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RAPID RESPONSE INITIATIVE

FINAL
SITE ASSESSMENT ADDENDUM REPORT
JET ENGINE TEST STAND AND SOIL STOCKPILE

107th FIGHTER-INTERCEPTOR GROUP
NIAGARA FALLS AIR FORCE RESERVE STATION
NEW YORK AIR NATIONAL GUARD
NIAGARA FALLS, NEW YORK

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Prepared for

Air National Guard Readiness Center/CEVR
Andrews Air Force Base,
Maryland 20331-6008

Submitted by

HAZARDOUS WASTE REMEDIAL ACTIONS PROGRAM
Oak Ridge, Tennessee 37831-7606
managed by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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LIST OF ACRONYMS

AFRS	Air Force Reserve Station
ANG	Air National Guard
ANGRC	Air National Guard Readiness Center
ANGS	Air National Guard Station
ASTM	American Society for Testing and Materials
BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
°C	degrees Celsius
CFR	Code of Federal Regulations
cm/sec	centimeters per second
COC	chain-of-custody
DOE	Department of Energy
Energy Systems	Martin Marietta Energy Systems, Inc.
ES	Engineering Science
°F	degrees Fahrenheit
ft	feet
GC	gas chromatograph
gpm	Gallons Per Minute
HAZWRAP	Hazardous Waste Remedial Actions Program
IAG	Interagency Agreement
IA/RS	Initial Assessment/Records Search
in.	inch
IRP	Installation Restoration Program
JETS	Jet Engine Test Stand
µg/l	micrograms per liter
NFANGS	Niagara Falls Air National Guard Station
NYSDEC	New York State Department of Environmental Conservation
OVA	Organic Vapor Analyzer
PAH	polynuclear aromatic hydrocarbons
PEER	PEER Consultants, P.C.
PID	photoionization detector
ppb	Parts Per Billion
QAP	Quality Assurance Procedure
QA/QC	quality assurance/quality control
RRI	Rapid Response Initiative
SA	site assessment
TCLP	Toxicity Characteristics Leaching Procedure
TPH	total petroleum hydrocarbons
TRC	Tracer Research Corporation
USCS	Unified Soil Classification System
USGS	United States Geological Survey
UST	underground storage tank system
WP	Work Plan
yd^3	Cubic Yards

JET ENGINE TEST STAND AND SOIL STOCKPILE SITE ASSESSMENT ADDENDUM REPORT

1.0 INTRODUCTION

1.1 BACKGROUND

This report outlines additional site assessment activities which were conducted at the Jet Engine Test Stand (JETS), Building No. 852 located at the 107th Fighter-Interceptor Group, Niagara Falls Air National Guard Station (NFANGS), Air Force Reserve Facility (AFRF) approximately 6 miles northeast of Niagara Falls, New York (Figure 1.1). The additional site assessment activities were performed in response to requests, dated February 9 and 12, 1993, by the New York State Department of Environmental Conservation (NYSDEC) to further investigate contaminated soil and groundwater conditions at the JETS and at an existing soil stockpile (Appendix A).

The Air National Guard Readiness Center (ANGRC) has developed the Rapid Response Initiative (RRI) to conduct site assessments, evaluate potential corrective actions, and design the selected remedies at leaking underground storage tank (UST) and spill sites at Air National Guard (ANG) facilities. The Department of Energy (DOE), through an existing Interagency Agreement (IAG) with the Air Force, provides technical assistance in implementing the RRI for the ANGRC. Martin Marietta Energy Systems, Inc. (Energy Systems), was assigned the responsibility of managing the Hazardous Waste Remedial Actions Program (HAZWRAP) for DOE. This report was prepared by PEER Consultants, P.C. (PEER) under the direction of HAZWRAP.

1.2 PREVIOUS INVESTIGATIONS

1.2.1 Jet Engine Test Stand (JETS) Facility

As part of the Installation Restoration Program (IRP), a Phase I - Initial Assessment/Records Search (IA/RS) was previously prepared for the Niagara Falls AFRF by Engineering Science (ES).[1] Nine areas at the Niagara Falls AFRF were considered to have sufficient potential to cause environmental contamination and warrant further investigation under the IRP. ES determined that four additional areas at the AFRF did not present sufficient potential for environmental contamination to warrant additional study, including the JETS facility. Areas of the AFRF that were interpreted to pose an environmental threat are unlikely to be related to contamination that may be present at the JETS as a result of low permeabilities, distances, and presumed groundwater flow directions.

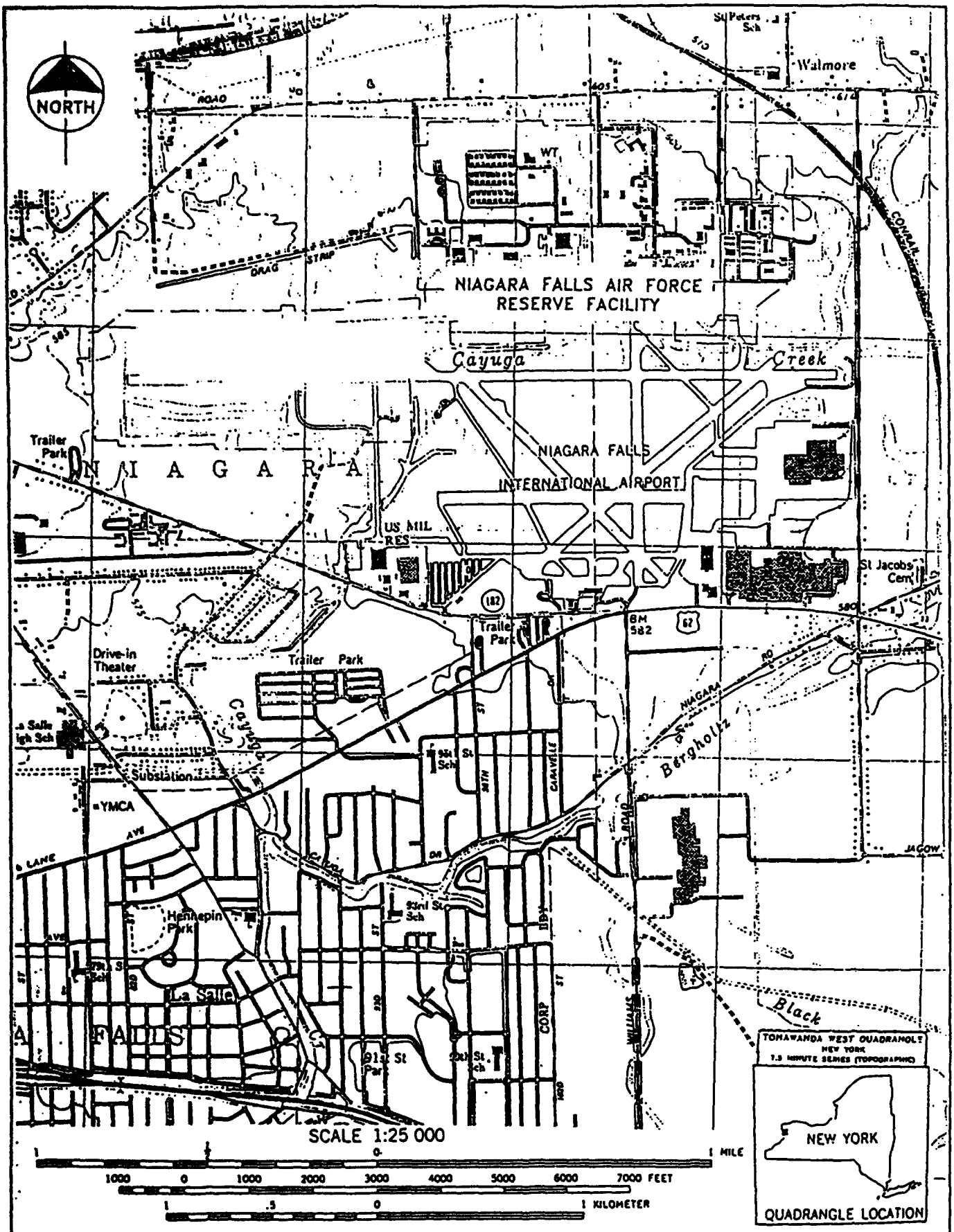

FIGURE 1.1 LOCATION MAP NIAGARA FALLS AIR FORCE RESERVE FACILITY	PEER CONSULTANTS, P.C.	DISK: 30702291 FILE: NF001.DWG

Petroleum contamination was reported by ANG personnel on October 28, 1988, as seepage had occurred through joints in the floor at the eastern end of Building No. 852 (Figure 1.2). ANG personnel suspected that the fuel transfer line from the outside fuel tank to the engine test pit was the source of the contamination. A pressure test of the fuel transfer line by a New York State employee on October 31, 1988, indicated that the line was incompetent.

Tracer Research Corporation (TRC) conducted an investigation in the vicinity of the JETS in November 1988 in response to the discovery of a leaking underground petroleum pipeline.[2] TRC's investigation included the collection of soil gas and groundwater samples within 4 ft of the ground surface using 3/4-in. hollow steel probes. TRC concluded that two areas of petroleum contamination existed within 4 ft of the ground surface in soils and groundwater in the vicinity of the JETS facility (Figure 1.2).

Based on TRC's findings, four monitoring wells and two recovery wells were subsequently installed. These wells were screened at a minimum, 6 ft below ground surface (BGS), and below the shallow water table. Groundwater contamination was not found to be present within these wells. No information concerning contaminated soil conditions was provided.

Results of the two studies suggest that soil and groundwater contamination exists to depths approaching approximately 6 ft BGS. A lack of data was identified with respect to the following:

- extent of soil and groundwater contamination;
- extent of saturated soils;
- site stratigraphy;
- horizontal and vertical hydraulic gradients; and
- migration pathways.

Subsequently, the NYSDEC requested an additional study at the JETS site. In response to this request, PEER planned and conducted a site assessment in December 1991, to determine the extent of any soil and/or groundwater contamination.[3] The scope of services included drilling 22 soil borings at the site and installing monitoring wells in 8 of the borings, collecting soil and water samples, screening the samples for the presence of ionizable organics with an HNu photoionization detector (PID), analyzing the samples using a field gas chromatograph (GC), and submitting selected samples for confirmatory analysis to an analytical

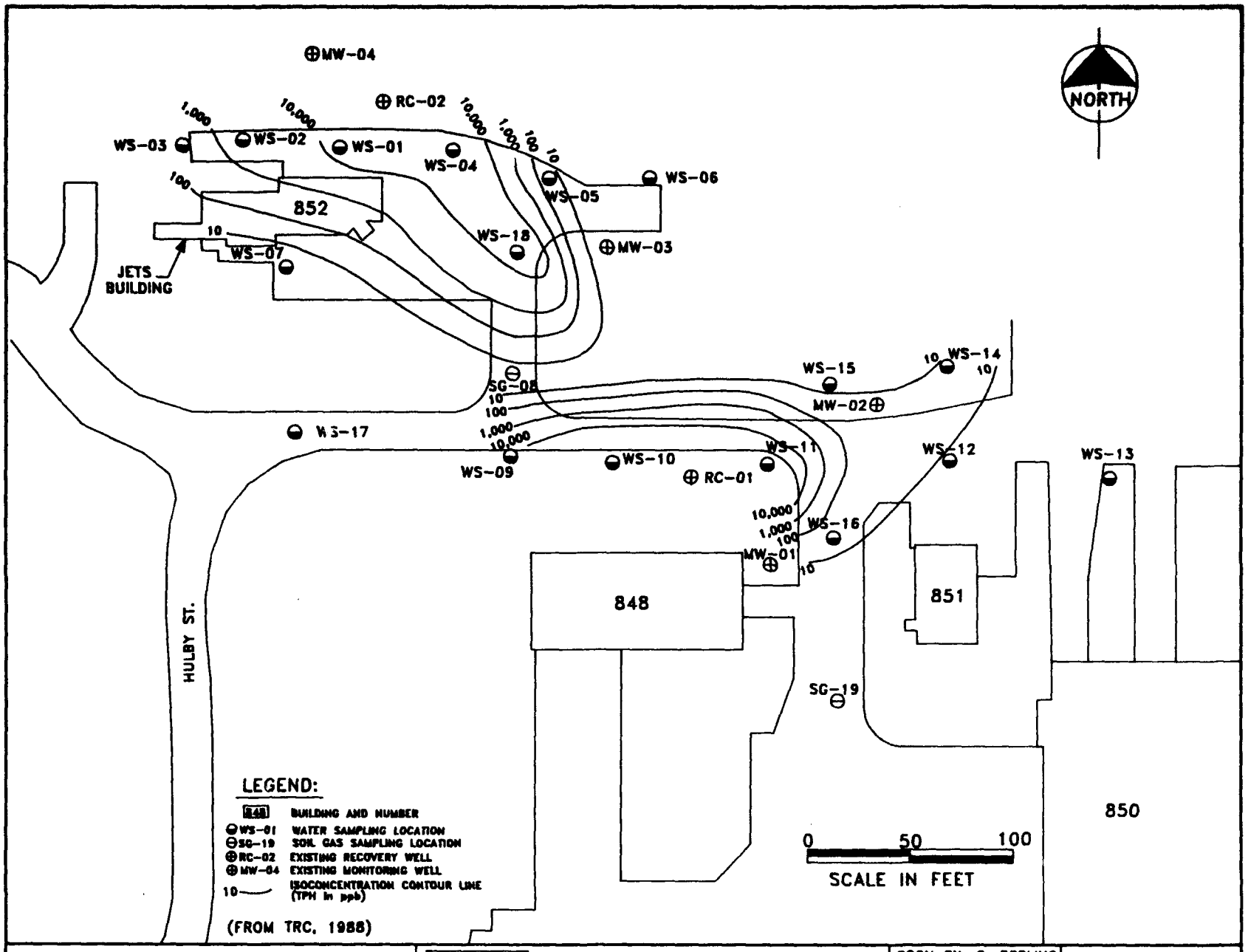

FIGURE 1.2 TOTAL HYDROCARBON ISOCONCENTRATION MAP, TRC 1988
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laboratory. The locations of the soil borings and the monitoring wells are shown in Figure 1.3.

