumed to be PAH-free.

Table 7
Analysis of MGP Samples

Sample #	PAH RIS℠® Test Results (ppm)	HPLC Results (ppm)
PAH-137	≥10	<21
PAH-141	<1	<21
PAH-118	≥1 and <10	<26
PAH-136	≥10	26
PAH-139	≥10	<28
PAH-126	≥1 and <10, ≥10*	<32
PAH-127	≥10	<33
PAH-122	≥10	<33
PAH-138	≥10	33
PAH-131	≥10	<34
PAH-128	≥10	<35
PAH-132	≥10	<43
PAH-112	≥10	<48
PAH-140	≥10	50
PAH-130	≥10	54
PAH-116	<1	<61
PAH-135	≥10	71
PAH-133	≥10	<91
PAH-119	≥10	<100
PAH-120	≥10	<161
PAH-124	≥10	<167
PAH-134	≥10	182
PAH-114	≥10	<247
PAH-113	≥10	<343

* Replicate tests gave variable results, indicating PAH concentration near test level

Table 8
Analysis of Railroad Tie Plant Samples

Sample ID	PAH RISC® Test Results (ppm)	GC/MS Results (ppm)	Evaluation
V-1	≥1, <10	2.1	•
V-2	<1	<1	•
V-3	<1	<1	•
V-4	>10	305	•
V-5	<1	<1	•
V-6	<1	<1	•
V-7	<1	<1	•
V-8	<1	<1	•
V-9	<1	<1	•
V-10	<1	<1	•
V-11 (dup. of V-10)	<1	<1	•
V-12	>10	2.4	FP
V-13	≥100, <1000	44	FP
V-14	≥1, <10	7.5	•
V-15	>1000	1330	•
V-16	≥1, <10	2.4	•
V-17	≥1, <10	8.9	•
V-18	≥10, <100	70	•
V-19	≥1, <10	1.6	•
V-20	≥1, <10	4.9	•
V-21	≥100, <1000	142	•
V-22	≥10, <100	28	•
V-23	≥1, <10	3.2	•

• - Immunoassay and GC results agree
FP - False positive

ENSYS INC.

PAH RISc® INSTRUCTIONS FOR USERS WITH NONSTANDARD DETECTION LEVELS

Two level test:

Lowest detection level: Follow instructions in user's guide for 1 ppm test.

Highest detection level: Follow instructions in user's guide for 10 ppm test.

One level test: Follow instructions in user's guide for 1 ppm test.

NOTE: YOUR ORDER MAY INCLUDE ADDITIONAL DILUTION AMPULE(S)/VIAL(S) in order to achieve your test level(s). For example, to test at 100 ppm, a 1 and 10 ppm dilution ampule are provided. Always transfer 30 ul of filtered sample to the dilution ampule labeled with the lowest ppm level (i.e. 1 ppm). Then, transfer 30 ul from the lowest dilution ampule to the next highest dilution ampule. (In this example, transfer 30 ul from the 1 ppm dilution ampule to the 10 ppm dilution ampule and then transfer 30 ul from the 10 ppm dilution ampule to the 100 ppm dilution ampule.) Continue the test using the dilution ampule(s) corresponding to your test level(s).

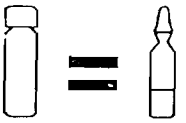
HOTLINE ASSISTANCE: If you need any assistance, call toll free 1-800-242-RISC(7472).

111992

P.O. Box 14063, Research Triangle Park, NC 27709
Royal Center, 4222 Emperor Blvd., Morrisville, NC 27560

ENSYS INC.

We've Improved!



For ease of use, at many common dilution levels, we have replaced the dilution vial with the dilution ampule.

To Open ampule: Tap on hard surface, then slip plastic safety sleeve over top. Break tip at scored neck.

PAH RISC™ SOIL TEST SYSTEM

RAPID IMMUNOASSAY SCREEN

User's Guide

This method correctly identifies 95% of samples that are PAH-free and those containing 1ppm or 10 ppm of PAHs. A sample that develops less color than the standard is interpreted as positive. It contains PAHs. A sample that develops more color than the standard is interpreted as negative. It contains less than 1 ppm or 10 ppm PAHs.

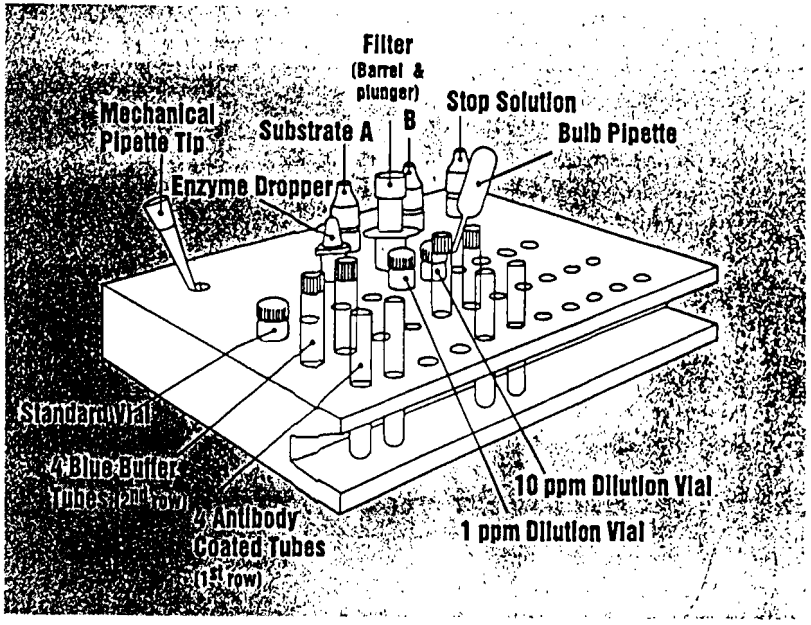
IMPORTANT NOTICE

The Test System performs accurately only when used as directed. This User's Guide is brief. Read it carefully prior to using the Test System. It will increase understanding of test objectives and help ensure a successful test

WORKSTATION SET-UP

Assemble the following components in the workstation:

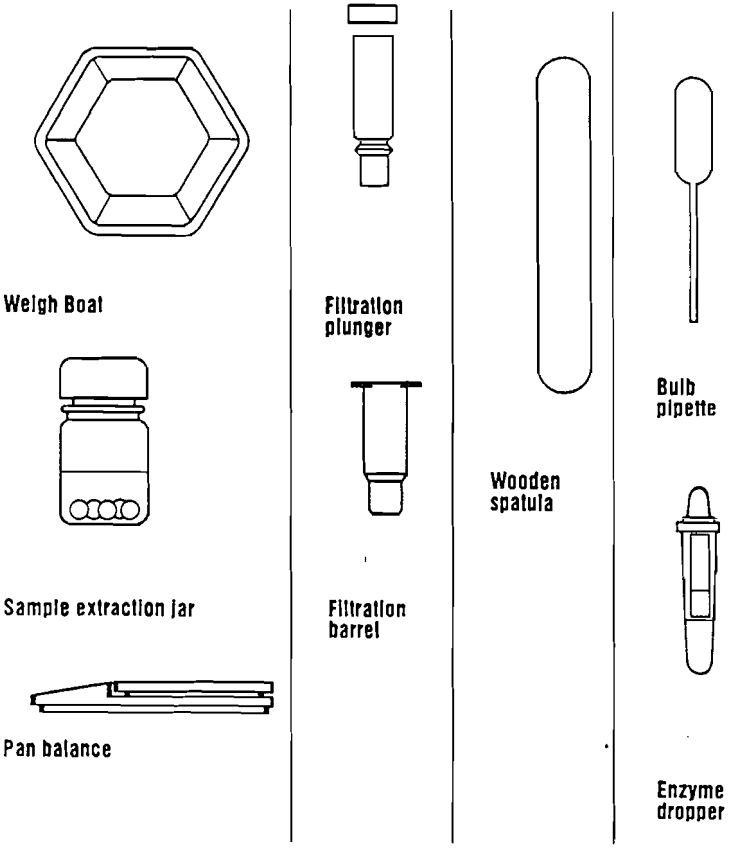
- ☐ 4 antibody coated tubes
- ☐ PAH standard vial
- ☐ 10 ppm dilution vial
- ☐ Filtration barrel & plunger
- ☐ 2 mechanical pipette tips
- ☐ Substrate B
- ☐ 4 blue buffer tubes
- ☐ 1 ppm dilution vial
- ☐ Enzyme dropper
- ☐ Bulb pipette
- ☐ Substrate A
- ☐ Stop solution



PHASE ONE
COMPONENTS FOR EXTRACTION & SAMPLE PREPARATION

Assemble the following components:

- ☐ Weigh boat
- ☐ Pan balance
- ☐ Wooden spatula
- ☐ Sample extraction jar
- ☐ Filtration barrel
- ☐ Filtration plunger
- ☐ Bulb pipette
- ☐ Enzyme dropper



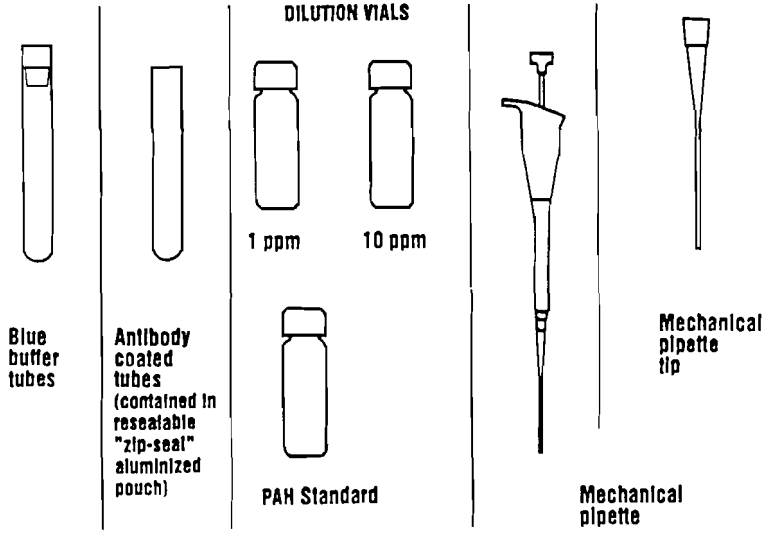
PHASE TWO
COMPONENTS FOR DILUTION OF SAMPLE & STANDARDS

Use the following component from Phase One:

- ☐ Filtered sample

Use the following additional components:

- ☐ Permanent marking pen (not included in test)
- ☐ 4 blue buffer tubes
- ☐ 4 antibody coated tubes
- ☐ Dilution vial marked "1 ppm Test"
- ☐ Dilution vial marked "10 ppm Test"
- ☐ PAH standard vial
- ☐ Mechanical pipette
- ☐ 2 mechanical pipette tips



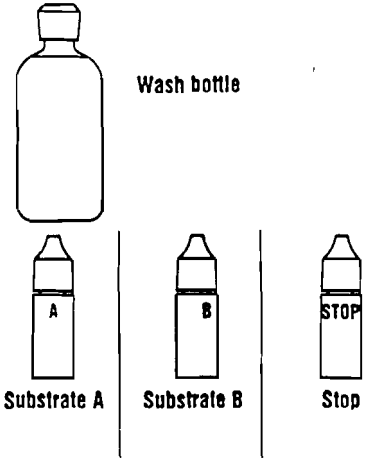
PHASE THREE
COMPONENTS FOR THE IMMUNOASSAY & COLOR DEVELOPMENT

Use the following components from earlier phases:

- ☐ Foam workstation
- ☐ Blue buffer tube marked "1"
- ☐ Blue buffer tube marked "10"
- ☐ Blue buffer tube marked "Standard 1"
- ☐ Blue buffer tube marked "Standard 2"
- ☐ Antibody coated tube marked "1"
- ☐ Antibody coated tube marked "10"
- ☐ Antibody coated tube marked "Standard 1"
- ☐ Antibody coated tube marked "Standard 2"
- ☐ Enzyme Dropper
- ☐ Laboratory Tissue (not included)

Use the following additional components:

- ☐ Wash bottle
- ☐ Stop watch or timer
- ☐ Substrate A (yellow cap)
- ☐ Substrate B (green cap)
- ☐ Stop Solution (red cap)
- ☐ Liquid waste container (not included)



PHASE FOUR
COMPONENTS FOR INTERPRETING TEST RESULTS

Use the following components from earlier phases:

- ☐ Foam workstation
- ☐ Antibody coated tube marked "1"
- ☐ Antibody coated tube marked "10"
- ☐ Antibody coated tube marked "Standard 1"
- ☐ Antibody coated tube marked "Standard 2"
- ☐ Laboratory tissue (not included)

Use the following additional component:

- ☐ Photometer

System Description

Each PAH RISc Soil Test System contains enough material to perform four complete tests, each at **1** and **10** ppm.

The PAH RISc Soil Test is divided into four phases. The instructions and notes should be reviewed before proceeding with each phase.

Hotline Assistance

If you need assistance or are missing necessary Test System materials, call toll free: 1-800-242-RISC (7472).

Validation and Warranty Information

Product claims are based on validation studies carried out under controlled conditions. Data has been collected in accordance with valid statistical methods and the product has undergone quality control tests of each manufactured lot.

PAH-free soil and soil containing 1 ppm and 10 ppm of PAHs were tested with the EnSys PAH RISc analytical method. The method correctly identified 95% of these samples. A sample that has developed less color than the standard is interpreted as positive. It contains PAHs. Either a 1 ppm or a 10 ppm sample that has developed more color than the standard is interpreted as negative. It contains less than the indicated level of PAHs (1 ppm or 10 ppm).

The company does not guarantee that the results with the PAH RISc Soil Test System will always agree with instrument-based analytical laboratory methods. All analytical methods, both field and laboratory, need to be subject to the appropriate quality control procedures.

EnSys, Inc. warrants that this product conforms to the descriptions contained herein. No other warranties, whether expressed or implied, including warranties of merchantability and of fitness for a particular purpose shall apply to this product.

EnSys, Inc. neither assumes nor authorizes any representative or other person to assume for it any obligation or liability other than such as is expressly set forth herein.

Under no circumstances shall EnSys, Inc. be liable for incidental or consequential damages resulting from the use or handling of this product.

How It Works

Standards, Samples, and color-change reagents are added to test tubes coated with a chemical specific to PAHS. The concentration of PAHS in an unknown **Sample** is determined by comparing its color intensity with that of a **Standard.**

Note: PAH concentration is inversely proportionate to color intensity; the lighter the color development of the sample, the higher the concentration of PAHs.

Quality Control

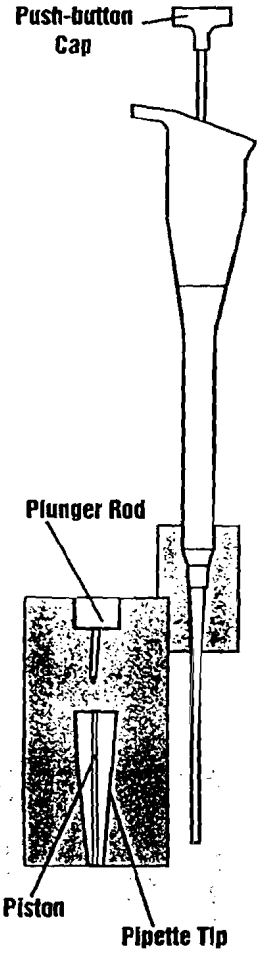
Standard precautions for maintaining quality control:

- Do not use reagents or test tubes from one Test System with reagents or test tubes from another Test System.
- Do not use the Test System after any portion has passed its expiration date.
- Do not attempt the test using more than 12 antibody coated tubes at the same time.
- Do not exceed incubation periods prescribed by the specific steps.

Storage and Handling Precautions

- Wear protective gloves and eyewear.
- Store kit at room temperature and out of direct sunlight (less than 80°F).
- Keep aluminized pouch (containing unused antibody coated tubes) sealed when not in use.
- If liquid from the extraction jar, or PAH Standard comes into contact with eyes, wash thoroughly with cold water and seek immediate medical attention.

HOW TO OPERATE THE MECHANICAL PIPETTE



To Set Or Adjust Volume

Remove push-button cap and loosen volume lock screw. Turn lower part of push-button to adjust volume up or down. Meter should read "030". Tighten volume lock screw and replace push-button cap.

To Assemble Pipette Tip

Slide larger mounting end of pipette tip onto end of pipette. Holding tip in place, press push-button until plunger rod enters pipette tip. Ensure no gap exists between pison and plunger rod (see illustration).

To Withdraw Sample

With tip mounted in position on pipette, press push-button to first stop and hold it.

Place tip at bottom of liquid sample and slowly release push-button to withdraw measured sample. Ensure that no bubbles exist in liquid portion of sample. If bubbles exist, dispense sample and re-withdraw sample.

To Dispense Sample

Place tip into dispensing vessel (immersing end of the tip if vessel contains liquid) and slowly press push-button to first stop. (Do not push to second stop or tip will eject).

Remove tip from vessel and release push-button.

To Eject Tip

Press push-button to second stop. Tip is ejected.

For additional information regarding operation and use of pipette, please refer to your pipette manual.

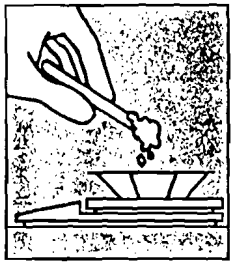
PHASE ONE

EXTRACTION & PREPARATION OF THE SAMPLE

NOTES BEFORE PROCEEDING WITH PHASE ONE

- Items that you will need that are not provided in the test kit include: a permanent marking pen, laboratory tissue, a timer or stopwatch, a liquid waste container, and disposable gloves.

WEIGH SAMPLE

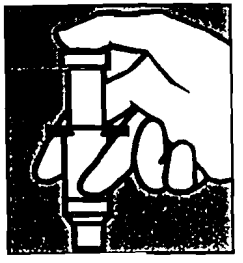


1. Place weigh boat on pan balance.
2. Press ON/MEMORY button on pan balance. Balance will beep and display 0.0.
3. Weigh out 10 +/- 0.1 grams of soil.
4. If balance turns off prior to completing weighing, use empty weigh boat to retare, then continue.

EXTRACT PAHS

5. Remove lid from extraction jar and transfer 10 grams of soil from weigh boat into extraction jar.
6. Recap extraction jar tightly and shake **vigorously** for one minute.
7. Allow to settle for one minute.

FILTER SAMPLE

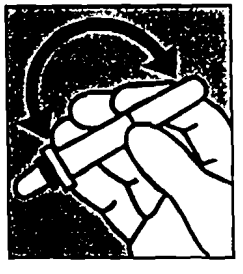


8. Remove lid from extraction jar.
9. Disassemble filtration plunger from filtration barrel.
10. Insert bulb pipette into top (liquid) layer in the extraction jar and draw up sample. Transfer **at least** ½ bulb capacity into filtration barrel. **Do not use more than one full bulb.**
11. Press plunger firmly into barrel until at least ½ mL of filtered sample is available (place on table and press if necessary).

Sample is now ready to be tested with the immunoassay.

PREPARE ENZYME DROPPER

12. Crush glass ampule contained within enzyme dropper by pressing tube against hard edge.



13. Mix enzyme by turning dropper end-over-end 5 times. Do not shake.
14. Remove seal from enzyme dropper.

PHASE TWO

DILUTION & BUFFERING OF SAMPLE & STANDARDS

Following completion of Phase Two steps, proceed directly with Phase Three.

NOTES BEFORE PROCEEDING WITH PHASE TWO

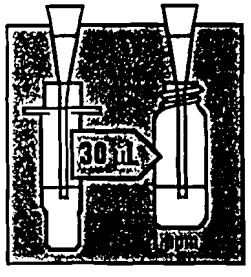
- Using a permanent marking pen (not included), write **Standard 1** near the top of one blue buffer tube and one antibody coated tube. Then, write **Standard 2** on one blue buffer tube and one antibody coated tube. Place the **Standard** tubes in the workstation.

- **For each sample to be tested at 1 ppm:**
  Place one **1** ppm dilution vial in the workstation.
  Write **1 ppm** near the top of one blue buffer tube and one antibody coated tube.

- **For each sample to be tested at 10 ppm:**
  Place one **10** ppm dilution vial in the workstation.
  Write **10 ppm** near the top of one blue buffer tube and one antibody coated tube.

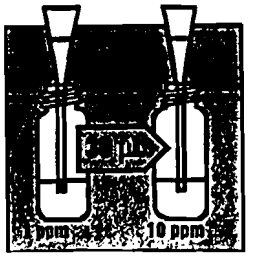
- Following instructions on reverse of insert, assemble new tip onto mechanical pipette.

DILUTE AND BUFFER SAMPLE

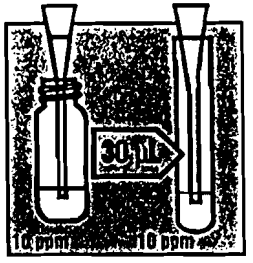


15 Remove caps from **1** and **10** ppm dilution vials.

16 Withdraw 30 µL of filtered sample using mechanical pipette and dispense below the liquid level in **1** ppm dilution vial. Replace cap and gently shake vial for 5 seconds.

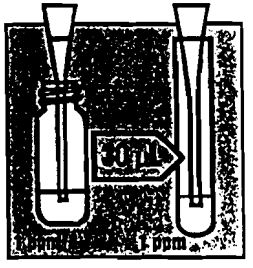


17 Withdraw 30 µL of diluted sample from the **1** ppm dilution vial and dispense below the liquid level in the **10** ppm dilution vial. Replace cap and gently shake vial for 5 seconds.



18 Remove caps from **1** and **10** ppm blue buffer tubes.

19 Withdraw 30 µL of diluted sample from **10** ppm dilution vial and dispense below the liquid level in **10** ppm blue buffer tube. Do not recap blue buffer tube.

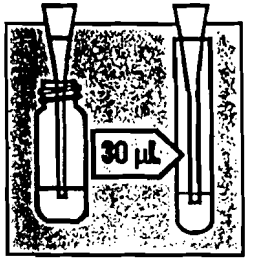


20 Wipe mechanical pipette tip, and withdraw 30 µL of diluted sample from **1** ppm dilution vial and dispense below the liquid level in **1** ppm blue buffer tube.

21 Gently shake both **1** and **10** ppm blue buffer tubes for 5 seconds.

22 Discard mechanical pipette tip.

BUFFER STANDARDS



23 Assemble new tip onto mechanical pipette.

24 Remove tops from PAH Standard vial and two blue buffer tubes marked **Standard 1** and **Standard 2**.

25 Withdraw 30 µL of PAH Standard and dispense below the liquid level in **Standard 1** blue buffer tube.

26 Wipe pipette tip with laboratory tissue.

27 Withdraw 30 µL of PAH standard and dispense below the liquid level in **Standard 2** blue buffer tube.

28 Dispose of PAH Standard vial in appropriate container.

29 Discard mechanical pipette tip.

30 Gently shake **Standard 1** and **Standard 2** blue buffer tubes for 5 seconds.

PHASE THREE

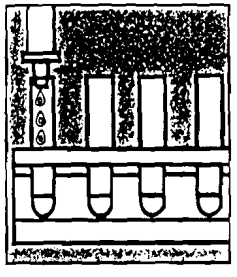
THE IMMUNOASSAY

Note: The timing used in performing Phase Three steps is critical to obtaining accurate test results.

NOTES BEFORE PROCEEDING WITH PHASE THREE

- This phase of the procedure requires critical timing and care in handling the antibody coated tubes.
- Instructions to gently shake any of the vials mean to gently but thoroughly mix the contents with special care not to spill or splash.
- All washing must be done thoroughly and with force to remove all unbound material. The wash solution is a harmless, dilute solution of detergent. Do not hesitate to wash vigorously even if the solution contacts gloved hands.

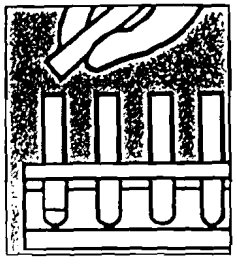
ADD ENZYME



31 Remove cap and dispense first drop from enzyme dropper into liquid waste container.

32 Dispense 3 drops into each blue buffer tube (**Standards** and **Samples**) by squeezing the dropper. When complete, gently shake blue buffer tubes for 5 seconds.

INCUBATION



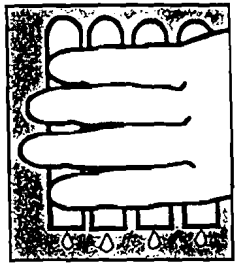
33 Start timing and immediately pour solution from each **Standard** blue buffer tube (1 and 2) into appropriate **Standard** antibody coated tube.

34 Pour solution from each **1** ppm and **10** ppm blue buffer tube into appropriate **1** ppm and **10** ppm antibody coated tube.

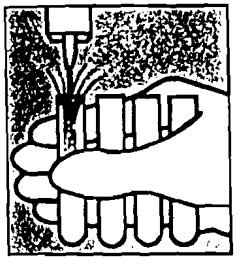
35 When pouring is complete, gently shake all 4 tubes for 5 seconds.

36 Let tubes stand exactly 10 minutes.

WASHING



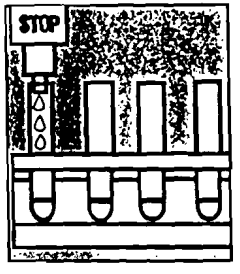
37 After the 10 minute incubation, discard solution from each antibody coated tube into liquid waste container.



38 Keeping nozzle of wash solution bottle just above top of antibody coated tube, forcefully squeeze wash solution into tube with a strong, vigorous stream to fill each tube. Empty all 4 washed tubes into liquid waste container. Repeat wash 3 times (total of 4 washes).

39 After final wash, tap antibody coated tubes upside down on the laboratory tissue.

COLOR DEVELOPMENT



40 Remove top from Substrate A (yellow cap).

Note: Keep Substrate dropper bottles **vertical** and direct each drop at bottom of antibody coated tubes. Addition of more or less than indicated number of drops (of Substrate A or B) may give inaccurate results.

41 Add 5 drops of Substrate A to each antibody coated tube..

42 Remove top from Substrate B (green cap).

43 **Start timing** and immediately add 5 drops of Substrate B to each antibody coated tube.

44 Shake all 4 tubes for 3-5 seconds, and let stand for **exactly** 2 ½ minutes. Solution will turn blue in some or all antibody coated tubes.

45 Stop reaction at end of 2 ½ minutes by adding 5 drops of Stop Solution (red cap). Shake all 4 tubes for 3-5 seconds.

Note: Blue solution will turn yellow when Stop Solution is added.

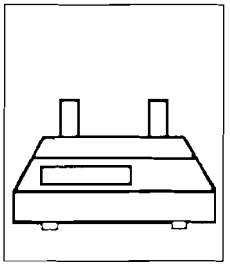
PHASE FOUR

INTERPRETING TEST RESULTS

NOTES BEFORE PROCEEDING WITH PHASE FOUR

- In this step, the standards are evaluated first in order to identify which is darker. To be conservative, the sample will be measured against the darker of these two standards.

SELECT STANDARD



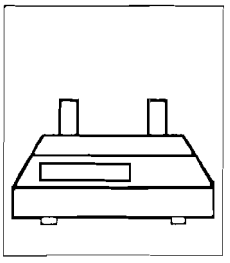
46 Wipe outside of **Standard 1** and **Standard 2** antibody coated tubes with laboratory tissue.

47 Place both **Standard** tubes in photometer.

48 If photometer readout is negative or zero, the tube in the left well is the darker standard. Remove tube from right well and discard it.

However,
If photometer reading is positive, the tube in the right well is the darker standard. Remove tube from left well, discard it, and move tube from right well to left well.

MEASURE SAMPLE



49 Wipe outside of **1** ppm antibody coated tube with laboratory tissue.

50 Place **1** ppm tube in right well of photometer and record reading shown on display.

If photometer reading is negative or zero, PAHs are present.

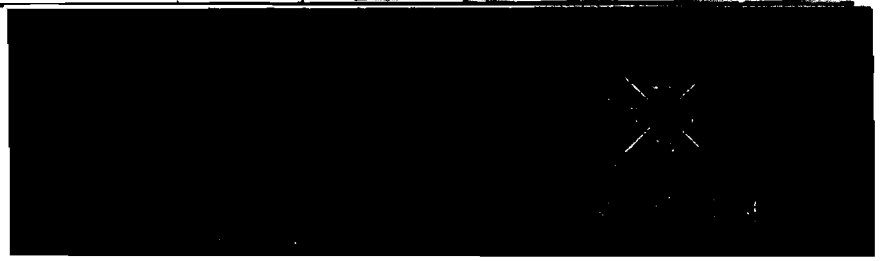
If photometer reading is positive, concentration of PAHs is less than **10** ppm.

51 Wipe outside of **10** ppm antibody coated tube with laboratory tissue.

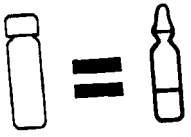
52 Place **10** ppm tube in right well of photometer and record reading shown on display.

If photometer reading is negative or zero, PAHs are present.

If photometer reading is positive, concentration of PAHs is less than **10** ppm.



We've Improved!



For ease of use, at many common dilution levels, we have replaced the dilution vial with the dilution ampule.

To Open ampule: Tap on hard surface, then slip plastic safety sleeve over top. Break tip at scored neck.

PCB RISC™ SOIL TEST SYSTEM

1 ppm

User's Guide

This method correctly identifies 95% of samples that are PCB-free and those containing 1 ppm or greater of PCBs. A sample that develops less color than the standard is interpreted as positive. It contains PCBs. A sample that develops more color than the standard is interpreted as negative. It contains less than 1 ppm PCBs.

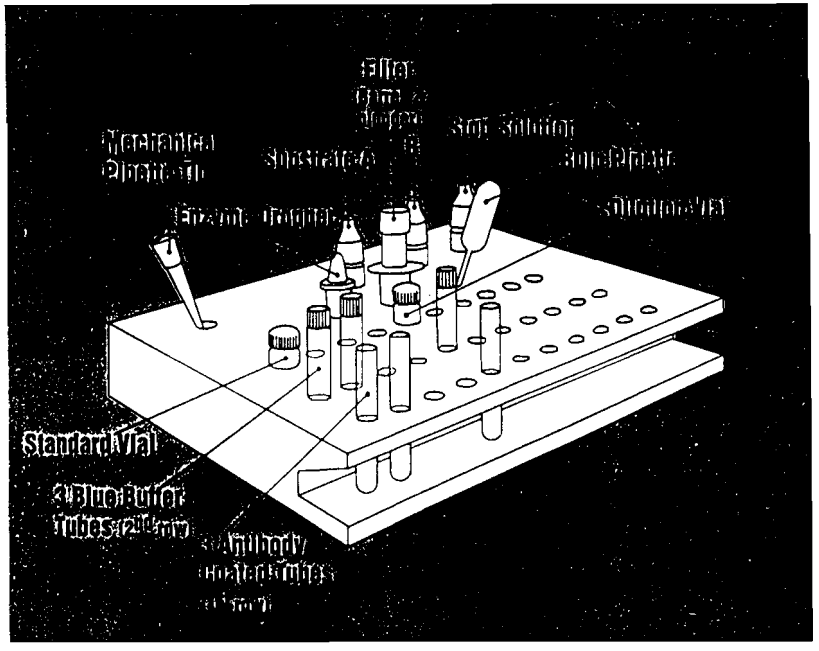
IMPORTANT NOTICE

The Test System performs accurately only when used as directed. This User's Guide is brief. Read it carefully prior to using the Test System. It will increase understanding of test objectives and help ensure a successful test.

WORKSTATION SET-UP

Assemble the following components in the workstation:

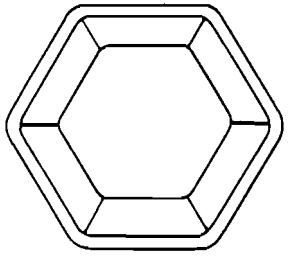
- ☐ 3 antibody coated tubes
- ☐ PCB standard vial
- ☐ Enzyme dropper
- ☐ Bulb pipette
- ☐ Substrate A
- ☐ Stop solution
- ☐ 3 blue buffer tubes
- ☐ 1 ppm dilution vial
- ☐ Filtration barrel & plunger
- ☐ 2 mechanical pipette tips
- ☐ Substrate B



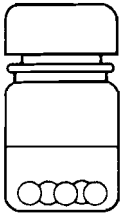
PHASE ONE
COMPONENTS FOR EXTRACTION & SAMPLE PREPARATION

Assemble the following components:

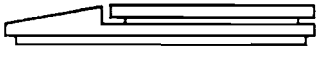
- ☐ Weigh boat
- ☐ Pan balance
- ☐ Wooden spatula
- ☐ Sample extraction jar
- ☐ Filtration barrel
- ☐ Filtration plunger
- ☐ Bulb pipette



Weigh Boat

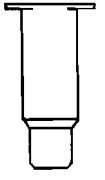


Sample extraction jar



Pan balance

Filtration plunger



Filtration barrel

Wooden spatula

Bulb pipette

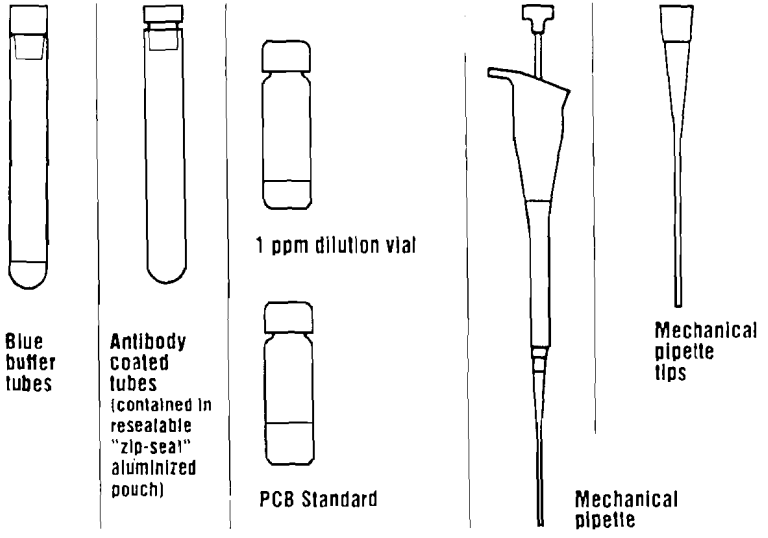
PHASE TWO
COMPONENTS FOR DILUTION OF SAMPLE & STANDARDS

Use the following component from Phase One:

- ☐ Filtered sample

Use the following additional components:

- ☐ Permanent marking pen (not included in test)
- ☐ 3 blue buffer tubes
- ☐ 3 antibody coated tubes
- ☐ Dilution vial marked "1"
- ☐ PCB standard vial marked "PCB Standard"
- ☐ Mechanical pipette
- ☐ 2 mechanical pipette tips



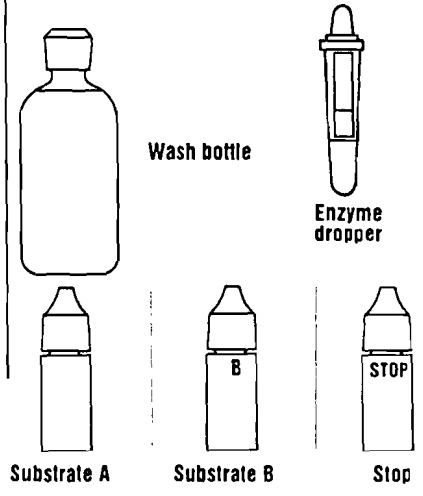
PHASE THREE
COMPONENTS FOR IMMUNOASSAY & COLOR DEVELOPMENT

Use the following components from earlier phases:

- ☐ Foam workstation
- ☐ Blue buffer tube marked "1"
- ☐ Blue buffer tube marked "Standard 1"
- ☐ Blue buffer tube marked "Standard 2"
- ☐ Antibody coated tube marked "1"
- ☐ Antibody coated tube marked "Standard 1"
- ☐ Antibody coated tube marked "Standard 2"
- ☐ Laboratory tissue (not included)

Use the following additional components:

- ☐ Enzyme dropper
- ☐ Wash bottle
- ☐ Liquid waste container (not included)
- ☐ Stop watch or timer
- ☐ Substrate A (yellow cap)
- ☐ Substrate B (green cap)
- ☐ Stop Solution (red cap)



PHASE FOUR
COMPONENTS FOR INTERPRETING TEST RESULTS

Use the following components from earlier phases:

- ☐ Foam workstation
- ☐ Antibody coated tube marked "1"
- ☐ Antibody coated tube marked "Standard 1"
- ☐ Antibody coated tube marked "Standard 2"
- ☐ Laboratory tissue (not included)

Use the following additional component:

- ☐ Photometer

System Description

Each PCB RISc Soil Test System contains enough material to perform four complete tests, each at two detection levels, if desired.

The PCB RISc Soil Test is divided into four phases. The instructions and notes should be reviewed before proceeding with each phase.

Hotline Assistance

If you need assistance or are missing necessary Test System materials, call toll free: 1-800-242-RISC (7472).

Validation and Warranty Information

Product claims are based on validation studies carried out under controlled conditions. Data has been collected in accordance with valid statistical methods and the product has undergone quality control tests of each manufactured lot.

PCB-free soil and soil containing 1 ppm or greater of PCBs were tested with the EnSys PCB RISc analytical method. The method correctly identified 95% of these samples. A sample that has developed less color than the standard is interpreted as positive. It contains PCBs. A sample that has developed more color than the standard is interpreted as negative. It contains less than 1 ppm PCBs.

The company does not guarantee that the results with the PCB RISc Soil Test System will always agree with instrument-based analytical laboratory methods. All analytical methods, both field and laboratory, need to be subject to the appropriate quality control procedures.

EnSys, Inc. warrants that this product conforms to the descriptions contained herein. No other warranties, whether expressed or implied, including warranties of merchantability and of fitness for a particular purpose shall apply to this product.

EnSys, Inc. neither assumes nor authorizes any representative or other person to assume for it any obligation or liability other than such as is expressly set forth herein.

Under no circumstances shall EnSys, Inc. be liable for incidental or consequential damages resulting from the use or handling of this product.

How It Works

Standards, Samples, and color-change reagents are added to test tubes, coated with a chemical specific to PCBs. The concentration of PCBs in an unknown **Sample** is determined by comparing its color intensity with that of a **Standard.**

Note: PCB concentration is inversely proportional to color intensity; the lighter the color development of the sample, the higher the concentration of PCBs.

Quality Control

Standard precautions for maintaining quality control:

- Do not use reagents or test tubes from one Test System with reagents or test tubes from another Test System.
- Do not use the Test System after any portion has passed its expiration date.
- Do not attempt the test using more than 12 antibody coated tubes (two of which are **Standards**) at the same time.
- Do not exceed incubation periods prescribed by the specific steps.
- Always dispense correct number of drops and wash the number of times indicated in this guide.
- Use EPA Method 8080 or Code of Federal Regulations Title 40, Part 136, Appendix A, Method 680 to confirm results.

Storage and Handling Precautions

- Wear protective gloves and eyewear.
- Store kit at room temperature and out of direct sunlight (less than 80°F).
- Keep aluminized pouch (containing unused antibody coated tubes) sealed when not in use.
- If Stop Solution or liquid from the extraction jar comes into contact with eyes, wash thoroughly with cold water and seek immediate medical attention.
- If Stop Solution or liquid from the extraction jar comes into contact with skin or clothing, wash thoroughly with cold water.
- Standard Solution contains PCBs. Test samples may contain PCBs. Handle with care.

PHASE ONE

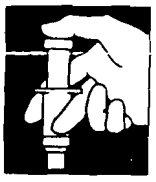
EXTRACTION & PREPARATION OF THE SAMPLE

NOTES BEFORE PROCEEDING WITH PHASE ONE

- Items that you will need that are not provided in the test kit include a permanent marking pen, laboratory tissue, a timer or stopwatch, liquid waste container, and disposable gloves.

1 Place weigh boat on pan balance.
2 Press ON/MEMORY button on pan balance. Balance will beep and display 0.0
3 Weigh out 10 +/- 0.1 grams of soil.
4 If balance turns off prior to completing weighing, use empty weigh boat to retare, then continue.

5 Remove lid from extraction jar and transfer 10 grams of soil from weigh boat into extraction jar.
6 Recap extraction jar tightly and shake vigorously for one minute.
7 Allow to settle for one minute.



8 Remove lid from extraction jar.
9 Disassemble filtration plunger from filtration barrel.
10 Insert bulb pipette into top (liquid) layer in the extraction jar and draw up sample. Transfer **at least** ½ bulb capacity into filtration barrel. Do not use more than one full bulb.
11 Press plunger firmly into barrel until at least ½ mL of filtered sample is available (place on table and press if necessary).

Sample is now ready to be tested with the immunoassay.

PHASE TWO

DILUTION & BUFFERING OF SAMPLE & STANDARDS

Following completion of Phase Two steps, proceed directly with Phase Three.

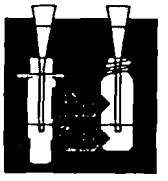
NOTES BEFORE PROCEEDING WITH PHASE TWO

- Using a permanent marking pen (not included), write **Standard 1** near the top of one blue buffer tube and one antibody coated tube. Then, write **Standard 2** near the top of one blue buffer tube and one antibody coated tube. Place the **Standard** tubes in the workstation.

- **For each sample to be tested:**
  Place one **1 ppm** dilution vial in the workstation.
  Write **1 ppm** near the top of one blue buffer tube and one antibody coated tube.

For two level test, repeat preceding steps for **10 ppm** dilution vial, using appropriate labels

- Following instructions on reverse of insert, assemble new tip onto mechanical pipette.
- Avoid withdrawing air bubbles in all pipetting steps.
- Do not attempt the test using more than 12 antibody coated tubes (two of which are **Standards**) at the same time.

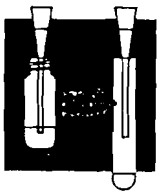


12 Remove cap from **1 ppm** dilution vial.
13 Withdraw 30 µL of filtered sample using mechanical pipette and dispense below the liquid level in **1 ppm** dilution vial. Then, withdraw another 30 µL of filtered sample and dispense below the liquid level into the same **1 ppm** dilution vial for a total of 60 µL; replace cap and gently shake vial for 5 seconds.

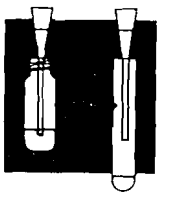
FOR TWO LEVEL TEST, INSERT THE FOLLOWING:

13a Withdraw 30 µL from the **1 ppm** dilution vial using mechanical pipette and dispense below the liquid level in **10 ppm** dilution vial. Then, withdraw another 30 µL from the **1 ppm** dilution vial and dispense below the liquid level into the same **10 ppm** dilution vial for a total of 60 µL; replace cap and gently shake vial for 5 seconds.

FOR TWO LEVEL TEST, FROM THIS POINT ON, ALL REFERENCES TO 3 TUBES SHOULD BE REPLACED BY 4 TUBES



14 Remove cap from **1 ppm** blue buffer tube.
15 Withdraw 30 µL of diluted sample from **10 ppm** dilution vial and dispense below the liquid level in **10 ppm** blue buffer tube. Do not recap blue buffer tube.
15a Withdraw 30 µL of diluted sample from **1 ppm** dilution vial and dispense below the liquid level in **1 ppm** blue buffer tube. Do not recap blue buffer tube.
16 Gently shake **1 ppm** blue buffer tube for 5 seconds.
17 Discard mechanical pipette tip.



18 Assemble new tip onto mechanical pipette.
19 Remove tops from PCB Standard vial and two blue buffer tubes marked **Standard 1** and **Standard 2**.
20 Withdraw 30 µL of PCB Standard and dispense below the liquid level in **Standard 1** blue buffer tube.
21 Wipe pipette tip with laboratory tissue.
22 Withdraw 30 µL of PCB standard and dispense below the liquid level in **Standard 2** blue buffer tube.
23 Immediately replace cap on PCB Standard vial.
24 Discard mechanical pipette tip.
25 Gently shake **Standard 1** and **Standard 2** blue buffer tubes for 5 seconds.

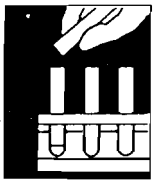
PHASE THREE

THE IMMUNOASSAY

Note: The timing used in performing Phase Three steps is critical to obtaining accurate test results.

NOTES BEFORE PROCEEDING WITH PHASE THREE

- This phase of the procedure requires critical timing and care in handling the antibody coated tubes
- Instructions to gently shake any of the vials mean to gently but thoroughly mix the contents with special care not to spill or splash
- Washing must be done thoroughly and with force to remove all unbound material. The wash solution is a harmless, dilute solution of detergent. Do not hesitate to wash vigorously even if the solution contacts gloved hands.



26 Start timing and immediately pour solution from each **Standard** blue buffer tube (1 and 2) into appropriate **Standard** antibody coated tube

27 Pour solution from **1 ppm** blue buffer tube into **1 ppm** antibody coated tube.

27a Pour solution from **10 ppm** blue buffer tube into **10 ppm** antibody coated tube.

28 When pouring is complete, gently shake all 3 tubes for 5 seconds.

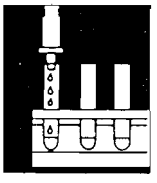
29 Let tubes stand exactly 10 minutes

30 Crush glass ampule contained within enzyme dropper by pressing tube against hard edge.

30a Repeat step 30 to prepare one enzyme dropper for every 5 antibody coated tubes.

31 Mix enzyme by turning dropper end-over-end 5 times. Do not shake.

32 Remove seal from enzyme dropper

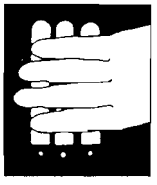


33 Dispense first drop from enzyme dropper into liquid waste container.

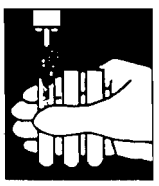
Note: before dispensing drops, tap capped tip on hard surface to avoid dispensing air bubbles

34 At exactly 10 minutes, start timing and immediately dispense 3 drops into each antibody coated tube (**Standards** and **Sample**) by squeezing the dropper. When complete, gently shake antibody coated tubes for 5 seconds

35 Let tubes stand exactly 5 minutes



36 After the 5 minute incubation (a total of 15 minutes), discard solution from each antibody coated tube into liquid waste container.



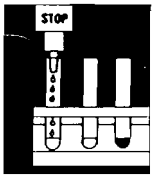
37 Keeping nozzle of wash solution bottle just above top of antibody coated tube, forcefully squeeze wash solution into each tube with a strong, vigorous stream to fill each tube. Empty all 3 washed tubes into liquid waste container. Repeat wash **3 times** (total of 4 washes).

38 After final wash, tap antibody coated tubes upside down on a laboratory tissue

Note: When running up to 12 antibody coated tubes, tubes can be washed in two groups - one group immediately following the other group

PHASE THREE (CONT.)

COLOR DEVELOPMENT



39 Remove top from Substrate A (yellow cap).

Note: Keep Substrate dropper bottles vertical and direct each drop at bottom of antibody coated tubes. Addition of more or less than indicated number of drops (of Substrate A or B) may give inaccurate results.

40 Add 5 drops of Substrate A to each antibody coated tube.

41 Remove top from Substrate B (green cap).

42 Start timing and immediately add 5 drops of Substrate B to each antibody coated tube.

43 Shake all 3 tubes for 3-5 seconds, and let stand for exactly 2 minutes. Solution will turn blue in some or all antibody coated tubes.

44 Stop reaction at end of 2 ½ minutes by adding 5 drops of Stop Solution (red cap)

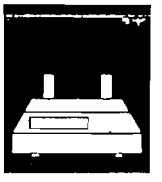
Note: Blue solution will turn yellow when Stop Solution is added

PHASE FOUR

INTERPRETING TEST RESULTS

NOTES BEFORE PROCEEDING WITH PHASE FOUR

- In this step, the standards are evaluated first in order to identify which is darker. To be conservative, the sample will be measured against the darker of these two standards.



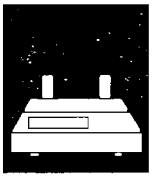
45 Wipe outside of **Standard 1** and **Standard 2** antibody coated tubes with laboratory tissue.

46 Place both **Standard** tubes in photometer.

47 If photometer readout is negative or zero, the tube in the left well is the darker standard. Remove tube from right well and discard it

However

If photometer reading is positive, the tube in the right well is the darker standard. Remove tube from left well, discard it, and move tube from right well to left well.



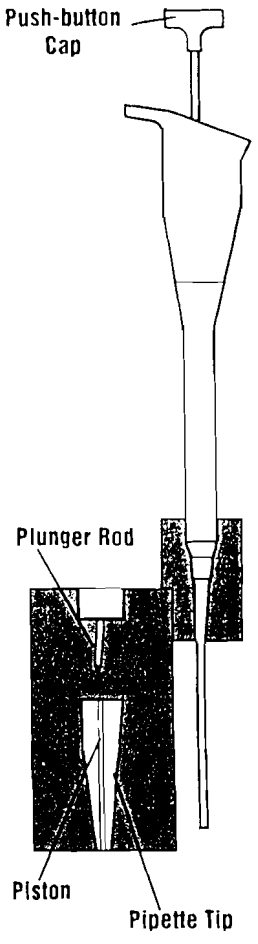
48 Wipe outside of **1 ppm** antibody coated tube with laboratory tissue

49 Place **1 ppm** tube in right well of photometer and record reading shown on display.

If photometer reading is negative or zero, PCBs are present.

If photometer reading is positive, concentration of PCBs is less than **1 ppm**

HOW TO OPERATE THE MECHANICAL PIPETTE



To Set Or Adjust Volume

Remove push-button cap and use it to loosen volume lock screw. Turn lower part of push-button to adjust volume up or down. Meter should read "030". Tighten volume lock screw and replace push-button cap.

To Assemble Pipette Tip

Slide larger mounting end of pipette tip onto end of pipette. Holding tip in place, press push-button until plunger rod enters pipette tip. Ensure no gap exists between piston and plunger rod (see illustration).

To Withdraw Sample

With tip mounted in position on pipette, press push-button to first stop and hold it.

Place tip at bottom of liquid sample and slowly release push-button to withdraw measured sample. Ensure that no bubbles exist in liquid portion of sample. If bubbles exist, dispense sample and re-withdraw sample.

To Dispense Sample

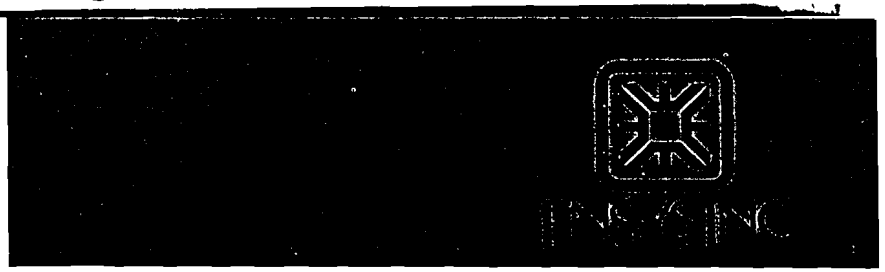
Place tip into dispensing vessel (immersing end of the tip if vessel contains liquid) and slowly press push-button to first stop. (Do not push to second stop or tip will eject).

Remove tip from vessel and release push-button.

To Eject Tip

Press push-button to second stop. Tip is ejected.

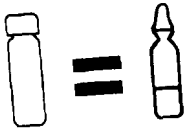
For additional information regarding operation and use of pipette, please refer to your pipette manual.



PCB RISC™ SOIL TEST SYSTEM

1 ppm

We've Improved!



For ease of use, at many common dilution levels, we have replaced the dilution vial with the dilution ampule.

To Open ampule: Tap on hard surface, then slip plastic safety sleeve over top. Break tip at scored neck.

User's Guide

This method correctly identifies 95% of samples that are PCB-free and those containing 1 ppm or greater of PCBs. A sample that develops less color than the standard is interpreted as positive. It contains PCBs. A sample that develops more color than the standard is interpreted as negative. It contains less than 1 ppm PCBs.

IMPORTANT NOTICE

The Test System performs accurately only when used as directed. This User's Guide is brief. Read it carefully prior to using the Test System. It will increase understanding of test objectives and help ensure a successful test.

APPENDIX B

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

FOR

REMEDIAL INVESTIGATION - FEASIBILITY STUDY

AT THE

ONEIDA SITE
CITY OF ONEIDA, MADISON COUNTY, NY

Submitted For:

NIAGARA MOHAWK POWER CORPORATION
SYRACUSE, NEW YORK 13202

Submitted By:

ENGINEERING-SCIENCE, INC.
290 ELWOOD DAVIS ROAD, SUITE 312
LIVERPOOL, NY 13088

Reviewed and Approved By:

	NAME	DATE
Project Manager	[signature]	2/25/93
H&S Officer	Brian J. Powell CSP	2/26/93

EMERGENCY CONTACTS

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below. For emergency situations, contact should first be made with the site coordinator who will notify emergency personnel who will then contact the appropriate response teams. This emergency contacts list must be in an easily accessible location at the site. A map indicating directions to the Oneida Hospital is included in Figure 1.

Contingency Contacts	Phone Number
Nearest phone located on-site	To be installed, or cellular phone or NMPC radio system
Fire Department	(315) 363-1020 (315) 363-1021
Poison Control Center	(800) 252-5655
NMPC - Oneida 215 Sconondoa	(800) 932-0301
Steven P. Stucker (NMPC Project Manager)	(315) 428-5652
NYSDEC Hotline	(800) 457-7362

MEDICAL EMERGENCY

Ambulance	(315) 363-6100 or (315) 361-1000
Oneida City Hospital* 321 Genesee Street, Oneida	(315) 363-6000

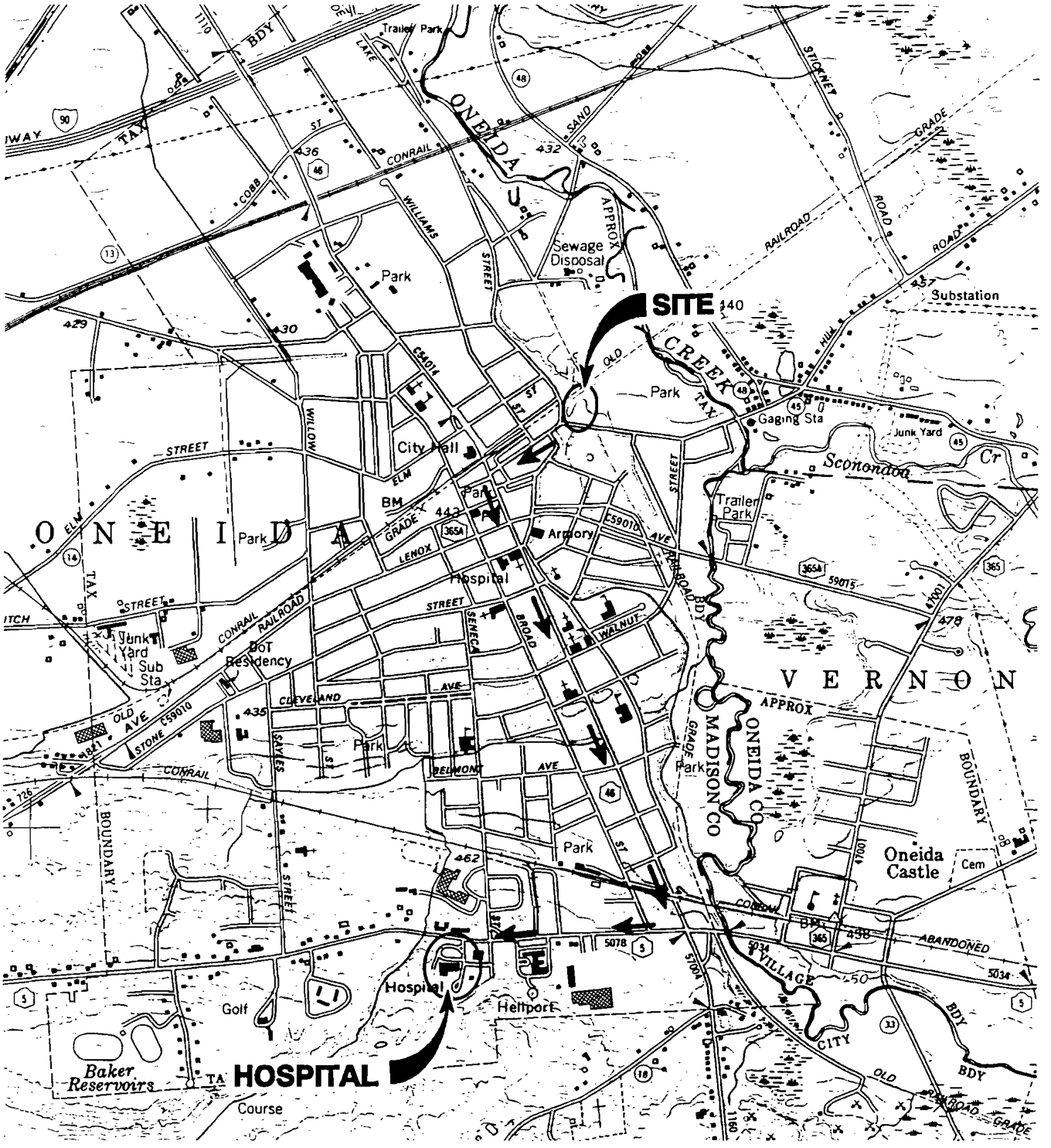
ROUTE TO HOSPITAL

Take 365A West to 46 South. Turn right (West) on Genesee Street (Route 5). Hospital is on left, approximately 2,500 feet.

Consultant Contacts	Phone
ES Project Manager: George H. Moreau (ES Syracuse)	(315) 451-9560 (Office)
ES Office Health and Safety Representative: Brian J. Powell, CIH (ES Syracuse)	(315) 451-9560 (Office)

*Prior to start of work, discuss site activities with hospital personnel to confirm that they will be prepared to handle an emergency (e.g., decontamination).

FIGURE 1



SCALE

0 2000 4000 FT.

2000 FT.

ENGINEERING-SCIENCE

ROUTE TO HOSPITAL

ONEIDA FORMER MGP SITE

NIAGARA MOWHAWK POWER CORP.

SPILL/RUPTURE NOTIFICATION

Utility Emergency

Gas Emergency	(800) 847-2345
Gas & Electric	(800) 548-2240

Agencies

NYSDEC Hotline	(800) 457-7362
National Spill Response Center	(800) 424-8802
Local DEC Office (Region 7)	(315) 426-7400

Provide the following information to the agencies:

- Name of person making call
- Company and location
- Nature of fire (fire calls only)
- Name and estimate amount of chemical released to the environment (spills only)
- Time of release
- Remedial action taken to correct the problem

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B-1 INTRODUCTION

B-1.1 Purpose and Requirements

The purpose of this health and safety plan is to establish personnel protection standards and mandatory safety practices and procedures for field investigation efforts. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while operations are being conducted at hazardous waste sites.

The provisions of the plan are mandatory for all on-site personnel. All Parsons ES personnel shall abide by this plan. Health and Safety plans must be prepared by subcontractors and they must conform to this plan as a minimum. All personnel who engage in project activities must be familiar with this plan and comply with its requirements. These personnel must sign-off on the Plan Acceptance Form (Attachment B-2) prior to beginning work on the site. The Plan Acceptance Form must be filed in the project file. A copy of this form will also be retained on site. All personnel will have received 40 hours of initial training in hazardous waste operations in compliance with 29 CFR 1910.120. The 40-hour training or 8 hours of refresher training will have taken place within the 12 months prior to the start of field work. The site safety officer, field team leader, and others in a supervisory or oversight role will have up-to-date certifications in CPR and first aid.

B-1.2 Site Background

The Oneida (Sconondoa Street) MGP site is located in an industrialized part of the City of Oneida, Madison County, New York. The site is wedged-shaped and 1.84 acres in size, The site is bordered to the west by Tailrace Creek, a tributary to Oneida Creek; to the east by an earthen path which was formerly rail tracks for the New York, Ontario and Western Railroad; and to the south by Sconondoa Street. The site is secured by a fence at the property perimeter and is locked after working hours. The site is generally flat with a gentle slope to the north. A five-foot embankment exists to the northwest of the site, above Tailrace Creek.

A Niagara Mohawk service center and storage area are currently in use at the site. The site contains a service office, garage, underground storage tanks, and a storage of powerline spools, transformers, and utility poles. Operational utility lines are present along the eastern and northern boundary of the site. Portions of the site are paved; the storage area is covered with gravel.

Tailrace Creek contains an oily sheen adjacent to, and downgradient from the property. Within the past ten years, dredging of the sediments was apparently performed along approximately 50 feet of Tailrace Creek, south of the former rail line. The spoils were deposited along the northern creek bank and contain a thick tarry substance similar in consistency to asphalt. The southern bank of Tailrace Creek, north of the former 100,000-cubic foot gas holder, contains a small patch of black, tarry material. Two wells within approximately one-half mile east of the site are registered with the U.S. Geological Survey database. The current use status of these wells is not

known. It is also not known whether site groundwater may impact these wells, as groundwater flow directions beneath the site have not been defined.

Potential sources of MGP residues are former production structures which have since been demolished and removed, but which may have residual contamination associated with them. These include a 25,000-cubic foot relief holder, a 100,000-cubic foot distribution holder, a cistern, purifiers, and oil tanks.

B-1.3 Scope of Work

Field tasks to be conducted at the site include:

- Shallow soil borings
- Deep soil borings
- Sediment inspection/PAH field screening
- Sediment sampling
- Surface water sampling
- Surface soil sampling
- Groundwater monitoring well installation and sampling

Section 3 of the Work Plan contains detailed field task descriptions.

B-1.4 Project Team Organization

Table B-1.1 describes the responsibilities of all on-site personnel associated with this project. The names of principal on-site personnel associated with this project are delineated below:

Consultant Project Manager: George H. Moreau

Consultant Remedial Investigation Team Leader: Scott B. Dillman

Consultant Site Health and Safety Officer: Brian J. Powell

B-2 RISK ANALYSIS

B-2.1 Chemical Hazards

Highest priority potential contaminants which may be encountered while conducting field tasks at the Oneida site are polycyclic aromatic hydrocarbons (PAHs), benzene, and polychlorinated biphenyls (PCBs). Some relevant properties of these compounds are shown in Table B-2.1. These compounds are most likely to have adverse effects if encountered in a significant quantity during field activities.

In addition to the compounds detected on site, some of the solvents used in the processing of samples and for the decontamination of equipment are potentially hazardous to human health if they are not used properly. Material Safety Data Sheets for these compounds are included in Attachment B-3. Some or all of these compounds may be used in the current tasks to be performed at the site.

TABLE B-1.1
ON-SITE PERSONNEL

Title	General Description	Responsibilities
Project Manager	Reports to upper-level management. Has authority to direct response operations. Assumes total control over site activities.	· Prepares and organizes the background review of the situation, the Work Plan, the Health and Safety Plan, and the field team. · Obtains permission for site access and coordinates activities with appropriate officials. · Ensures that the Work Plan is completed and on schedule. · Briefs the field teams on their specific assignments. · Uses the site health and safety officer to ensure that health and safety requirements are met. · Prepares the final report and support files on the response activities. · Serves as the liaison with public officials.
Site Safety Officer	Advises the Project Manager on all aspects of health and safety on site. Stops work if any operation threatens worker or public health or safety.	· Periodically inspects protective clothing and equipment. · Ensures that protective clothing and equipment are properly stored and maintained. · Controls entry and exit at the Access Control Points. · Coordinates health and safety program activities with the Project Safety Officer. · Confirms each team member's suitability for work based on a physician's recommendation. · Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue. · Implements the Site Safety Plan. · Conducts periodic inspections to determine if the Site Safety Plan is being followed. · Enforces the "buddy" system. · Knows emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.