Field GC analyses (benzene, toluene, ethylbenzene, and xylenes) were performed on all soil samples collected from each boring. Concentrations of total BTEX (sum of benzene, toluene, ethylbenzene, and xylenes) in excess of 50 parts per billion (ppb) were limited to an area within 45 ft of the eastern end of the JETS building and were not found at depths greater than 7 ft BGS.

A composite soil sample from borings at the JETS was submitted to a laboratory for hazardous waste determination. The sample was evaluated for reactivity, corrosivity, ignitability, and toxicity. Results indicated that the soil was not a characteristic hazardous waste.

Five soil samples were selected based upon field screening and field GC results and sent to a laboratory. The extracts derived from the samples using the Toxicity Characteristic Leaching Procedure (TCLP) were analyzed for purgeable aromatics and polynuclear aromatic hydrocarbons by EPA Methods 8020 and 8270. Laboratory results indicated that leachable quantities of purgeable aromatics and polynuclear aromatic hydrocarbons were present below the allowable NYSDEC groundwater standards for these compounds.

It was concluded that soil and groundwater in the immediate vicinity of the JETS building, based upon the field GC and laboratory data, was impacted by petroleum releases. However, the concentrations of contaminants in soils were found to be at levels below corrective action guidelines based on the proposed New York State Petroleum Contaminated Soil Guidance Policy.[6] Therefore, no further investigative or corrective action was recommended for soils in the vicinity of the JETS building.

Napthalene was detected at a concentration of 66 μg/L at one groundwater sampling location (MW-11D). Further investigative or corrective action for groundwater was not recommended because: (1) The unconsolidated deposits at the site are not a primary or principal aquifer[7] and do not represent a potential water supply source at the AFRF; (2) No petroleum contaminants are present in groundwater from any of the other monitoring wells at the site; (3) The concentration of naphthalene reduces with depth to nondetectable in groundwater from the 5.9 to 10.9 ft BGS interval at the location of MW-11D; (4) Upward vertical hydraulic gradients between the consolidated and unconsolidated deposits minimize the likelihood of downward migration of petroleum contaminants into the Lockport Dolomite; (5) The limited occurrence and relatively low concentration of naphthalene detected (66 μg/L), and the low hydraulic conductivity of the water bearing deposits at the site indicates there is minimal likelihood of contamination actually migrating from the site and reaching any potential receptors.

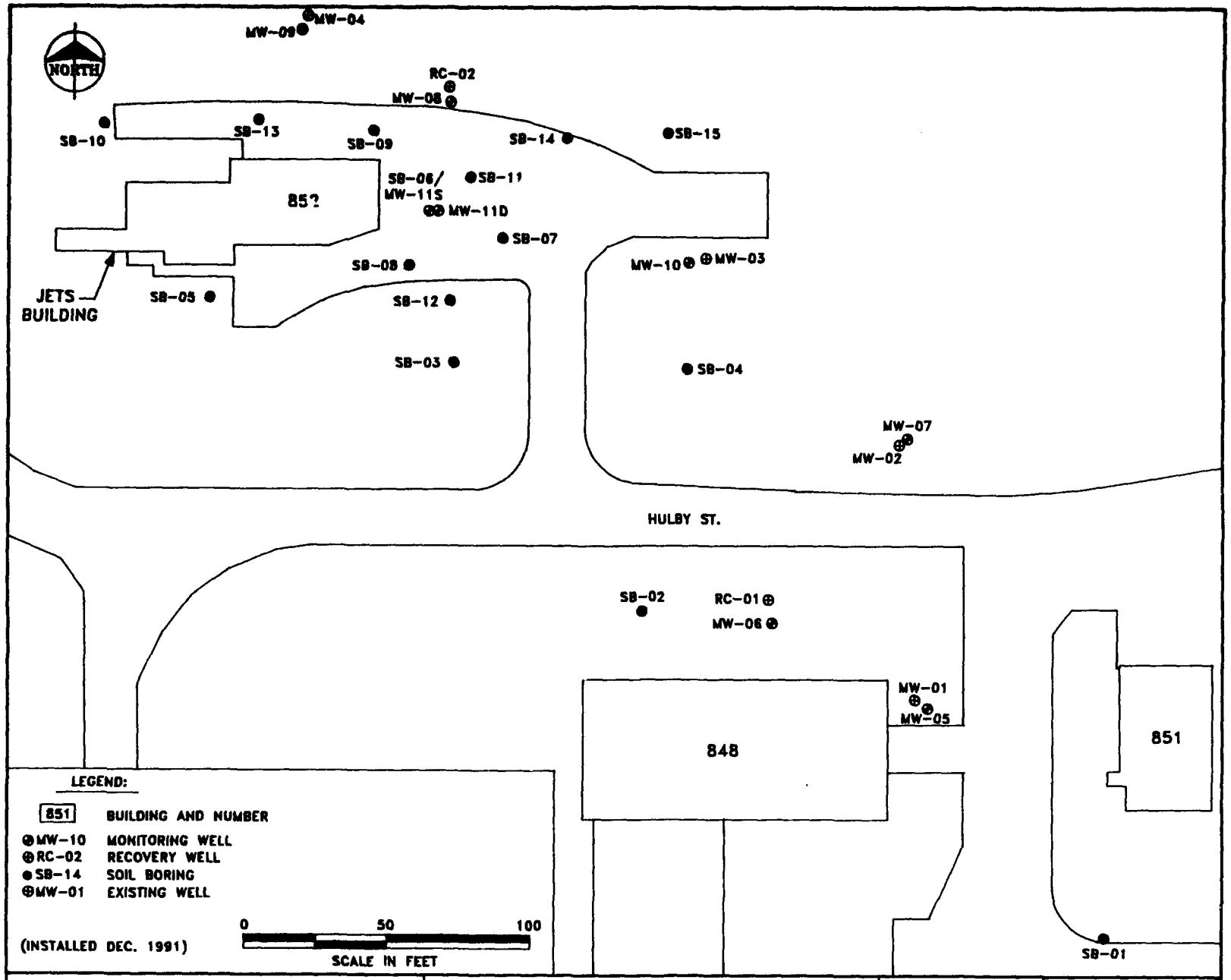

FIGURE 1.3 LOCATION OF SOIL BORINGS/ MONITORING WELLS, PEER 1991
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1.2.2 Soil Stockpile

Based on information provided by the ANG, the current soil stockpile at the site previously consisted of six small piles and one larger pile, which were later consolidated. The stockpiled soils were reported to be materials excavated during previous UST removals at the site. One soil sample from each of the small piles and five soil samples from the larger pile were collected and analyzed by Buffalo Testing Laboratories, Inc., in September 1990. The Toxicity Characteristics Leaching Procedure (TCLP) was performed on each soil sample and the leachate was analyzed for polynuclear aromatic hydrocarbons (PAHs) using EPA Method 610. Concentrations of all compounds analyzed were below the detection limits of the analytical method. However, the NYSDEC determined that this analytical protocol was inappropriate and that additional sampling and analysis should be undertaken in accordance with their recommendations.

As a result of this decision, PEER conducted soil stockpile sampling in December 1991.[3] The soil stockpile sampling locations are shown in Figure 1.4. The soil stockpile sampling included the collection of 43 split-spoon samples. The TCLP extracts from 13 composite and 4 grab samples were subjected to laboratory analysis for selected purgeable aromatics and polynuclear aromatics by EPA Methods 8020 and 8270, respectively. A composite soil sample from the stockpile was also subjected to hazardous waste characterization (reactivity, corrosivity, ignitability, toxicity). The stockpiled soil was determined to not be classified as a characteristic hazardous waste. All purgeable aromatic and polynuclear aromatic hydrocarbon constituents detected were below New York state groundwater cleanup standards. Therefore, PEER concluded that the soil stockpile was not regulated as solid waste and that the soil stockpile could be used for fill purposes.

1.3 SITE DESCRIPTION

The Niagara Falls AFRF is located in Niagara County, New York, on the north side of the Niagara Falls International Airport (Figure 1.1). The land occupied by the Niagara Falls AFRF is leased by the United States Government and activities on this land are overseen by the 914th Tactical Airlift Group. The 107th Fighter Interceptor Group, NY ANG has a tenant relationship with the Air Force and leases buildings situated in the western portion of the AFRF. The Niagara Falls AFRF is approximately 6 miles northeast of the City of Niagara Falls and approximately 15 miles north of the city of Buffalo in northwestern New York.

The Niagara Falls AFRF occupies approximately 985 acres adjacent to Lockport Road (Figure 1.5), and is completely fenced with controlled access. The AFRF mission is to train Air Force Reserve and National Guard officers and airmen to combat ready status for potential national emergencies. The population of the installation during a typical week is approximately 700. During training activities on one weekend each month, the