TABLE B-1.1, CONTINUED
ON-SITE PERSONNEL

Title	General Description	Responsibilities
		· Notifies, when necessary, local public emergency officials. · Coordinates emergency medical care. · Sets up decontamination lines and the decontamination solutions appropriate for the type of chemical contamination on the site. · Controls the decontamination of all equipment, personnel, and samples from the contaminated areas. · Assures proper disposal of contaminated clothing and materials. · Ensures that all required equipment is available. · Advises medical personnel of potential exposures and consequences. · Notifies emergency response personnel by telephone or radio in the event of an emergency.
Field Team Leader	Responsible for field team operations and safety.	· Manages field operations. · Executes the Work Plan and schedule. · Enforces safety procedures. · Coordinates with the Site Safety Officer in determining protection level. · Enforces site control. · Documents field activities and sample collection. · Serves as a liaison with public officials.
Work Team	System operators. The work party must consist of at least two people.	· Safely completes the on-site tasks required to fulfill the Work Plan. · Complies with Site Safety Plan. · Notifies Site Safety Officer or supervisor of suspected unsafe conditions.

TABLE B-2.1

TOXICOLOGIC PROPERTIES OF COMPOUNDS(1)

Compound	LEL (%)	TLV (ppm)	IDLH	Odor Threshold (ppm)	Odor Characteristic	Acute Toxic Effects
PAHs	NS	0.2 mg/m^3 (Carcinogen)	400 mg/m^3	NA	Variable	Skin, respiratory irritants, bladder and kidneys are target organs
PCBs	NS	0.5 mg/m^3 (Carcinogen)	5 mg/m^3	NA	Mild hydro-carbon odor	Eye irritation, acne, jaundice, dark urine
Phenol	1.7	5 mg/m^3	100	1.0	Acid/creosote	Eye, skin, and respiratory irritant, anorexia
Cyanide	5.6	5 mg/m^3	50	5	Bitter almond	Asphyxia and death, nausea, vomiting, eye/skin irritation
Benzene	1.3	1.0 (Carcinogen)	1,000	119	Aromatic/sweet	Flushing, weakness, headache, coma, death
Toluene	1.2	100	2,000	37	Sweet, pungent Benzene-like	Euphoria, headache, dilated pupils, paresthesia dermatitis
o-m, p-Xylenes	1.0	100	1,000	20	Aromatic	Liquid irritates eyes and skin. Inhalation causes coughing, pulmonary edema.
Ethyl Benzene	1.0	100	2,000	0.6	Oily Solvent	Ingestion causes vomiting, coma, death

LEL Lower Explosive Limit

TLV Threshold Limit Value (ACGIH, 1987-88)

IDLH Level which is immediately dangerous to life and health

NA Not Available

(1) Source: NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Centers for Disease Control, National Institute for Occupational Safety and Health, September, 1985.

B-2.2 Physical Hazards

B-2.2.1 Heat Stress

The use of protective equipment, if required, may create heat stress. Monitoring of personnel wearing personal protective clothing should commence when the ambient temperature is 70°F or above. Table B-2.2 presents the suggested frequency for such monitoring. Monitoring frequency should increase as ambient temperature increases or as slow recovery rates are observed. Heat stress monitoring should be performed by a person with a current first aid certification who is trained to recognize heat stress symptoms. For monitoring the body's recuperative abilities to excess heat, one or more of the following techniques will be used. Other methods for determining heat stress monitoring, such as the wet bulb globe temperature (WBGT) Index from American Conference of Governmental Industrial Hygienist (ACGIH) TLV Booklet can be used.

To monitor the worker, measure:

- Heart rate. Count the radial pulse during a 30-second period as early as possible in the rest period.
- If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 100 beats per minute at the next rest period, shorten the following work cycle by one-third.
- Oral temperature. Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).
- If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period.
- If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following cycle by one-third.

B-2.2.2 Prevention of Heat Stress

Proper training and preventative measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress the following steps should be taken:

- Adjust work schedules.
  - Modify work/rest schedules according to monitoring requirements.
  - Mandate work slowdowns as needed.
  - Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.

TABLE B-2.2

SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORING FOR FIT AND ACCLIMATIZED WORKERS [a]

Adjusted Temperature[b]	Normal Work Ensemble[c]	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

a For work levels of 250 kilocalories/hour.

b Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F = ta °F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

c A normal work ensemble consists of cotton overalls or other cotton clothing with long sleeves and pants.

- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, i.e., eight fluid ounces (0.23 liters) of water must be ingested for approximately every eight ounces (0.23 kg) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
  - Maintain water temperature 50° to 60°F (10° to 16.6°C).
  - Provide small disposable cups that hold about four ounces (0.1 liter).
  - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.
  - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.

B-2.2.3 Cold-Related Illness

If work on this project begins in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally labeled frostbite.

Hypothermia - Hypothermia is defined as a decrease in the patient core temperature below 96°F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interferences with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a "cold" ambient temperature. Symptoms of hypothermia include: shivering, apathy, listlessness, sleepiness, and unconsciousness.

Frostbite - Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 20°F. Symptoms of frostbite are: a sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

B-2.2.4 Prevention of Cold Related Illness

- Educate workers to recognize the symptoms of frostbite and hypothermia.
- Identify and limit known risk factors.
- Assure the availability of enclosed, heated environment on or adjacent to the site.
- Assure the availability of dry changes of clothing.

- Develop the capability for temperature recording at the site.
- Assure the availability of warm drinks.

Monitoring

Start (oral) temperature recording at the job site:

- At the Field Team Leader's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind-chill less than 20°F, or wind-chill less than 30°F with precipitation).
- As a screening measure whenever any one worker on the site develops hypothermia.

Any person developing moderate hypothermia (a core temperature of 92°F) cannot return to work for 48 hours.

B-3 PERSONNEL PROTECTION AND MONITORING

B-3.1 Medical Surveillance

The consultant will utilize the services of a licensed occupational health physician with knowledge and/or experience in the hazards associated with the project to provide the medical examinations and surveillance specified herein.

Personnel involved in this operation have undergone medical surveillance prior to employment, and thereafter at 12-month intervals. The 12-month medical examination will meet the requirements of 29 CFR 1910.120. The medical exam is performed under the direction of a licensed Occupational Health Physician. A medical certification as to the fitness or unfitness for employment on hazardous waste projects, or any restrictions on his/her utilization that may be indicated, is provided by the physician. This evaluation will be repeated as indicated by substandard performance or evidence of particular stress that is evident by injury or time loss illness on the part of any worker. Copies of documents will be filed on-site.

B-3.2 Site Specific Training

The Site Health and Safety Officer will be responsible for developing a site specific occupational hazard training program and providing training to all consultant personnel that are to work at the site. This training will consist of the following topics:

- Names of personnel responsible for site safety and health.
- Safety, health, and other hazards at the site.
- Proper use of personal protective equipment.
- Work practices by which the employee can minimize risk from hazards.
- Safe use of engineering controls and equipment on the site.

- Acute effects of compounds at the site.
- Decontamination procedures.

B-3.3 Personal Protective Equipment and Action Levels

B-3.3.1 Conditions for Level D

Level D protection will be worn for initial entry on-site and initially for all activities. Level D protection will consist of:

- Coveralls
- Safety boots
- Nitrile outer and PVC inner gloves (must be worn during all sampling activities)
- Hard hat (must be worn during drilling activities)
- Splash goggles (must be worn if a splash hazard is present)
- 5-minute escape SCBA

B-3.3.2 Conditions for Level C

Dust and vapor suppression control will be implemented if the level of volatile organic compounds consistently exceeds 1 ppm. One such control method will be to mist surface soils. If the aforementioned action levels continue to be exceeded, the level of personal protection will be upgraded to level C.

Equipment Required For Level C

- 5-minute escape SBA
- Full-face air-purifying respirator
- Combination dust/organic vapor cartridges
- Tyvek overall suit
- PVC outer and Nitrile inner gloves
- Safety boots
- Hard hat (must be worn during drilling activities)

Conditions for Retreat

All personnel will move upwind of the source if any of the following conditions exist:

- Particulate concentrations consistently exceed 5 mg/m^3.
- Organic vapor concentrations (PID readings) consistently exceed 5 ppm (based on benzene).

Workers may utilize dust and vapor suppression techniques to lower the concentrations. Work may resume when concentrations drop to acceptable levels. If concentrations do not drop sufficiently, the field team leader will consult with the Office Health and Safety Representative to discuss further options.

OSHA Requirements for Personal Protective Equipment

All personal protective equipment used during the course of this field investigation must meet the following OSHA standards:

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133	ANSI Z87.1-1968
Respiratory	29 CFR 1910.134	ANSI Z88.1-1980
Head	29 CFR 1910.135	ANSI Z89.1-1969
Foot	29 CFR 1910.136	ANSI Z41.1-1967

ANSI = American National Standards Institute

Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.1025; 29 CFR 1910.134).

Air purifying respirators cannot be worn under the following conditions:

- Oxygen deficiency
- IDLH concentrations
- High relative humidity
- If contaminant levels exceed designated use concentrations.

Note: If respiratory protection is used the appropriate respirator usage log(s) must be filled out and returned to the Office Health and Safety Representative (Attachment B-2).

B-3.4 Monitoring Requirements

Monitoring for organic vapors in the breathing zone will be conducted with a Photovac MicroTIP (or equivalent) photoionization detector. Readings will be taken under the following circumstances.

- Upon initial entry onto the site.
- When weather conditions change.
- When work begins on another portion of the site.
- Continuously during drilling.

B-3.4.1 Community Air Monitoring Plan

Real-time air monitoring for volatile compounds at the perimeter of the exclusion zone is necessary. If particulates become a concern at this site, possibly as a result of drilling activities or wind erosion of soils, this community plan will be modified accordingly. Contaminants onsite are not anticipated to pose a problem as particulates because of the moisture content of the soil.

- Volatile organic compounds must be monitored at the downwind perimeter of the exclusion zone continuously. If total organic vapor levels exceed 5 ppm above background, monitoring at the site perimeter will be conducted continuously until levels in the exclusion zone drop below action levels. All readings must be recorded and be available for State (DEC & DOH) personnel to review.
- Drager tubes will be used to monitor cyanide if purifier wastes are encountered.

The potential for generating dust is greatest at the start of the boring, until the moist soils above the water table are encountered. At the Oneida site, moist soil or the water table was typically encountered at a depth of 2 to 5 feet below ground surface. Once the moist soils and water table are encountered, the soil cuttings become saturated and dust is not generated. To prevent dust generation prior to encountering the water table, we will be wetting down the ground surface and soil cuttings until the water table is encountered.

We believe this is a more effective and preventative approach to community protection. This will also provide a better alternative to dust monitoring while on-site, since we will be unable to avoid situations where service center activities (such as trucks passing through the site) create dust which exceeds our investigation action level and causes us to stop work, because the source of the dust cannot be determined (i.e. the action level is below the visible level).

Similarly, our alternative method will provide preventative measures while working in the public park. However, we do not anticipate the presence of MGP-related contamination in the park. Previous work just outside the site property line did not identify zones of contamination which would generate contaminated dust. This is expected to be the case in the park, which is over 1000 feet away from the site. Our rationale for drilling there is to place a piezometer for water level measurements.

There is also a Department of Public Works soil stockpile area adjacent to the park. Trucks moving through that area generate dust which could be detected during our monitoring and cause work to be unnecessarily stopped.

With respect to abatement of nuisance odors, our history of over 25 borings and well installations and over a dozen test pit excavations at the Oneida site has shown odors to not be a problem. However, as was planned for the previous test pit excavations, we will have on-site odor-suppression foam to cover the soil cuttings coming out of the borings, if needed. We will also keep the soil cuttings stored in the roll off container covered, and will use foam to mitigate odors created by the soils in the roll off, if necessary. We will arrange for removal of any soils stored on-site which generate nuisance odors that cannot be controlled.

B-3.4.2 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the Exclusion Zone, drilling activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, drilling activities can resume. If the organic vapor levels are greater than

5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 ft. downwind of the Exclusion Zone or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background, and
- more frequent intervals of monitoring, as directed by the Safety Officer, are conducted.

If the organic vapor level is above 25 ppm at the perimeter of the Exclusion Zone work activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

B-3.4.3 Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the Survey Site or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the Exclusion Zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20-Foot Zone).

If either of the following criteria are exceeded in the 20-Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented:

- Organic vapor levels approaching 5 ppm above background for a period of more than 30 minutes.
- Organic vapor levels greater than 10 ppm above background for any time period.

B-3.4.4 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.
2. Frequent air monitoring will be conducted at 30 minute intervals within the 20-Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.
3. All Emergency contacts will go into effect as appropriate.

B-4 WORK ZONES AND DECONTAMINATION

B-4.1 Site Work Zones

To reduce the spread of hazardous materials by workers from the contaminated areas to the clean areas, zones will be delineated at the site. The flow of personnel between the zones should be controlled. The establishment of the work zones will help ensure that: personnel are properly protected against the hazards present where they are working, work activities and contamination are confined to the appropriate areas, and personnel can be located and evacuated in an emergency.

B-4.1.1 Exclusion Zone

Exclusion zones will be established at the site for all drilling activities; unprotected onlookers should be located 50 feet upwind of drilling or soil sampling activities. In the event that volatile organics are detected in the breathing zone as discussed in Section 3, all personnel within the exclusion zone must don Level C protection. Exclusion zones will also be established during any activity when Level C protection is established as a result of conditions discussed in Section 3.

All personnel within the exclusion zone will be required to use the specified level of protection. No food, drink, or smoking will be allowed in the exclusion or decontamination zones.

B-4.1.2 Decontamination Zone

Should it be necessary to establish an exclusion zone, the decontamination zone will be utilized. This zone will be established between the exclusion zone and the support zone, and will include the personnel and equipment necessary for decontamination of equipment and personnel (discussed below). Personnel and equipment in the exclusion zone must pass through this zone before entering the support zone. This zone should always be located upwind of the exclusion zone.

B-4.1.3 Support Zone

The support zone will include the remaining areas of the job site. Break areas, operational direction, and support facilities (to include supplies, equipment storage, and maintenance areas) will be located in this area. No equipment or personnel will be permitted to enter the support zone from the exclusion zone without passing through the personnel or equipment decontamination station. Eating, smoking, and drinking will be allowed only in this area.

B-4.2 Decontamination

Any water used in decontamination procedures will be contained along with the investigation-derived waste and characterized prior to disposal.

B-4.2.1 Decontamination of Personnel

Decontamination will not be necessary if only Level D protection is used. However, disposable gloves used during sampling activities should be removed and bagged; personnel should be encouraged to remove clothing and shower as soon as is practicable at the end of the day. All clothing should be machine-washed. All personnel will wash hands and face prior to eating and before and after using the

restroom. Disposable boots or washable boots will be removed or cleaned before leaving the site.

Decontamination will be necessary if Level C protection is used. The following OSHA-specified procedures include steps necessary for complete decontamination prior to entry into the support zone, and steps necessary if a worker only needs to change a respirator or respirator canister.

Modification can be made to the twelve station decontamination process by the site health and safety officer depending upon the extent of contamination.

Station 1: Segregated Equipment Drop

Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross-contamination.

Station 2: Suit/Safety Boot and Outer-Glove Wash

Thoroughly wash chemically resistant suit, safety boots, and outer gloves. Scrub with long-handle, soft-bristle scrub brush and copious amounts of Alconox/water solution.

Necessary equipment includes:

1. Wash tub (30 gallon or large enough for person to stand in)
2. Alconox/water solution
3. Long-handle soft-bristle scrub brushes

Station 3: Suit/Safety Boot and Outer-Glove Rinse

Rinse off Alconox/water solution using copious amounts of water. Repeat as many times as necessary.

Necessary equipment includes:

1. Wash tub (30 gallon or large enough for person to stand in)
2. Spray unit
3. Water
4. Long-handle, soft-bristle scrub brushes

Station 4: Outer Gloves Removal

Remove the outer gloves and deposit in individually marked plastic bags.

Necessary equipment includes:

1. Plastic bag

Station 5: Canister or Mask Change

If a worker leaves the exclusion zone to change a canister (or mask), this is the last step in the decontamination procedures. The worker's canister is exchanged, new outer

glove donned, and joints taped. Worker returns to duty. Otherwise the worker proceeds to Station 6.

Necessary equipment includes:

1. Canister (or mask)
2. Tape
3. Gloves

Station 6: Removal of Chemically Resistant Suit

With assistance of helper, remove suit. Deposit in container with plastic liner.

Necessary equipment includes:

1. Container with plastic liner

Station 7: Inner-Glove Wash

Wash inner gloves with Alconox/water solution that will not harm skin. Repeat as many times as necessary.

Necessary equipment includes:

1. Alconox/water solution
2. Wash tub
3. Long-handle, soft-bristle brushes

Station 8: Inner-Glove Rinse

Rinse inner gloves with water. Repeat as many times as necessary.

Necessary equipment includes:

1. Water
2. Wash tub

Station 9: Respirator Removal

Remove face-piece. Avoid touching face. Wash respirator in clean, sanitized solution, allow to dry and deposit facepiece in plastic bag. Store in clean area.

Necessary equipment includes:

1. Plastic bags
2. Sanitizing solution
3. Cotton

Station 10: Inner-Glove Removal

Remove inner gloves and deposit in container with plastic liner.

Necessary equipment includes:

1. Container with plastic liner

Station 11: Field Wash

Wash hands and face.

Necessary equipment includes:

1. Water
2. Soap
3. Tables
4. Wash basins or buckets
5. Clean towels

Station 12: Redress

If re-entering exclusion zone put on clean field clothes (e.g., Tyvek, gloves, etc.).

Necessary equipment includes:

1. Table
2. Clothing

B-4.2.2 Decontamination of Equipment

Drill rigs will be steam cleaned and drilled equipment will be decontaminated prior to moving to a site. Drilling equipment used for multiple boreholes will be decontaminated prior to drilling each boring at the site. The equipment will be decontaminated in the following manner:

- The drill rig will be steam cleaned to remove gross contamination.
- Downhole equipment (auger bits, drill rods, split spoons, etc.) will be steam cleaned and air dried to remove gross contamination.
- Surface equipment, such as field meters and surveying instruments, will be wiped with a clean, damp cloth.

A drilling sequence hierarchy (from less likely to more likely contaminated boring locations) will be imposed to reduce the potential for cross contamination.

B-5 ACCIDENT PREVENTION AND CONTINGENCY PLAN

B-5.1 Accident Prevention

All field personnel will receive health and safety training prior to the initiation of any site activities. On a day-to-day basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Before daily work assignments, Health and Safety meetings should be held. Discussion should include:

- Tasks to be performed.
- Time constraints (e.g., rest breaks, cartridge changes).

- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, concentration limits, or other danger signals.
- Emergency procedures.

B-5.1.1 Drilling

Prior to any drilling activity efforts will be made to determine whether underground installations will be encountered and, if so, where these installations are located. Hard hats and safety boots must as a minimum be worn within 50 feet of the drill rig. The drill rig cannot be operated within 10 feet of power lines. The Field Team Leader or Site Health and Safety Officer will provide constant on-site inspection of the drilling subcontractor to ensure that they are meeting the health and safety requirements. If deficiencies are noted, work will be stopped and corrective action will be taken (e.g., retrain, purchase additional safety equipment). Reports of health and safety deficiencies and the corrective action taken will be forwarded to the Project Manager.

B-5.2 Contingency Plan

The Project Supervisor is responsible for implementing the Contingency Plan whenever there is either a threat to human health or an environmental hazard. Possible situations include actual or imminent fires, explosions, or spills.

The individual discovering the emergency situation is to notify the Project Supervisor who will then notify the appropriate organizations as described on page B-2.

Emergency decontamination of personnel, if required, will involve the following procedures:

1. immediate removal and containment of contaminated protective outerwear,
2. use of emergency eye wash, first aid, and/or showers (Niagara Mohawk facility), and
3. contact emergency public health services, hospital, and ambulance, if required.

B-5.2.1 Assessment

The Project Manager in conjunction with the Health and Safety Officer is responsible for ascertaining any possible health or environmental hazards and determining the need for evaluation and notification of the proper authorities.

B-5.2.2 Control Procedures

The employee discovering a fire, explosion, spill, or other emergency situation is responsible for notifying the Project Manager and to the extent possible, providing the information listed on page B-4. The Project Manager will assess the situation to determine if it can be adequately handled by site personnel or if additional assistance is needed.

Before any employee attempts to extinguish a fire, clean-up and contain a spill or take any other action, he or she must be aware of the properties of the material involved and its associated hazards. All employees will be familiarized with this

information during their training period and will be instructed on the proper protective clothing to be worn in such a situation.

B-5.2.3 Fire and/or Explosion

In the event of a fire or explosion, the Niagara Mohawk Project Manager should be notified immediately. The Project Manager in conjunction with the Health and Safety Officer is responsible for determining the requirements for outside assistance as well as the necessity for site evacuation.

Small fires can be extinguished using fire extinguishers which will be maintained in the "Support Zone". Larger fires will require the assistance of the fire department.

Any contaminated materials must be properly cleaned before being returned to service.

B-5.2.4 Spill and/or Material Release

In the event of a spill or release of materials, the Niagara Mohawk Project Manager should be notified immediately. The Project Manager shall immediately notify the site engineer. The Project Manager will be responsible for determining whether the spill or release can be handled by on-site personnel or whether outside assistance is necessary. In addition, the Project Manager will be responsible for ensuring that all agency notifications are made.

Spill clean-up poses no danger under normal conditions. The first step (subsequent to the notification of the Engineer) is to determine the source of the spill and correct. In the event of a small spill, granules or sorbent pads may be utilized to soak up the spilled material. The granules would then be swept up and containerized in Department of Transportation approved drums. Absorbent materials will be kept in the "Support Zone".

Large spills that cannot be properly contained and cleaned by on-site workers will be handled by calling in appropriate off-site assistance.

Any contaminated materials or equipment must be properly cleaned before being returned to service.

B-5.2.5 Prevention of Recurrence or Spread of Fires, Explosions, or Releases

In the event of any emergency situation, operations at the Oneida site will be suspended until it is determined that no risk remains. All response actions will be taken with the primary objective of protecting human health and safety, and then the environment. The cause and subsequent handling of any emergencies that occur at the Oneida site will be methodically reviewed in order to prevent future occurrences.

B-5.2.6 Post-Emergency Equipment Maintenance

After an emergency situation, any contaminated materials or equipment that were used will be decontaminated or disposed of and replaced.

Equipment needed for decontamination would include sorbent (such as Speedi-Dry), broom, shovel, rags, detergent, degreaser, water, rinse basin, protective clothing, and containers for disposal.

B-5.2.7 Personal Injury

A first-aid kit will be maintained on site at all times. In case of personal injury at the site, the following procedures should be followed:

- Another team member (buddy) should signal the Field Team Leader that an injury has occurred.
- A field team member trained in first aid can administer treatment to an injured worker.
- The victim should then be transported to the nearest hospital or medical center. If necessary, an ambulance should be called to transport the victim.
- The Field Team Leader or Site Health and Safety Officer is responsible for making certain that an accident report form is completed. This form is to be submitted to the Office Health and Safety Representative. Follow-up action should be taken to correct the situation that caused the accident.
- The NMPC Project Manager shall be notified.

B-5.2.8 Evacuation Procedures

- The Field Team Leader will initiate evacuation procedure by signalling to leave the site. The signal will be three short blasts on an air horn.
- All personnel in the work area should evacuate the area and meet in the common designated area.
- All personnel suspected to be in or near the contract work area should be accounted for and the whereabouts of missing persons determined immediately.
- Further instruction will then be given by the Field Team Leader.

ATTACHMENT B-1

AIR MONITORING EQUIPMENT CALIBRATION AND MAINTENANCE

AIR MONITORING EQUIPMENT CALIBRATION AND MAINTENANCE

All monitoring instruments must be calibrated and maintained periodically. The limitations and possible sources of errors for each instrument must be understood by the operator. It is important that the operator ensures that the instrument responds properly to the substances it was designed to monitor. Portable air quality monitoring equipment that measures total ionizables present such as the Photovac Microtip must be calibrated at least once each day. Combustible gas/oxygen meters (explosimeters) such as the Biosensor II must be calibrated at least once each week. The specific instructions for calibration and maintenance provided for each instrument should be followed.

ATTACHMENT B-2

FORMS FOR HEALTH AND SAFETY-RELATED ACTIVITIES

Note: The OSHA Job Safety and Health Protection Form (see next page) must be posted prominently during the field investigation.

PLAN ACCEPTANCE FORM

PROJECT HEALTH AND SAFETY PLAN

I have read and agree to abide by the contents of the Health and Safety Plan for the following project:

PROJECT TITLE: _____

PROJECT NUMBER: _____

_____

Name (print)

_____

Signature

_____

Date

Place in project Health and Safety File before starting field work.

SITE-SPECIFIC TRAINING

PROJECT HEALTH AND SAFETY TRAINING

I hereby confirm that site-specific health and safety training has been conducted by the site health and safetyd officer which included:

- Names of personnel responsible for site safety and health
- Safety, health, and other hazards at the site
- Proper use of personal protective equipment
- Work practices by which the employee can minimize risk from hazards
- Safe use of engineering controls and equipment on the site
- Acute effects of compounds at the site
- Decontamination procedures

For the following project:

PROJECT TITLE: _____

PROJECT NUMBER: _____

_____

Name (print)

_____

Signature

_____

Date

Place in project Health and Safety File as soon as possible.

AIR PURIFYING

RESPIRATOR LOG

SITE: _____

LOCATION: _____

DATES OF INVESTIGATION: _____

User	Date of Use	Cleaned and Inspected Prior To Use (Initials)	Cartridges Changed Prior to Use (Yes, NO, N/A)	Total Hours on Cartridge	Date of Last Fit Test

Site Health and Safety Officer or
Project Manager

Date

Place in project Health and Safety File as soon as possible.

SCBA

RESPIRATORY LOG

SITE: _____

LOCATION: _____

DATES OF INVESTIGATION: _____

User	Date of Use	SCBA #	Satisfactory Check-out (Yes/No - Initials)	Date Cleaned

SCBA Performance Comments:

_____

Site Health and Safety Officer or Project Manager — Date

Place in project Health and Safety File as soon as possible.

OCCUPATIONAL INJURY / ILLNESS REPORT

SAFETY EXCELLENCE
MOHAWK

DO NOT DELAY THIS REPORT - COMPLETE ALL SECTIONS

- **SERIOUS INJURY / ILLNESS REQUIRES IMMEDIATE NOTIFICATION TO SAFETY DEPARTMENT**

INJURED EMPLOYEE COMPLETE THIS SECTION

SOCIAL SECURITY NUMBER | DATE OF INCIDENT | HOUR OF DAY (MILITARY TIME)

EMPLOYEE NAME (FIRST, MI, LAST) | SBU / CSU

NAMES AND EMPLOYEE NUMBERS (OR COMPANY) OF WITNESSES

1.

2.

NAME OF CREW CHIEF OR SUPERVISOR | EXT:

ADDRESS WHERE INCIDENT OCCURRED (STREET, CITY)

COUNTY

DESCRIBE FIRST AID GIVEN

DATE

BY WHOM

JOB TITLE WHEN INJURED

SUPERVISOR INSTRUCTIONS/ACTIONS

1. Complete this form immediately upon employee notification of occupational injury/illness.
2. **Immediately telephone the Local Safety & Health Department.**
   DATE:_____ TIME:_____

Inside Calls	Outside Calls
East - 831-3346	East - 433-3346
West - 841-7110	West - 831-7110
Central - 821-1024	Central - 460-1024
Nuclear - 824-7888	Nuclear - 349-7888

3. Notify Local Safety and Health Specialist for cases involving medical treatment, potential lost time or restricted duty.
   DATE:_____ TIME:_____
4. Notify Local Occupational Health Nurse for potential lost time or restricted duty case.
   DATE:_____ TIME:_____

East - 831-3739	West - 841-7115
Central - 821-5805	Nuclear - 824-7645

5. Send original Injury/Illness Report to Local Safety and Health Office. _____

Has Physical Evaluation Form been provided to physician? ☐ Yes ☐ No

Is investigation planned? ☐ Yes ☐ No

DESCRIBE THE INCIDENT INCLUDING THE EVENTS LEADING UP TO IT:

HAVE IMMEDIATE CORRECTIVE ACTIONS BEEN TAKEN? IF "YES", DESCRIBE: ☐ Yes ☐ No | DESCRIBE:

WERE REQUIRED MECHANICAL SAFEGUARDS AND/OR REQUIRED PERSONAL PROTECTION EQUIPMENT IN USE AT TIME OF ACCIDENT? ☐ Yes ☐ No | EXPLAIN:

FRAUDULENT WORKERS COMPENSATION CLAIMS ARE SUBJECT TO CRIMINAL PENALTIES UNDER SECTION 114 OF THE NYS WORKERS COMPENSATION LAW.

EMPLOYEE SIGNATURE | DATE

X

SUPERVISOR COMPLETE THIS SECTION

WORK LOCATION | OSHA LOCATION CODE NUMBER | DATE SUPERVISOR FIRST KNEW OF INCIDENT | DATE OF FIRST FULL DAY OF LOST TIME

EMPLOYEE STATUS (CHECK ONE) ☐ REGULAR ☐ PROBATIONARY ☐ TEMPORARY ☐ PART TIME

EMPLOYEE IS A: ☐ DAY ☐ SCHEDULE ☐ SHIFT WORKER

WAS THIS REGULAR OCCUPATION? ☐ YES ☐ NO

IF NOT WORKING AT REGULAR OCCUPATION, WHY? ☐ TEMP. UPGRADE ☐ OTHER, EXPLAIN

TOTAL HOURS SCHEDULED TO WORK WEEK OF INCIDENT
TOTAL HRS. WEEK

NAME AND ADDRESS OF PHYSICIAN | NAME AND ADDRESS OF HOSPITAL

DATE OF INITIAL TREATMENT | DATE OF INITIAL TREATMENT

SUPERVISOR COMPLETE THIS SECTION

CLASS OF INCIDENT - LIST ONE NUMBER OR LETTER - NOT BOTH

CLASS — CODE NO.

01 - INJURY, DEATH	04 - INJURY, TIME RESTRICTED	07 - ILLNESS, DEATH	10 - ILLNESS, TIME RESTRICTED	D - DISPUTED
02 - INJURY, TIME LOST	05 - INJURY, RETIRED	08 - ILLNESS, TIME LOST	11 - ILLNESS, RETIRED	F - FIRST AID
03 - INJURY, OTHER	06 - INJURY, PERM TRANSFER	09 - ILLNESS, OTHER	12 - ILLNESS, PERM TRANSFER	I - INCOMPLETE

NATURE OF INCIDENT - LIST NO MORE THAN TWO OF THE FOLLOWING

NATURE — CODE NOS.

01 - ABRASION	11 - ELECTRICAL SHOCK	21 - SPRAIN	31 - FOREIGN BODY
02 - FRACTURE	12 - RADIATION EXPOSURE	22 - CHIP	32 - DISLOCATION
03 - FLASH BURN	13 - INFECTION	23 - RUPTURE	33 - STRAIN
04 - HERNIA	14 - CONCUSSION	24 - DUST TO LUNG	34 - RESERVED
05 - CRUSH	15 - LACERATION	25 - CHEMICAL BURN	35 - HEAT ILLNESS
06 - BRUISE	16 - PUNCTURE	26 - SORENESS	36 - REPETITIVE TRAUMA
07 - THERMAL BURN	17 - CONTUSION	27 - SEPARATION	37 - HEARING LOSS
08 - AMPUTATION	18 - INSECT STING/BITE	28 - RESPIRATORY (TOXIC AGENTS)	38 - SUNBURN
09 - SKIN DISORDER	19 - ANIMAL BITE	29 - POISONING (TOXIC AGENTS)	39 - RESERVED
10 - POISONOUS PLANT	20 - FROSTBITE	30 - RESPIRATORY (NON-TOXIC)	

SPECIFIC PART OF BODY INJURED - LIST NO MORE THAN FOUR OF THE FOLLOWING

BODY — CODE NOS. / CODE NOS.

01 - SCALP	15 - RIGHT SHOULDER	29 - LEFT SMALL FINGER	43 - LEFT RIBS	57 - RIGHT ANKLE
02 - LEFT EYE	16 - LEFT UPPER ARM	30 - LEFT THUMB	44 - RIGHT RIBS	58 - LEFT FOOT
03 - RIGHT EYE	17 - RIGHT UPPER ARM	31 - RIGHT INDEX FINGER	45 - CHEST	59 - RIGHT FOOT
04 - LEFT EAR	18 - LEFT ELBOW	32 - RIGHT MID. FINGER	46 - LUNGS	60 - LEFT KNEE
05 - RIGHT EAR	19 - RIGHT ELBOW	33 - RIGHT RING FINGER	47 - INTERNAL	61 - RIGHT KNEE
06 - MOUTH	20 - LEFT FOREARM	34 - RIGHT SMALL FINGER	48 - LEFT BUTTOCKS	62 - CHIN
07 - SKULL	21 - RIGHT FOREARM	35 - RIGHT THUMB	49 - RIGHT BUTTOCKS	63 - TAILBONE
08 - FOREHEAD	22 - LEFT WRIST	36 - FINGERNAILS	50 - LEFT HIP	
09 - NOSE	23 - RIGHT WRIST	37 - UPPER BACK	51 - RIGHT HIP	
10 - JAW	24 - LEFT HAND	38 - MID BACK	52 - LEFT THIGH	
11 - NECK	25 - RIGHT HAND	39 - LOWER BACK	53 - RIGHT THIGH	
12 - CHEEK	26 - LEFT INDEX FINGER	40 - ABDOMEN	54 - LEFT LOWER LEG	
13 - TEETH	27 - LEFT MIDDLE FINGER	41 - LEFT GROIN	55 - RIGHT LOWER LEG	
14 - LEFT SHOULDER	28 - LEFT RING FINGER	42 - RIGHT GROIN	56 - LEFT ANKLE	

WHAT CAUSED ACCIDENT TO HAPPEN - LIST ONE OF THE FOLLOWING UNDER ACT OR CONDITION - NOT BOTH

ACT — CODE NO.

CONDITION — CODE NOS.

UNSAFE ACT:

01 - NOT USING EQUIPMENT PROVIDED.	10 - USING VEHICLE IMPROPERLY
02 - OPER. W/O AUTHORITY	11 - USING MATERIAL IMPROPERLY
03 - OVERRIDE SAFETY DEVICE	12 - FAILURE TO WARN
04 - IMPROPER LOADING	13 - WORK ON MOVING MACHINE
05 - IMPROPER CARRYING	14 - HORSEPLAY
06 - IMPROPER LIFTING	15 - IMPROPER MIXING
07 - OPER. IMPROPER SPEED	16 - TAKING IMPROPER POSITION
08 - FAILURE TO USE PROTECTIVE GEAR	17 - FAILURE TO SECURE
09 - USE TOOL IMPROPERLY	18 - IMPROPER PLACING
	19 - USE OF IMPROPER APPAREL
	20 - FAILURE TO FOLLOW PROCEDURES

UNSAFE CONDITION:

01 - IMPROPER VENTILATION	10 - SLIPPERY SURFACE
02 - RESERVED	11 - IMPROPER ILLUMINATION
03 - CONGESTED AREA	12 - POISONOUS PLANT
04 - DISTRACTING	13 - BODILY REACTION
05 - IMPROPER GUARDED	14 - INSECT BITE
06 - RESERVED	15 - POOR HOUSEKEEPING
07 - HAZARDOUS ARRANGEMENT	16 - DOG BITE
08 - IMPROPER PLACING	17 - OTHER ANIMAL BITE
09 - ROUGH TERRAIN	18 - ENVIRONMENTAL PHYS. AGENTS
	19 - DEFECTIVE EQUIPMENT

WHAT HAPPENED? - LIST ONE OF THE FOLLOWING

ACTION — CODE NO.

01 - STRUCK AGAINST	09 - BURNED	17 - MOTOR VEHICLE ACCIDENT
02 - STRUCK BY	10 - INHALATION	18 - RESERVED
03 - CAUGHT IN	11 - ABSORPTION	19 - REPETITIVE TRAUMA
04 - FALL FROM SAME LEVEL	12 - INGESTION	
05 - FALL (DIFFERENT LEVEL)	13 - POISONING	
06 - SLIP (NOT A FALL)	14 - ELECTRICAL CONTACT	
07 - OVEREXERTION	15 - ANIMAL BITE	
08 - EXPOSURE TO ENVIRONMENTAL PHYSICAL AGENTS	16 - INSECT EXPOSURE	

WHAT WAS THE AGENCY MOST INVOLVED WITH ACCIDENT? - LIST ONE OF THE FOLLOWING

OBJECT — CODE NO.

01 - MACHINE	13 - ROAD	25 - BUILDING	37 - PIT	49 - AERIAL LIFT EQUIP.	61 - STRAP
02 - VEHICLE	14 - STAIRS	26 - FLOOR	38 - CONFINED SPACE	50 - GAS APPARATUS	62 - ANIMAL
03 - HAND TOOL	15 - STEPS	27 - WIND	39 - BOILER	51 - CONTAINER	63 - TEMPERATURE
04 - SHEET METAL	16 - PLATFORM	28 - ICE	40 - TANK	52 - OXY-ACETYLENE	64 - HYDRAULIC TOOL
05 - WORK MATERIAL	17 - CHEMICALS	29 - SNOW	41 - ELECTRICAL APPARATUS	53 - BARREL	65 - HYDRAULIC EQUIP.
06 - BELT	18 - LADDER	30 - RAIN	42 - PRESSURE VESSEL	54 - INSECT	66 - FUEL (COAL)
07 - CABLE	19 - SCAFFOLDS	31 - POLE	43 - ST. LIGHT. MATERIAL	55 - TREE	67 - FUEL (OIL)
08 - CHAIN	20 - PIPE	32 - TOWER	44 - METERS	56 - ROPE	68 - FUEL (NATURAL GAS)
09 - RESERVED	21 - CONVEYOR	33 - FIRE	45 - WELDING APPARATUS	57 - WIRE	69 - FLAMMABLE LIQUID
10 - COMPRESS GASES	22 - HOIST	34 - SMOKE	46 - NUCLEAR MATERIAL	58 - CHAIN SAW	70 - POWER TOOL
11 - GROUND	23 - CRANE	35 - EXCAVATION	47 - FURNITURE	59 - PARTICLES	71 - DOOR
12 - STREET	24 - ELEVATOR	36 - TRENCH	48 - OFFICE EQUIPMENT	60 - VEGETATION	72 - RESERVED
					73 - SHORING

SUPERVISOR'S SIGNATURE
X

DATE

DO NOT COMPLETE BELOW - FOR SAFETY AND HEALTH DEPARTMENT USE ONLY

SAFETY AND HEALTH SPECIALIST SIGNATURE
X

DATE

REPORT ONLY	NON-OSHA	OSHA RECORDABILITY (CHECK ONE)			C-2 REQUIRED	CASE NUMBER
		NO LOST TIME	RESTRICTED	LOST TIME	☐ YES ☐ NO	

REASON FOR OSHA RECORDABILITY DETERMINATION

ACCIDENT REPORT FORM

Project: _____

EMPLOYER

1. Name _____
2. Mailing Address _____
   (No. and Street) (City or Town) (State)
3. Location, if different from mail address _____

_____

INJURED OR ILL EMPLOYEE

4. Name _____ Social Security Number _____
   (First) (Middle) (Last)
5. Home Address _____
   (No. and Street) (City or Town) (State)
6. Age _____ 7. Sex: Male _____ Female _____ (Check one)
8. Occupation _____
   (Specific job title, not the specific activity employee was performing at time of injury)
9. Department _____
   (Enter name of department in which injured person is employed, even though they may have been temporarily working in another department at the time of injury)

THE ACCIDENT OR EXPOSURE TO OCCUPATIONAL ILLNESS

10. Place of accident of exposure _____
    (No. and Street) (City or Town) (State)
11. Was place of accident or exposure on employer's premises? _____
    (Yes/No)
12. What was the employee doing when injured? (Be specific - Was employee using tools or equipment or handling material?) _____

_____

_____

ACCIDENT REPORT FORM
(Continued)

13. How did the accident occur? _____
(Describe fully the events which resulted in the

_____

injury or occupational illness. Tell what happened and how. Name objects and

_____

substances involved. Give details on all factors which led to accident. Use separate

_____

sheet for additional space.)

14. Time of accident: _____

15. ES WITNESS TO ACCIDENT

_____	_____	_____	
(Name)	(Affiliation)	(Phone No.)	
_____	_____	_____	
(Name)	(Affiliation)	(Phone No.)	
_____	_____	_____	
(Name)	(Affiliation)	(Phone No.)	

OCCUPATIONAL INJURY OR OCCUPATIONAL ILLNESS

16. Describe the injury or illness in detail and indicate the part of the body affected. _____

_____

17. Name the object or substance which directly injured the employee. (For example, object which struck employee; the vapor or poison inhaled or swallowed; the chemical or radiation which irritated the skin; or in cases of strains, hernias, etc., the object the employee was lifting, pulling, etc.

_____

_____

18. Date of injury or initial diagnosis of occupational illness _____
(Date)

19. Did the accident result in employee fatality? _____ (Yes or No)

ACCIDENT REPORT FORM
(Continued)

OTHER

20. Name and address of physician _____
21. If hospitalized, name and address of hospital _____

_____

Date of report _____ Prepared by _____

Official position _____

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory civil penalties against employers of up to $7,000 for each serious violation and for optional penalties of up to $7,000 for each nonserious violation. Penalties of up to $7,000 per day may be proposed for failure to correct violations within the proposed time period and for each day the violation continues beyond the prescribed abatement date. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $70,000 for each such violation. A minimum penalty of $5,000 may be imposed for each willful violation. A violation of posting requirements can bring a penalty of up to $7,000.

There are also provisions for criminal penalties. Any willful violation resulting in the death of any employee, upon conviction, is punishable by a fine of up to $250,000 (or $500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment. Falsifying records, reports, or applications is punishable by a fine of $10,000 or up to six months in jail or both.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State Labor or Health department or a State university.

Posting Instructions

Employers in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29,Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, GA	(404) 347-3573
Boston, MA	(617) 565-7164
Chicago, IL	(312) 353-2220
Dallas, TX	(214) 767-4731
Denver, CO	(303) 844-3061
Kansas City, MO	(816) 426-5861
New York, NY	(212) 337-2378
Philadelphia, PA	(215) 596-1201
San Francisco, CA	(415) 744-6670
Seattle,WA	(206) 442-5930

Lynn Martin

Lynn Martin, Secretary of Labor

U.S. Department of Labor

Occupational Safety and Health Administration

Washington, DC
1991 (Reprinted)
OSHA 2203

ATTACHMENT B-3

MATERIAL SAFETY DATA SHEETS

METHANOL
METHANOL
METHANOL

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY NUMBER: (201) 796-7100
CHEMTREC ASSISTANCE: (800) 424-9300

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **METHANOL**

CAS-NUMBER 67-56-1

TRADE NAMES/SYNONYMS:
METHYL ALCOHOL; WOOD ALCOHOL; METHYL HYDROXIDE; CARBINOL; MONOHYDROXYMETHANE; WOOD SPIRIT; WOOD NAPHTHA; METHYLOL; COLONIAL SPIRIT; COLUMBIAN SPIRIT; PYROXYLIC SPIRIT; COULOMATIC (R) CONDITIONER SOLUTION; STANDARD WATER IN METHANOL; STCC 4909230; UN 1230; RCRA U154; A454; A452; A936; A408; A947; A935; BP1105; A412; A411; A433P; SW2;; SC95; A452SK; A408SK; A412P; A434; A412SK; A450; A433S; CH4O; ACC14280

CHEMICAL FAMILY:
HYDROXYL, ALIPHATIC

MOLECULAR FORMULA: C-H3-O-H

MOLECULAR WEIGHT: 32.04

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=3 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: METHYL ALCOHOL (METHANOL) PERCENT: 100
CAS# 67-56-1

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
METHYL ALCOHOL (METHANOL):
200 PPM (262 MG/M3) OSHA TWA (SKIN); 250 PPM (328 MG/M3) OSHA STEL
200 PPM (262 MG/M3) ACGIH TWA (SKIN); 250 PPM (328 MG/M3) ACGIH STEL
200 PPM (262 MG/M3) NIOSH RECOMMENDED TWA (SKIN);
250 PPM (328 MG/M3) NIOSH RECOMMENDED STEL
200 PPM (262 MG/M3) DFG MAK TWA (SKIN);
400 PPM (524 MG/M3) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 4 TIMES/SHIFT

MEASUREMENT METHOD: SILICA GEL TUBE; WATER; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III # 2000, METHANOL).

5000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

OSHA LIMITS ADOPTED JANUARY 19, 1989 ARE SUBJECT TO THE DECISION OF THE 11TH CIRCUIT COURT OF APPEALS (AFL-CIO V. OSHA) AS OF JULY 7, 1992.

PHYSICAL DATA

DESCRIPTION: CLEAR, COLORLESS LIQUID WITH A CHARACTERISTIC ALCOHOLIC ODOR.

BOILING POINT: 149 F (65 C) MELTING POINT: -137 F (-94 C)

SPECIFIC GRAVITY: 0.7914 VAPOR PRESSURE: 97.25 MMHG @ 20 C

EVAPORATION RATE: (BUTYL ACETATE=1) 4.6 SOLUBILITY IN WATER: VERY SOLUBLE

ODOR THRESHOLD: 100 PPM VAPOR DENSITY: 1.11

SOLVENT SOLUBILITY: ETHER, BENZENE, ALCOHOL, ACETONE, CHLOROFORM, ETHANOL.

VISCOSITY: 0.59 CPS @ 20 C

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:

DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT, FLAME, OR OXIDIZERS.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE

FLASH POINT: 52 F (11 C) (CC) UPPER EXPLOSIVE LIMIT: 36.0%

LOWER EXPLOSIVE LIMIT: 6.0% AUTOIGNITION TEMP: 725 F (385 C)

FLAMMABILITY CLASS(OSHA): IB

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR ALCOHOL-RESISTANT FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL-RESISTANT FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. DIKE FIRE-CONTROL WATER FOR LATER DISPOSAL; DO NOT SCATTER THE MATERIAL. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 28).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING AMOUNTS AS FOG. SOLID STREAMS MAY NOT BE EFFECTIVE. COOL CONTAINERS WITH FLOODING QUANTITIES OF WATER. APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING TOXIC VAPORS. KEEP UPWIND.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49-CFR 172.101:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49-CFR 172.101 AND SUBPART E:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49-CFR 173.119
EXCEPTIONS: 49-CFR 173.118

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180), DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204. EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO OCTOBER 1, 1993. (56 FR 47158, 09/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
METHYL ALCOHOL-UN 1230

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
3 - FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101 AND SUBPART E:
FLAMMABLE LIQUID, POISON

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS
EXCEPTIONS: NONE
NON-BULK PACKAGING: 49 CFR 173.202
BULK PACKAGING: 49 CFR 173.243

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 1 L
CARGO AIRCRAFT ONLY: 60 L

TOXICITY

METHYL ALCOHOL (METHANOL):
IRRITATION DATA: 20 MG/24 HOURS SKIN-RABBIT MODERATE; 40 MG EYE-RABBIT MODERATE; 100 MG/24 HOURS EYE-RABBIT MODERATE.
TOXICITY DATA: 86,000 MG/M3 INHALATION-HUMAN TCLO; 300 PPM INHALATION-HUMAN TCLO; 64,000 PPM/4 HOURS INHALATION-RAT LC50; 1000 PPM INHALATION-MONKEY LCLO; 50 GM/M3/2 HOURS INHALATION-MOUSE LCLO; 44,000 MG/M3/6 HOURS INHALATION-CAT LCLO; 15,800 MG/KG SKIN-RABBIT LD50; 393 MG/KG SKIN-MONKEY LDLO; 428 MG/KG ORAL-HUMAN LDLO; 143 MG/KG ORAL-HUMAN LDLO; 6422 MG/KG ORAL-MAN LDLO; 3429 MG/KG ORAL-MAN TDLO; 4 GM/KG ORAL-WOMAN TDLO; 7 GM/KG

ORAL-MONKEY LD50: 5628 MG/KG ORAL-RAT LD50: 7300 MG/KG ORAL-MOUSE LD50: 14,200 MG/KG ORAL-RABBIT LD50: 7500 MG/KG ORAL-DOG LDLO: 9800 MG/KG SUBCUTANEOUS-MOUSE LD50: 2131 MG/KG INTRAVENOUS-RAT LD50: 4710 MG/KG INTRAVENOUS-MOUSE LD50: 8907 MG/KG INTRAVENOUS-RABBIT LD50: 4641 MG/KG INTRAVENOUS-CAT LDLO: 7529 MG/KG INTRAPERITONEAL-RAT LD50: 10,765 MG/KG INTRAPERITONEAL-MOUSE LD50: 1826 MG/KG INTRAPERITONEAL-RABBIT LD50: 3556 MG/KG INTRAPERITONEAL-GUINEA PIG LD50: 8555 MG/KG INTRAPERITONEAL-HAMSTER LD50: 868 MG/KG UNREPORTED-MAN LDLO: MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS).
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- SKIN, EYE.
ACUTE TOXICITY LEVEL: SLIGHTLY TOXIC BY DERMAL ABSORPTION AND INGESTION; RELATIVELY NON-TOXIC BY INHALATION.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT; NEUROTOXIN.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH KIDNEY, EYE OR SKIN DISORDERS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
METHYL ALCOHOL (METHANOL):
NARCOTIC/NEUROTOXIN. 25,000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH
ACUTE EXPOSURE- MAY CAUSE IRRITATION OF THE MUCOUS MEMBRANES, COUGHING, OPPRESSION IN THE CHEST, TRACHEITIS, BRONCHITIS, TINNITUS, UNSTEADY GAIT, TWITCHING, COLIC, CONSTIPATION, NYSTAGMUS, AND BLEPHAROSPASM. SYMPTOMS FROM OCCUPATIONAL EXPOSURE INCLUDE PARESTHESIAS, NUMBNESS AND SHOOTING PAINS IN THE HANDS AND FOREARMS, METABOLIC ACIDOSIS, AND EFFECTS ON THE EYES AND CENTRAL NERVOUS SYSTEM MAY OCCUR AS DETAILED IN ACUTE INGESTION.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE EFFECTS AS IN ACUTE INGESTION. REPEATED EXPOSURE TO 200-375 PPM CAUSED RECURRENT HEADACHES IN WORKERS. EXPOSURE FOR 4 YEARS TO 1200-8000 PPM RESULTED IN MARKED DIMINUTION OF VISION AND ENLARGEMENT OF THE LIVER IN A WORKMAN REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
METHYL ALCOHOL (METHANOL):
IRRITANT/NARCOTIC/NEUROTOXIN.
ACUTE EXPOSURE- CONTACT WITH LIQUID MAY CAUSE IRRITATION. SKIN ABSORPTION MAY OCCUR AND CAUSE METABOLIC ACIDOSIS AND EFFECTS ON THE EYES AND CENTRAL NERVOUS SYSTEM AS DETAILED IN ACUTE INGESTION.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH THE LIQUID MAY CAUSE DEFATTING OF THE SKIN RESULTING IN ERYTHEMA, SCALING, AND ECZEMATOID DERMATITIS. CHRONIC ABSORPTION MAY RESULT IN METABOLIC ACIDOSIS AND EFFECTS AS DETAILED IN ACUTE INGESTION.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
METHYL ALCOHOL (METHANOL):
IRRITANT.
ACUTE EXPOSURE- VAPORS MAY CAUSE IRRITATION. HIGH CONCENTRATIONS HAVE BEEN REPORTED TO CAUSE VIOLENT INFLAMMATION OF THE CONJUNCTIVA AND EPITHELIAL DEFECTS ON THE CORNEA. MILD IRRITATION MAY OCCUR WITH DILUTE SOLUTIONS; THE UNDILUTED LIQUID HAS PRODUCED MODERATE CORNEAL OPACITY AND CONJUNCTIVAL REDNESS IN RABBITS. APPLICATION OF A DROP OF METHANOL IN RABBIT EYES CAUSED A MILD REVERSIBLE REACTION, GRADED 3 ON A SCALE OF 1-10 AFTER 24 HOURS.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
METHYL ALCOHOL (METHANOL):
NARCOTIC/NEUROTOXIN.
ACUTE EXPOSURE- MAY CAUSE MILD AND TRANSIENT INEBRIATION AND SUBSEQUENT DROWSINESS FOLLOWED BY AN ASYMPTOMATIC PERIOD LASTING 8-48 HOURS. FOLLOWING THE DELAY, COUGHING, DYSPNEA, HEADACHE, DULLNESS, WEAKNESS, VERTIGO OR DIZZINESS, NAUSEA, VOMITING, OCCASIONAL DIARRHEA, ANOREXIA, VIOLENT PAIN IN THE BACK, ABDOMEN, AND EXTREMITIES, RESTLESSNESS, APATHY OR DELIRIUM, AND RARELY, EXCITEMENT AND MANIA MAY OCCUR. RAPID, SHALLOW RESPIRATION DUE TO METABOLIC ACIDOSIS, COLD AND CLAMMY SKIN, HYPOTENSION, CYANOSIS, OPISTHOTONOS, CONVULSIONS, MILD TACHYCARDIA, CARDIAC DEPRESSION, PERIPHERAL NEURITIS, CEREBRAL AND PULMONARY EDEMA, UNCONSCIOUSNESS, AND COMA ARE POSSIBLE. EFFECTS ON THE EYE MAY INCLUDE OPTIC NEURITIS, BLURRED OR DIMMED VISION, DILATED, UNRESPONSIVE PUPILS, PTOSIS, EYE PAIN, CONCENTRIC CONSTRICTION OF VISUAL FIELDS, DIPLOPIA, CHANGE IN COLOR PERCEPTION, PHOTOPHOBIA, AND OPTIC NERVE ATROPHY. PARTIAL BLINDNESS OR POSSIBLY DELAYED TRANSIENT OR PERMANENT BLINDNESS MAY OCCUR. BILATERAL SENSORINEURAL DEAFNESS HAS BEEN REPORTED IN A SINGLE CASE. LIVER, KIDNEY, HEART, STOMACH, INTESTINAL AND PANCREATIC DAMAGE MAY ALSO OCCUR. DEATH

MAY BE DUE TO RESPIRATORY FAILURE OR RARELY FROM CIRCULATORY COLLAPSE. AS LITTLE AS 15 ML HAS CAUSED BLINDNESS; THE USUAL FATAL DOSE IS 60-240 ML. PROLONGED ASTHENIA AND IRREVERSIBLE EFFECTS ON THE NERVOUS SYSTEM INCLUDING DIFFICULTY IN SPEECH, MOTOR DYSFUNCTION WITH RIGIDITY, SPASTICITY, AND HYPOKINESIS HAVE BEEN REPORTED.
CHRONIC EXPOSURE- REPEATED INGESTION MAY CAUSE VISUAL IMPAIRMENT AND BLINDNESS AND OTHER SYSTEMIC EFFECTS AS DETAILED IN ACUTE INGESTION. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- IF INGESTION OF METHANOL IS DISCOVERED WITHIN 2 HOURS, GIVE SYRUP OF IPECAC. LAVAGE THOROUGHLY WITH 2-4 L OF TAP WATER WITH SODIUM BICARBONATE (20 G/L) ADDED. GET MEDICAL ATTENTION IMMEDIATELY. LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL (DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

ANTIDOTE:
THE FOLLOWING ANTIDOTE(S) HAVE BEEN RECOMMENDED. HOWEVER, THE DECISION AS TO WHETHER THE SEVERITY OF POISONING REQUIRES ADMINISTRATION OF ANY ANTIDOTE AND ACTUAL DOSE REQUIRED SHOULD BE MADE BY QUALIFIED MEDICAL PERSONNEL.

METHANOL POISONING:
GIVE ETHANOL, 50% (100 PROOF), 1.5 ML/KG ORALLY INITIALLY, DILUTED TO NOT MORE THAN 5% SOLUTION, FOLLOWED BY 0.5-1.0 ML/KG EVERY 2 HOURS ORALLY OR INTRAVENOUSLY FOR 4 DAYS IN ORDER TO REDUCE METABOLISM OF METHANOL AND TO ALLOW TIME FOR ITS EXCRETION. BLOOD ETHANOL LEVEL SHOULD BE IN THE RANGE OF 1-1.5 MG/ML (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). ANTIDOTE SHOULD BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.

ORAL OR INTRAVENOUS ADMINISTRATION OF 4-METHYLPYRAZOLE INHIBITS ALCOHOL DEHYDROGENASE AND HAS BEEN USED EFFECTIVELY AS AN ANTIDOTE FOR METHANOL OR ETHYLENE GLYCOL POISONING (ELLENHORN AND BARCELOUX, MEDICAL TOXICOLOGY).

REACTIVITY

REACTIVITY.
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES

INCOMPATIBILITIES:
METHYL ALCOHOL (METHANOL)
ACETYL BROMIDE: VIOLENT REACTION WITH FORMATION OF HYDROGEN BROMIDE
ALKYLALUMINUM SOLUTIONS: VIOLENT REACTION
ALUMINUM: CORRODES
BARIUM PERCHLORATE: DISTILLATION YIELDS HIGHLY EXPLOSIVE ALKYL PERCHLORATE
BERYLLIUM HYDRIDE: VIOLENT REACTION, EVEN AT -196 C
BROMINE: VIGOROUSLY EXOTHERMIC REACTION
CALCIUM CARBIDE: VIOLENT REACTION.
CHLORINE: POSSIBLE IGNITION AND EXPLOSION HAZARD
CHLOROFORM AND SODIUM HYDROXIDE: EXPLOSIVE REACTION
CHROMIUM TRIOXIDE (CHROMIC ANHYDRIDE): POSSIBLE IGNITION
CYANURIC CHLORIDE: VIOLENT REACTION.
DICHLOROMETHANE: POSSIBLE IGNITION AND EXPLOSION.
DIETHYL ZINC: POSSIBLE IGNITION AND EXPLOSION.
HYDROGEN PEROXIDE + WATER: EXPLOSION HAZARD.
IODINE + ETHANOL + MERCURIC OXIDE: EXPLOSION HAZARD.
LEAD: CORRODES.
LEAD PERCHLORATE: EXPLOSION HAZARD.
MAGNESIUM: VIOLENT REACTION.
MAGNESIUM (POWDERED): MIXTURES ARE CAPABLE OF DETONATION
METALS: INCOMPATIBLE.
NICKEL: POSSIBLE IGNITION IN THE PRESENCE OF NICKEL CATALYST.
NITRIC ACID (CONCENTRATED): MIXTURES OF GREATER THAN 25% ACID MAY DECOMPOSE VIOLENTLY.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD
PERCHLORIC ACID: EXPLOSION HAZARD.
PHOSPHOROUS TRIOXIDE: POSSIBLE VIOLENT REACTION AND IGNITION
PLASTICS, RUBBER, COATINGS: MAY BE ATTACKED.
POTASSIUM: POSSIBLE DANGEROUS REACTION
POTASSIUM HYDROXIDE + CHLOROFORM: EXOTHERMIC REACTION
POTASSIUM TERT-BUTOXIDE: FIRE AND EXPLOSION HAZARD.
SODIUM + CHLOROFORM: POSSIBLE EXPLOSION
SODIUM HYPOCHLORITE: EXPLOSION HAZARD
SODIUM METHOXIDE + CHLOROFORM: VIOLENT REACTION
SULFURIC ACID: FIRE AND EXPLOSION HAZARD
ZINC: EXPLOSION HAZARD

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY

STORAGE

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER U154.

****
CONDITIONS TO AVOID

AVOID CONTACT WITH HEAT, SPARKS, FLAMES OR OTHER IGNITION SOURCES. VAPORS MAY BE EXPLOSIVE. MATERIAL IS POISONOUS; AVOID INHALATION OF VAPORS OR CONTACT WITH SKIN. DO NOT ALLOW MATERIAL TO CONTAMINATE WATER SOURCES.

****
SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE.

AIR SPILL:
APPLY WATER SPRAY TO KNOCK DOWN VAPORS.

WATER SPILL:
ALLOW SPILLED MATERIAL TO AERATE.

LIMIT SPILL MOTION AND DISPERSION WITH NATURAL BARRIERS OR OIL SPILL CONTROL BOOMS.

USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA! KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY.

REPORTABLE QUANTITY (RQ): 5000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE GENERAL DILUTION VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

METHYL ALCOHOL (METHANOL):

2000 PPM- ANY SUPPLIED-AIR RESPIRATOR.
ANY SELF-CONTAINED BREATHING APPARATUS.

5000 PPM- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS-FLOW MODE.

10,000 PPM- ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR THAT HAS A TIGHT-FITTING FACEPIECE AND IS OPERATED IN A CONTINUOUS-FLOW MODE.

25,000 PPM- ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC, INC.
CREATION DATE: 09/25/84 REVISION DATE: 10/12/92

-ADDITIONAL INFORMATION-
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MATERIAL SAFETY DATA SHEET

APPROVED BY U S LABOR DEPT. ESSENTIALLY SIMILAR TO FORMS OSHA 20 & 174

NuTECH ENVIRONMENTAL CORP.

5350 N. WASHINGTON ST.
DENVER, CO 80216
PHONE: 800-321-8824
303-295-3702

"For Chemical Emergency
Spill, Leak, Fire, Exposure or Accident
call CHEMTREC- Day or Night
800-424-9300"

TRADE NAME:	*OCA™ 21 COUNTERACTANT*
CHEMICAL NAME & SYNONYMS:	Not Applicable
CHEMICAL FAMILY:	Not Applicable
FORMULA:	Not Applicable

I. PHYSICAL DATA

BOILING POINT	100 °C
SPECIFIC GRAVITY (Water=1)	1.00
POUNDS/GALLON:	8.33
VAPOR PRESSURE (mm of Hg) @ 20°C:	Nil
VAPOR DENSITY (air=1):	N/A
WATER ABSORPTION	Complete
FLASH POINT (TCC) °F	>153
DRY TIME (Ether=1):	LONG
EVAPORATION RATE:	not volatile
pH	ranges from 6.0 to 7.0
APPEARANCE:	Light milky color
ODOR:	Aromatic floral bubble gum odor

II. INGREDIENTS

MATERIAL	*CAS #*	*VOL(%)*	*TLV(PPM)*
75224 Surfonic N-95 Surfactant	9016-45-9	2.5%	N/A
DMDM Hydantoin	6440-58-0	0.2%	N/A
Triton X-114 Surfactant	9036-19-15	2.0%	N/A
Natural Essential Oils (proprietary compound)		2.5%	N/A
Inert Ingredients		92.8%	N/A

DOT SHIPPING NAME: None required

III. FIRE & EXPLOSION HAZARDS

LOWER FLAMMABLE LIMIT IN AIR (% by vol): Non flammable

FLASH POINT (TEST METHOD): >153°F (TCC)

EXTINGUISHING MEDIA: Water spray, CO_2, dry chemical or foam.