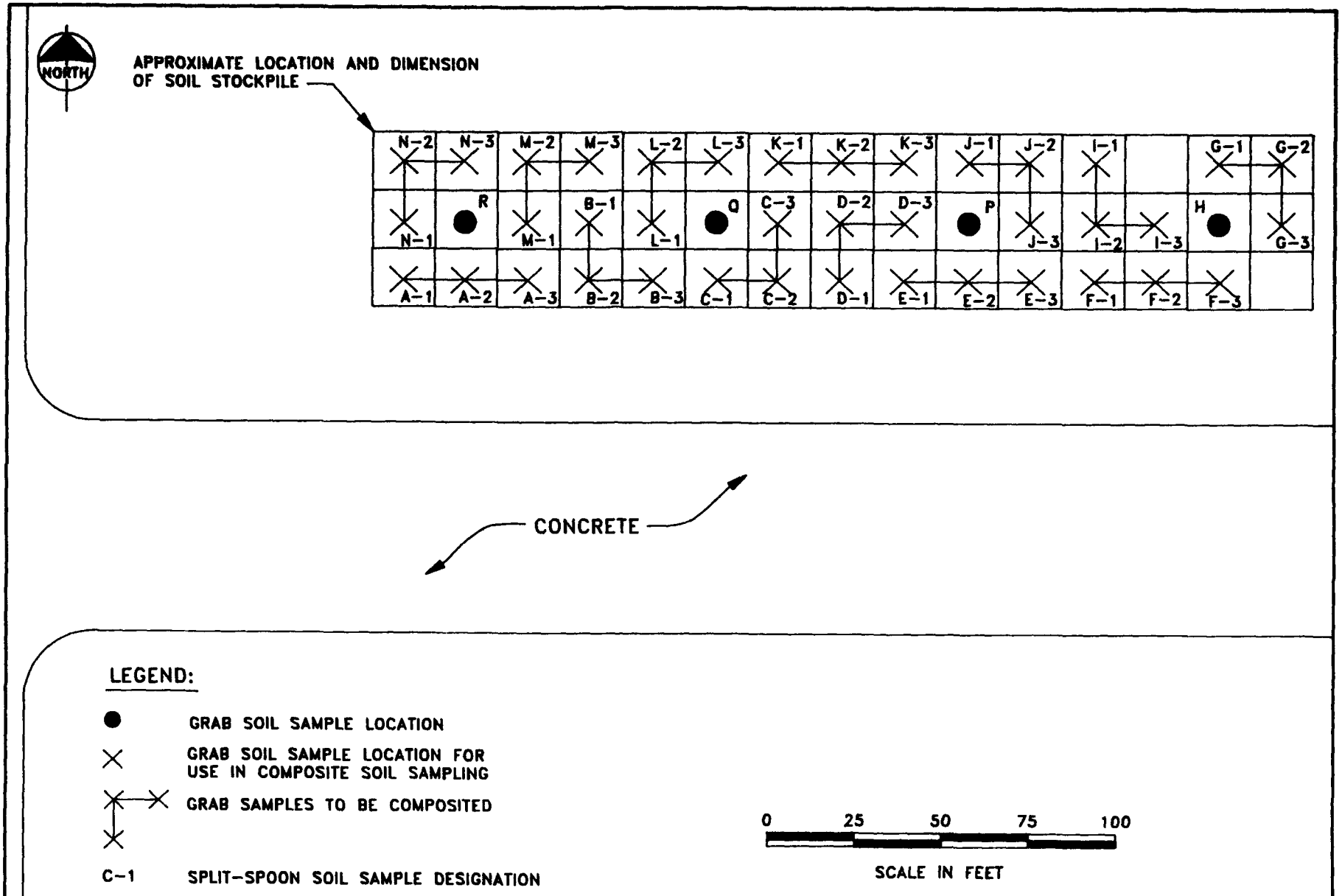

FIGURE 1.4 SOIL STOCKPILE SAMPLING LOCATIONS, PEER 1991
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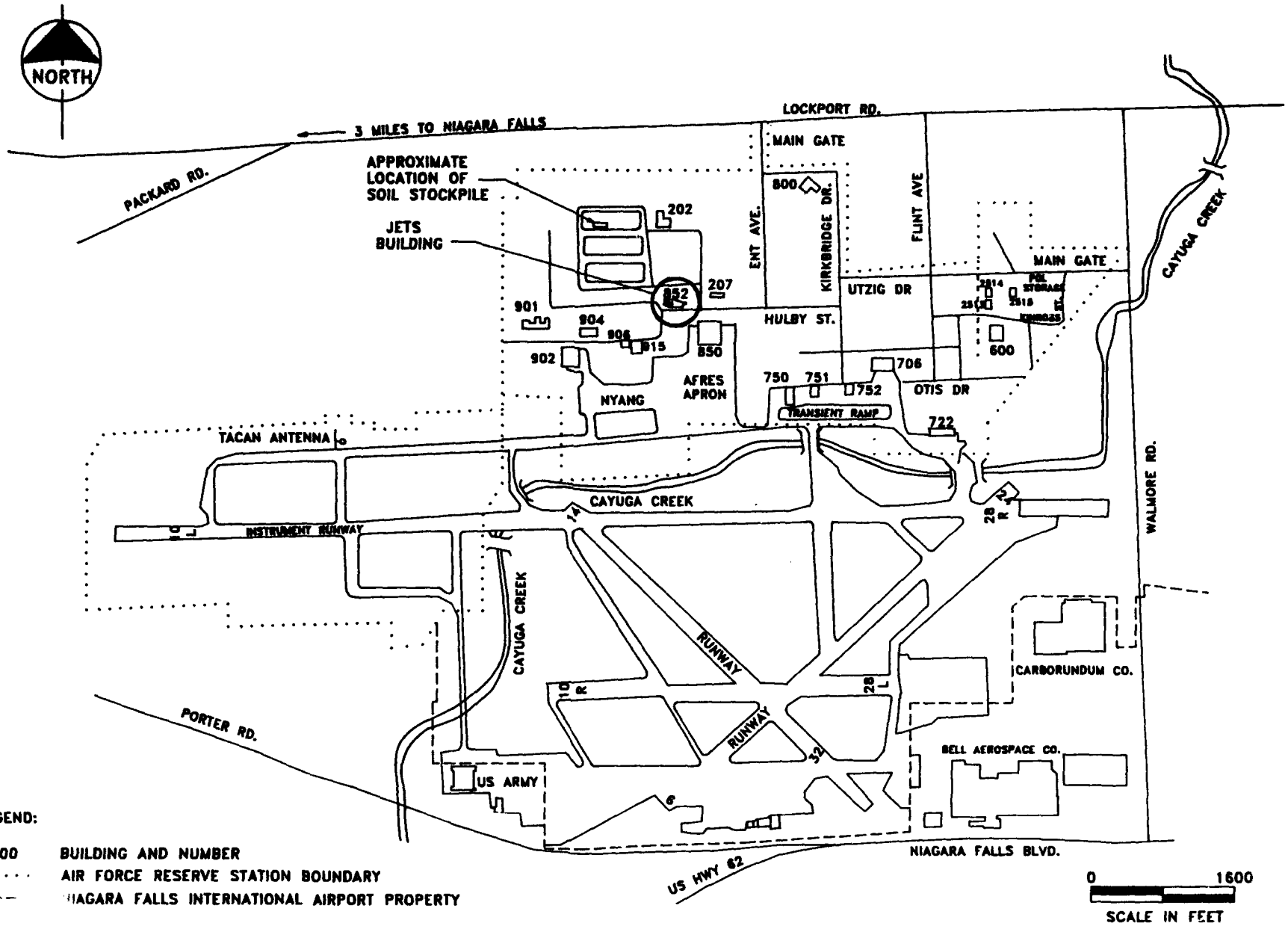

FIGURE 1.5 SITE PLAN
NIAGARA FALLS AIR FORCE RESERVE STATION

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population increases to about 2560. The NY ANG has stationed units at Niagara Falls AFRF since November 1942.[1]

1.3.1 JETS (Building No. 852)

The JETS (Building No. 852) site location is shown on Figures 1.5 and 1.6, and is located due north of the Niagara Falls International Airport. This building was used to test the performance of jet engines after conducting repairs. A concrete walkway exists adjacent to the north and south sides of Building No. 852. The area to the east of the building is paved with asphalt and a paved asphalt drive connects this area with Hulby Street to the south. Several underground utilities have been located in the vicinity, including natural gas, sanitary sewer, storm drain, water supply pipes, and an unverified line (Figure 1.6).

The JETS site is relatively flat. Surface drainage occurs to the south-southwest into Cayuga Creek. Storm drainage systems accommodate much of the surface water runoff with discharge into Cayuga Creek.

1.3.2 Soil Stockpile

A soil stockpile is located at the facility to the west of Building No. 202 (Figures 1.5 and 1.7). The stockpile was originally approximately 3 ft in height, 150 ft in length, and 50 ft in width. The stockpile is situated on an unpaved portion of the site. At the time of the SA Addendum, the stockpile appeared to have been disturbed as it was significantly smaller than previously reported and was no longer covered by sheets of plastic. The dimensions of the stockpile were approximately 3 ft in height, 80 ft in length, and 50 feet in width. The nature of the disturbance is not known.

1.4 ENVIRONMENTAL SETTING

The following environmental setting description is adapted from the IA/RS Report.[1]

1.4.1 Meteorology

The monthly temperature at the Niagara Falls AFRF ranged from 24.5 to 70.3°F between 1874 and 1981 and averaged 47.3°F. Average annual precipitation for the same period was 35.6 in. The evaporation rate is estimated to be 27 in. per year, resulting in a net infiltration/runoff of 8.6 in. per year for the Niagara Falls area.

1.4.2 Geology

The Niagara Falls AFRF is situated in the Huron Plain physiographic province and is bordered by the Niagara Escarpment to the north and the Onondaga Escarpment to the south. The topography of the base is relatively flat with an estimated relief of 16 ft.

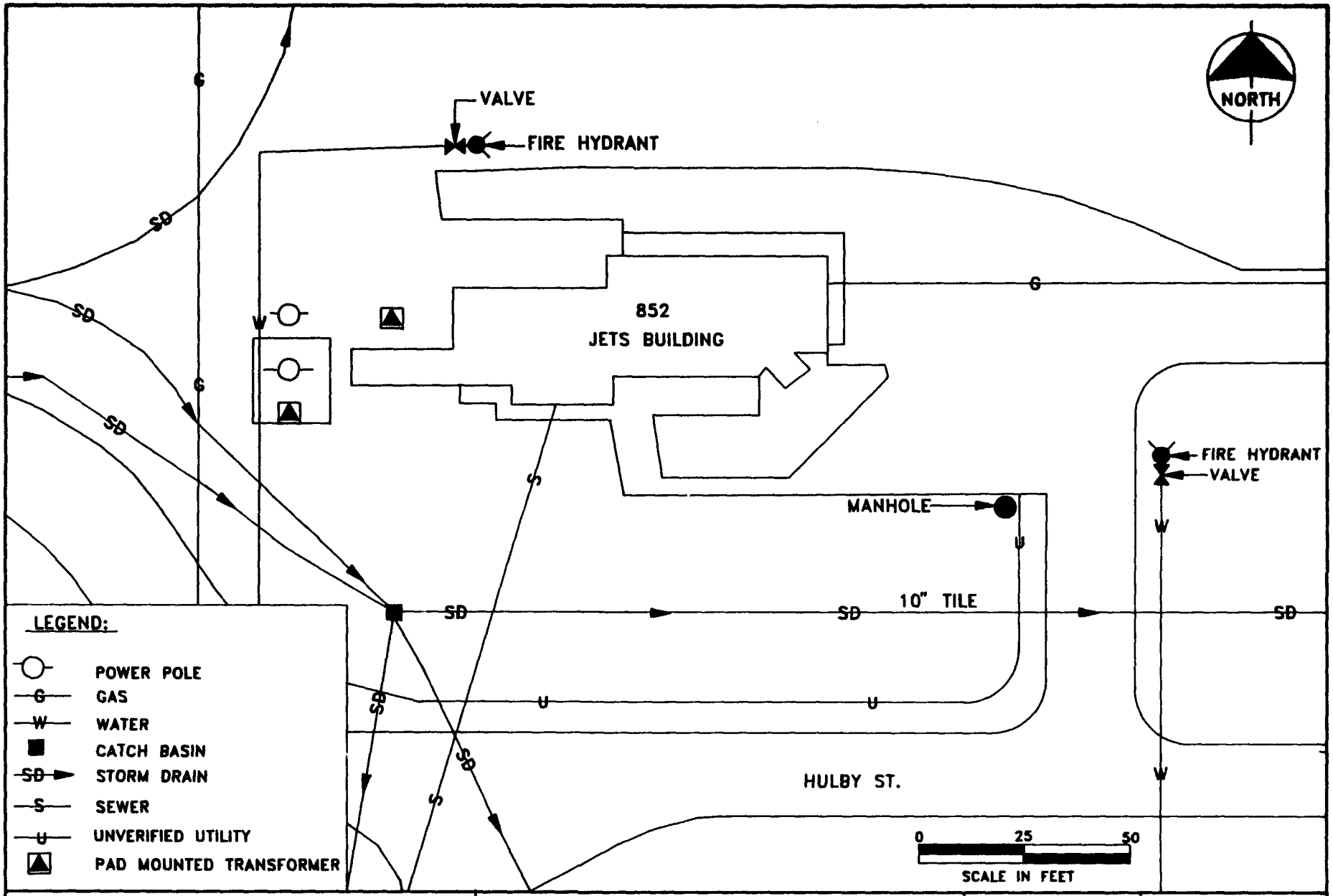

FIGURE 1.6 LOCATION OF UTILITIES IN THE REGION OF BUILDING 852 NIAGARA FALLS AIR FORCE RESERVE STATION

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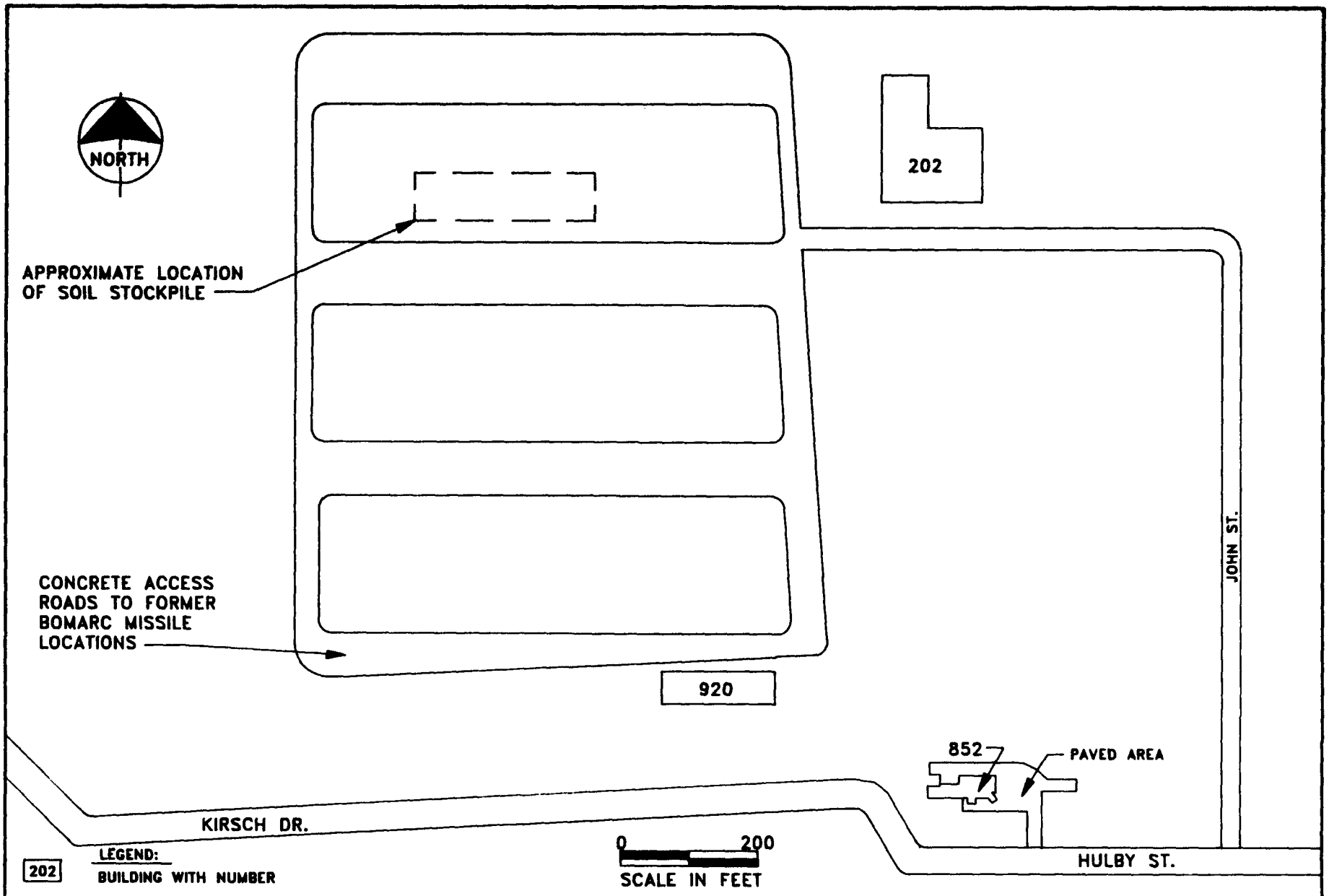

FIGURE 1.7 LOCATION OF SOIL STOCKPILE IN THE REGION OF BUILDING 202
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Unconsolidated deposits at the base consist of clay, silt, and fine sand deposited during glaciation of the region. Data from soil boring installation at the Niagara Falls AFRF indicate that the unconsolidated deposits are 10 to 21 ft thick. Underlying the unconsolidated materials is the Silurian Lockport Dolomite, which is estimated to be 120 ft thick in the area of the site. The Lockport Dolomite is composed of dark-gray to brown, thin-bedded to massive dolomite, locally containing gypsum. Outcrops of the Lockport Dolomite occur in the vicinity of the site.

1.4.3 Soils

Three soil units occur at the AFRF: cut and fill soils, the Lakemont unit, and the Odessa unit. Cut and fill soils are soils that have been disturbed, have variable physical properties, and no distinct horizons. They most likely consist of materials of the Lakemont and Odessa units with granular fill. The Lakemont and Odessa units are composed of a silty, clay loam surface layer, with a silty, clay subsoil over clay and silt material. Both soil units are red, however, the Odessa soils are lighter in color than the Lakemont. Permeabilities of the Odessa and Lakemont soils are less than 0.2 to 2.0 in. per hour (1×10^{-3} to 1×10^{-2} cm/sec).[1]

1.4.4 Surface Water

A portion of the Niagara Falls AFRF lies within the 100-year floodplain of Cayuga Creek, which flows south-southwest across the AFRF. The JETS (Building No. 852) is situated within the Cayuga Creek drainage basin (Figure 1.1). Surface runoff flows either directly or through a storm drain system to Cayuga Creek or its tributaries.

1.4.5 Groundwater

Groundwater in the vicinity of the AFRF occurs in both the unconsolidated deposits and the underlying bedrock units. Groundwater has been encountered from 2 to 6 ft BGS at the site in the unconsolidated deposits. In the unconsolidated deposits, water occurs in the pore spaces between the individual grains. In the underlying bedrock, the Lockport Dolomite, water occurs in vertical joints and small cavities formed by the solution of gypsum.[10]

Wells constructed in the unconsolidated deposits overlying the bedrock at the AFRF have low yield which is due to the low permeabilities associated with the unconsolidated deposits. Perched water conditions have been reported in the unconsolidated deposits at the site following periods of heavy rainfall and snow melt. Groundwater flow directions in the unconsolidated deposits may vary locally, resulting in flow direction that follow surface drainage and topography. The direction of groundwater flow within the unconsolidated deposits was observed to be variable during field activities conducted by PEER (December, 1991).

Wells constructed in the Lockport Dolomite have variable yields which is related to depth and the secondary porosity associated with the formation. Generally speaking, well yield is known to decrease with depth. Wells used for water supply at the AFRF are reported to be approximately 60 feet in depth with 10 feet of unconsolidated deposit as overburden. At a combined rate (2), these wells have yielded from 50,000 to 70,000 gpd. Locally, recharge of the Lockport Dolomite occurs by the downward vertical migration of precipitation through overlying unconsolidated deposits.[10]

Groundwater within the Lockport Dolomite reportedly exhibits both confined and unconfined aquifer characteristics. Groundwater flow is generally to the south-southeast.[10]

2.0 SITE ASSESSMENT ADDENDUM

2.1 SITE ASSESSMENT ADDENDUM OBJECTIVES

This section outlines the additional investigative activities which took place in the vicinity of the JETS and the soil stockpile in response to February 9 and February 12, 1993, letters from the NYSDEC (Appendix A). These letters requested that (1) a grab sample of soil be taken from Area A-3 of the soil stockpile and the extract derived from the TCLP be analyzed by EPA Method 8020 and that (2) shallow soil borings be advanced in the roadway at Building 852, and soil samples be collected and the TCLP extracts be analyzed using EPA Method 8021 and EPA Method 8270.

2.1.1 Jet Engine Test Stand (JETS)

In response to the NYSDEC request, additional soil sampling, field screening, and laboratory analyses were conducted in the vicinity of the JETS site to assist in the evaluation of the vertical and horizontal extent of soil contamination, and to gather information to support corrective action, if warranted.

The work was conducted in accordance with the NYSDEC document "Petroleum-Contaminated Soil Guidance Policy" (Appendix B).[4] Field activities were to be conducted according to the work plan (WP),[5] but were modified during execution of the field work in response to a verbal request by NYSDEC representatives, as described in the following sections. All changes made in the field were approved by the PEER Program Manager and the HAZWRAP and ANGRC Project Managers prior to implementation. All changes were documented on PEER Field Change Forms (Appendix C).

2.1.2 Soil Stockpile

In response to the NYSDEC request, additional soil sampling was conducted at Area A-3 in the soil stockpile to evaluate the types and levels of contaminants present and to enable determination of treatment/disposal options.

The work was conducted in accordance with the NYSDEC document "Petroleum-Contaminated Soil Guidance Policy" (Appendix B).[4] Field activities were conducted according to the WP.[5]

2.2 REGULATORY GUIDANCE

2.2.1 Soil

The previous site assessment conducted in 1991[3] was performed according to the "Proposed New York State Petroleum-Contaminated Soil Guidance Policy."[6] Since that

time, a final guidance document, "New York State Petroleum-Contaminated Soil Guidance Policy," has been issued and is contained in Appendix B.[4] The Site Assessment Addendum was conducted in accordance with these final requirements, which are summarized below.

Hazardous Waste Determination

An initial determination must be made on all excavated and in-situ petroleum-contaminated soil as to whether or not it is a hazardous waste. A petroleum-contaminated soil is considered a hazardous waste when it exhibits any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity as defined in 6 New York Code of Rules and Regulations (NYCRR) Part 371, Section 371.3, and 40 Code of Federal Regulations (CFR) Part 261. Ignitability, corrosivity, and reactivity are determined in accordance with EPA protocol (40 CFR 261). However, the NYCRR allows for two methods to determine toxicity of soils. The first is the Toxicity Characteristic Leaching Procedure (TCLP). If the extract from a representative sample of the soil contains any of the contaminants above the levels listed in Table B.1, Appendix I, it is a hazardous waste. The second method of toxicity determination is to identify the total concentration of the contaminant in the soil. If the total concentration is less than the corresponding TCLP regulatory level, then it is assumed that the leachate level could not exceed the standard. However, if the total concentration equals or exceeds the corresponding TCLP regulatory level, then a complete TCLP must be run to establish toxicity.

If the contaminated soil has been excavated and if any of the hazardous waste criteria apply, then the soil is classified as a hazardous waste and must be removed to a hazardous waste treatment facility. The soils may be stored on an impervious material such as polyethylene sheeting until such determination is made. If the in-situ soil meets any of the hazardous waste criteria as a result of petroleum contamination, then the site is required to be remediated under the direction of the Division of Hazardous Waste Remediation and the Division of Hazardous Substances Regulation.

Petroleum Contaminated Soils

In-situ petroleum-contaminated soil is considered to be "not sufficiently contaminated to require remediation" if the following four guidelines are met:

1) protection of groundwater;

2) protection of human health;

3) protection of fish and wildlife and their environment; and

4) protection against objectionable nuisance characteristics.

Compliance with these guidelines is satisfied by analysis of soil samples for contaminant concentrations and/or leachability, and comparison of the analytical results to guidance values established by NYSDEC. The guidance values for soils stipulated by NYSDEC in association with these criteria are based upon the levels of volatile hydrocarbon compounds identified by EPA Method 8021 (Appendix B, Appendix B, Table 1), for gasoline-contaminated soils, and upon the levels of semi-volatile hydrocarbon compounds identified by EPA Method 8270 Base/Neutral (Appendix B, Appendix B, Table 2), for fuel oil-contaminated soils. In-situ soils containing petroleum contaminants which exceed guidance values are required to be remediated in accordance with NYSDEC requirements.

Excavated petroleum-contaminated soil determined to not be hazardous waste is by definition a solid industrial waste and must be managed in accordance with NYCRR Part 360 regulations (Appendix B). The NYSDEC's preferred method of management is treatment of the contaminated soils to achieve acceptable levels of petroleum contaminants, in order to protect human health, groundwater, and fish and wildlife.

Gasoline-Contaminated Soils. For protection of groundwater quality, the concentrations of hydrocarbon compounds in the TCLP extract, as determined by Method 8021 for a liquid matrix, must be less than or equal to the TCLP extract guidance value, C_w; or as determined by Method 8021 for a solid matrix, must be less than or equal to the partitioning model guidance value, C_p. For protection of human health, the concentrations of the hydrocarbon compounds in the soil, as determined by Method 8021 for a solid matrix, must be less than or equal to the health-based guidance value, C_h. For protection of fish and wildlife, the concentrations of hydrocarbon compounds in soil, as determined by Method 8021 for a solid matrix, must be less than or equal to the sediment guidance value, C_s, or the partitioning model guidance value, C_p, in the absence of a sediment guidance value. Meeting this requirement is only necessary when dealing with contaminated sediment.

Fuel Oil-Contaminated Soils. For protection of groundwater quality, the concentrations of hydrocarbon compounds in the TCLP extract, as determined by Methods 8021 and 8270 Base/Neutral for a liquid matrix, must be less than or equal to the TCLP extract guidance value, C_w; or as determined by Methods 8021 and 8270 Base/Neutral for a solid matrix, must be less than or equal to the partitioning model guidance value, C_p. For protection of human health, the concentrations of the hydrocarbon compounds in the soil, as determined by Methods 8021 and 8270 Base/Neutral for a solid matrix, must be less than or equal to the health-based guidance value, C_h. For protection of fish and wildlife, the concentrations of hydrocarbon compounds in soil, as determined by Methods 8021 and 8270 Base/Neutral for a solid matrix, must be less than or equal to the sediment guidance value, C_s, or the partitioning model guidance value, C_p, in the absence of a sediment guidance value. Meeting this requirement is only necessary when dealing with contaminated sediment.

2.3 SITE ASSESSMENT ADDENDUM APPROACH AND SCOPE

The scope of the additional site assessment activities as described in the WP[5] was to determine if soil contamination was present in the vicinity of the JETS Building outside of the area defined by previous investigations and to determine if the soil stockpile associated with previous UST removals was to be classified as hazardous waste or solid waste per the NYSDEC Petroleum-Contaminated Soil Guidance Policy (Appendix B).

The investigation activities as described in the WP,[5] were to be of a limited nature and were to consist of drilling three shallow soil borings in the area of the roadway which was covered by asphalt, collecting a maximum of 3 samples from each boring for laboratory analysis, and collecting a sample from the soil stockpile in Area A-3. Borings were to be advanced to 8 ft BGS. Soil samples obtained continuously by split spoon during drilling were to be field screened for the presence of petroleum hydrocarbons using a PID or Organic Vapor Analyzer (OVA). If, during the field screening, visual or olfactory evidence indicated soil contamination was present, the borehole was to be abandoned and a new location was to be established further from the source. Samples from the boreholes were to be selected based upon screening results and submitted to a laboratory for confirmatory analysis.

No groundwater sampling or well installation was planned. Specific tasks to be performed during the investigation as specified in the workplan included:

<u>JETS</u>

- Advancing three soil borings at the site beneath the asphalt roadway;
- Obtaining soil samples (split spoon) continuously from ground surface to the termination of each boring;
- Screening soil samples (headspace) using a PID or OVA;
- Obtaining water level and free product (if present) measurements from the existing monitoring wells;
- Submitting 12 soil samples and 1 duplicate soil sample to a laboratory for analysis;
- Documenting any additional task or work scope changes made; and
- Preparing a report summarizing the findings of the investigation.

Soil Stockpile

- Obtaining one soil sample (grab) from Area A-3 in the existing soil stockpile;
- Documenting any additional task or work scope changes;
- Submitting the soil sample to a laboratory for analysis; and
- Preparing a report summarizing the findings of the investigation.

Following approval of the WP by HAZWRAP and the ANGRC, and a discussion between PEER representatives, the Station environmental contact, and Mr. Salvatore Calandra, the NYSDEC contact, it was determined that the number of borings and their planned locations did not satisfy the intent of the NYSDEC's February 12, 1993 letter (Appendix A); e.g., to further characterize the level of contamination in the most permeable zone (6 to 12 in.) just beneath the asphalt and to determine the extent of soil contamination still present.

Two field change forms were initiated to document these changes and were approved by the PEER Program Manager and the HAZWRAP and ANGRC Project Managers. The field change forms are included in Appendix C and the actual work performed to accommodate these changes is described under methodology (Section 2.4).

2.4 METHODOLOGY

2.4.1 Utility Survey

Before drilling activities began, the proposed locations of all soil borings were marked using flags. Areas in the vicinity of the borings were evaluated for the presence of aboveground and/or subsurface utilities. All subsurface utilities were identified by discussions with AFRS personnel and by contacting a local utility locating service. Utilities were clearly marked to prevent damage during drilling. The drill rig was positioned to avoid overhead utility lines during drilling.

2.4.2 Soil Borings

To determine whether contamination had migrated within the permeable zone beneath the asphalt, and to determine the concentration of soil contamination, a total of three soil borings (SB-16, SB-18, and SB-19) were advanced in the roadway at Building 848 to a depth of 6 ft below ground surface (BGS). A fourth boring, SB-17, was advanced in Hulby Street near the access road to Building 852 to a depth of 2 ft BGS.

The proposed locations of the soil borings, as described in the WP, are shown in Figure 2.1. The actual locations of the soil borings, following implementation of the field changes, are shown in Figure 2.2. The first boring (SB-16) was placed on the northern side of the building on the pavement. The second boring (SB-17) was placed near the northern edge of Hulby Street at the intersection with the access road to Building 848. The third boring (SB-18) was placed in the center of the pavement near the southern end of the access road to Hulby Street. The fourth boring (SB-19) was placed near the center of the asphalt apron on the eastern side of the building.