SPECIAL FIRE FIGHTING PROCEDURES: Wear respirator (pressure-demand, self-contained breathing apparatus, OSHA/NIOSH approved or equivalent) and full protective gear whenever fighting fires involving chemicals.

UNUSUAL EXPLOSION AND FIRE PROCEDURES: None known to NuTech Environmental.

IV. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: None established

EFFECTS OF ACUTE EXPOSURE:

INGESTION:	No effects of exposure expected
INHALING:	May cause a sore throat.
SKIN CONTACT:	No effects of exposure due to contact
EYE CONTACT:	Irritating to the eyes upon direct contact.

EMERGENCY & FIRST AID PROCEDURES:

INGESTION:	Dilute by giving 2 glasses of water to drink. Never give anything to an unconscious person. Consult a physician.
INHALING:	Move subject to fresh air.
SKIN CONTACT:	Wash skin affected skin thoroughly with soap and water. Wash clothes before reuse.
EYE CONTACT:	Flush eyes with a large amount of water for at least 15 minutes.

V. REACTIVITY DATA

STABILITY:	Stable
CONDITIONS TO AVOID :	Isolate from oxidizers, heat, sparks, and open flame.
MATERIALS TO AVOID :	Isolate from strong oxidizers such as permanganate or peroxide.
HAZARDOUS DECOMPOSITION PRODUCT:	Carbon Monoxide, Carbon Dioxide or unidentified organic compounds may be formed during combustion.

VI. ENVIRONMENTAL PROTECTION

SPILLS OR LEAK PROCEDURES:	Mop up with absorbent material. Isolate from strong oxidizers, heat, sparks, & open flame.
WASTE DISPOSAL METHOD:	*Small:* Evaporate until all vapors are gone. Dispose of remainder by legally applicable methods. ***Large:*** Recycle
HANDLING & STORAGE PRECAUTIONS	Store in a cool, dry, well ventilated area away from heat. Indoors or outdoors. Keep containers tightly closed and in an upright position.

VII. EMPLOYEE PROTECTION

RESPIRATORY PROTECTION (SPECIFY TYPE):	Normal room ventilation with no special respiratory protection is required for normal operations.
VENTILATION:	LOCAL EXHAUST: Preferable MECHANICAL (GENERAL): Acceptable SPECIAL: None OTHER: None
PROTECTIVE CLOTHING:	None required
EYE PROTECTION:	Protective eye goggles should be worn while handling the chemical concentrate

VIII. SPECIAL PROTECTIONS

None required.

The information on this MSDS was obtained from current and reliable sources. Legal responsibility is assumed only for the fact that all studies reported here & opinions are those of qualified experts. Buyer assumes all risk & liability. He accepts & uses this material on these conditions. He must keep a copy of this MSDS where material is handled.

ATTACHMENT B-4

NIAGARA MOHAWK
STANDARD OPERATING SAFETY PROCEDURES

STANDARD OPERATING SAFETY PROCEDURES

Standard operating safety procedures include safety precautions and operating practices, that all on-site personnel will follow. These include:

Personal Precautions

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated as being contaminated.
- Hands and face must be thoroughly washed upon leaving the work area.
- Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
- No facial hair which interferes with a satisfactory fit of the mask-to-face-seal is allowed on personnel required to wear respirators. Personnel will use the negative pressure fit test prior to each use of the equipment.
- Contact with contaminated or suspected surfaces should be avoided. Whenever possible, do not walk through puddles, leachate, discolored surfaces, kneel on ground, lean, sit or place equipment on drums, containers, or the ground surface.
- Medicine and alcohol can potentiate the effects from exposure to toxic chemicals. Prescribed drugs should not be taken by personnel on site where the potential for adsorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverages should be avoided, in the off-duty hours, for all site personnel. Engineering-Science, Inc. recognizes all requirements for providing a drug-free work environment as specified in Niagara Mohawk Addendum A, General Conditions of Contract for Construction - 00700, Section 760: Alcohol/Drug Screening/Testing - Nuclear.

Operations

- All personnel going on-site must be adequately trained and thoroughly briefed on potential hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications.
- Any required respiratory protection and chemical-protective clothing must be worn by all personnel going into areas designated for wearing protective equipment.
- Personnel on-site will use the buddy system at all times.
- Visual contact must be maintained between pairs on-site and safety personnel. Entry team members should remain close together to assist each other during emergencies.
- During continual operations, on-site workers will act as safety back-up to each other. Off-site personnel provide emergency assistance.

- Personnel should practice unfamiliar operations prior to doing the actual procedure.
- Entrance and exit locations must be designated and emergency escape routes delineated. Warning signals for site evacuation must be established.
- Communications using radios, hand signals, signs, or other means must be maintained between initial entry members at all times. Emergency communications should be prearranged in case of radio failure, necessity for evacuation of site, or other reasons.
- Personnel and equipment in the contaminated area should be minimized, consistent with effective site operations.
- Work areas for various operational activities must be clearly established.
- Procedures for leaving a contaminated area must be planned and implemented prior to going on-site. Work areas and decontamination procedures must be established based on expected site conditions.
- A boat horn will be kept in the office trailer and at the excavation site. It will be sounded to notify both Engineering-Science, Inc. and Niagara Mohawk personnel in the event of a serious health or safety problem.
- An on-site log book will be maintained daily to record the time of arrival and departure of all personnel with this project.

Note: These procedures will be posted at the Oneida site and reviewed with site personnel prior to commencing work.

ATTACHMENT B-5

DRILLING SAFETY GUIDE

Drilling Safety Guide

INTERNATIONAL DRILLING FEDERATION

DCDMA
The Drilling Equipment Manufacturers Association

NDCA
National Drilling Contractors Association

CDDA
Canadian Diamond Drilling Association

DRILLING SAFETY GUIDE

The *Drilling Safety Guide* has been prepared through the combined efforts of member delegations of the Diamond Core Drill Manufacturers Association (DCDMA), the National Drilling Contractors Association (NDCA) and the National Water Well Association-Drill Rig/Heavy Equipment Products Group (NWWA) and is published by the International Drilling Federation for the benefit of the drilling industries.

This guide contains suggested safety procedures. It is not intended to set forth any standard industry procedures or requirements. This manual is to be used as a guideline for the safe operation of drilling equipment. IDF, DCDMA, NDCA, NWWA, their officers, and members deny any liability for any injury to people or property that may occur even if these procedures are properly followed. Further, the IDF, DCDMA, NDCA, NWWA, their officers, and members do not accept responsibility for the completeness of the guide or the applicability of the statements or procedures to the use of all drilling machines and tools in all environments. Many aspects of drilling safety cannot be expressed in detail and cannot be met by mechanical means; drilling safety can only be accomplished with the exercise of intelligence, care, and common sense.

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DRILLING SAFETY GUIDE

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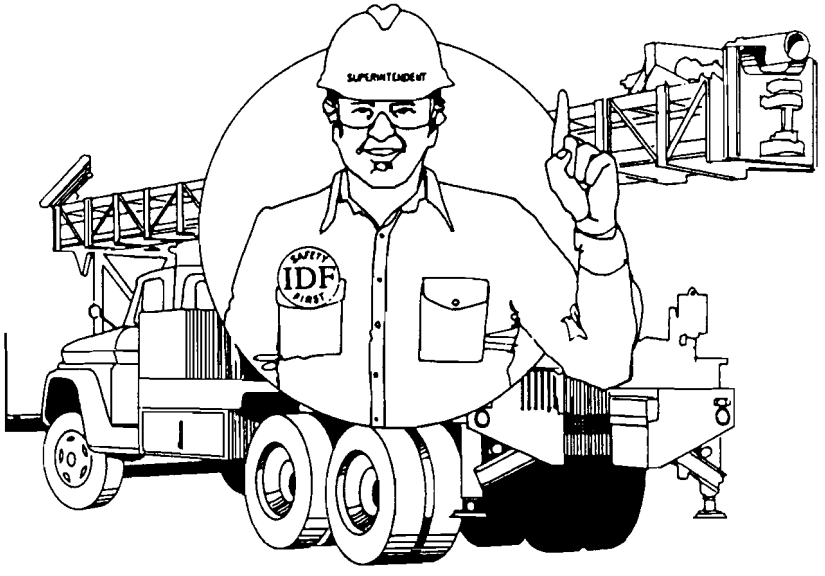
DRILLING SAFETY GUIDE

1. An Introduction To Drilling Safety

The organization for which you work is interested in your safety. Your employer cares about your safety not only when you are working on or around a drill rig, but also when you are traveling to and from a drilling site, moving the drill rig and tools from location to location on a site, or providing maintenance on a drill rig or drilling tools. This safety guide is for your benefit. Failure to heed the safety procedures contained in this manual could result in serious injury or death.



Every drill crew should have a designated safety supervisor who has the authority to enforce safety on the drilling site. A rig worker's first safety responsibility is to obey the directions of the safety supervisor.

2. Governmental Regulations

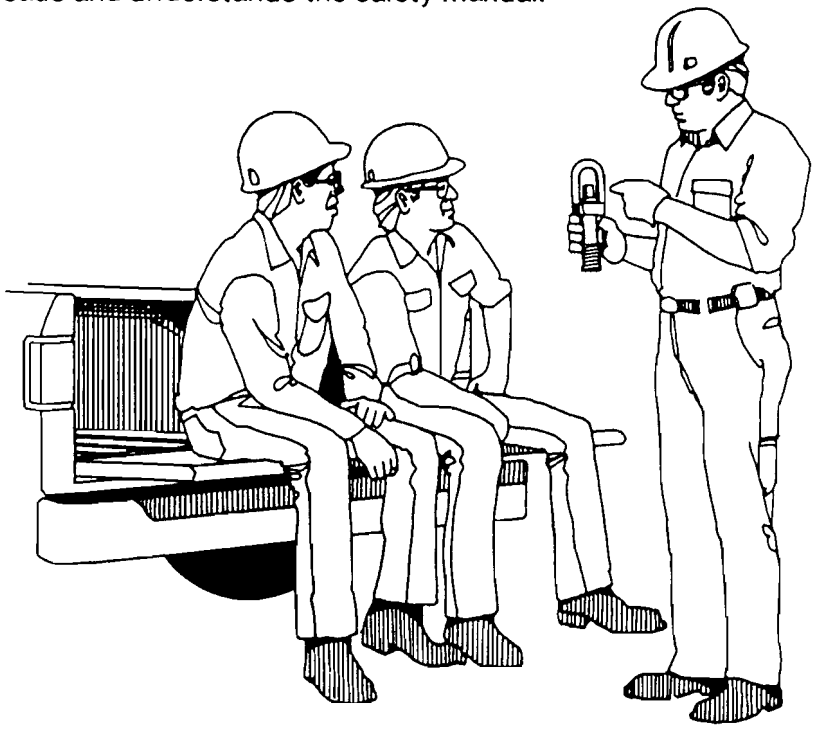
All local, state, and federal regulations or restrictions, currently in effect or effected in the future, take precedence over the recommendations and suggestions which follow. Government regulations will vary from country to country and from state to state.

3. The Safety Supervisor

The safety supervisor for the drill crew will, in most cases, be the drill rig operator. The safety supervisor must:

- Consider the "responsibility" for safety and the "authority" to enforce safety to be a matter of first importance.
- Be the leader in using proper personal safety gear and set an example in following the rules that are being enforced on others.
- Enforce the use of proper personal protective safety equipment and take appropriate corrective action when proper personal protective safety equipment is not being used.
- Understand that proper maintenance of tools and equipment and general "housekeeping" on the drill rig will provide an environment that will promote and enforce safety.
- Before drilling is started with a particular drill, ensure that anyone who operates the drill has had adequate training and is thoroughly familiar with the drill rig, its controls, and its capabilities.
- Inspect the drill rig at least daily for structural damage, loose bolts and nuts, proper tension in chain drives, loose or missing guards or protective covers, fluid leaks, damaged hoses, and/or damaged pressure gauges and pressure relief valves.
- Check and test all safety devices, such as emergency shutdown switches, at least daily and preferably at the start of a drilling shift. Drilling must not be permitted until all emergency shutdown and warning systems are working correctly. Do not allow any emergency device to be bypassed or removed.
- Check that all gauges, warning lights, and control levers are functioning properly and listen for unusual sounds each time an engine is started.
- Ensure that every drill rig worker is informed of safe operat-

ing practices on and around the drill rig. Provide every drill rig worker with a copy of the organization's drilling operations safety manual, and when appropriate, the drill rig manufacturer's operations and maintenance manual. Ensure that every employee reads and understands the safety manual.



- Carefully instruct a new worker in drilling safety and observe the new worker's progress towards understanding safe operating practices.
- Assess the mental, emotional, and physical capability of each worker to perform the assigned work in a proper and safe manner. Remove any worker from the drill site whose mental and physical capabilities might cause injury to the worker or coworkers.
- Ensure that a first-aid kit and a fire extinguisher, which are properly maintained, are on each drill rig and each additional vehicle.
- Be well trained in and capable of using first-aid kits, fire extinguishers, and all other safety devices and equipment. Train crew members.

- Maintain a list of addresses and telephone numbers of emergency assistance units (ambulance services, police, hospitals, etc.) and inform other members of the drill crew of the existence and location of the list.

4. Individual Protective Equipment

For most geotechnical, mineral, and/or groundwater drilling projects, individual protective equipment must include a safety hat, safety shoes, safety glasses, and close-fitting gloves and clothing. The clothing of the individual drill rig worker is not generally considered protective equipment; however, the worker's clothing should be comfortable but must be close fitting, without loose ends, straps, draw strings, belts or otherwise unfastened parts that might catch on some rotating or translating component of the drill rig. Rings and jewelry must not be worn during a work shift.

- *Safety Head Gear.* Safety hats (hard hats) must be worn by everyone working or visiting at or near a drilling site. All safety hats must meet the requirements of ANSI Z89.1. All safety hats must be kept clean and in good repair with the headband and crown straps properly adjusted for the individual drill rig worker or visitor.
- *Safety Shoes or Boots.* Safety shoes or boots must be worn by all drilling personnel and all visitors to the drill site that observe drilling operations within close proximity of the drill rig. All safety shoes or boots must meet the requirements of ANSI Z41.1.
- *Gloves.* All drilling personnel must wear gloves for protection against cuts and abrasions that could occur while handling wire rope or cable and from contact with sharp edges and burrs on drill rods and other drilling or sampling tools. All gloves must be close fitting and not have large cuffs or loose ties that can catch on rotating or translating components of the drill rig.
- *Safety Glasses.* All drilling personnel must wear safety glasses. All safety glasses must meet the requirements of ANSI Z87.1.
- *Other Protective Equipment.* For some drilling operations, the environment or regulations may dictate that other protective equipment be used. The requirement for such equipment must

be determined jointly by the management of the drilling organization and the safety supervisor. Such equipment might include face or ear protection or reflective clothing. Each drill rig worker must wear noise-reducing ear protectors when appropriate.

When drilling is performed in chemically or radiologically contaminated ground, special protective equipment and clothing may, and probably will, be required. The design and composition of the protective equipment and clothing must be determined jointly by the management and the client who requests the drilling services, and under some circumstances, with the concurrence of a health and safety professional.

5. Housekeeping On and Around the Drill Rig

The first requirement for safe field operations is that the safety supervisor understand and fulfill the responsibility for maintenance and "housekeeping" on and around the drill rig. The safety supervisor must:

- Provide suitable storage locations for all tools, materials, and supplies so that these items can be conveniently and safely handled without hitting or falling on a member of the drill crew or a visitor.
- Avoid storing or transporting tools, materials, or supplies within or on the mast (derrick) of the drill rig, unless designed for this purpose.
- Stack pipe, drill rods, casing, augers, and similar drilling tools in orderly fashion on racks or sills to prevent spreading, rolling, or sliding.
- Place penetration or other driving hammers at a safe location on the ground or secure them to prevent movement when not in use.
- Keep work areas, platforms, walkways, scaffolding, and other accessways free of materials, debris, obstructions, and substances such as ice, grease or oil that could cause a surface to become slick or otherwise hazardous.
- Keep all controls, control linkages, warning and operation lights and lenses free of oil, grease, and/or ice.
- Store gasoline only in a non-sparking, red container with a flame arrester in the fill spout and having the word "gasoline" easily visible.

6. Maintenance

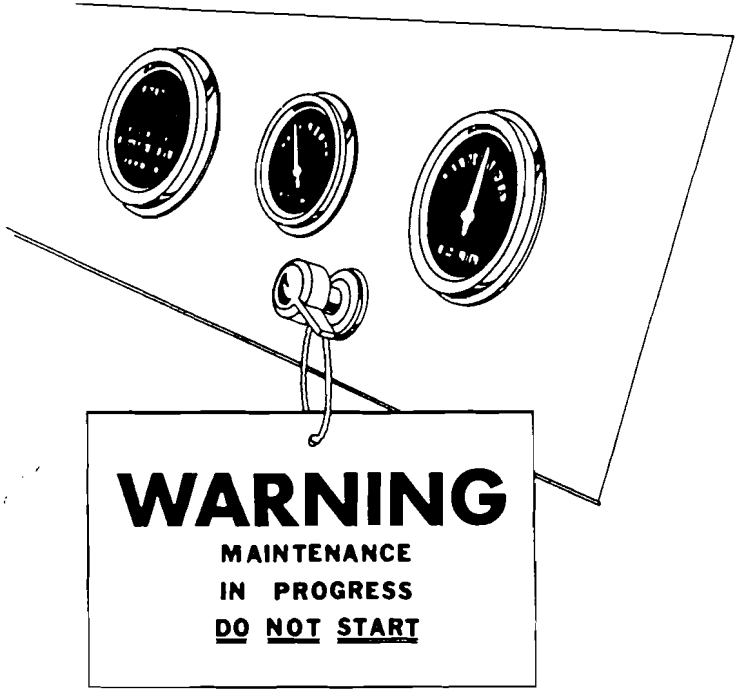
Good maintenance will make drilling operations safer. Also, maintenance must be performed safely. The following points are essential to safety:

- Wear safety glasses when performing maintenance on a drill rig or on drilling tools.
- Shut down the drill rig engine to make repairs or adjustments to a drill rig or to lubricate fittings (except repairs or adjustments that can only be made with the engine running). Take precautions to prevent accidental starting of an engine during maintenance by removing or tagging the ignition key.

• Block the wheels or lower the leveling jacks or both and set hand brakes before working under a drill rig.

• Release all pressure on the hydraulic systems, the drilling fluid system and the air pressure systems of the drill rig — when possible and appropriate — prior to performing maintenance. In other words, reduce the drill rig and operating systems to a "zero energy state" before performing maintenance. Use extreme caution when opening drain plugs and radiator caps and other pressurized plugs and caps.

• Do not touch an engine or the exhaust system of an engine following its operation until the engine and exhaust system have had adequate time to cool.



• Never climb the mast (derrick) to do maintenance or make repairs. Lower mast, stop engine and deenergize rig before starting maintenance or repair on mast.

• Never weld or cut on or near a fuel tank.

• Do not use gasoline or other volatile or flammable liquids as a cleaning agent on or around a drill rig.

• Follow the manufacturer's recommendations for applying the proper quantity and quality of lubricants, hydraulic oils and/or coolants.

• Replace all caps, filler plugs, protective guards or panels, and high pressure hose clamps and chains or cables that have been removed for maintenance before returning the drill rig to service.

7. Hand Tools

Since there are almost an infinite number of hand tools that can be used on or around a drill rig and in repair shops, there are an equal number of instructions for proper use. "Use the tool for its intended purpose" is the most important rule. The following suggestions apply to safe use of several hand tools that frequently are used on and around drill rigs:

• When a tool becomes damaged, either repair it before using it again or get rid of it.

• When using a hammer, any kind of hammer for any purpose, wear safety glasses and require all others around you to wear safety glasses.

• When using any kind of chisel or punch, for any purpose, wear safety glasses and require all others around you to wear safety glasses.

• Keep all tools cleaned and stored appropriately when not in use.

• Use wrenches — not pliers — on nuts.

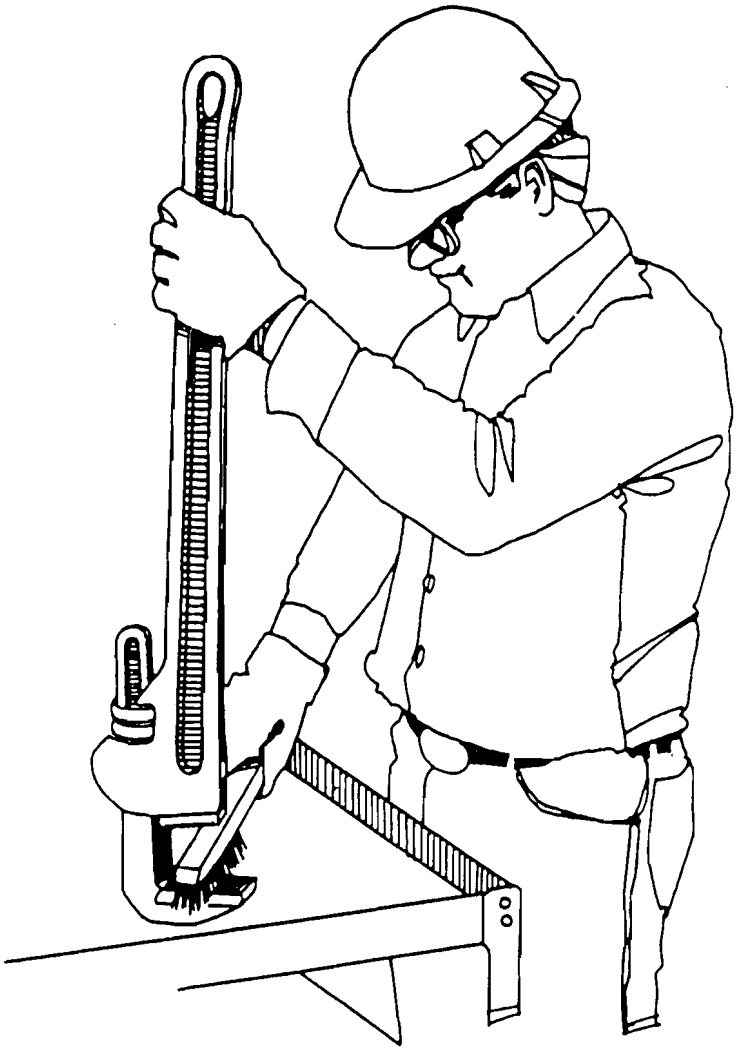
• Use screwdrivers with blades that fit the screw.

• When using a wrench on a tight nut, first use some penetrating oil and then use the largest wrench available that fits the nut. When possible pull on the wrench handle rather than push on it; apply force to the wrench with both hands when possible and with both feet firmly placed. Always assume that you may lose your footing; check the place that you may fall for sharp objects.

• Keep all pipe wrenches clean and in good repair. Use a wire brush frequently to clean the jaws of pipe wrenches. An accumulation of dirt and grease can cause wrenches to slip.

• Never use pipe wrenches in place of a rod-holding device.

• Replace hook and heel jaws when they become visibly worn.



• When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be smashed between the wrench handle and the ground or the platform if the wrench should slip or the tool joint suddenly let go.

8. Clearing the Work Area

Prior to drilling, adequately clear and level the site to accommodate the drill rig and supplies and provide a safe working area.

Do not begin drilling if tree limbs, unstable ground, or site obstructions cause unsafe tool handling conditions.

9. Start-Up

Instruct all drill rig personnel and visitors to "stand clear" of the drill rig immediately prior to starting the engine.

• Make sure all brakes are set, all gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers or air controls are in the correct positions, and the cathead rope is not on the cathead before starting a drill rig engine.

• Start all engines according to the manufacturer's manual.

10. Drilling Operations

Safety requires the attention and cooperation of every worker and site visitor.

• Do not drive the drill rig from hole to hole with the mast (derrick) in the raised position.

• Before raising the mast (derrick), look up to check for overhead obstructions. (Refer to Section 11 on Overhead and Buried Utilities.)

• Before raising the mast (derrick), clear all drill rig personnel (with exception of the operator) and visitors from the areas immediately to the rear and the sides of the mast. Inform all drill rig personnel and visitors that the mast is being raised prior to raising it.

• Before the mast (derrick) of a drill rig is raised and drilling is begun, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. Relevel the drill rig if it settles after initial set up. Lower the mast (derrick) only when the leveling jacks are down and do not raise the leveling jack pads until the mast (derrick) is lowered completely.

• Before starting drilling operations, secure, and/or lock the mast (derrick) if required, according to the drill manufacturer's recommendations.

• Do not stand on the elevated deck of a truck-mounted or all-terrain-mounted drill rig while the drill rig is in operation unless necessary for special tasks and the operator has been notified.

• Only operate a drill rig from the position of the controls. Before leaving the area of the controls, shift the transmission

controlling the rotary drive into neutral and place the feed lever in neutral. Before leaving the vicinity of the drill, shut down the drill engine.

- Throwing or dropping tools must not be permitted. Carefully pass tools by hand between personnel or use a hoist line.
- Do not consume alcoholic beverages, other depressants, or chemical stimulants prior to starting work on a drill rig or while on the job.
- If it is necessary to drill within an enclosed area, make certain that exhaust fumes are conducted out of the area. Exhaust fumes are toxic and some cannot be detected by smell.
- Clean mud and grease from boots before stepping on a drill platform and use hand holds and railings. Watch for slippery ground when stepping down from the platform.
- During freezing weather, do not touch any metal parts of the drill rig with exposed flesh. Freezing of moist skin to metal can occur almost instantaneously.
- Drain all air and water lines and pumps when not in use if freezing weather is expected.
- Adequately cover or protect all unattended boreholes to prevent drill rig personnel, site visitors, or animals from stepping or falling into the hole. Cover, protect or backfill all open boreholes according to local or state regulations on completion of the drilling project.
- Never allow "horsing around" within the vicinity of the drill rig and tool and supply storage areas — even when the drill rig is shut down.
- When using a ladder on a drill rig, face the ladder and grasp either the side rails or the rungs with both hands while ascending or descending. Do not attempt to use one or both hands to carry a tool while on a ladder. Use a hoist line and a tool "bucket" or a safety hook to raise or lower hand tools.
- Terminate drilling operations during an electrical storm and move the complete crew away from the drill rig.

An elevated derrick platform should be used with the following precautions:

- When working on a derrick platform, use a safety belt and a lifeline. The safety belt must be at least 4 in. (100 mm) wide and should fit snugly but comfortably. The lifeline, when attached

to the derrick, must be less than 6 ft. (2 m) long. The safety belt and lifeline must be strong enough to withstand the dynamic force of a 250 lb. (115 kg) weight (contained within the belt) falling 6 ft. (2 m).

- Use a safety device when climbing to a derrick platform that is higher than 20 ft. (6 m).
- When on a derrick platform, fasten the lifeline to the derrick just above the derrick platform and to a structural member that is not attached to the platform or to other lines or cables supporting the platform.
- When first arriving at a derrick platform, immediately inspect for broken members, loose connections, loose tools, or other loose materials.
- Securely attach tools to the platform with safety lines. Do not attach a tool to a line attached to one's wrist or any other part of the body.
- When working on a derrick platform, do not guide drill rods or pipe into racks or other supports by taking hold of a moving hoist line or a traveling block.
- Do not leave loose tools and similar items on the derrick platform or on structural members of the derrick.
- A derrick platform over 4 ft. (1.2 m) above ground surface must have toe boards and safety railing that are in good condition.
- Avoid being under rig workers on elevated platforms whenever possible.

If heavy objects must be manually lifted, exercise care to avoid injury.

- Before lifting an object without using a hoist, make sure that the load is within your personal lifting capacity. If it is too heavy, ask for assistance.
- Before lifting a relatively heavy object, approach the object by bending at the knees, keeping the back vertical and unarched while obtaining a firm footing. Grasp the object firmly with both hands and stand slowly and squarely while keeping the back vertical and unarched. In other words, perform the lifting with the muscles in the legs, not with the muscles in the lower back.
- If a heavy object must be moved some distance without the aid of machinery, keep the back straight and unarched. Change directions by moving the feet, not by twisting the body.

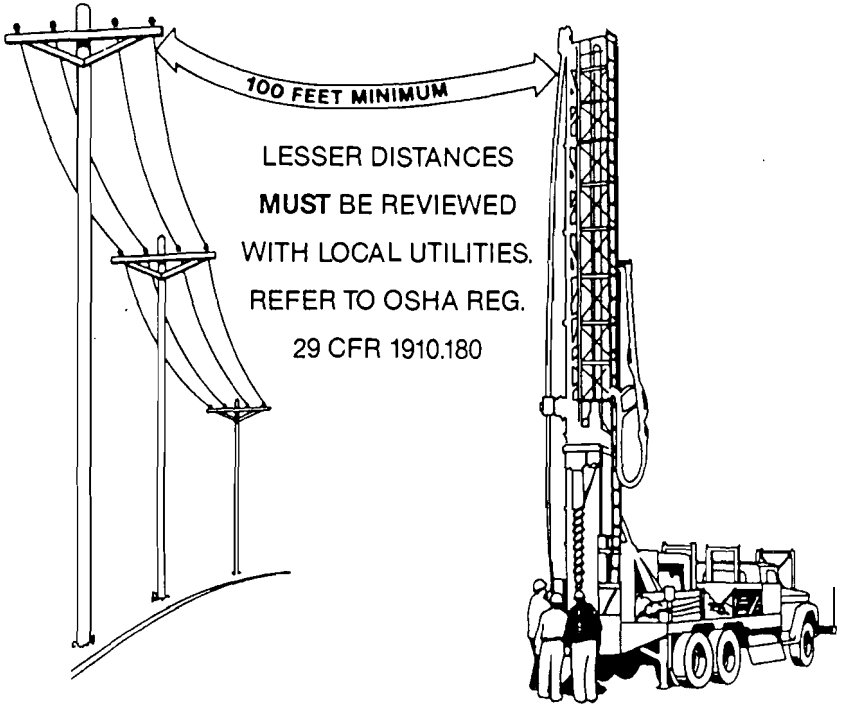
• Move heavy objects with the aid of hand carts whenever possible.

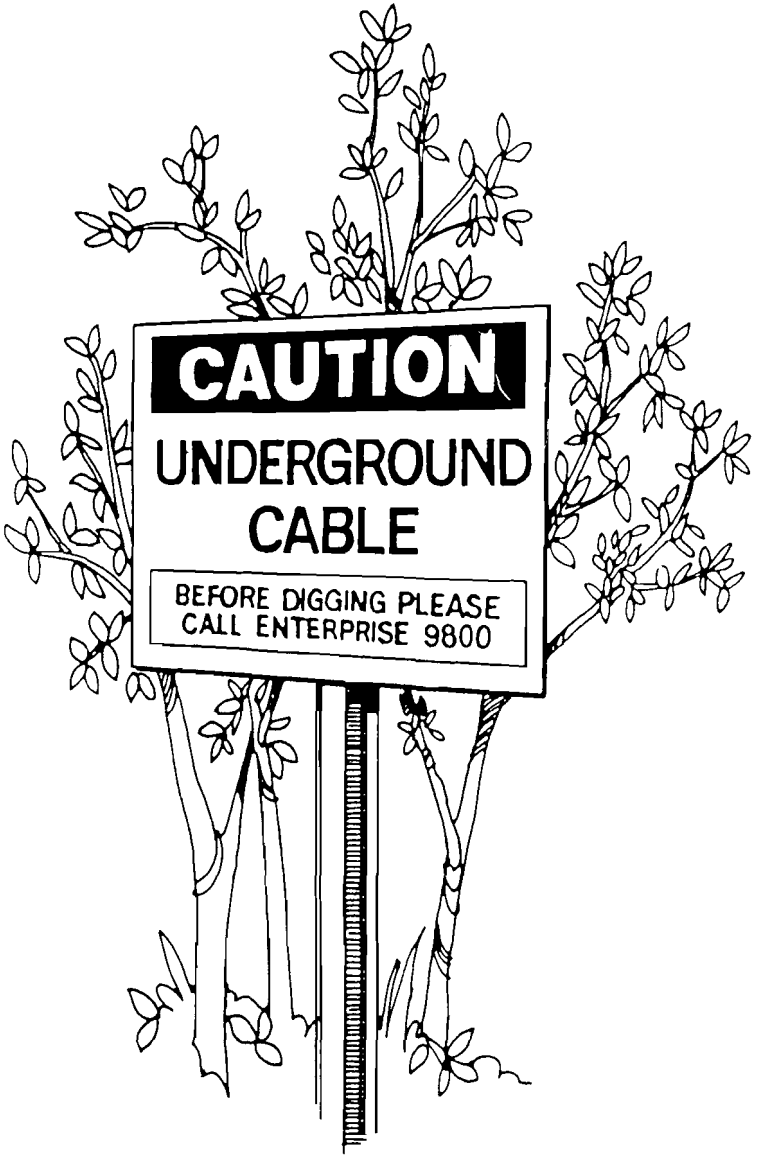
11. Overhead and Buried Utilities

Both supervisors and members of the exploration crew must take special precautions when a drill rig will be used on a site or project within the vicinity of electrical power lines and other utilities. Electricity can shock, it can burn, and it can cause death.