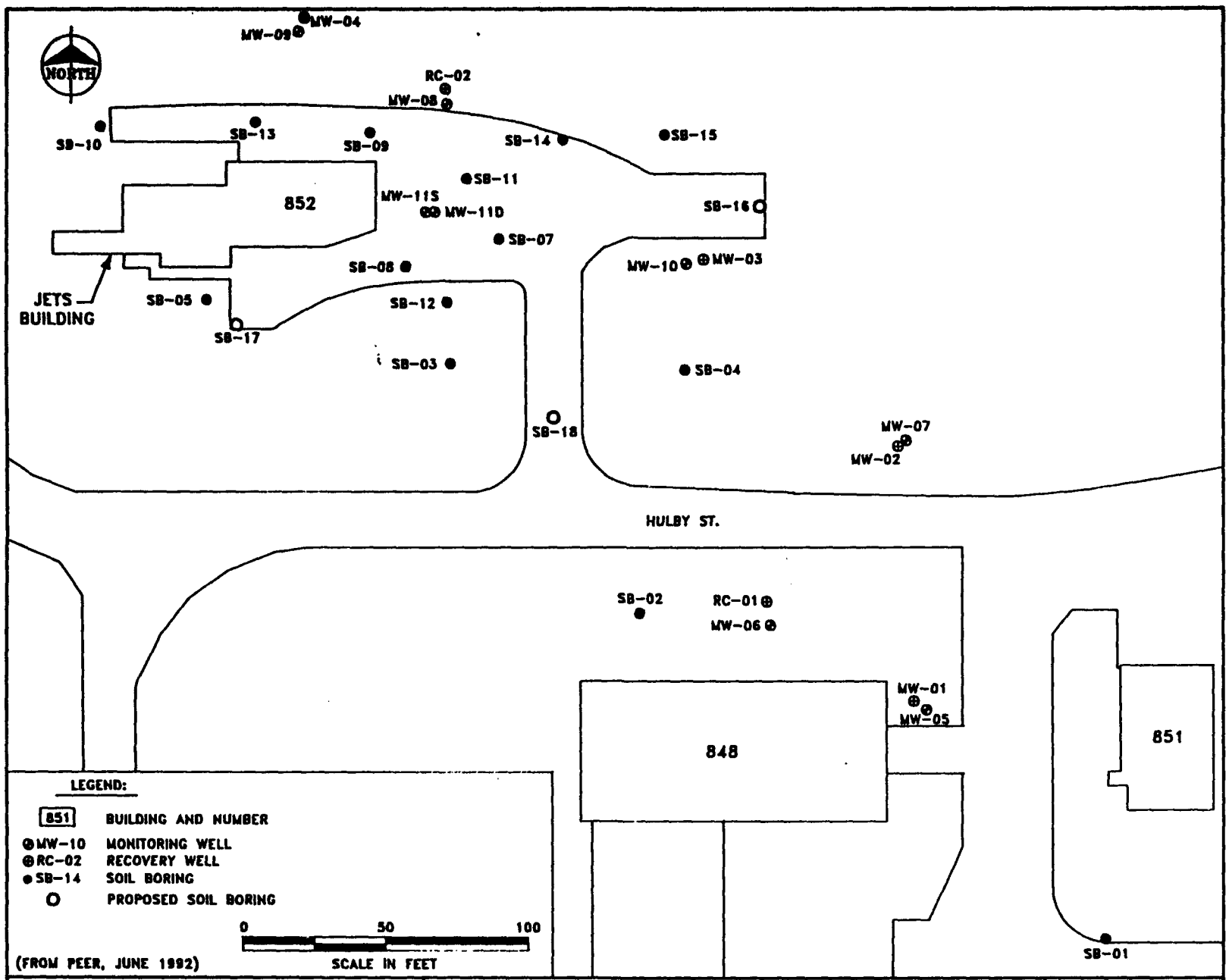
2.4.3 Soil Sampling

During the SA Addendum, four soil borings (SB-16 through SB-19) were advanced through the unconsolidated deposits using a hydraulically-activated drill rig with 4.25-in. I.D. hollow stem augers (HSAs). In accordance with the WP, three soil borings were to be advanced to a depth of 8 ft BGS, with a maximum of three samples from each boring to be submitted for laboratory analysis. Following implementation of the field change (Appendix C), three soil borings (SB-16, SB-18, and SB-19) were advanced to 6 ft BGS and a fourth boring (SB-17) was advanced to 2 ft BGS. Bedrock was not encountered during drilling. The soils were continuously sampled at 2-ft intervals. Samples were collected using 2-ft stainless steel split-spoon samplers in accordance with ASTM Method D1586-84. Soil samples were visually classified in the field by a registered geologist according to ASTM-2488-90. A total of 10 samples were collected, e.g., one from each 2 ft sampling interval.

The soil samples collected using split-spoons were divided vertically into two portions. The sample portion exhibiting the highest possible potential for contamination (i.e., staining, odors, OVA reading) was designated for laboratory analyses, and was placed into a 4-oz. widemouth glass container supplied by the laboratory with a Teflon lined lid using a stainless steel spoon or spatula. An attempt was made to leave as little headspace as possible. The sample portion exhibiting the least potential for contamination was designated for headspace analysis and was placed into a glass jar, the mouth covered with aluminum foil leaving some airspace, and capped.

To assess the types and levels of soil contamination present in Area A-3 of the soil stockpile, one grab sample (10-01-SS-SP-01-02) was collected by first clearing away 2 to 4 inches of surface soil and then using a decontaminated shovel to collect a representative sample. The sampling location is shown in Figure 2.3.

Care was taken to collect soils which were free of plant matter, asphalt, and gravel when sampling. After sample collection, the laboratory sample containers were wiped clean with a paper towel, packed in a cooler with double bagged water ice, and cooled to 4°C.



(FROM PEER, JUNE 1992)

FIGURE 2.1 LOCATION OF PROPOSED SOIL BORINGS
NIAGARA FALLS AIR FORCE RESERVE STATION

PEER
CONSULTANTS, P.C. ENGINEERS · SCIENTISTS · MANAGEMENT CONSULTANTS
575 Oak Ridge Turnpike · Oak Ridge, TN 37830 · (615)483-3191

DSGN BY: S. PEPLING DWN BY: C. HALL	SCALE: AS INDICATED
REVISION NO. 0	PROJ./DISK: 1443K10 FILE: NF00B.DWG

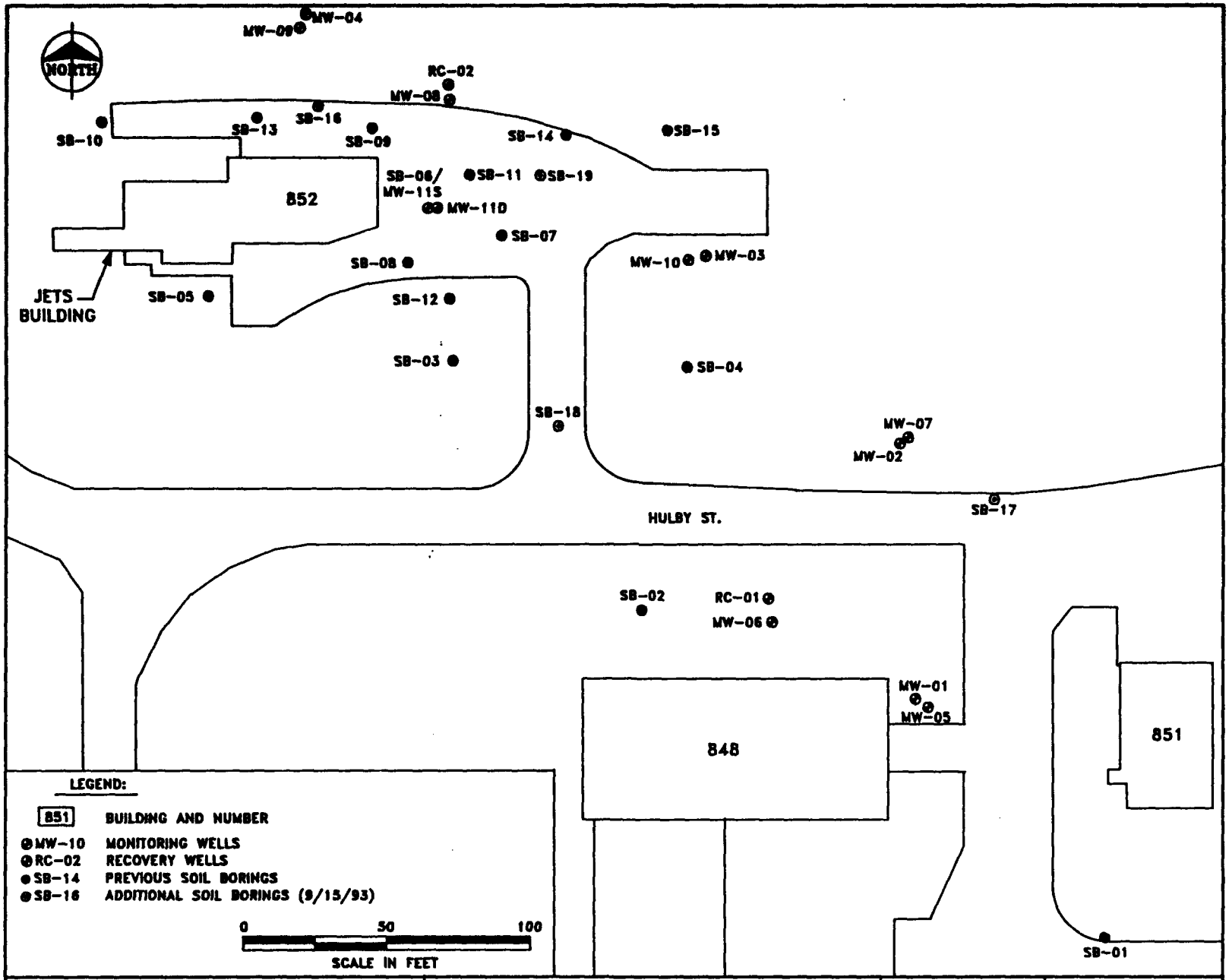


FIGURE 2.2 FINAL LOCATION OF SOIL BORINGS/ MONITORING WELLS
NIAGARA FALLS AIR FORCE RESERVE STATION

PEER
CONSULTANTS, P.C. ENGINEERS · SCIENTISTS · MANAGEMENT CONSULTANTS
175 Oak Ridge Turnpike · Oak Ridge, TN 37830 · (615)483-3191

FILE: NF008B.DWG DWN BY: C. HALL	SCALE: AS INDICATED
REVISION NO. 0	PROJ./DISK: 1443K10

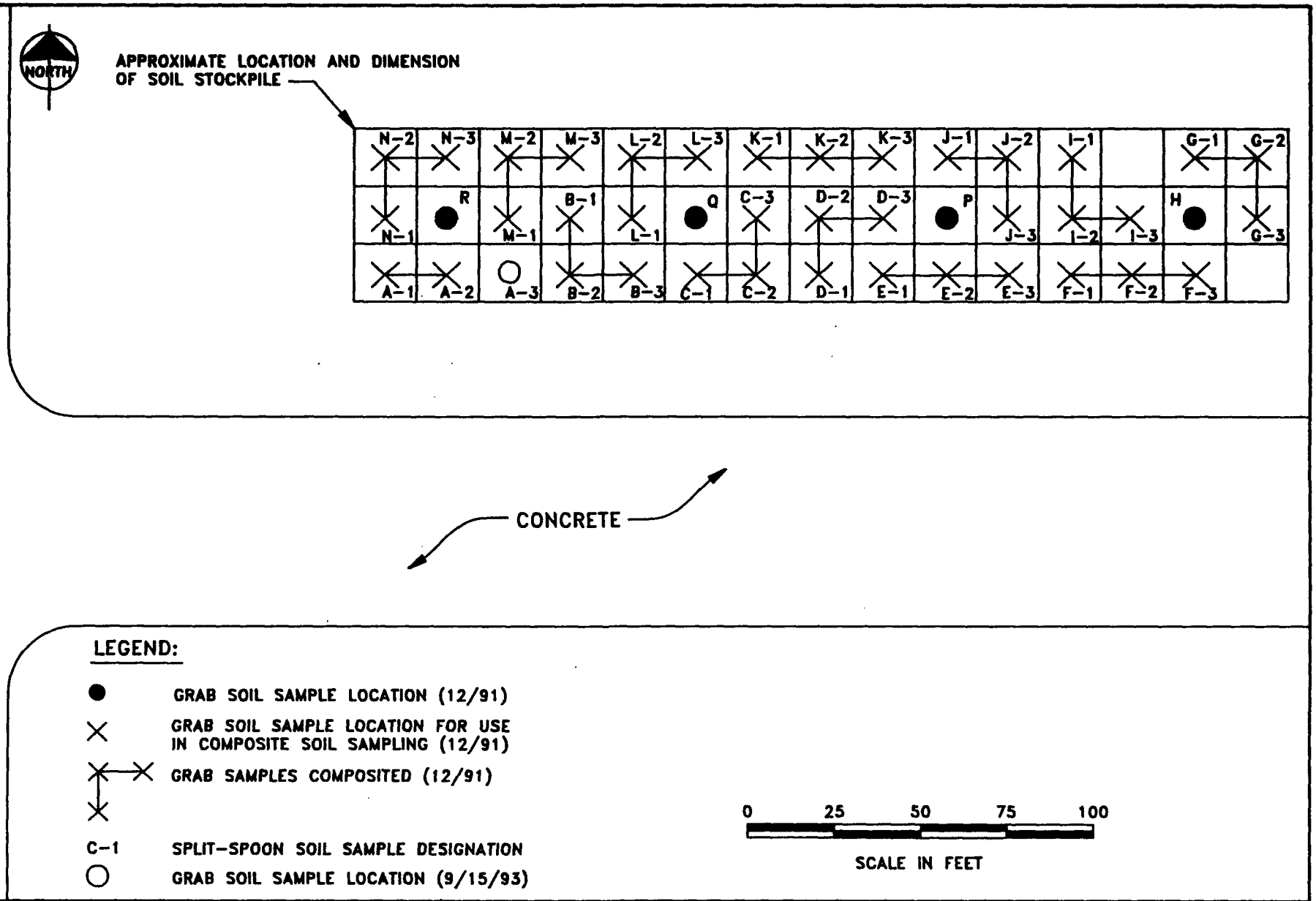


FIGURE 2.3 SOIL STOCKPILE SAMPLING LOCATIONS
NIAGARA FALLS AIR FORCE RESERVE STATION

PEER CONSULTANTS, P.C. ENGINEERS · SCIENTISTS · MANAGEMENT CONSULTANTS
575 Oak Ridge Turnpike · Oak Ridge, TN 37830 · (615)483-3191

DSGN BY: S. PEPLING DWN BY: C. HALL	SCALE: AS INDICATED
REVISION NO. 0	PROJ./DISK: 1443K10 FILE: NF009.DWG

2.4.4 Field Screening

Sample portions for headspace analysis were collected and allowed to equilibrate (volatilize) above a minimum temperature of 68°F for at least 15 minutes. Air temperature was verified using a thermometer. All samples were allowed to equilibrate for the same length of time. Once the sample had equilibrated, headspace was screened for the presence of ionizable organic vapors using a Foxboro Model 128 OVA. The OVA probe was inserted through the foil under the lid of the jar and a reading was made and recorded in a field logbook. Results are presented in Appendix F and summarized in Section 3.3.