• Locate, note, and emphasize overhead and buried utilities on all boring location plans and boring assignment sheets.

• When overhead electrical power lines exist at or near a drilling site or project, consider all wires to be alive and dangerous.





• Watch for sagging power lines before entering a site. Do not lift power lines to gain entrance. Call the utility and ask them to lift or raise the lines or deenergize (turn off) the power.

• Before raising the drill rig mast (derrick) on a site in the vicinity of power lines, walk completely around the drill rig. Determine the minimum horizontal distance from any point on the drill rig

to the nearest power line when the mast is raised and/or being raised. If this horizontal distance is less than 100 ft. (30 m), first consult the local utility company and refer to OSHA REG 29 CFR 1910.180 before commencing operations.

- Keep in mind that both hoist lines and overhead power lines can be moved toward each other by the wind.
- In order to avoid contact with power lines, only move the drill rig with the mast (derrick) down.
- If there are any questions concerning the safety of drilling on sites in the vicinity of overhead power lines, call the power company. The power company will provide expert advice at the drilling site as a public service and at no cost.

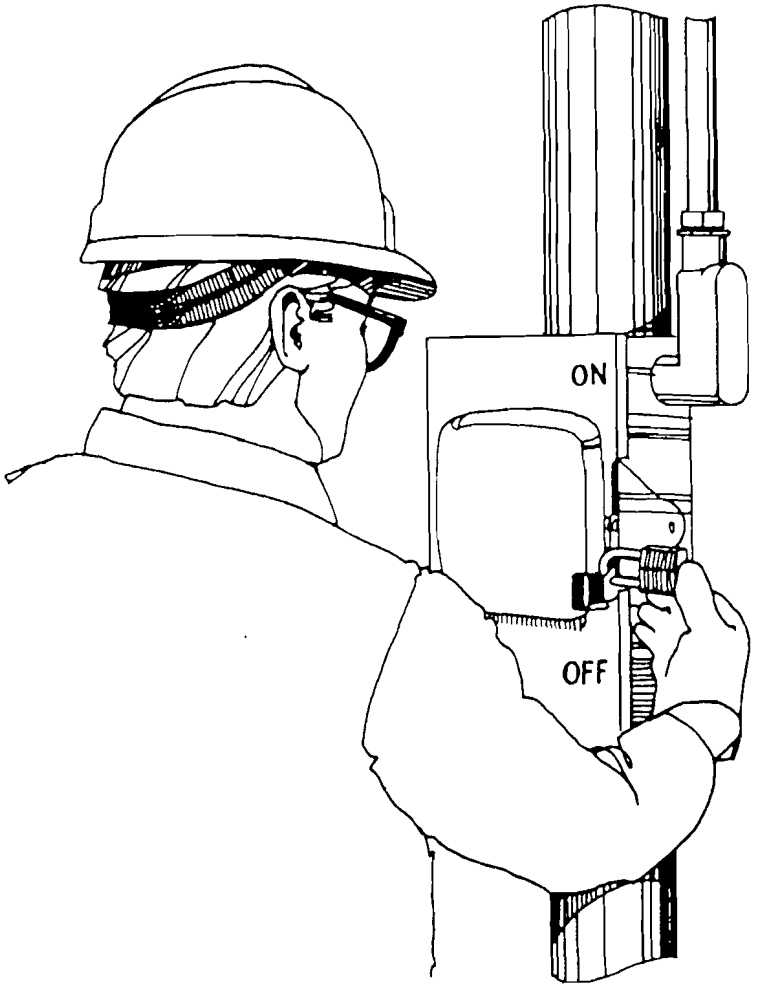
Electricity is as dangerous underground as overhead. Be aware of and always suspect the existence of underground utilities such as electrical power, gas, petroleum, telephone, sewer and water.

- If a sign warning of underground utilities is located on a site boundary, do not assume that underground utilities are located on or near the boundary or property line under the sign. Call the utility and check it out. The underground utilities may be a considerable distance away from the warning sign.
- Always contact the owners of utility lines or the nearest underground utility location service before drilling. Determine jointly with utility personnel the precise location of underground utility lines, mark and flag the locations, and determine jointly with utility personnel what specific precautions must be taken to ensure safety.

12. Supplying Power to the Job Site

Drilling projects sometimes require around-the-clock operations and, therefore, require temporary electrical lighting. In general, all wiring and fixtures used to provide electricity for drilling operations should be installed by qualified personnel in accordance with the National Electrical Code (NFPA70-1984) with consideration of the American Petroleum Institute's recommended practices for electrical installations for production facilities (API-RP-500B). Lights should be installed and positioned so that the work area and operating positions are well

lighted without shadows or blind spots. The following are specific recommendations for land-based drilling operations:



- Before working on an electrical power or lighting system, lock-out the main panel box with your own lock and keep the key on your person at all times.
- Install all wiring using high quality connections, fixtures and wire. Be sure that the wiring is insulated and protected with consideration for the drilling environment. Do not use makeshift

wiring and equipment.

- Place all lights positioned directly above working areas in cages or similar enclosures to prevent loose or detached lamps or vaportight enclosures from falling on workers.
- Install lights so as to eliminate glare or "blind spots" on tools, ladders, walkways, platforms, and the complete working area.
- Locate and guard electrical cables to prevent damage by drilling operations or by the movement of personnel, tools, or supplies.
- Use only three-prong, U-blade, grounded type plug receptacles and have adequate current carrying capacity for the electrical tools that may be used.
- Use only electrical tools that have three-prong, U-blade, ground wire plugs and cords.
- Do not use electrical tools with lock-on devices.
- Provide adequate grounding for all electrical welders, generators, control panels, and similar devices.
- Provide secure protective enclosures on control panels, fuse boxes, transformers, and similar equipment.
- Avoid attaching electrical lighting cables to the derrick or other components of the drill rig. If this must be done, use only approved fasteners. Do not "string" wire through the derrick.
- Do not use poles used to hold wiring and lights for any other purpose.
- Turn power off before changing fuses or light bulbs.
- Require all workers in a drilling area illuminated with electrical lighting to wear safety head gear that protects the worker's head, not only against falling or flying objects, but also against limited electrical shock and burns according to ANSI Z89.1 and Z89.2.
- Allow only trained, designated personnel to operate electrical equipment.
- Do not permit unqualified field personnel to work on or near electric lines or devices.

13. Contact with Electricity

If a drill rig makes contact with electrical wires, it may or may not be insulated from the ground by the tires of the carrier. Under either circumstance, if the human body simultaneously

comes in contact with the drill rig and the ground, electrocution can result, causing death or serious injury. If a drill rig or a drill rig carrier makes contact with overhead or underground electrical lines:

- Under most circumstances the operator and other personnel on the seat of the vehicle should remain seated and not leave the vehicle. They should not move or touch any part, particularly a metallic part, of the vehicle or the drill rig.
- If it is determined that the drill rig should be vacated, all personnel must jump clear and as far as possible from the drill. Personnel must not step off — but must jump off. Do not hang on to the vehicle or any part of the drill when jumping clear.
- If you are on the ground, stay away from the vehicle and the drill rig; do not allow others to get near the vehicle and the drill rig. Seek assistance immediately from local emergency personnel such as the police or a fire department.
- When an individual is injured and in contact with the drill rig or with power lines, attempt rescue with extreme caution. If a rescue is attempted, use a long, dry, unpainted piece of wood or a long, dry, clean rope. Keep as far away from the victim as possible and do not touch the victim until the victim is completely clear of the drill rig or electrical lines.
- Do not attempt to administer first aid unless the victim is completely clear of the electrical source. Begin cardiopulmonary resuscitation (CPR) immediately if a heart beat (pulse) cannot be detected.

14. Wire Line Hoists, Wire Rope, and Hoisting Hardware

Use wire line hoists, wire rope, and hoisting hardware only as stipulated by the American Iron and Steel Institute *Wire Rope Users Manual.*

- Visually inspect all wire ropes and fittings during use and thoroughly inspect them at least once a week for abrasion, broken wires, wear, reduction in rope diameter, reduction in wire diameter, fatigue, corrosion, damage from heat, improper reeving, jamming, crushing, bird caging, kinking, core protrusion, and/or damage to lifting hardware. Replace wire ropes when inspection indicates excessive damage, as described in the *Wire Rope Users Manual.*

- Thoroughly inspect all wire ropes that have not been used for a period of a month or more.
- Install all connections and end fittings, which consist of spliced eyes and various manufactured devices, according to the manufacturer's specifications. Do not exceed ratings specified by manufacturer.
- If a ball-bearing type hoisting swivel is used to hoist drill rods, inspect and lubricate swivel bearing daily to assure that the swivel freely rotates under load.
- If a rod slipping device is used to hoist drill rods, do not drill through or rotate drill rods through the slipping device; do not hoist more than 1 ft. (0.3 m) of the drill rod column above the top of the mast (derrick); do not hoist a rod column with loose tool joints; and do not make, tighten, or loosen tool joints while the rod column is being supported by a rod slipping device. If drill rods should slip back into the borehole, do not attempt to break the fall of the rods by hand or by tensioning the slipping device.
- Most sheaves on exploration drill rigs are stationary with a single part line. Never increase the number of parts of line without first consulting with the manufacturer of the drill rig.
- Wire ropes must be properly matched with each sheave. If the rope is too large, the sheave will pinch the wire rope. If the rope is too small, it will groove the sheave. Once the sheave is grooved, it will severely pinch and damage larger-sized wire ropes.

The following procedures and precautions must be understood and implemented for use of wire ropes and rigging hardware:

- Use tool handling hoists only for vertical lifting of tools (except when angle hole drilling). Do not use tool handling hoists to pull on objects away from the drill rig; however, drills may be moved using the main hoist of the drill if the wire rope is spooled through proper sheaves according to the manufacturer's recommendations.
- When stuck tools or similar loads cannot be raised with a hoist, disconnect the hoist line and connect the stuck tools directly to the feed mechanism of the drill. Do not use hydraulic leveling jacks for added pull to the hoist line or to the feed mechanism of the drill.

- When attempting to pull out a mired down vehicle or drill rig carrier, only use a winch on the front or rear of the vehicle and stay as far as possible away from the wire rope. Do not attempt to use tool hoists to pull out a mired down vehicle or drill rig carrier.
- Apply loads smoothly and steadily to minimize shock loading of a wire rope.
- Avoid sudden loading in cold weather.
- Never use frozen ropes.
- Protect wire rope from sharp corners or edges.
- Replace faulty guides and rollers.
- Replace worn sheaves or worn sheave bearings.
- Replace damaged latches on hooks before using.
- Know the working load of the equipment and tackle being used. Never exceed this limit.
- Periodically inspect and test hoist clutches and brakes.
- Know and do not exceed the rated capacity of mast hooks, rings, links, swivels, shackles, and other lifting aids.
- Always wear gloves when handling wire ropes.
- Do not use hands to guide wire rope on hoist drums.
- Following the installation of a new wire rope, first lift a light load to allow the wire rope to adjust.
- Never conduct any hoisting operations when the weather conditions are such that hazards to personnel, the public, or property are created.
- Never leave a load suspended in the air when the hoist is unattended.
- Keep hands away from hoists, wire rope, hoisting hooks, sheaves, and pinch points while slack is being taken up or when the load is being hoisted.
- Never hoist the load over the head, body, or feet of any personnel.
- Never use a hoist line to "ride" up the mast (derrick) of a drill rig.
- Use replacement wire ropes that conform to the drill rig manufacturer's specifications.

15. Cathead and Rope Hoists

Follow these procedures when using a cathead hoist:

• Keep the cathead clean and free of rust, oil and grease. Rust should be removed from the cathead with a wire brush having a handle.

• Check the cathead periodically, when the engine is not running, for rope wear grooves. If a rope groove forms to a depth greater than 1/8 in. (3 mm), replace the cathead.

• Always use a clean, dry, sound rope. A wet or oily rope may "grab" the cathead and cause drill tools or other items to be rapidly hoisted to the top of the mast.

• Should the rope "grab" the cathead or otherwise become tangled in the drum, release the rope and sound an appropriate alarm for all personnel, including the operator, to rapidly back away and stay clear. If the rope "grabs" the cathead, and tools are hoisted to the sheaves at the top of the mast, the rope will often break, releasing the tools. If the rope does not break, stay clear of the drill rig until the operator cautiously returns to turn off the drill rig engine and appropriate action is taken to release the tools. Keep careful watch on the suspended tools and quickly back away after turning off the engine.

• Always protect the rope from contact with chemicals. Chemicals can cause deterioration of the rope that may not be detected visibly.

• Never wrap the rope from the cathead (or any other rope, wire rope, or cable on the drill rig) around a hand, wrist, arm, foot, ankle, legs, or any other part of the body.

• Always maintain a minimum of 18 inches of clearance between the operating hand and the cathead drum when driving samplers, casing, or other tools with the cathead and rope method. Be aware that the rope advances toward the cathead with each hammer blow as the sampler or other drilling tool advances into the ground.

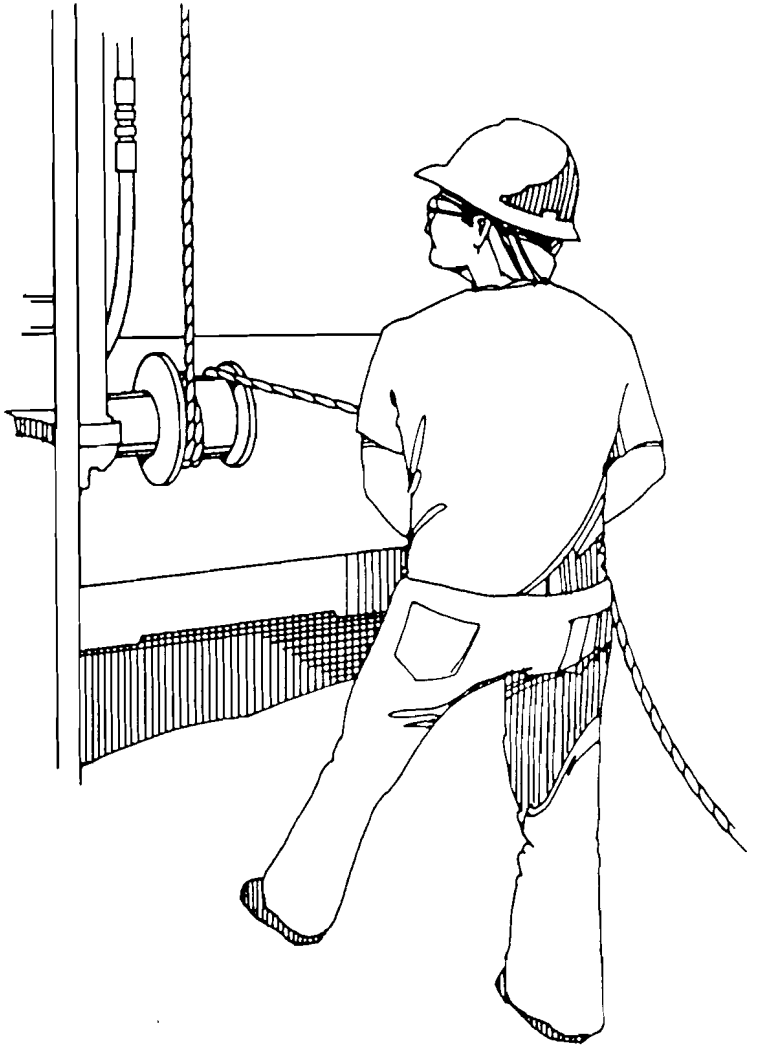
• Never operate a cathead (or perform any other task around a drill rig) with loose, unbuttoned, or otherwise unfastened clothing or when wearing gloves with large cuffs or loose straps or lacings.

• Do not use a rope that is any longer than necessary. A rope that is too long can form a ground loop or otherwise become entangled with the operator's legs.

• Do not use more rope wraps than are required to hoist a load.

• Do not leave a cathead unattended with the rope wrapped on the drum.

• Position all other hoist lines to prevent contact with the operating cathead rope.



• When using the cathead and rope for driving or back-driving, make sure that all threaded connections are tight and stay as far away as possible from the hammer impact point.

• Only operate the cathead standing on a level surface with good, firm footing conditions without distraction or disturbance.

16. Augers

Follow these general procedures when starting a boring with continuous flight or hollow-stem augers:

- Start an auger boring with the drill rig level, the clutch or hydraulic rotation control disengaged, the transmission in low gear, and the engine running at low RPM.
- Apply an adequate amount of down pressure prior to rotation to seat the auger head below the ground surface.
- Look at the auger head while slowly engaging the clutch or rotation control and starting rotation. Stay clear of the auger.
- Slowly rotate the auger and auger head while continuing to apply down pressure. Keep one hand on the clutch or on the rotation control at all times until the auger has penetrated about one foot or more below ground surface.
- If the auger head slides out of alignment, disengage the clutch or hydraulic rotation control and repeat the hole starting process.
- An auger guide can facilitate the starting of a straight hole through hard ground or a pavement.

Establish a system of responsibility for the operator and tool handler to follow during the series of various activities required for auger drilling, such as connecting and disconnecting auger sections, and inserting and removing the auger fork. The operator must ensure that the tool handler is well away from the auger column and that the auger fork is removed before starting rotation. In addition:

- When rotating augers, stay clear of the rotating auger and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason whatever.
- Only use the manufacturer's recommended method of securing the auger to the power coupling. Do not use an overlength pin or bolt. Do not touch the coupling or the auger with hands, a wrench, or any other tools during rotation.
- Whenever possible, use tool hoists to handle auger sections.
- Never place hands or fingers under the bottom of an auger

section when hoisting the auger over the top of the auger sectior in the ground or other hard surfaces such as the drill rig platform.

- Never allow feet to get under the auger section that is being hoisted.
- Use a long-handed shovel to move auger cuttings away from the auger. Never use hands or feet to move cuttings away from the auger.
- Do not attempt to remove earth from rotating augers. Clean augers only when the drill rig is in neutral and the augers are stopped from rotating.

17. Rotary and Core Drilling

Check rotary drilling tools prior to drilling:

- Lubricate and check for frozen bearings before using water/air swivels and hoisting plugs. Water/air swivel bearings must be free before using, and stay clear of water/air swivel hose when rotating.
- Check drill rod chuck jaws periodically and replace when necessary.
- Check the capacities of hoists and sheaves against the anticipated weight to the drill rod string plus other expected hoisting loads.

During rotary or core drilling, follow these special precautions that involve chucking, joint break, hoisting, and lowering of drill rods:

- Only the operator of the drill rig should be allowed to brake or set a manual chuck so that rotation of the chuck will not occur prior to removing the wrench from the chuck.
- Drill rods should not be braked during lowering into the hole with drill rod chuck jaws.
- Do not lower drill rods into the hole with pipe wrenches.
- If a string of drill rods is accidentally or inadvertently released into the hole, do not attempt to grab the falling rods by hand or with a wrench.
- In the event of a plugged bit or other circulation blockage, relieve the high pressure in the piping and hose between the pump and the obstruction before breaking the first tool joint.

• When drill rods are hoisted from the hole, clean them only with a wiper made of rubber or other suitable material. Do not use hands to clean drilling fluid from drill rods.

• If work must progress above a portable drilling fluid (mud) pit, do not attempt to stand on narrow sides or cross members. Equip the mud pit with rough surfaced, fitted cover panels of adequate strength to hold drill rig personnel.

• Do not lift or lean unsecured drill rods against the mast. Either provide some method of securing the upper ends of the drill rod sections for safe vertical storage or lay the rods down.

18. Transporting a Drill Rig

When transporting a drill rig on and off a drilling site:

• Allow only licensed individuals to operate the vehicle. Comply with all federal, state, and local regulations.

• Know the traveling height (overhead clearance), width, length, and weight of the drill rig with carrier and know the highway and bridge load, width, and overhead limits. Allow adequate margins and make sure that they are not exceeded.

• Never move a drill rig unless the vehicle brakes are in sound working order.

• Allow for mast overhang when cornering or approaching other vehicles or structures.

• Be aware that the canopies of service stations and motels are often too low for a drill rig mast to clear with the mast in the travel position.

• Watch for low hanging electrical lines, particularly at the entrances to drilling sites, restaurants, motels, or other commercial sites.

• Never travel on a street, road, or highway with the mast (derrick) of the drill rig in the raised or partially raised position.

• Remove all ignition keys when a drill rig is left unattended.

19. Loading and Unloading

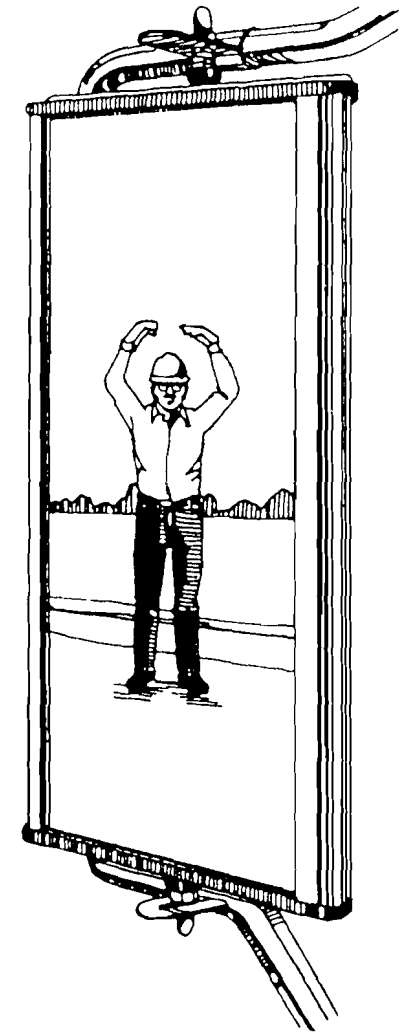
When loading or unloading a drill rig on a trailer or a truck:

• Use ramps of adequate design that are solid and substantial enough to bear the weight of the drill rig with carrier — including tooling.

• Load and unload on level ground.

• Use the assistance of someone on the ground as a guide.

• Check the brakes on the drill rig carrier before approaching loading ramps.



• Distribute the weight on the drill rig, carrier, and tools on the trailer so that the center of weight is approximately on the centerline of the trailer and so that some of the trailer load is transferred

to the hitch of the pulling vehicle. Refer to the trailer manufacturer's weight distribution recommendations.

- Secure the drill rig and tools to the hauling vehicle with ties, chains, and/or load binders of adequate capacity.

20. Off-Road Movement

Follow these procedures during off-road movement:

- Before moving a drill rig, first walk the route of travel, inspecting for depressions, stumps, gulleys, ruts, and similar obstacles.
- Always check the brakes of a drill rig carrier before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Discharge all passengers before moving a drill rig on rough or hilly terrain.
- Engage the front axle (for 4 x 4, 6 x 6, etc. vehicles or carriers) when traveling off highway on hilly terrain.
- Use caution when traveling side-hill. Conservatively evaluate side-hill capability of drill rigs because the arbitrary addition of drilling tools may raise the center of mass. When possible, travel directly uphill or downhill. Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Attempt to cross obstacles such as small logs and small erosion channels or ditches squarely rather than at an angle.
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.
- Set all brakes and/or locks after the drill has been moved to a new drilling site. When grades are present, block the wheels.
- Never travel off-road with the mast (derrick) of the drill rig in the raised or partially raised position.

21. Tires, Batteries, and Fuel

Check tires on the drill daily for safety and, during extended travel, for loss of air. Maintain air pressures for travel on streets, roads, and highways according to the manufacturer's recommendations. Only repair truck and off-highway tires with the required special tools and follow the recommendations of a tire manufacturer's repair manual.

If tires on all-terrain drills are deflated to reduce ground pressure for movement on soft ground, reinflate the tires to normal pressures before movement on firm or hilly ground or on streets, roads, and highways. Underinflated tires are not stable on firm ground.

During air pressure checks, inspect for:

- Missing or loose wheel lugs.
- Objects wedged between duals or embedded in the tire casing.
- Damaged or poorly fitting rims or rim flanges.
- Abnormal or uneven wear and cuts, breaks, or tears in the casing.

Batteries contain strong acid. Use extreme caution when servicing batteries.

- Service batteries only in a ventilated area and while wearing safety glasses.
- When a battery is removed from a vehicle or service unit, disconnect the battery ground clamp first.
- When installing a battery, connect the battery ground clamp last.
- When charging a battery with a battery charger, turn off the power source to the battery before either connecting or disconnecting charger leads to the battery posts. Loosen cell caps before charging to permit the escape of gas.
- Spilled battery acid can burn skin and should be immediately flushed with lots of water. If battery acid gets into someone's eyes, flush immediately with large amounts of water and see a medical physician at once.
- To avoid battery explosions, keep the cells filled with electrolyte, use a flashlight (not an open flame) to check electrolyte levels and avoid creating sparks around the battery by shorting across a battery terminal. Keep lighted or smoking materials and flames away from batteries.

Take special precautions for handling fuel and refueling the drill rig or carrier.

- Only use the type and quality of fuel recommended by the engine manufacturer.
- Refuel in a well-ventilated area.

- Do not fill fuel tanks while the engine is running. Turn off all electrical switches.
- Do not spill fuel on hot surfaces. Clean any spills before starting an engine.
- Wipe up spilled fuel with cotton rags or cloths; do not use wool or metallic cloth.
- Keep open lights, lighted smoking materials, flames, or sparking equipment well away from the fueling area.
- Turn off heaters in carrier cabs when refueling the carrier or the drill rig.
- Do not fill portable fuel containers completely full to allow expansion of the fuel during temperature changes.
- Keep the fuel nozzle in contact with the tank being filled to prevent static sparks from igniting the fuel.
- Do not transport portable fuel containers in the vehicle or carrier cab with personnel.
- During travel store fuel containers and hoses so they are in contact with a metal surface. This should prevent the buildup of static charge.

22. First Aid

Train at least one member of the drill crew, and if only one, preferably the drilling and safety supervisor, to perform first aid. First aid must be taught on a person-to-person basis, not by providing or reading a manual. Manuals should only provide continuing reminders and be used for reference. Courses provided or sponsored by the American Red Cross or a similar organization best satisfy the requirements of first aid training for drill crews.

For drilling operations it is particularly important that those responsible for first aid should be able to recognize the symptoms of and be able to provide first aid for electrical shock, heart attack, stroke, broken bones, eye injury, snake bite, and cuts or abrasions to the skin. Again, first aid for these situations is best taught to drill crew members by instructors qualified by an agency such as the American Red Cross.

Keep first aid kit available and well maintained on each drill site.

23. Drill Rig Utilization

Do not attempt to exceed manufacturers' ratings of speed, force, torque, pressure, flow, etc. Only use the drill rig and tools for the purposes for which they are intended and designed.

24. Drill Rig Alterations

Alterations to a drill rig or drilling tools must only be made by qualified personnel and only after consultation with the manufacturer.

APPENDIX C

CITIZEN PARTICIPATION PLAN

CITIZEN PARTICIPATION PLAN

FOR THE

NIAGARA MOHAWK POWER CORPORATION

INVESTIGATION AND REMEDIAL PROGRAM

AT THE

FORMER ONEIDA (SCONONDOA STREET) MANUFACTURED GAS PLANT SITE

ONEIDA, NEW YORK

APRIL 1995

PREPARED BY:

NIAGARA MOHAWK POWER CORPORATION

300 ERIE BOULEVARD WEST

SYRACUSE, NY 13202

TABLE OF CONTENTS

1.0 INTRODUCTION

Niagara Mohawk Power Corporation (NMPC), the New York State Department of Environmental Conservation (NYSDEC), and the New York State Department of Health (NYSDOH) are committed to implementing a citizen participation plan (CPP) for the former Oneida (Sconondoa St.) manufactured gas plant (MGP) site investigation and remedial program. NMPC has entered into an Order on Consent with the NYSDEC to investigate and remediate, where necessary, the former MGP site.

Implementation of a CPP will promote public understanding of investigation activities at the former MGP site, and enable NMPC and the NYSDEC to identify those issues which the public assigns the highest priority, and develop a comprehensive remedial program which addresses the needs of the public, the environment, and NMPC.

2.0 PUBLIC PARTICIPATION OBJECTIVES/ACTIVITIES

Objectives

Identify individuals and groups (audiences) who may have an interest in the site and the planned investigation activities.

* Identify and develop appropriate channels of communication for these audiences.
* Provide interested and affected parties with information about the site and planned investigation, as well as future plans, to the extent these are known.
* Create a dialogue between NMPC and the public that seeks to identify and address issues and concerns.
* Identify and communicate those areas where interested and affected parties can provide input to the project as well as the manner in which this input will be utilized.
* Build trust and credibility among participants and in the citizen participation process.
* Evaluate and act upon feedback to achieve continuous process improvement.

Activities

Public participation activities to be completed as part of the overall project include:

1) Meetings with local elected and other governmental officials, such as the fire and police chiefs, prior to beginning site investigation phase and after results of the prior phase have been received, to review project details and schedule.

2) A meeting with employees at the NMPC Sconondoa Street facility before major phases of the investigation commence, and seek their assistance with identification of public concerns regarding the site and the investigation process.

3) Review the need for a meeting with a focus group that represents neighborhood, local government, and other interests. The group would assist with identification of public

concerns regarding the site and the investigation process. The need for additional members and future meetings would be determined by the group.

4) Preparation of information sheets covering, in plain language, such issues as:
   a) site history
   b) nature of activities to be performed during 1995
   c) potential health and environmental issues associated with coal tar by-products and the site
   d) project schedule; and
   e) results of the investigation phases (to be prepared after phases have been completed).

   An information sheet will be issued prior to the start of a phase of the investigation (i.e. PSA, RI, FS, etc.), after results of the RI/FS investigation have been received and future actions determined, and, if needed, at other stages during the investigation.

5) Public informational meetings which allow the NYSDEC, NYS Department of Health (NYSDOH), and NMPC an opportunity to provide information about the site and planned investigation activities. These meetings will also give the public an opportunity to ask questions and provide input.

   Notice of public informational meetings will be provide to individuals on the CPP contact list. A project information sheet will be included with this notice. NYSDEC and NYSDOH will be invited to all public informational meetings. A summary of each public informational meeting will be distributed to all individuals attending, and placed in the document repository.

6) Presentations by NMPC representative to any groups wishing to learn more about the project.