2.4.5 Analytical

To satisfy NYSDEC requirements, the contaminated soils were characterized by using the recommended analytical methods specified in the "Petroleum-Contaminated Soil Guidance Policy" (Appendix B). For this phase of the site assessment, the NYSDEC letters specified the analytical methods that were used (Appendix A). For the in-situ soils at the JETS Building, the laboratory samples were first subjected to extraction by the TCLP and the extracts were then analyzed using EPA Method 8021 and EPA Method 8270. The sample from the soil stockpile was first subjected to extraction by the TCLP and the extracts were then analyzed using EPA Method 8020 (Table 2.1). Results are presented in Appendix G, and summarized in Section 3.3.

2.4.6 Soil Boring Abandonment

Borings which were installed during the SA addendum were abandoned by grouting. The grout consisted of a mixture of Portland cement and 4 to 6% powdered bentonite. A grout density of 13.5 to 14.1 lbs/gal was used. The grout was emplaced until it completely filled the borehole. Asphalt was not replaced per direction of the Station contact.

2.4.7 Water Level and Free Product Measurements

Groundwater elevations were measured in the existing monitoring wells to the nearest 0.01 ft using an electric oil/water interface probe that was decontaminated between measurements. Elevations were referenced to the top of the casing in each well. No free product was noted in any of the existing monitoring wells. Results are discussed in Section 3.2.

TABLE 2.1. SUMMARY OF NUMBER OF SOIL SAMPLES, ANALYTICAL METHODS, CONTAINER TYPES, AND PRESERVATIVES FOR NIAGARA FALLS AFR[1]

Soil Sample Location	Parameter	Analytical Method	No. of Laboratory Samples	Duplicates	Container Type	Preservative Requirements
Borings	Volatile Organics	TCLP/8021	10	1	40-mL glass vials (2)	Cool 4°C
	Semi Volatile Organics	TCLP/8270	10	1	250-mL glass jar	Cool 4°C
Stockpile	Purgable Aromatics	TCLP/8020	1	0	40-mL glass vials (2)	Cool 4°C

1 Numbers shown are actual numbers of samples which were analyzed.

2.4.8 Field Logbook

Field logbook documentation was conducted in accordance with PEER Standard Operating Procedure (SOP) F-1, "Field Logbook."[9] Field logbooks were used for recording field information pertaining to all Contractor and Subcontractor activities performed during the site assessment addendum, including field work documentation, field instrumentation readings, photographic references, sample numbers, field descriptions, equipment used, and field activities accomplished. Entries included sufficient detail to reconstruct significant activities without reliance on memory. All measurements and samples collected were noted and initialed in the margin at that time by the individual responsible for the entry.

The field logbook was bound and contained sequentially numbered pages. All entries were written in waterproof ink. The following information was included in the field logbook:

- Date and time each task started; weather conditions; names, titles, and organizations of personnel performing the task.
- A description of site activities in specific detail.
- A description of field screening activities in detail, including instrument calibration.
- A description in specific detail of samples collected, sample identification numbers, and Chain-of-Custody (COC) form numbers.
- A list of the time, equipment type, and decontamination procedures followed (if different from WP).
- A list of equipment failures or breakdowns and description of repairs.
- Any field changes or additional work added to the WP.

Each page was dated and signed by the person making the entry. Incorrect entries were corrected by drawing a single line through the error, and initialing it.

2.4.9 Instrument Calibration

All field instruments were calibrated at least once daily according to manufacturer's instructions. Each instrument calibration was documented in field logbook.

The portable OVA used for screening for the presence of organic vapors was calibrated using 100 ppmv methane gas.

2.4.10 Sample Designation

All samples collected were assigned a unique sample number as described below:

- a 2-digit number representing the PEER project number (e.g., 10 = Project number 1443-K10-92);

- a 2-digit number representing the UST I.D. number (e.g., 01 = UST No. 1);

- a 2-character code representing the type of sample (e.g., SS = soil sample, GW = groundwater sample, SP = seep/spring sample, SW = surface water sample, TW = tap water sample);

- A 2-character code representing the collection location of the sample (e.g., for soil boring, SB = boring; for discrete pits, PF = pit floor, EW = east wall, WW = west wall, NW = north wall, SW = south wall; for piping trenches, PT = piping trench; for test pits, UE = tank end/piping trench junction, DE = disperser end/piping trench junction; for soil stockpiles, SP = stockpile);

- A 2-digit number representing the coordinate locations for samples from borings, soil stockpiles, or trenches; and

- For soil samples, a 2-digit number representing the depth of the sample BGS in ft. The number will correlate to the sampling interval shown on the boring logs.

For example, 10-01-SS-SB-01-06 represents a soil sample obtained for PEER Project 1443-K10-92 at UST No. 1 from soil boring Number 01 at a depth of from 6 to 8 ft BGS.

2.4.11 Sample Containers, Labels, and Preservation

Sample containers were purchased new and precleaned and supplied by the designated analytical laboratory. Sample volume requirements, preservation techniques, maximum holding times, and container material requirements were dictated by the media being sampled and the analyses to be performed. Field personnel collected a sufficient volume of each sample in appropriate containers, with the appropriate preservative, to allow for all the analyses that were scheduled to be performed on each sample.

The sample labels were supplied along with the containers. Immediately upon collection, a unique sample number was assigned to each sample in waterproof ink, as described in Section 2.4.10.

2.4.12 Sample Packaging and Shipment

Samples were packed and shipped in accordance with PEER SOP F-3, "Packaging and Shipment of Environmental Samples,"[9] within 24 hours of collection. Samples were preserved the same day they were collected. Coolers were shipped by a next-day delivery service to the laboratory. Notification of shipment, including airbill number, was telephoned to the laboratory the day of sample collection. Receipt of the previous day's shipment was confirmed daily. All sample containers, preservatives, and shipping crates/coolers were supplied by the designated analytical laboratory.

Immediately upon collection, samples designated for laboratory analysis were placed in a shipping container at the point of collection and surrounded with double-bagged water ice so that the temperature of the samples was maintained at 4°C. Packing material was used to secure the samples in the shipping container to help prevent breakage of glass containers. Enough packing material was placed in the cooler so that the samples did not rattle or shake inside the shipping container. When the samples were deemed secure from breakage and properly iced, the COC form (Section 2.5.3) was placed in a plastic cover and taped inside the lid of the shipping container. The lid of the container was then closed, secured using strapping tape, and custody sealed to ensure that samples were not disturbed during shipment.

2.4.13 Photographs

During the site investigation, photographic documentation was used in accordance with PEER SOP F-21, "Photographic Documentation."[9] Photographs were taken of the sites and each boring location. Additional photographs were taken showing typical procedures for drilling and soil sampling.

Each photograph was logged in a field logbook. Each entry includes: the project name, project number, time, date, and location of the photograph; a description of objects in the photograph, the film roll and frame number; and the person taking the photograph. The film roll number was identified by taking a photograph of an information sign number on the first frame of the roll.

2.5 QUALITY ASSURANCE AND QUALITY CONTROL

PEER SOPs[9] covering documentation, sample collection, handling and packaging, quality control samples, and sample custody were followed. Portions of the Quality Assurance (QA)/Quality Control (QC) Program are summarized in the following subsections.

2.5.1 Field Changes

All field activities were to be conducted in accordance with the WP, with the exception of changes which occurred in the field in response to discussions with the on-site NYSDEC representative. All changes made in the field were in accordance with PEER Quality Assurance Procedure (QAP)-001G, "Control of Field Changes,"[9] and were approved by the PEER Program Manager and the HAZWRAP and ANGRC Project Managers prior to their initiation. All changes were documented in the field logbook, and on PEER Field Change Forms (Appendix C).

2.5.2 Data Reporting

Data quality and data validation was controlled in accordance with PEER QAP-002D, "Control of Data Quality and Data Validation." This ensured that all field data gathered or developed were properly reviewed.

2.5.3 Chain-of-Custody (COC)

Chain-of-custody was maintained from the time of sample collection through analysis. All samples collected for off-site laboratory analysis during the monitoring program were documented on a COC Form. The original COC Form accompanied all samples from the time of collection through laboratory receipt. Copies were maintained by the PEER Site Manager. Each custody transfer was documented by signature of the relinquishing and receiving individuals, and the date and time of transfer. COC Forms are included in Appendix D.

This procedure was used throughout the site assessment Addendum to guide the transmittal of information regarding collected samples to the analytical laboratory, and other necessary parties. Samples were considered to be under custody if:

- They were in the sampler's possession, or
- They were in the sampler's line of sight after being in possession, or
- They were in a designated controlled source area.

The Site Manager had overall responsibility for ensuring that care and custody of the samples collected was maintained until they were transferred or properly dispatched to the laboratory. Each individual who collected a sample was responsible for sample custody until transferred to someone else via the COC record.

The samples for field screening and classification remained in the possession of the field team from collection through analysis. A PEER COC form was completed for all samples submitted to an off-site laboratory for analysis. The COC form documented the following information: project name, signature of sampler, sampling station, sample number, date and time of sample collection, grab or composite designation,

analytical test method, matrix, preservatives, and signatures of individuals involved in sample transfer. Each custody transfer was documented by signature of the relinquishing and receiving individuals and the date and time of transfer.

2.5.4 Decontamination of Field Equipment

Field equipment used for collection of samples such as bailers, split-spoons, or spatulas was decontaminated between samples in accordance with PEER SOP Q-3, "Decontamination - Field Equipment," which involves the following procedure:

- Scrub with laboratory grade detergent such as Liquinox® or Alconox®,
- Rinse with tap water,
- Rinse with ASTM Type II water,
- Rinse with methanol, and
- Air dry.

Once air dried, the sampling equipment was wrapped in plastic or aluminum foil, unless placed in immediate use.

All other downhole equipment was decontaminated by steam cleaning between borings. A temporary decontamination pad was constructed on the asphalt parking area for this purpose.

2.5.5 Prevention of Cross-Contamination

To prevent cross-contamination, the individuals performing the sampling tasks acquired a fresh pair of Latex gloves prior to the initiation of each sampling event. Sampling equipment such as split spoons and bailers were decontaminated prior to collection of each sample.

Sample containers and sampling equipment were not allowed to come in direct contact with the ground surface or with excavated soils or water. All sample containers and sampling equipment were protected by and placed on plastic sheeting as needed. Plastic ground covers were used as needed.

2.5.6 Field Quality Control Samples

To enhance the reliability of field sampling procedures and materials, field QC samples were collected or prepared for each medium sampled, a sample shipment, and a sampling event, as described in the following.

Duplicates

One duplicate soil sample was collected. The TCLP extract for the duplicate was analyzed for volatile and semivolatile organics by EPA Methods 8021 and 8270 (Table 2.1).

Equipment Rinsate Blank

One equipment rinsate blank was collected to evaluate the effectiveness of the equipment decontamination procedure. The sample was analyzed for volatile organics by EPA Method 8021 (Table 2.1).

Trip Blank

One trip blank was analyzed for volatile organics by EPA Method 8021 (Table 2.1) to evaluate the potential for sample cross-contamination during shipment.

2.6 ADDITIONAL REQUIREMENTS

2.6.1 Waste Management

Waste management activities were conducted in accordance with PEER SOP F-4, "Waste Minimization/Waste Disposal." Investigation-derived wastes such as soil cuttings and decontamination and purge water were collected and segregated by the drilling subcontractor into 55-gallon open-top drums. The drums were properly identified, placed on pallets, and left on-site in a designated area for disposal by Niagara Falls AFRF personnel. Recommendations for disposal are provided in Appendix H.

2.6.2 Boring and Monitoring Well Abandonment

Soil borings were abandoned by filling each borehole with cement/bentonite grout.

2.6.3 Health and Safety

All site assessment field activities were conducted in conformance with a site-specific Health and Safety Plan.

3.0 JETS SITE ASSESSMENT ADDENDUM FINDINGS

3.1 SITE SOILS

Soils encountered in the vicinity of the JETS during the SA addendum consisted predominantly of dark brown to grayish brown clay (CL) and silt (ML). All soils were overlain by 3 to 6 in. of asphalt, beneath which was approximately 1 ft of gravel with variable amounts of sand and silt (road bed material). Detailed soil descriptions are presented on the subsurface logs (Appendix E).