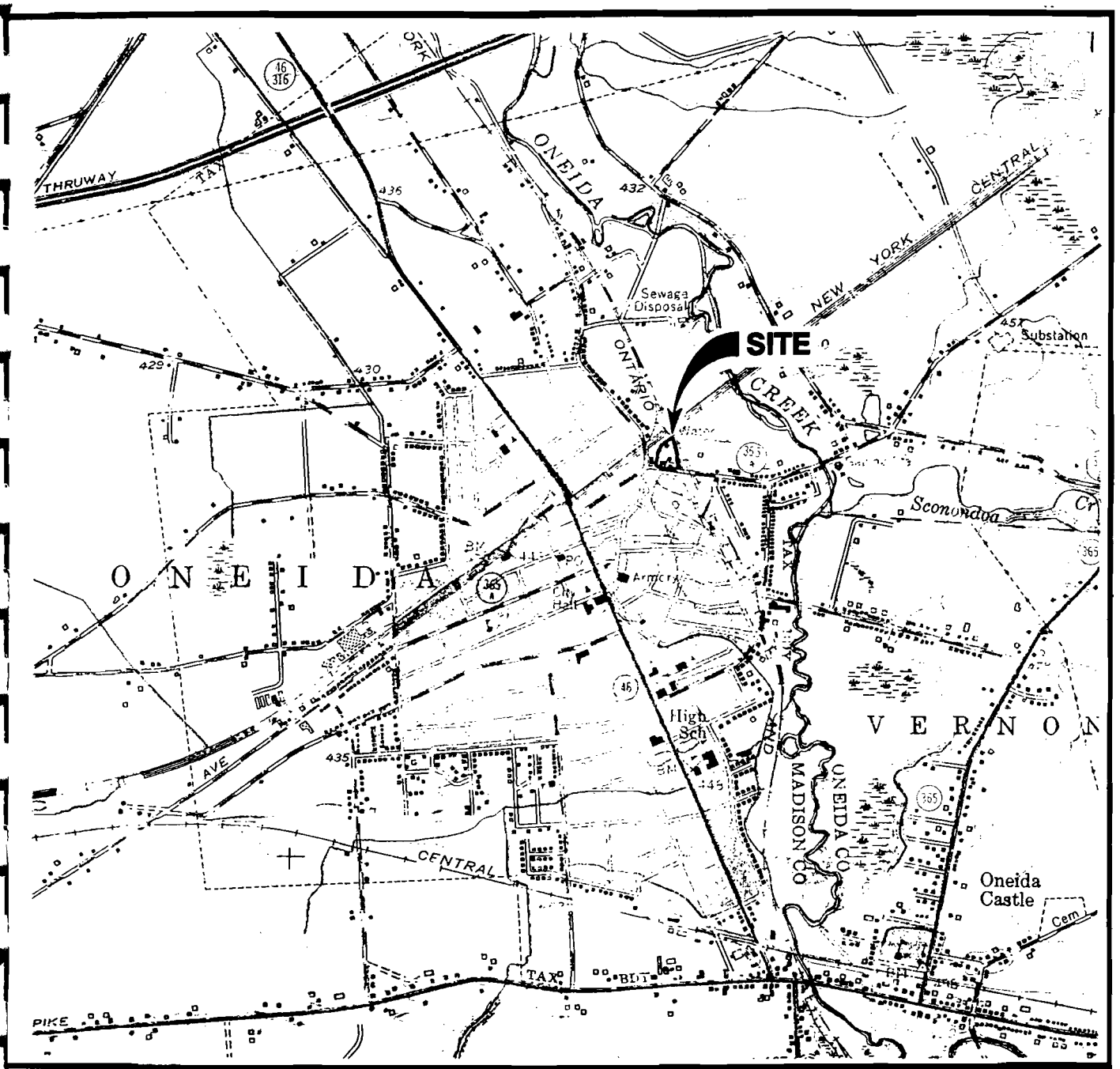
7) Updating of the Oneida Public Library document repository with informational materials that describe the site history, the coal gasification process, results of the PSA/IRM study, the RI/FS work plan, and by-products associated with the manufactured gas process.

8) Evaluation of the citizen participation process through discussions with all appropriate parties, as appropriate.

3.0 BASIC SITE INFORMATION

The Oneida (Sconondoa Street) former MGP site is located in the City of Oneida, Madison County, New York (Figure 3-1). The site is wedge-shaped, bordered to the north and west by Tailrace Creek (a tributary to Oneida Creek), to the east by an earthen path which formerly was the route of the New York Ontario and Western Railroad, and to the south by Sconondoa Street (Figure 3-2).

FIGURE 3-1



SCALE

0 2000 4000 FT.

2000 FT.

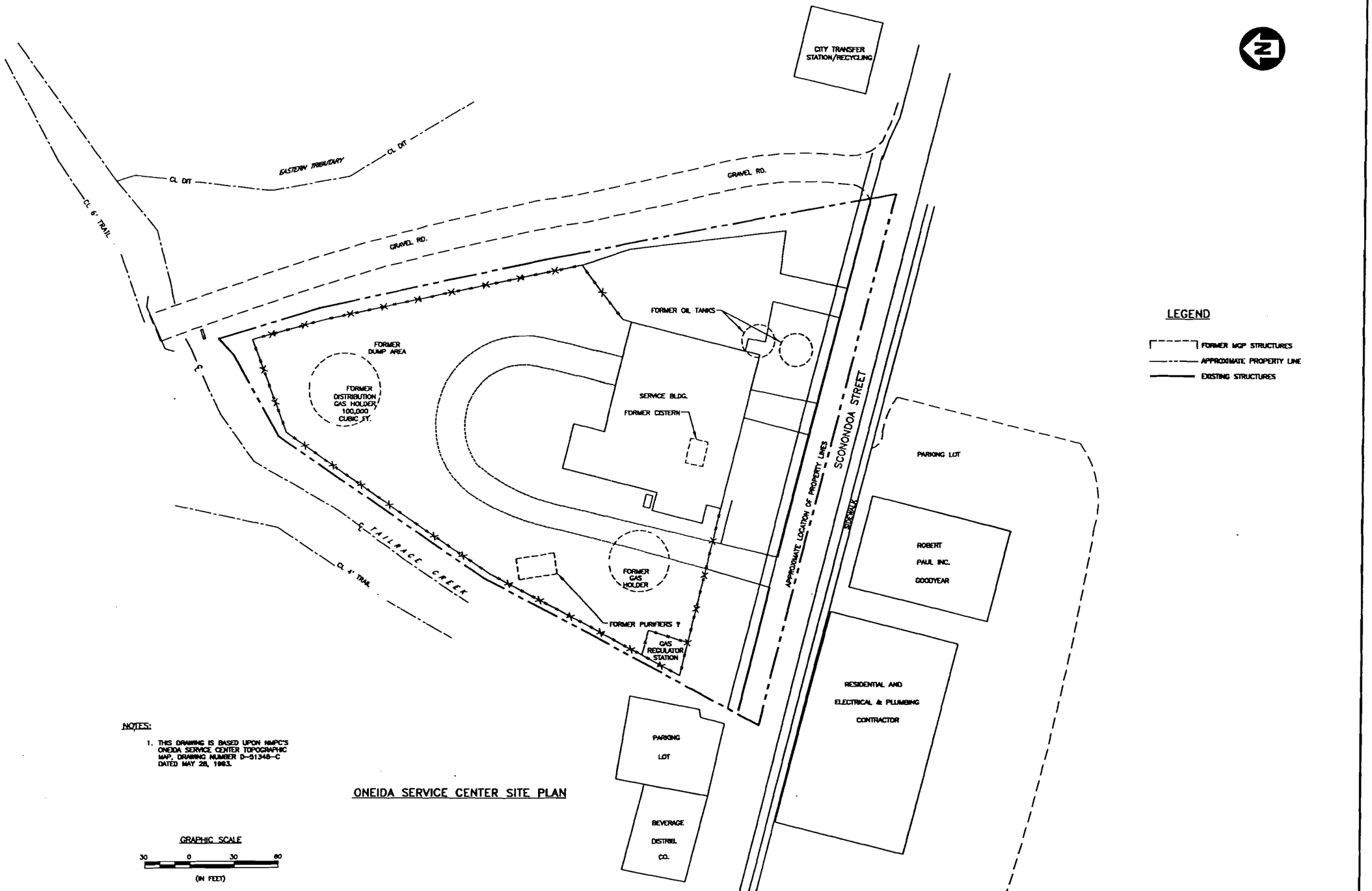
QUADRANGLE LOCATION

N

ENGINEERING-SCIENCE

SITE LOCATION MAP

ONEIDA FORMER MGP SITE NIAGARA MOHAWK POWER CORP.



NOTES:

1. THIS DRAWING IS BASED UPON NMPC'S ONEIDA SERVICE CENTER TOPOGRAPHIC MAP, DRAWING NUMBER D-51348-C DATED MAY 28, 1993.

ONEIDA SERVICE CENTER SITE PLAN

GRAPHIC SCALE

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(IN FEET)

DATE: 10/21/94
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PROJECT NO. 723629 DATE
DESIGNED BY — —
DRAWN BY JTS, JHG —
CHECKED BY — —
ENGINEER —
REGISTRATION NO. — DATE —

ENGINEERING–SCIENCE
DESIGN • RESEARCH • PLANNING
290 ELWOOD DAVIS ROAD • SUITE 312 • LIVERPOOL, NEW YORK 13088 • 315/451-9560
OFFICES IN PRINCIPAL CITIES

ES

NIAGARA MOHAWK

NIAGARA MOHAWK POWER COMPANY
SYRACUSE, NEW YORK

ONEIDA SERVICE CENTER
CITY OF ONEIDA
MADISON COUNTY NEW YORK
SITE PLAN

SCALE AS SHOWN
FIGURE NO. 3-2
FILE NO. 723629

The site is located in an area characterized by industrial and commercial land use. The City of Oneida recycling center is located east of the site, a beverage distributing company is to the west, and a Goodyear distributorship and an electrical and plumbing contractor are located to the south, across Sconondoa Street.

The 1.84-acre former MGP site is secured by a fence at the property perimeter which is locked after working hours. The site is generally flat, and slopes gently to the north. A five-foot embankment exists along Tailrace Creek.

The last remnants of the Sconondoa Street MGP were demolished in 1963. Approximate locations of former MGP structures are shown on Figure 3.1 The current facility, a Niagara Mohawk service center, functions as a base for gas and transmission line maintenance. Approximately thirty employees are currently assigned to the service center, including twenty four line crew employees and six office employees. The site contains an office, garage, and fuel island. Powerline spools and utility poles are stored at the site. Operational utility lines are present along the eastern and northern boundary of the site. The site is partially paved on the south and east sides of the service building, where driveways and a parking lot are situated. The storage areas, and most of the area inside the fence are unpaved and covered by gravel.

Prior to construction of the MGP, between 1896 and 1899, the property was owned by the G. Berry Tannery. In 1920 the coal gas operations were converted to water (carburetted) gas. After 1928, gas production at Oneida was only on emergency basis; as the Oneida area was connected by pipeline to larger plants in Utica.

The site is not listed on the New York State Registry of Inactive Hazardous Waste Sites. The by-products of MGP operations are not considered hazardous wastes by the NYSDEC.

4.0 PROJECT DESCRIPTION

The overall objective of the present program is to investigate the site and determine surface and subsurface conditions (soil quality, groundwater quality, potential exposure pathways, etc.) related to past MGP operations. The investigation is administered under a NYSDEC Order on Consent

There have been two environmental investigations to date at the former MGP site as follows:

USEPA Site Inspection Report

During March 1988, the NUS Corporation conducted a site inspection of the Oneida site for the Environmental Protection Agency (EPA). A total of ten environmental samples consisting of five surface soil, two sediment and three surface waters samples were collected.

The surface soil samples reportedly contained low concentrations of BTEX (benzene, toluene, ethylbenzene and xylene) and significant amounts of PAHs. PCBs were detected in soil samples between 0.2 and 15 ppm. A former transformer storage area was reportedly the source of the PCB contamination. Sediment samples contained BTEX, PAHs and phenol.

A total of 19 metals were detected in surface soil and sediment samples. All metals detected, with the exception of barium, mercury and lead, were within naturally-occurring concentrations ranges. Of these three metals, only lead is known to be associated with MGP residues. The highest concentrations of lead were detected in Tailrace Creek sediment, including one at the culvert discharge at the southwest corner of the site. This sample suggests an upstream source other than NMPC. A total of 15 metals were detected in surface water samples. Six metals, cadmium, cobalt, iron, lead, selenium and zinc were detected above NYS Class C surface water standards, including one sample collected the furthest upstream in Tailrace Creek. Tailrace Creek is a tributary to Oneida Creek, a Class C stream.

Based on the information gathered during the Field Investigation Team (FIT) site investigation, the site was ranked as a low priority for future action. However, it was recommended for a future site investigation regarding transformer storage and the fuel island. No further site investigations have been conducted by the EPA.

In addition, in December 1992 NMPC generated an Initial Submittal for the site that included a history of the MGP activities, current conditions and a summary of previous investigations.

Preliminary Site Assessment and Interim Remedial Measures (PSA/IRM) Study

A PSA/IRM Study was completed by NMPC in the fall of 1993, the results of which included the following:

1) MGP-related by-products were detected in the surface soils, subsurface soils, surface water and groundwater. However, the nature and extent of the MGP by-products were deemed inappropriate for any Interim Remedial Measures (IRMs).

2) The geologic stratigraphy beneath the site consists of fill material, organic peat interbedded with silt and clay, glacially derived sands, silts and gravels. A layer of lacustrine clay underlies at least some, if not all of the site.

3) Groundwater flow in the uppermost saturated formation is toward the north/northwest toward Oneida Creek. Some MGP-related constituents were detected in the on-site groundwater.

4) There are no known groundwater or surface water users in the vicinity of the site. The area is served by the City of Oneida municipal water supply.

5) Some off-site impacts were detected in sediments along Tailrace Creek. These sediments will be further investigated during the RI/FS.

The work completed complied with the Order on Consent and the New York State Environmental Conservation Law.

The NYSDEC has reviewed the PSA/IRM Study, and determined that a Remedial Investigation/Feasibility Study (RI/FS) at NMPC's Oneida (Sconondoa Street) former MGP site is required. The determination is mainly due to the apparent off-site presence of MGP residuals in sediments and groundwater adjacent to the site. The first step in the RI/FS process is development of a work plan, which is designed to meet current requirements established in a NYSDEC Order on Consent (#DO-001-9210). The work plan proposes RI/FS activities and includes a quality assurance plan, field sampling plan, citizen participation plan, cultural resources management plan, and health and safety plan. This investigation incorporates all of the USEPA CERCLA requirements and guidance, and includes additional NYSDEC requirements, as specified herein.

The remedial investigation/feasibility study (RI/FS) will build on results from previous investigations. RI/FS activities proposed include:

1. Site Screening;
2. Source Characterization/Migration Pathways Assessment;
3. Hydrogeologic characterization;
4. Site survey;
5. Data Validation and Evaluation;
6. Risk Assessment;
7. Remedial Investigation Report; and
8. Feasibility Study;

The elements of the RI/FS are set forth in the CERCLA of 1980, 42 U.S.C. Section 9601 et seq., as amended, the current National Contingency Plan (NCP), and the EPA Interim Final Guidance document entitled "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA", dated October 1988 and any subsequent revisions thereto, and appropriate technical and administrative guidelines.

The RI/FS has the following objectives:

- to determine the nature and extent of contamination, including delineation and characterization of waste sources, waste materials, and potential contaminant migration pathways;

- to determine potential human health and environmental risks and applicable or relevant and appropriate requirements (ARARs);

- to determine appropriate remedial alternatives/costs, including waste treatment technologies and candidate treatment vendors/facilities (NMPC's ongoing R&D program shall be considered in making such determinations);

- to determine, the impacts of remedial action upon on-site and off-site buildings, structures and facilities, and;

- to support and facilitate a comprehensive remedial design.

5.0 IDENTIFICATION OF INTERESTED PARTIES

A project contact list (Table 5-1) will be used to inform interested parties of key milestones in the program. It is comprised of elected officials, people and organizations directly affected by the remedial program, and representatives of the local media.

The list will be updated as needed, based on expressions of interest at public meetings or written requests for inclusion.

The mailing list used for mailing reports, as required in the NYSDEC Order on Consent, is listed on Table 5-2.

6.0 PROJECT CONTACT PERSONS

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New York State Department
of Environmental
Conservation
Mr. John Spellman, P.E.
Project Manager
NYSDEC - 50 Wolf Road
Albany, NY 12233
Phone: (518) 457-9280

NYSDEC Toll-Free Information Number: (800) 342-9296

New York State Department of
Health, Environmental Health
Information Line:

Susan Van Patten
(800)458-1158, extension 402.

The NYSDOH toll free number answers calls between 8:00 am and 4:30 pm on business days. After hours callers can leave a message. Touchtone callers can ask for a list of topics.

7.0 DOCUMENT REPOSITORY

Project documents may be reviewed at the following locations:

Oneida Public Library	M	11-8
220 Broad Street	T	11-8
Oneida, NY 13421	W	11-6
(315) 363-3050	Th	11-6
	F	1-5
	S	11-4

NYSDEC
Region 7
615 Erie Blvd.
Syracuse, NY 13204-2400
(315) 426-7400
Open Monday thru Friday 8:30 am - 4:30 pm

8.0 DEFINITION OF COMMONLY USED CITIZEN PARTICIPATION TERMS

Citizen Participation - A process to inform and involve the interested/affected public in the decision-making process during identification, assessment and remediation of inactive hazardous waste sites. This process helps to assure that the best decisions are made from technical, environmental, human health, and economic perspectives.

Citizen Participation Plan - A document that describes the site-specific citizen participation activities that will take place to complement the "technical" (remedial) activities. It also provides site background and rationale for the selected citizen participation program for the site. A plan may be updated or altered as public interest or the technical aspects of the program change.

Citizen Participation Specialist - A staff member within the NYSDEC Division of Hazardous Waste Remediation who provides guidance, evaluation and assistance to help the Project Manager carry out his/her site-specific Citizen Participation program.

Consent Order - A legal and enforceable negotiated agreement between the NYSDEC and responsible parties where responsible parties agree to undertake investigation and cleanup or pay for the costs of investigation and cleanup work at a site. The order includes a description of the remedial actions to be undertaken at the site and a schedule for implementation.

Construction - NMPC selects contractors and supervises construction work to carry out the designed remedial alternative. Construction may be as straightforward as excavation of contaminated soil with disposal at a permitted hazardous waste facility. On the other hand, it may involve drum sampling and identification, complete encapsulation, leachate collection, storage and treatment, ground water management, or other technologies. Construction costs may vary from several thousand dollars to many millions of dollars depending on the size of the site, the soil, ground water and other conditions, and the nature of the wastes.

Contact List - Names, addresses and/or telephone numbers of individuals, groups, organizations and media interested and/or affected by a particular hazardous waste site compiled and updated by the NMPC. Interest in the site, stage of remediation and other factors guide how comprehensive the list becomes. Used to assist the NMPC to inform and involve the interested/affected public.

Contract - A legal document signed by a contractor and the NMPC to carry out specific site remediation activities.

Contractor - A person or firm hired to furnish materials or perform services, especially in construction projects.

Delisting - Removal of a site from the state Registry based on study which shows the site does not contain hazardous wastes.

Document Repository - Typically a regional NYSDEC office and/or public building, such as a library, near a particular site, at which documents related to remedial and citizen participation activities at the site are available for public review. Provides access to documents at times and a

location convenient to the public. Environmental Management Councils (EMCs), Conservation Advisory Committees (CACs) as well as active local groups often can serve as supplemental document repositories.

Feasibility Study (FS) - A process for developing, evaluating and selecting remedial actions, using data gathered during the remedial investigation to: define the objectives of the remedial program for the site and broadly develop remedial action alternatives; perform an initial screening of these alternatives; and perform a detailed analysis of a limited number of alternatives which remain after the initial screening stage.

Information Sheet - A synopsis of all or a portion of the project prepared by NMPC to disseminate information. Uses may include discussion of an element of the remedial program, opportunities for public involvement, availability of a report or other information, or announcement of a public meeting.

Monitoring/Maintenance - Denotes post-closure activities to insure continued effectiveness of the remedial actions. Typical monitoring/maintenance activities include quarterly inspection by a technician; measurement of level of water in monitoring wells; or collection of ground water and surface water samples.

Preliminary Site Assessment - Preliminary characterization of a site; identifies surface or subsurface potential migration pathways; identifies populations or resources which could be affected by the site; and describes past site operations/history. After a Phase I investigation, DEC may choose to nominate the site for the National Priorities List, or, where appropriate, conduct additional investigations.

Project Manager - Responsible for the day-to-day administration of the site investigation, and ultimate remediation/closure. The Project Manager works with the Office of Public Affairs and Corporate Communications, as well as fiscal and legal staff to accomplish site-related goals and objectives.

Public - Individuals, groups, and/or organizations affected by, or interested in an industrial waste site investigation.

Public Informational Meeting - A scheduled gathering of the NMPC, NYSDEC, NYSDOH, and the public to give and receive information, ask questions and discuss issues. May take one of the following forms: large-group meeting called by the NMPC; participation by the NMPC at a meeting sponsored by another organization such as a town board; working group or workshop; or tour of the site.

Public Notice - Written or verbal communication to the public regarding an update on the site investigation (including a forthcoming meeting and/or report). Includes newspaper advertisements, telephone calls to key citizen leaders, targeted mailings, etc.).

Remedial Design - Once a remedial action has been selected, technical drawings and specifications for remedial construction at a site are developed, as specified in the final RI/FS report. Design

documents are used to bid and construct the chosen remedial actions. Remedial design is prepared by consulting engineers with experience in environmental remediation.

Remedial Investigation (RI) - A process to determine the nature and extent of contamination by collecting data and analyzing the site. It includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for, and proposed extent of, a remedial program for the site.

Responsible Parties - Individuals, companies (e.g. current or past site owners or operators, transporters or generators of hazardous waste) responsible for or contributing to the contamination of an industrial waste site. PRP is an acronymn for potentially responsible party.

Responsiveness Summary - A formal or informal written or verbal summary and response by the Department to public questions and comments. Prepared during or after important elements in a site's remedial program. The responsiveness summary may list and respond to each question, or summarize and respond to questions in categories.

TABLE 5-1
CITY OF ONEIDA
MADISON COUNTY, NEW YORK
CONTACT LIST (MARCH 1995)

LOCAL GOVERNMENT:

Army Carinci, Mayor
Office of the Mayor
P.O. Box 550
109 N. Main Street
Oneida, NY 13421
(315)-363-4800

Frank Bova
6th Ward Councilman
332 Williams Street
Oneida, NY 13421
(315) 363-6381

Grace Perretta
City Clerk
P.O. Box 550
109 North Main Street
Oneida, NY 13421
(315) 363-4800

Malcolm Cowles
Planning Commission Chairman
P.O. Box 550
109 N. Main Street
Oneida, NY 13421
(315) 363-1174

James Bacher
City Engineer
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109 N. Main Street
Oneida, NY 13421
(315) 363-7222

TABLE 5-1
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MADISON COUNTY, NEW YORK
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Oneida, NY 13421
(315) 363-7777

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Department of Economic Development
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Oneida, NY 13421
(315) 363-4800

Ralph Keller
Commissioner of Public Safety
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109 N. Main Street
Oneida, NY 13421
(315) 363-6663

John C. McClellan
Chief of Police and
Director of Civil Defense
P.O. Box 550
109 N. Main Street
Oneida, NY 13421
(315) 363-9111

Erwin Smith
Fire Chief
P.O. Box 550
109 N. Main Street
Oneida, NY 13421
(315) 363-1910

TABLE 5-1
CITY OF ONEIDA
MADISON COUNTY, NEW YORK
CONTACT LIST (MARCH 1995)

COUNTY GOVERNMENT:

Larry Carpenter
Chairman
Madison County Board of Supervisors
P.O. Box 635
Wampsville, NY 13163
(315) 366-2201

City of Oneida
4th, 5th & 6th Wards:
Al Cukierski
29 West Elm
Oneida, NY 13421
(315) 363-5464 (home)
Donald H. Behr
223 North Street
Oneida, NY 13421
(315) 363-5646 (home)

O. Perry Tooker
County Clerk
County Office Building
Wampsville, NY 13163
(315) 366-2261

Russel Lura
Director of Planning Department
County Office Building
Wampsville, NY 13163
(315) 366-2341

S. John Campanie
County Attorney
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TABLE 5-1
CITY OF ONEIDA
MADISON COUNTY, NEW YORK
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Environmental Health Division
Toxic/Hazardous Waste Management
County Office Building
Wampsville, NY 13163
(315) 366-2341

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Highway Superintendent
139 North Court Street
Wampsville, NY 13163
(315) 366-2221

STATE GOVERNMENT:

Senator Nancy Larraine Hoffmann
333 East Washington Street
Syracuse, NY 13201
(315) 428-4107

Assembly Member William Magee
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James Van Hoesen, P.E.
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Bureau of Construction Services
NYS Department of Environmental Conservation
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(518) 457-9280

TABLE 5-1
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MADISON COUNTY, NEW YORK
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NYS Department of Health
Bureau of Environmental Exposure
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(518) 458-6306 (ext. 310)

Robert Griffiths
NYS Department of Health
Bureau of Environmental Exposure
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(518) 458-6306

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Health Liaison Program
2 University Place
Room 240
Albany, NY 12203-3399
(800) 458-1158 ext.402 or (518) 458-6402

TABLE 5-1
CITY OF ONEIDA
MADISON COUNTY, NEW YORK
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Regional Water Engineer
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(315) 426-7400

Steve Eidt
Regional Hazardous Substances Engineer
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Syracuse, NY 13204-2400
(315) 426-7400

Neal Driscoll
Citizen Participation Specialist
NYS Department of Environmental Conservation
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(315) 426-7400

PRIVATE ORGANIZATIONS:

Oneida Public Library
220 Broad Street
Oneida, NY 13421
(315) 363-3050

Michael Healy
Executive Director
Greater Oneida Chamber of Commerce
154 Madison Street
Oneida, NY 13421-1629
(315) 363-4300

TABLE 5-1
CITY OF ONEIDA
MADISON COUNTY, NEW YORK
CONTACT LIST (MARCH 1995)

Elizabeth Jump
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423 W. Onondaga Street
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(315) 422-9797

Bruce Carpenter
Audubon Society/NY Rivers United
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Rome, NY 13440
(315) 339-2097

Rogers Environmental Education Center
Route 80
Sherbourne, NY
(315) 674-4017

Owl Club
130 Vanderbilt Avenue
Oneida, NY 13241
(315) 363-3081

Sue Crimmins, Executive Director
Central NY Council on Occupational
Safety & Health
615 W. Genesee Street
Syracuse, NY 13204
(315) 471-6187

Pastor Gordon DeLand
1137 Upper Lenox Avenue
Oneida, NY 13421
(315) 361-1550

TABLE 5-1
CITY OF ONEIDA
MADISON COUNTY, NEW YORK
CONTACT LIST (MARCH 1995)

MEDIA:

Local Newspapers

Oneida Daily Dispatch
Phyllis Harris, Managing Editor
130 Broad Street
Oneida, NY 13421
(315) 363-5100

Rome Observer Dispatch
310 E. Chestnut Street
Rome, NY 13440
(315) 336-8000

Syracuse Herald Journal & Herald American
Local News Bureau - Oneida
156 Main Street
Oneida, NY 13421
(315) 363-6200

Local Television

WFXV Channel 33
Greenfield Road
Rome, NY 13440
(315) 337-3300

WUTR
Smith Hill Road
Utica, NY 13502
(315) 797-5220

Local Radio

WFRG FM 96.1
549 S. Jay Street
Rome, NY 13440
(315) 337-9600

WRNY/WUUU FM
Muck Road
Rome, NY 13440
(315) 336-5600

TABLE 5-1
CITY OF ONEIDA
MADISON COUNTY, NEW YORK
CONTACT LIST (MARCH 1995)

NEIGHBORHOOD RESIDENTS:

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Oriskany Falls, NY 13425

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c/o Joseph Barbano, Jr.
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City of Oneida
City Hall
Oneida, NY 13421

Marion Waters and Michael Grass
c/o Michael T. Grass
104 North Lake Street
Oneida, NY 13421

John H. Paul
D 2 Hill Road
Oneida, NY 13421

Robert Paul, Inc.
214 Sconondoa Street
Oneida, NY 13421

Hung Nguyen
506 Sconondoa St.
Oneida, NY 13421

Raymond L. Buss
113 N. Lake St.
Oneida, NY 13421

David J. Mennig
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Oneida, NY 13421

Judy M. Garlock
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Oneida, NY 13421

James Mowers
167 Madison St.
Oneida, NY 13421

Helen Dwyer
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Oneida, NY 13421

Central Distributing Co.
123 Phelps St.
Oneida, NY 13421

Randy Urben A-2
Leroy Thornton A-3
210 Sconondoa St.
Oneida, NY 13421

Linda Twomey
416 Sconondoa St.
Oneida, NY 13421

Crilder Oil
314 Sconondoa St.
Oneida, NY 13421

Mid-State Supply Co., Inc.
317 Sconondoa St.
Oneida, NY 13421

TABLE 5-1
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G. Carl
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Oneida, NY 13421

Colleen J. Delansy
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Oneida, NY 13421

Lloyd Harquail and Robt. Meehan
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Oneida, NY 13421

Samuel W. Kenyon
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Oneida, NY 13421

Scott Koons
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Oneida, NY 13421

Samuel Kenyon
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Oneida, NY 13421

Henry Dence
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Oneida, NY 13421

David Urtz
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Oneida, NY 13421

Ernest Harp
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Evonne VanPatten
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Oneida, NY 13421

Thomas Collins
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Mary M. Towsley
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J. Robinson
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TABLE 5-1
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Oneida, NY 13421

Knights of Columbus
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Oneida, NY 13421

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Oneida Pet Grooming
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Oneida, NY 13421

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Oneida, NY 13421

Chris Schrank
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Milton Buyea
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Robert J. Maxfield
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William Sawyer
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Oneida, NY 13421

Judy L. VanVorst
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Oneida, NY 13421

M. Smith
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Oneida, NY 13421

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TABLE 5-1
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TABLE 5-1
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Oneida, NY 13421

Table 5-2

MAILING LIST

Party	No. of Copies
John Spellman, P.E. Bureau of Construction Services Division of Hazardous Waste Remediation New York Department of Environmental Conservation 50 Wolf Road Albany, New York 12233-7010	1 copy
Mr. James Van Hoesen, P.E. Chief Western Field Services Section Bureau of Construction Services Division of Hazardous Waste Remediation New York Department of Environmental Conservation 50 Wolf Road Albany, New York 12233-7010	6 copies (1 unbound)
G. Anders Carlson, Director Bureau of Environmental Exposure Investigation New York State Department of Health 2 University Place Albany, New York 12203	2 copies
Charles Branagh, P.E. Regional Hazardous Waste Engineer New York Department of Environmental Conservation 615 Erie Blvd. Syracuse, NY 13204-2400	1 copy

APPENDIX D

CULTURAL RESOURCES MANAGEMENT PLAN

Collamer & Associates, Inc.
Archaeological Services &
Historic Research
114 Gardner Hill
East Nassau, N.Y. 12062

Collamer & Associates, Inc.
Archaeological Services &
Historic Research

PHASE 1 CULTURAL RESOURCE
INVESTIGATION PLAN
for
Niagara Mohawk Power Corporation
THE MULTI-MGP SITE PROGRAM

Prepared for: Niagara Mohawk Power Corporation
300 Erie Boulevard West
Syracuse, N.Y. 13202

Prepared by: Collamer & Associates, Inc.
114 Gardner Hill Road
East Nassau, N.Y. 12062

Date: March 31, 1993

114 Gardner Hill • East Nassau, N.Y. 12062 • 518-766-5387

TABLE OF CONTENTS

1.0 INTRODUCTION

Collamer & Associates, Inc. is a small, woman-owned business, enterprise with expertise in the full range of cultural resource studies and management plans, including all phases of archaeological investigations and historic research. These involve the completion of more than 300 projects throughout New York State. The company has also provided its services to the Niagara Mohawk Power Corporation (NMPC) since 1987, acting as their primary archaeologists under a blanket contract from 1990. In response to this role, we have endeavored to develop a cultural resource management program which involves a thorough understanding of NMPC construction techniques and scheduling, while still implementing a plan to ensure the information obtained, and collections recovered benefit both the average person and the scholar to the fullest extent possible. Therefore, all cultural resource surveys (CRS) conducted will result in a practical approach and thoughtful analytical presentation, rather than just a quantitative analysis of the results.

Previous cultural resource investigations conducted by the company for NMPC and other firms have involved intensive excavation and analysis of prehistoric, historic, military and/or industrial archaeological sites. The documentation, analysis and interpretation presented in these studies allowed the state and federal agencies to evaluate the effect of the proposed project upon any cultural resources identified. When impacts could not be avoided, further studies were conducted to enable an assessment of the significance of the resource and its potential inclusion in the State and National Register of Historic Places.

All investigations completed by the firm are designed to follow the intent and instruction of Federal Guidelines as established in Chapter 36 CFR 800, including Section 14.09 regulations. Ms. Collamer, serving as the Principal Investigator and President of the Company, is a member of the Society of Professional Archaeologist and meets all requirements of the federal government to conduct archaeological studies (in accordance with the Secretary of the Interior's Standards for Archaeology and Historic Preservation 36 CFR 61 Guidelines). She has also completed the "Health & Safety For Hazardous Waste Site Activities" course to satisfy OSHA requirements of 29 CFR 1910.120(e)(3)(i).

As outlined by Niagara Mohawk Power Corporation, a total of 21 individual project sites have been identified in the Multi-MGP Site Program which may require complete Phase 1 Cultural Resource Surveys. A schedule for preliminary site assessment, which will include the cultural resource studies, was presented to the Department of Environmental Conservation (DEC). This involved a work study plan to be initiated over a six year period. According to this schedule, three sites will be assessed each year. Collamer & Associates, Inc., in collaboration with Niagara Mohawk Power

Corporation, has developed an appropriate Cultural Resources Management Plan which will assure a thorough, in-depth study of each site. This program will be implemented upon approval by the Department of Environmental Conservation (DEC) and the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP).

2.0 CULTURAL RESOURCES MANAGEMENT PLAN FOR THE MGP PROGRAM

Each of the 21 MGP sites are related to the storage, use, and distribution of natural gas and the associated waste products. Although the involvement and extent of the facility operation varies at each local, similar site conditions may be expected at all the project areas which may include extensive fill and ground disturbance. Since the majority of the project sites are situated in regions which may be sensitive for the location of evidence of both prehistoric and historic occupation, a Phase 1 Cultural Resource Survey (CRS) has been recommended for each project area. The Phase 1 investigations generally entail the identification, documentation and assessment of cultural resources (both prehistoric and historic) with respect to the proposed undertakings to enable the continuation of the work with the least impact to the known resources. The primary goal of the study is to provide a reasonable assessment of the presence or absence of cultural resources within the project area. This is typically achieved through two general stages which include a Stage 1A Literature/Map Review, and Stage 1B Archaeological Field Investigations.

2.1 Approach to the Stage 1A Literature Search/Map Review

The intent of the Stage 1A Study outlined in this proposal is to develop a predictive sensitivity profile for each of the project areas as outlined in the MGP Program. The sensitivity assessment is designed to determine the differential probability of the land within the property boundaries to contain evidence of prehistoric or historic occupation. The resulting management plan will serve as a guide for future archaeological investigations, in the event of new construction, modifications or alterations to the existing conditions within each of the project boundaries.

The main focus of the Stage 1A level investigation revolves around the identification of known cultural resources and past land use within one mile of each of the MGP sites. This aids in the assessment of the specific probability for the location of archaeological and architectural sites which may be affected by alterations to the existing physiographic conditions at each site location. Initially, available archaeological and architectural files will be reviewed for the immediate vicinity of the sites to provide an applicable data base for the study, an indication of past land use, and to identify existing significant resources.

This information will then be augmented with archival research, relevant interviews and map analysis which will enable the development of the differential probability for each project area to contain intact archaeological deposits or associated architectural sites. In this manner, regions least likely to contain intact resources may be quickly eliminated from further consideration.

During the Phase 1A study, Collamer & Associates, Inc. will conduct the research primarily relating to the prehistoric development, including an examination of relevant archaeological files, consultations with local historians, and the development of the early historical context. Since NMPC maintains an extensive research library, manuscripts section, and map collection, they will provide the description of the historic industrial background and documentation relating to each specific site. This will include, but not be limited to deeds, maps, historic photographs, construction plans and interviews with former employees. If needed, additional historic maps will be provided by Collamer & Associates, Inc. from the sources which may include the NYS Archives, the NYS Library and/or local museums or libraries.

Collamer & Associates, Inc. will examine available archaeological site inventory files, local histories, early maps, current archaeological publications, and relevant prior cultural resource investigations applicable to the project areas. These will assist in the development of the general prehistoric and historic sequence of the land use, and provide valuable background data for the prediction of site types and densities in the project area. Since the research is also designed to confirm the level and extent of prior ground disturbance within the project limits, specific components of the study may consist of an examination and interpretation of "as built" construction plans, soil bores, auger tests, percolation trenches and other associated soil tests conducted by NMPC, if available. Elements of the Stage 1A Study may include, but not be limited to:

1. An examination of the Archaeological Site Inventory Files, Building-Structure Inventory Files, State and National Register of Historic Places listings, and existing cultural resource reports housed at OPRHP.
2. A review of the New York State Museum (NYSM) Archaeological Site Files and related agency publications.
3. Contact with appropriate Anthropological departments at local colleges to identify any archaeological sites they may have on file or relevant studies which have been previously conducted.
4. Consultation with the County and Town Historians to address their local concerns.
5. An examination of early historic maps at the New York State Archives and other local sources for the project area to aid in the identification of historic archaeological sites.

6. Detailed research specifically related to the project area to be conducted at the New York State library, local and/or regional libraries.
7. Interviews with local avocational archaeological groups and other knowledgeable persons.
8. A review of the development of the project site as prepared by NMPC from its initial industrial use to the present condition.
9. A review of available topographic, construction, and planning maps to aid in the identification and extent of previously disturbed regions.
10. A review of Interviews conducted by NMPC with relevant personnel regarding the construction methodology utilized during the development in the project area to aid in the verification of the level and extent of disturbed regions.
11. Photographic documentation of existing structures within or directly adjacent to the project boundaries. OPRHP Building-Structure Inventory forms will be completed for all structures judged to have been constructed prior to 1940, unless previous forms have been submitted.
12. A preliminary site visit will be conducted at this level by either NMPC or Collamer & Associates, Inc. to initially identify any extensively disturbed areas, existing ground conditions and document the visible structural components of the site.

Any relevant files maintained by NMPC will be made available to the consultant to aid in the accumulation of pertinent data on the development of the project area. This will include previous OPRHP Building-Structure (Blue Forms), deeds and maps. Any architectural or archaeological sites identified through the Stage 1A literature search will be located upon a base map of the project area to be incorporated within the study.

Environmental information, including the topography, geology, drainage, and soils for each project, as well as, the existing prehistoric sites, will also be obtained to form a basis for the predictive sensitivity profile. A comparison of the physiographic characteristics of known habitation sites has shown that certain environmental factors are important criteria in the choice of settlement locations, procurement sites and seasonal occupation areas. Since the major environmental factors of recorded sites can easily be recognized by an examination their locations as presented upon maps, they may indicate broad patterns of settlement, occupation or use which will be incorporated within the study.

The current environmental conditions identified at each project location resulted from the geomorphological influences, climatic changes and man-made alterations occurring over time. A general review of this development with emphasis on the bedrock geology, topography, drainage, soil types and climate enables a better understanding of the progression of the vegetation, fauna and human

occupation in the study area. Incorporated within the sensitivity profile, this information, in conjunction with the identification of existing man-made disturbances, provides the necessary background to determine the potential sensitivity in the project area for the location of intact cultural resources.

If available, aerial mapping, "as built" engineer drawings, and existing soil bore data will be incorporated into the study to document pre-existing conditions and the level and extent of prior ground disturbances. The differential sensitivity of each project area for the location of evidence of both prehistoric and historic cultural resources will be developed based upon the results of the Stage 1A Literature Review, physiographic characteristics identified in the project area, prior ground disturbance, and current theoretical assumptions related to site predictability.

This study will divide each MGP site into regions of high, moderate and low sensitivity for the identification of cultural resources. These delineations will be clearly justified within the report and presented upon a detailed sensitivity map of each project area. The predictive sensitivity map will be provided at an appropriate scale to be incorporated within the final report. If necessary, engineer drawings may be used representing sectioned units. The sensitivity profile presented upon these maps will be used in structuring the location and extent of subsequent Stage 1B archaeological field investigations.

Recorded site locations, (archaeological, archival or architectural) and the sensitivity potential will be maintained upon base maps and coded referencing their type, cultural affiliation, and level. The information will be correlated with a computerized data file management system. In this manner, the archaeological site files currently maintained by NMPC may be easily upgraded. In addition, an active file of known sites will be available for use in future planning. This method would also decrease the amount of repetition in the investigations, provide a valuable cultural resource data base, and in the event of revisions, enable a quick evaluation of the alternate impacts.

A draft report of the Phase 1A study outlining the results, with recommendations regarding the need for Phase 1B investigations can be submitted to DEC and/or OPRHP, with the NMPC initial submittal. If it is determined at the Stage 1A level that archaeological field investigations are required at any of the MGP sites, these excavation may be incorporated within the soil testing program as defined by NMPC. Prior to the initiation of the field investigations, the written comments of DEC and OPRHP will be taken under advisement and, when possible, incorporated into the field testing strategy.

2.2 Approach to the Stage 1B Archaeological Field Investigations

The second stage of the Phase 1 Cultural Resource Study generally involves appropriate field investigations to aid in the identification of existing archaeological deposits and architectural resources. This study may incorporate relevant data from soil bores, trenches, and other preliminary soil tests which may be conducted within the project boundaries. In this manner, a more informative interpretation of the existing ground disturbance, deep stratigraphy and integrity of the soils may be assessed.

Preliminarily, a visual reconnaissance of the entire project area is conducted. Information obtained during this phase will include detailed notes of any observed features, visible evidence of sites and/or disturbance. The results will be incorporated into the sensitivity profile and design strategy for the subsurface survey.

All regions where visible evidence suggests archaeological site locations and/or areas of disturbance will be noted upon the surveyed maps. The rational for such indications and the approximate size of the areas will be explained in the narrative report. The location and angle of all general-view photographs of the project setting, including areas of disturbance and approximate size, will also be shown upon the final project maps.

As a result of the anticipation of extensive amounts of fill at each facility location (3 feet to 17 feet), the initial Phase 1B investigations may be conducted simultaneously with the PSA/IRM Study field work. This will include the incorporation, and if necessary, the modification of the program. The soil tests conducted for the PSA/IRM program will be used to verify the reliability of the sensitivity profile for each site, and reasonably determine the presence or absence of cultural resources at each project location.

NMPC will take samples of soil from what is judged to represent undisturbed soils beneath the fill to aid in the determination of the presence of absence of cultural materials. The soil samples will be obtained using split-spoon bores, backhoes, augers and/or other soils testing methods commonly used by NMPC. These deposits will be screened and the soil matrix removed. After cleaning, all resulting material will be examined.

In addition to the structured tests NMPC will conduct for their preliminary site assessments, additional investigations will be conducted in areas judged to be highly sensitive for the identification of cultural resources reflecting the results of each Phase 1A study. The location and extent of this additional testing will ultimately be determined by the results of the soil testing program, existing ground disturbance and reliability of the sensitivity model.

During these investigations, existing cultural material identified will be maintained in a collection, only if appropriate. Only significant or relevant artifacts recovered during this phase will be retained which would indicate the presence of prehistoric and/or early historic occupations. The location and description of other artifacts not collected will be recorded in the field notes. In addition, any early structural and/or foundation remains located during this phase will minimally be documented with photographs, measured and surveyed. All test locations will additionally be surveyed by NMPC. Collamer & Associates, Inc., maintains the in-house and support cartographic personnel and facilities enable the generation of specific site maps for planning purposes and final report production.

Subsurface archaeological investigations will be undertaken as required. These tests will extend to what is judged to be culturally sterile subsoils, where feasible. The interval strategy and testing design utilized during this phase of the cultural resource studies will reflect the site type and densities anticipated in the project area. Justifications for the interval strategy utilized will be clearly outlined in the narrative report. The stratigraphy within each test unit will be recorded indicating the soil type, texture, munsell color, and depth of each pedogenic horizon. The walls of each test will be cleaned and carefully examined for any intrusive features or soil stains, where possible. When identified, all cultural features will be documented with scaled drawings and photographs. A sample of soils removed from the excavations will either be sifted through 1/4 inch mesh screen or wet screened to identify any cultural resources depending on the soil consistency and contaminates.

Each site identified will be assigned a unique number or name which will relate to its location and cultural affiliation. All surface collections, foundations, subsurface test locations and significant sites will be clearly presented upon maps of the project area. In addition, excavation records and artifact catalogs will be presented in an appendix of the final report. OPRHP Archaeological Site Forms will be prepared for all sites identified. The site forms will be supplemented with information acquired during the Site Examination, if appropriate.

All structures identified within the project area during the field reconnaissance will be photographed (3 1/2" x 5" color) and preliminary data accumulated, if not already compiled by NMPC. The angel for each photograph will be shown upon the project maps. A sequential arbitrary numbering system will be maintained which will relate each structure to the base project map. All structure inventory data will be properly initiated for inclusion into the Building-Structure Inventory files, if appropriate. Field data gathered for each structure may include, but will not be limited to: the location (street address & house number where applicable), ownership/history of ownership, function/historic function,

architectural description/age, modifications to the structure/integrity, associated outbuildings, and landscape features within the project area.

The results of the archaeological field investigations conducted at each site will be presented to DEC and OPRHP as an initial Phase 1B investigation. Written comments and concerns received from OPRHP and DEC within 30 days of receipt of the draft submission will be addressed. If no cultural resources are identified and no comments are received, the Phase 1 cultural resource investigations will be considered complete and a final Phase 1 report submitted in one bound volume for each site (Stage 1A and Stage 1B).

If significant cultural resources are identified during the Stage 1B investigations, the extent of the additional field investigations will be determined by the type of resource identified, a preliminary assessment of the site integrity and the potential anticipated impacts as a result of NMPC involvement. If an archaeological site possesses integrity of location, design, setting, materials, workmanship, feeling, or association, it may be eligible for listing on the National or State Registers of Historic Places. On the other hand, if the integrity of a site has been destroyed either through construction disturbance, or natural events (floods, erosion, fire, etc.), thus precluding the identification of intact remains or cultural components, it may not be considered eligible for nomination.

The potential eligibility of all significant sites identified during the investigations should be assessed if they are within the project area, and can not be mitigated by avoidance or planned management. A written proposal outlining the specific investigations to be conducted at a Stage 2 level will be submitted to DEC and OPRHP for approval after consultation with NMPC. This will enable a reasonable strategy to be developed regarding the necessity for any additional archaeological investigations and appropriateness of these investigations.

Whether the Phase 1 investigations are considered completed, or further future work is scheduled, the NMPC contractual agreement will assure DEC and OPRHP a qualified archaeologist will remain on call for the life of the project to address any cultural resources which may come to light during deep excavations or further site analysis and NMPC work.

3.0 REPORT PRODUCTION

Reports generated by Collamer & Associates, Inc. for the MGP sites will be completed in a comprehensive, narrative format. Each phase of the investigations from the initial theoretical perspectives through the final cultural resources management plan will be presented as separate sections within one bound report. These

reports will contain original copies of photographs (or a color xerox) and project maps. The final report can be presented to NMPC on computer disk, along with the mylar copies of the base maps and illustrations for integration in their final report.

The report will not merely provide a quantitative analysis of the results, but also discuss the geographical limits and chronological periods for the themes and contexts associated with the sites identified in the project boundaries. Therefore, the study will serve as a documentary history of the project area.

The intent of the Phase 1 Investigation is to provide a reasonable assessment of the presence or absence of cultural resources within the project area. The results of the Phase 1 (Stage 1A and Stage 1B) will be presented in one bound report for each project area.

A typical final report for the Phase 1 outline will contain, but not be limited to the following:

Title Page

The title page will identify the project, location, author, and submission date.

Table of Contents

This section will cite the major sections of the report, present a list of figures, a list of tables and define the appendices.

Executive Summary (Abstract)

The intent of this section is to provide the reader with a concise non-technical summary of the proposed undertaking, the results of the investigations and the recommendations of the archaeologist. This summary will also list any structures slated for removal (keyed to the map of archaeological investigations), archaeological sites and any sites (architectural or archaeological) listed or eligible for the State or National Register, within or adjacent to the project area. The reader may then focus upon areas of initial concern and facilitate the review process.

1.0 Introduction

This section will contain a brief summary describing in general terms the NMPC work scope, date of initiation of the study, participants in the work and general conditions of the investigations. It will be further divided into two sub-chapters.

1.1 Project Location and Description

This sub-chapter will address in narrative the project location and include locational inset maps as figures. The text will further detail the project in terms of limits (length and width), outline the basis of these limits (engineer drawings, NMPC property maps and consultation with NMPC), define the study area and region of impact. Further discussions will identify the project within a regional context and the limits of the cultural resource investigations.

1.2 Approach to the Stage 1A Study

Contained in this sub-chapter will be an overview of the approach to the study. This will include a description of the survey strategy covering the entire investigative sequence from theoretical assumptions through the scope-of-work to the project objectives.

2.0 Environmental Overview

Current environmental conditions which exist in any project area are a result of the geomorphological influences, climatic changes and manmade alterations which have occurred through time. A general review of this development with emphasis on the bedrock geology, topography, drainage, soil types and climate will enable a better understanding of the progression of the vegetation, fauna and human occupation within the study area. Incorporated in the sensitivity profile, this information, in conjunction with the field identification of existing man-made disturbances, provides the necessary background to determine the probability of the project area to contain intact cultural resources. This chapter will be divided into seven sub-chapters, each relevant to the development of the particular sensitivity of the project.

2.1 Bedrock Geology and Geomorphology

The underlying bedrock structures the topographic relief and soil development in the region. Depending on the specific fault types, tectonic activity and exposed outcrops, some of the specific geological deposits may have been extensively utilized by early inhabitants as a source of raw material for tools, building materials, fertilizers, antiseptics and mining industries. While the underlying bedrock contributes to the existing conditions, glacial activity in this region has been the main geomorphological force. Thus, a review of the effects of this activity is necessary for the prediction of potential early prehistoric site locations which may be situated in the project area.

2.2 Topography

Evidence of both prehistoric and historic occupations, as documented in prior cultural resource investigations, indicate that populations have a predilection for certain landforms as habitation sites, resource procurement areas or vantage points. Other regions afforded protection from prevailing winds, provided maximum light exposure or protective ledges. A review of the topography identified on known sites compared with that in the project area will aid in the assessment of the probability of the location of sites within the project limits.

2.3 Drainage

Streams and watersheds provide natural transportation routes used by both prehistoric and historic populations through the early development of New York State. Archaeological investigations have indicated that a viable water source is an important factor in settlement locations, as well as trade routes and the transmission of cultural attributes. Thus, a discussion of the watercourses within the project are will enable a reasonable assessment of the potential for specific regions of the property to contain evidence of cultural resources.

2.4 Soils

As indicated by previous cultural resource studies and current theoretical assumptions, the location of habitation sites is affected by the types and textures of particular soils identified in any given area. Although specialized procurement sites are less prone to be situated in regions as dictated by soil types, the ability of the soils to support particular vegetative sequences is important in the predictability study. In addition, the identification of the acidity of the soils may indicate which material remains (faunal and floral) would most likely be preserved and those which would rapidly decay. The acidity of the soil also determines the types of vegetation which will exist in the area.

2.5 Climate, Vegetation and Fauna

A review of the climatic development of the region provides background relating to the progression of major vegetative sequences which may allude to the species of animals in the area during particular time frames. Since prehistoric people relied upon hunting and gathering, an understanding of this development as it relates to the project area would allow a reasonable interpretation of the types and density of sites anticipated. Photographs within the appendices will document the existing vegetation seen in the project area.

2.6 Man-made Disturbances and Alterations

The man-made disturbances identified in the project will directly affect the potential for locating intact cultural resources. These disturbances may also suggest the past land use and potential integrity of the soils. As such, the location and extent of this ground disturbance will determine the extent and location of subsequent archaeological field investigations. General photographs will be taken to preliminarily document any existing ground disturbances. In addition, the extensive research facilities maintained by NMPC may contain historic photographs of the extent of any ground disturbing activities within the project limits.

3.0 Cultural Research

A review of prior cultural resource investigations, recorded archaeological and/or architectural sites, and the prehistoric and historic regional development will aid in a reasonable assessment of the past land use and the creation of a sensitivity profile for the project. This research focuses on the cultural aspects and properties in the vicinity of the proposed project, it is not intended to locate or determine the potential for hazardous wastes. Only an examination of the soils by a qualified individual would ensure a determination of the presence or absence of any toxic or chemical components. Such work is beyond the scope of a normal cultural resource investigation.

3.1 Prior Cultural Research Investigations

A review of recorded cultural resource investigations conducted for the vicinity of each MGP site will identify if previous archaeological investigations have been conducted for the project area, and the number or location of tests. Generally, regions which have been previously examined need not be re-examined, if an appropriate testing strategy was utilized and the corridors and/or direct impacts were similar. This information will be presented in a concise manner summarizing the results and the relationship of the previous testing with the potential project impacts.

3.2 Recorded Sites and Architectural Concerns

This chapter will contain an outline of the sources checked and the results of the findings. Since the locations of both prehistoric and early historic sites are considered to be confidential, their precise locations are not for publication. However, the site types, cultural affiliations and a brief synopsis of the results of the file examinations will be discussed, and the site information presented in a concise format appropriate for the report. Agencies

and data files to be consulted will include, but not be limited to:

The Office of Parks Recreation and Historic Preservation
National and State Register Listings
Building- Structure Site Inventory Files
Archaeological Site Files
The New York State Museum Archaeological Site Files
The New York State Archives, Early Maps and Histories

3.3 Interviews and Correspondence

Interviews will be conducted with local historians, relevant landowners, avocational archaeological societies and knowledgeable persons to identify unrecorded sites and confirm the relationship of known sites with the project area. The information presented in the narrative format will consist of a concise discussion of the sites found, and their relationship to the project area. A complete list of persons interviewed including the date, address, and summary of the conversation will be presented within the text, or in an appendix, if appropriate. In addition, interviews with any technical consultants, historians, and the NMPC employees will be documented in an appendix.

3.4 Prehistoric Review

The prehistoric review will consist of a summary of the cultural development in the vicinity of the project area. This will include a discussion of the site types, cultural affiliation and site densities as identified within one mile of the project area, focusing on those within or immediately adjacent to the project boundaries. This discussion will serve as the foundation for the determination of the prehistoric sensitivity profile.

3.5 Historic Review

The historic review will develop the chronological historic context for the vicinity of the project area. The focus of the narrative text will center on the specific sites anticipated within the project boundaries which may be affected by the proposed construction. A thoughtful discussion of the sites identified through the map research, historical reviews and interviews will outline the types of sites anticipated and their known or probable locations. In addition, a discussion of any National Register properties and structures of local governmental concern (planning board, local historians, etc.) will be addressed. Representative sections of the historic maps cited in the report will be included in an appendix. All sources utilized during this review and other portions of the study will be appropriately documented in a bibliography. NMPC will provide all appropriate site documentation

including deeds, abstracts, photographs (aerial and historic), site histories, Sanborn Fire Insurance Maps, and information related to gas use, distribution and facilities.

4.0 Sensitivity Assessment/ Site Prediction

A brief review of the prehistory and history of the region, in conjunction with an examination of the physiographic characteristics identified upon the recorded sites will provide a valuable data base for the anticipation of particular site types, cultural affiliation, density and location within the project limits. In this chapter, a sensitivity profile indicating regions of high, moderate and low probability will be developed specifically related to each project area. The rational for these divisions will be clearly outlined in the report. Tables, and charts may be presented in the appendices if extensive, or within the narrative report, if applicable. The rational, evidence of existing ground disturbance and anticipated construction impacts will structure the need and extent of the Stage 1B Field Investigations for confirmation of the reliability of the sensitivity model.

5.0 Stage 1B Archaeological Field Investigations

This chapter will be divided into two sub-chapters which will detail the field investigations from the theoretical approach through the results.

5.1 Stage 1B Approach and Methodology

This sub-chapter will discuss the pre-existing field conditions, initial survey techniques utilized, scope of field work, participants, and the archaeological methodology implemented for the investigations. The discussion will additionally outline the number and type of excavations conducted and areas of ground disturbance identified.

5.2 Results of the Field Reconnaissance

The results of the field investigations citing the cultural resources identified will be presented in this sub-chapter in a meaningful sequence. Preliminary site data including the identification number, location, affiliation, site description, integrity, contextual theme and historical association will be discussed for each site identified. An artifact catalog, excavation records and profiles will be presented in the appendices. However, summaries will be included in the narrative text, as appropriate. For architectural or historic sites,

contributing elements will also be addressed in regard to the potential project impacts. Discussions of the sites may contain documentation including, but not limited to, artifact illustrations, photographs, plans, and elevations, as appropriate. OPRHP Site Forms (Archaeological and Building-Structure Inventory Forms) will be completed for all archaeological and architectural sites which pre-date 1940, and are located in the project area. If forms for the structures exist, these will be reviewed and current photographs submitted.

If no sites are identified which require additional work, this chapter will be followed by the recommendations and conclusions of the report. If sites are identified, and a site examination is deemed necessary, the recommendations outlining the need and extend of the additional work will be discussed in a final chapter within a cultural resource management plan.

6.0 Recommendations/ Cultural Resource Management Plan

This chapter will present a review of the cultural resource investigations conducted for each MGP site. It will incorporate the results of the Stage 1B field investigations with modifications to the original sensitivity model developed during the Stage 1A study, if appropriate. If significant archaeological sites have been recorded during the investigations, this chapter will provide a detailed cultural resources management plan. This plan may outline the need and extent of additional work, mitigation by avoidance or other appropriate mitigation measures (outreach programs, brochures, exhibits, sponsorship of research programs, or educational programs). However, as new information comes to light, this plan may be modified to reflect the results of further studies.

7.0 Bibliography and Attachments

This chapter will contain a bibliography of all sources, publications and maps utilized in the preparation of the study.

Appendices

The appendices will include, but not be limited to, sources consulted, sites identified, relevant correspondence, appropriate charts and tables, an artifact catalog, and excavation records. Xeroxed historic maps, general photographs and appropriate OPRHP forms will be appended to provide documentation to the narrative text. In addition, the appendices will contain maps of the project to include, a site index map, photograph location map, map of archaeological investigations, sensitivity maps and detailed site plans. These will reflect accurate surveyed locations of all

significant sites, topographic conditions, and minimally possess a north arrow, and bar scale.

Report Graphics

Graphic representation to be supplied in the final report will include, but not be limited to:

1. A base map outlining the project boundaries on the appropriate portions of the relevant USGS quadrangle sheets, with the name of the sheet, scale, and north arrow clearly indicated;
2. A collection of relevant historical maps;
3. A surveyed base map with topography showing the location of all test units, cultural resources identified and construction limits;
4. Specific surveyed site maps showing structural remains, site boundaries, archaeological methodology employed, excavated units and elevations, if relevant.
5. A variety of plans, profiles, sections, and elevations as deemed appropriate and necessary documenting the existing conditions and/or features.
6. All photograph locations used in the text and appendices will be keyed to a map of the area discussed.

4.0 HANDLING OF CULTURAL MATERIALS

All artifacts recovered during field investigations are normally transported to the Collamer & Associates, Inc. laboratory located at 73 Dove Street in Albany, N.Y. for identification and analysis. However, based upon the potential health hazards involved with in the wet screening and the cleaning of any artifacts, only the cleaned materials will be transported to the laboratory for analysis and identification. The artifacts will then be processed in the laboratory using standard techniques. Flotation of soils samples taken from features, electrolysis of metal artifacts, and spectroanalysis of lithic materials may be conducted as appropriate. After cleaning, all artifacts will be placed in appropriate containers which may include either ziplock plastic bags, plastic snap-lock boxes, new pasteboard boxes.

Working stations include areas for the following: both wet and dry processing, cataloging, microscopic viewing, stabilization and conservation treatments. Generally as field work progresses, the basic stabilization procedures utilized by Collamer & Associates, Inc. are modified and become more site-specific, based upon particular micro-environments encountered. Floral, faunal and other organic remains can be treated (if required), dried appropriately, stored, and packed to assure stability. Lithics with well-preserved surfaces suitable for microwear analysis (as well as other fragile materials) are handled and packaged separately.

The artifacts will be identified within broad, easily recognizable groups. More definitive descriptions and detailed analysis may be conducted as time and budget constraints permit. Minimally, the analysis of prehistoric lithic materials reflects current stylistic and typological categories relevant to the region. In addition to categorization of recognized formal tool types, the identification and analysis of recovered lithic materials may incorporate a determination of utilized microscopic wear analysis and technical evaluations focusing on the materials and lithic processing. The precise technological and stylistic categories applied is determined by the range or variation of the artifacts recovered.

The analysis, therefore, focuses upon the identification of key stylistic and chronological indications as a basis for identifying the type and period of occupation represented as a first level of definition. The prehistoric classification used reflects past and current stylistic and typological categories pertaining to the northeast region. Diagnostic pottery and projectile point types are used in this region to assess the relative chronological range represented at the site. The identification and analysis of recovered lithic materials focuses on raw materials and techniques of manufacture as indicated by the lithic material and functional categories. Correlation of environmentally pertinent indicators of site location are determined by the range and variation of artifacts recovered during the excavation.

The historic classification will include an identification of material, and a brief description of the artifact. When possible, a date of manufacture, location and use will be included. This data may present information regarding the early historic use, areas of prior activity and/or structures.

Historic structural remains will be identified according to use, function and theme context. Where possible construction techniques will be discussed in relation to the use and date. The quality and condition of the exposed structural remains will be evaluated and the potential for additional intact remains will be assessed.

The main storage facility operated by Collamer & Associates, Inc. is situated in Albany, N.Y. and is protected by a closed circuit security system. The internal storage environment is regulated by a thermostat controlled heating system. Although Collamer & Associates, Inc. maintains approximately 1,500 feet of storage space, any significant collections should be offered to the NYS Museum for accession into their collection and incorporated into their ongoing cultural resource studies or maintained at the NMPC research facilities.

An inventory of all artifacts collected from the archaeological excavations is maintained in an artifact catalog. Minimally, the artifact catalog contains a specific catalog number, a brief description of the artifact, its material components and

chronological and cultural association. The specific catalog number reflects the project identification code, the year of the investigations, the methodology used for the collection, the specific number of the investigatory unit and the specimen number. In this manner, the provenience of the artifact is maintained at several levels and its location easily correlated with the project map. All materials will be stored in boxes and curated according to professional standards to further facilitate accession, if warranted.

Collamer & Associates, Inc. maintains the facilities and staff to provide long term storage. As required, artifacts will be curated and stored appropriately. An artifact catalog will included within each container identifying the project and the material contained within. All original field notes, photographs, log books, field maps, original survey data, as well as specimen field bags will be boxed separately and maintained in temperature controlled facilities. All collections and records will be made available upon receipt of written notification from NMPC.

APPENDIX E

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REFERENCES

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