3.2 SITE HYDROGEOLOGY

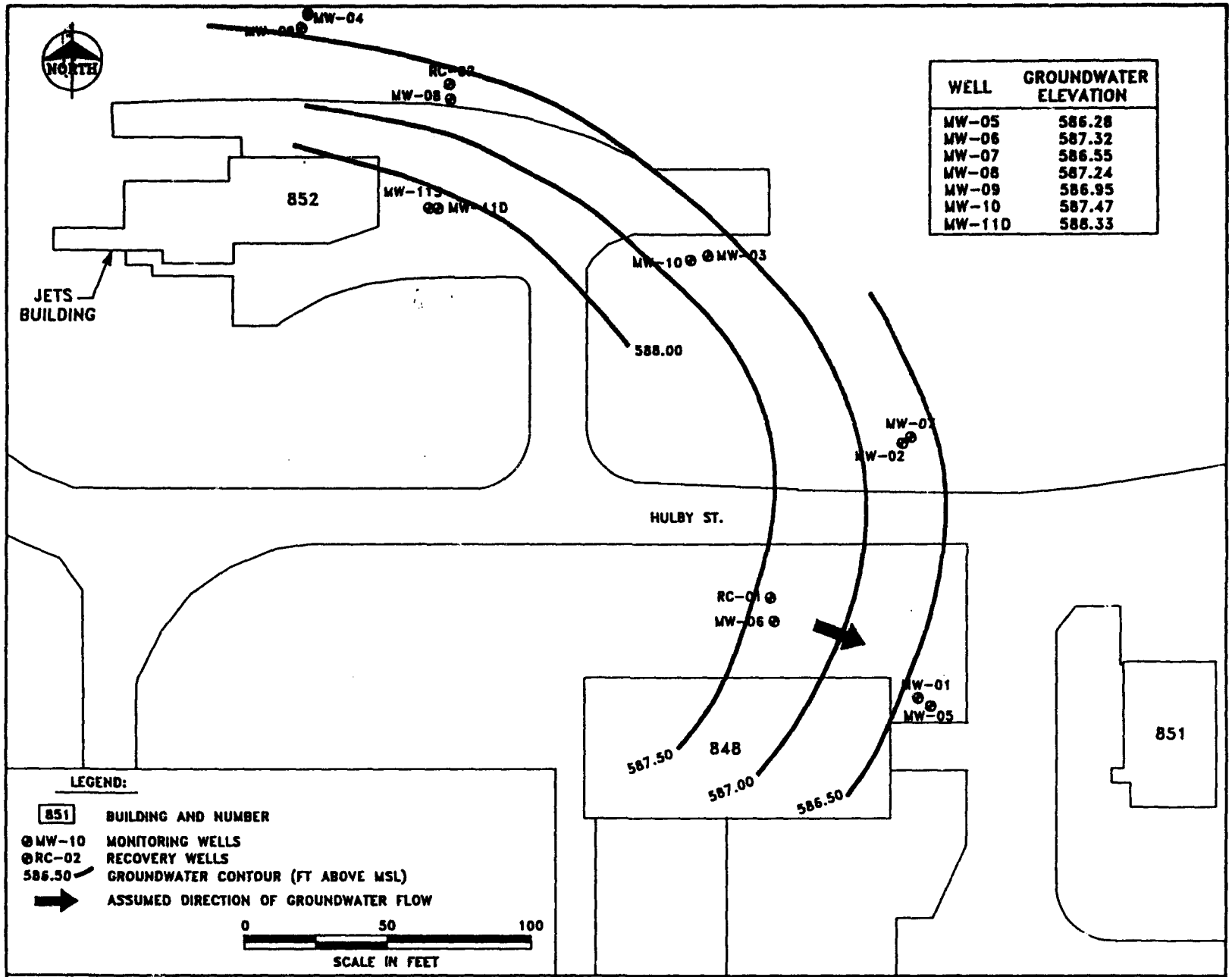
A perched and a water table groundwater contour map (Figures 3.1 and 3.2) were constructed using data from existing monitoring wells obtained on September 16, 1993 (Table 3.1). Based on both groundwater contour maps, the groundwater flow at the site appears to be moving radially outward from the JETS Building (Building No. 852) with the predominant flow being towards the east in both the perched and water table zones.

On September 16, 1993, the hydraulic gradient ranged from 0.009 ft/ft between MW-10 and MW-07, from 0.017 ft/ft between MW-06 and MW-05, from 0.009 ft/ft between MW-03 and MW-02, and from 0.015 ft/ft between RC-01 and MW-01. These calculations are summarized in Table 3.2.

3.3 ANALYTICAL RESULTS - JETS SOILS

During the SA addendum, four soil borings were advanced to depths ranging from 2 to 6 ft (Figure 2.2). These soil borings were sampled continuously by split spoon and each spoon was field screened for the presence of ionizable organics using an OVA (Appendix F). A total of 10 samples were collected from the boreholes and submitted for laboratory analysis. The samples were subjected to extraction by the zero-headspace (TCLP) technique and the extracts were then analyzed for the presence of purgeable aromatic hydrocarbons and semivolatile organics by EPA Methods 8021 and 8270, respectively. Results are summarized in Tables 3.3 and 3.4. The detailed laboratory reports are presented in Appendix G.

Laboratory analytical results of the soils obtained from the borings in the vicinity of the JETS site indicate that two samples contained concentrations of volatile hydrocarbon compounds which are in excess of NYSDEC guidance values. These samples were taken from SB-16 and SB-18 in the 0 to 2 ft BGS interval directly beneath the asphalt

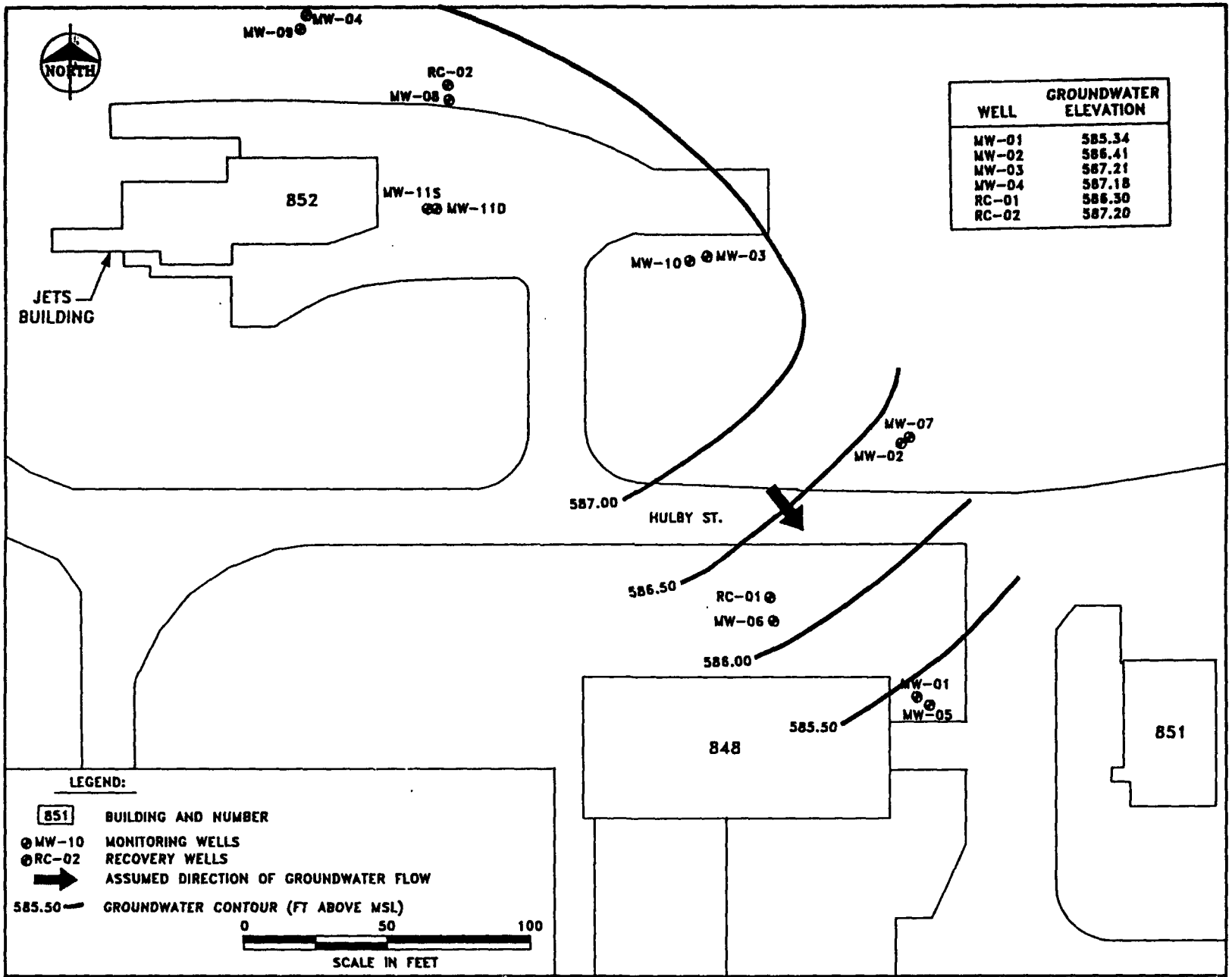


WELL	GROUNDWATER ELEVATION
MW-05	586.28
MW-06	587.32
MW-07	586.55
MW-08	587.24
MW-09	586.95
MW-10	587.47
MW-11D	588.33

FIGURE 3.1 GROUNDWATER CONTOUR MAP
PERCHED CONDITIONS, 9/16/93
NIAGARA FALLS AIR FORCE RESERVE STATION

PEER CONSULTANTS, P.C. ENGINEERS · SCIENTISTS · MANAGEMENT CONSULTANTS
575 Oak Ridge Turnpike · Oak Ridge, TN 37830 · (615)483-3191

FILE: NF00BC.DWG
DWN BY: C. HALL
SCALE: AS INDICATED
REVISION NO. 0
PROJ./DISK: 1443K10



WELL	GROUNDWATER ELEVATION
MW-01	585.34
MW-02	586.41
MW-03	587.21
MW-04	587.18
RC-01	586.30
RC-02	587.20

FIGURE 3.2 GROUNDWATER CONTOUR MAP
WATER TABLE CONDITIONS, 9/16/93
NIAGARA FALLS AIR FORCE RESERVE STATION

PEER CONSULTANTS, P.C. ENGINEERS · SCIENTISTS · MANAGEMENT CONSULTANTS
975 Oak Ridge Turnpike · Oak Ridge, TN 37830 · (615)483-3191

FILE: NF008C.DWG
DWN BY: C. HALL
SCALE: AS INDICATED
REVISION NO. 0
PROJ./DISK: 1443K10

TABLE 3.1 GROUNDWATER ELEVATIONS (09/16/93)			
Well Number	Reference Elevation[1]	Depth to Water[2]	Groundwater Elevation[3]
MW-01	591.40	6.06	585.34
MW-02	590.19	3.78	586.41
MW-03	591.88	4.67	587.21
MW-04	591.97	4.79	587.18
MW-05	591.40	5.12	586.28
MW-06	591.38	4.06	587.32
MW-07	589.90	3.35	586.55
MW-08	592.14	4.90	587.24
MW-09	591.88	4.93	586.95
MW-10	592.11	4.64	587.47
MW-11S	592.28	1.24	591.04
MW-11D	592.68	4.35	588.33
RC-01	591.35	5.05	586.30
RC-02	591.94	4.74	587.20

[1]Top of casing, feet above mean sea level.
[2]Measurement in feet from top of casing to water level.
[3]Feet above mean sea level.

Note: No free product was present in any of the wells.

TABLE 3.2 HYDRAULIC GRADIENT DATA[1] - SEPTEMBER 1993			
	Δh	Δl	$\Delta h/\Delta l$
MW-10 - MW-07	0.92	98	0.009
MW-03 - MW-02	0.80	93	0.009
MW-06 - MW-05	1.04	62	0.017
RC-01 - MW-01	0.96	62	0.015

Δh Head difference between well pairs, in ft.

Δl Horizontal distance between well pairs, in ft.

$\Delta h/\Delta l$ Hydraulic gradient.

(1) These calculations are based upon the following implicit assumptions:

1. The aquifer is an equivalent porous medium model.
2. All groundwater velocity is less than 0.001 m/s.
3. All groundwater flow is laminar.

TABLE 3.3

SUMMARY OF LABORATORY ANALYTICAL RESULTS - TCLP EXTRACTS OF JETS SOILS BY EPA METHOD 8021 (results in μg/L)

Compound	Sample Identification					C_w
	10-01-SS-SB-16-00	10-01-SS-SB-16-02	10-01-SS-SB-16-04	10-01-SS-SB-17-00	10-01-SS-SB-18-00	
Benzene	ND	ND	ND	ND	ND	0.7
Toluene	2	ND	1	2	1	5
Ethyl benzene	ND	ND	ND	ND	ND	5
m-p Xylene	**17**	ND	ND	3	2	10
o-Xylene	**18**	ND	ND	1	ND	5
Xylene	**35**	ND	ND	4	3	5
Isopropylbenzene	ND	ND	ND	ND	ND	5
n-Propylbenzene	ND	ND	ND	ND	ND	5
1,3,5-Trimethylbenzene	**84**	ND	ND	2	**37**	5
tert-Butylbenzene	**16**	ND	ND	ND	2	5
1,2,4-Trimethylbenzene	**160**	ND	ND	3	**15**	5
sec-Butylbenzene	ND	ND	1	ND	ND	5
p-isopropyltoluene	**19**	ND	ND	ND	**12**	5
n-Butylbenzene	ND	ND	ND	ND	ND	5
Napthalene	**17**	ND	ND	ND	2	10

ND - Not present above detection limit.

C_w - NYSDEC guidance value for groundwater protection.

Note: Bolding and shading indicates value which exceeds applicable NYSDEC C_w value.

Note: In instances where NYSDEC guidance values are lower than the detection limits of the laboratory, the human health guidance value is referred to for comparison to lab results.

TABLE 3.3 (Continued)

SUMMARY OF LABORATORY ANALYTICAL RESULTS - TCLP EXTRACTS OF JETS SOILS BY EPA METHOD 8021 (results in μg/L)

Compound	Sample Identification					C_w
	10-01-SS-SB-18-02	10-01-SS-SB-18-04	10-01-SS-SB-19-00	10-01-SS-SB-19-02	10-01-SS-SB-19-04	
Benzene	ND	ND	ND	ND	ND	0.7
Toluene	ND	ND	ND	ND	ND	5
Ethyl benzene	ND	ND	ND	ND	ND	5
m-p Xylene	ND	ND	ND	ND	ND	10
o-Xylene	ND	ND	ND	ND	ND	5
Xylene	ND	ND	ND	ND	ND	5
Isopropylbenzene	ND	ND	ND	ND	ND	5
n-Propylbenzene	ND	ND	ND	ND	ND	5
1,3,5-Trimethylbenzene	5	ND	ND	ND	ND	5
tert-Butylbenzene	ND	ND	ND	ND	ND	5
1,2,4-Trimethylbenzene	4	ND	ND	ND	ND	5
sec-Butylbenzene	ND	ND	ND	ND	ND	5
p-isopropyltoluene	3	ND	ND	ND	ND	5
n-Butylbenzene	ND	ND	ND	ND	ND	5
Napthalene	ND	ND	ND	ND	ND	10

ND - Not present above detection limit.

C_w - NYSDEC guidance value for groundwater protection.

Note: Bolding and shading indicates value which exceeds applicable NYSDEC C_w value.

Note: In instances where NYSDEC guidance values are lower than the detection limits of the laboratory, the human health guidance value is referred to for comparison to lab results.

TABLE 3.4

SUMMARY OF LABORATORY ANALYTICAL RESULTS
TCLP EXTRACTS OF JETS SOILS
BY EPA METHOD 8270
(results in μg/L)

Compound	Sample Identification					C_w
	10-01-SS-SB-16-00	10-01-SS-SB-16-02	10-01-SS-SB-16-04	10-01-SS-SB-17-00	10-01-SS-SB-18-00	
Naphthalene	ND	ND	ND	ND	ND	10
Acenaphthene	ND	ND	ND	ND	ND	50
Fluorene	ND	ND	ND	ND	ND	50
Phenanthrene	ND	ND	ND	ND	ND	50
Anthracene	ND	ND	ND	ND	ND	50
Fluoroanthene	ND	ND	ND	ND	ND	50
Pyrene	ND	ND	ND	ND	ND	50
Benzo(a)anthracene	ND	ND	ND	ND	ND	.002
Chrysene	ND	ND	ND	ND	ND	.002
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	.002
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	.002
Benzo(a)pyrene	ND	ND	ND	ND	ND	.002
Indeno(1,2,3-cd)-pyrene	ND	ND	ND	ND	ND	.002
Dibenzo(a,h)-anthracene	ND	ND	ND	ND	ND	50
Benzo(ghi)perylene	ND	ND	ND	ND	ND	.002

ND - Not present above detection limits.

C_w - NYSDEC guidance value for groundwater protection.

Note: Bolding and shading indicates value which exceeds applicable NYSDEC C_w value.

Note: In instances where NYSDEC guidance values are lower than the detection limits of the laboratory, the human health guidance value is referred to for comparison to lab results.

TABLE 3.4 (Continued)

SUMMARY OF LABORATORY ANALYTICAL RESULTS
TCLP EXTRACTS OF JETS SOILS
BY EPA METHOD 8270
(results in μg/L)

Compound	Sample Identification					C_w
	10-01-SS-SB-18-02	10-01-SS-SB-18-04	10-01-SS-SB-19-00	10-01-SS-SB-19-02	10-01-SS-SB-19-04	
Naphthalene	ND	ND	ND	ND	ND	10
Acenaphthene	ND	ND	ND	ND	ND	50
Fluorene	ND	ND	ND	ND	ND	50
Phenanthrene	ND	ND	ND	ND	ND	50
Anthracene	ND	ND	ND	ND	ND	50
Fluoroanthene	ND	ND	ND	ND	ND	50
Pyrene	ND	ND	ND	ND	ND	50
Benzo(a)anthracene	ND	ND	ND	ND	ND	.002
Chrysene	ND	ND	ND	ND	ND	.002
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	.002
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	.002
Benzo(a)pyrene	ND	ND	ND	ND	ND	.002
Indeno(1,2,3-cd)-pyrene	ND	ND	ND	ND	ND	.002
Dibenzo(a,h)-anthracene	ND	ND	ND	ND	ND	50
Benzo(ghi)perylene	ND	ND	ND	ND	ND	.002

ND - Not present above detection limit.

C_w - NYSDEC guidance value for groundwater protection.

Note: Bolding and shading indicates value which exceeds applicable NYSDEC C_w value.

Note: In instances where NYSDEC guidance values are lower than the detection limits of the laboratory, the human health guidance value is referred to for comparison to lab results.

where permeabilities are highest. Sample 10-01-SS-SB-16-00 was found to contain concentrations of m- and p-xylene at 17 μg/L; o-xylene at 18 μg/L; 1,3,5-trimethylbenzene at 84 μg/L, tert-butylbenzene at 16 μg/L; 1,2,4-trimethylbenzene at 160 μg/L; p-isopropyltoluene at 19 μg/L; and napthalene at 17 μg/L in the TCLP extract. The guidance value for these compounds is 5 μg/L. Sample 10-01-SS-SB-18-00 was found to contain concentrations of 1,3,5-trimethylbenzene at 37 μg/L; 1,2,4-trimethylbenzene at 15 μg/L; and p-isopropyltoluene at 12 μg/L in the TCLP extract. The guidance value for each of these compounds is 5 μg/L. Concentrations of base neutral compounds (EPA Method 8270) in each sample extract were below detection limits.

Three other samples contained detectable concentrations of volatile organics, but did not exceed the applicable NYSDEC guidance values for groundwater protection: sample 10-01-SS-SB-16-04, collected from SB-16 at the 4 to 6 ft BGS sampling interval, contained 1 μg/L toluene and 1 μg/L sec-butylbenzene; sample 10-01-SS-SB-17-00, collected from SB-17 at the 0 to 2 ft BGS sampling interval contained 2 μg/L toluene, 3 μg/L m- and p-xylene, 1 μg/L o-xylene, 4 μg/L xylenes, 2 μg/L 1-,3-,5 trimethylbenzene and 3 μg/L 1,2-4 trimethylbenzene; and sample 10-01-SS-SB-18-02, collected from SB-18 at the 2 to 4 ft BGS sampling interval contained 5 μg/L 1,3,5-trimethylbenzene, 4 μg/L 1,2,4-trimethylbenzene, and 3 μg/L p-isopropyltoluene.

3.4 ANALYTICAL RESULTS - SOIL STOCKPILE

During the SA addendum, one grab sample (10-01-SS-SP-01-02) was collected from Area A-3 of the soil stockpile (Figure 2.3). The sample was collected by first removing 2 to 4 in. of surface soil and then using a decontaminated shovel to collect a representative sample. Soil sample 10-01-SS-SP-01-02 was subjected to extraction by the TCLP and the extract was analyzed for the presence of BTEX compounds by EPA Method 8020. Analytical results are summarized in Table 3.5 and the laboratory reports are included in Appendix F. Results indicated that, with the exception of ethyl benzene, which was present at 1 μg/L, these compounds were not present in the extract at levels which exceeded detection limits.

3.5 ANALYTICAL RESULTS - QUALITY CONTROL SAMPLES

A trip blank was submitted to the laboratory in conjunction with soil samples collected on September 15, 1993, to assess possible contamination of the sample vials during transport. The trip blank was analyzed for purgeable aromatics by EPA Method 8021. Analytical results are summarized in Table 3.6 and presented in Appendix F. No concentrations were reported above the method detection limits for the analytes of interest.

An equipment rinsate sample was submitted to the laboratory for analysis as a measure of the effectiveness of the decontamination procedure. The rinsate sample was collected from a sampling spatula and analyzed for purgeable aromatics by EPA Method 8021. Analytical results are summarized in Table 3.6 and presented in

TABLE 3.5

SUMMARY OF LABORATORY ANALYTICAL RESULTS
TCLP EXTRACT OF SOIL STOCKPILE SAMPLE
BY EPA METHOD 8020
(results in μg/L)

Compounds	Sample Identification	C_w
	10-01-SS-SP-01-02	
Benzene	ND	0.7
Toluene	ND	5
Ethyl benzene	ND	5
m-p Xylene	ND	10
o-Xylenes	ND	5

ND - Not present above detection limit of 10 μg/L.

C_w - NYSDEC guidance value for groundwater protection.

Note: Bolding and shading indicates value which exceeds applicable NYSDEC C_w value.

Note: In instances where NYSDEC guidance values are lower than the detection limits of the laboratory, the human health guidance value is referred to for comparison to lab results.

TABLE 3.6
SUMMARY OF LABORATORY ANALYTICAL RESULTS
QA/QC SAMPLES
BY EPA METHOD 8021
(results in μg/L)

Compound	Sample Identification		C_w
	Equipment Rinsate Water Sample	Trip Blank Water Sample	
Benzene	ND	ND	0.7
Toluene	ND	ND	5
Ethyl benzene	ND	ND	5
m-p Xylene	ND	ND	10
o-Xylene	ND	ND	5
Xylene	ND	ND	5
Isopropylbenzene	ND	ND	5
n-Propylbenzene	ND	ND	5
1,3,5-Trimethylbenzene	ND	ND	5
sec-Butylbenzene	ND	ND	5
p-Isopropyltoluene	ND	ND	5
n-Butylbenzene	ND	ND	5
Naphthalene	ND	ND	10

ND - Not present above detection limit.

C_w - NYSDEC guidance value for groundwater protection.

Note: Bolding and shading indicates value which exceeds applicable NYSDEC guidelines.

Note: In instances where NYSDEC guidance values are lower than the detection limits of the laboratory, the human health guidance value is referred to for comparison to lab results.

Appendix F. No concentrations above the method detection limits were reported for the analytes of interest.

A duplicate soil sample from soil boring SB-19 from 4 to 6 feet BGS was submitted to the laboratory for analysis of the reproducibility of the laboratory analytical procedures. The duplicate soil sample was subjected to extraction by the TCLP and the extract was analyzed for semi-volatile organics by EPA Method 8270 and for purgeable aromatics by EPA Method 8021. Analytical results are summarized in Table 3.7 and Table 3.8, respectively, and presented in Appendix F. No concentrations above the method detection limits were reported for the analytes of interest. This is consistent with results for sample 10-01-SS-SB-19-04.

TABLE 3.7

SUMMARY OF LABORATORY ANALYTICAL RESULTS
TCLP EXTRACT OF DUPLICATE SOIL SAMPLE
BY EPA METHOD 8021
(results in $\mu g/L$)

Compound	Sample Identification	C_w
	Duplicate[1]	
Benzene	ND	0.7
Toluene	ND	5
Ethyl benzene	ND	5
m-p Xylene	ND	10
o-Xylene	ND	5
Xylene	ND	5
Isopropylbenzene	ND	5
n-Propylbenzene	ND	5
1,3,5-Trimethylbenzene	ND	5
sec-Butylbenzene	ND	5
p-Isopropyltoluene	ND	5
n-Butylbenzene	ND	5
Napthalene	ND	10

ND - Not present above detection limit.

C_w - NYSDEC guidance value for groundwater protection.

Note: Bolding and shading indicates value which exceed applicable NYSDEC C_w value.

Note: In instances where NYSDEC guidance values are lower than the detection limits of the laboratory, the human health guidance value is referred to for comparison to lab results.

[1]Duplicate of sample 10-01-SS-SB-19-04.

TABLE 3.8

SUMMARY OF LABORATORY ANALYTICAL RESULTS
TCLP EXTRACT OF DUPLICATE SOIL SAMPLE
BY EPA METHOD 8270
(results in μg/L)

Compound	Sample Identification	C_w
	Duplicate[1]	
Napthalene	ND	10
Acenaphthene	ND	50
Fluorene	ND	50
Phenanthrene	ND	50
Anthracene	ND	50
Fluoranthene	ND	50
Pyrene	ND	50
Benzo(a)anthracene	ND	.002
Chrysene	ND	.002
Benzo(b)fluoranthene	ND	.002
Benzo(k)fluoranthene	ND	.002
Benzo(a)pyrene	ND	.002
Indeno(1,2,3-cd)pyrene	ND	.002
Dibenzo(a,h)anthracene	ND	50
Benzo(ghi)perylene	ND	.002

ND - Not present above detection limit.

C_w - NYSDEC guidance value for groundwater protection.

Note: Bolding and shading indicates value which exceed applicable NYSDEC C_w value.

Note: In instances where NYSDEC guidance values are lower than the detection limits of the laboratory, the human health guidance value is referred to for comparison to lab results.

[1]Duplicate of sample 10-01-SS-SB-19-04.

4.0 CONCLUSIONS AND RECOMMENDATIONS

During this sampling event, four soil borings were installed at the direction of NYSDEC personnel (Figure 2.2). Per the NYSDEC, the TCLP extracts from the samples were analyzed for the presence of volatile and semi-volatile organics by EPA Methods 8021 and 8270.

As depicted on the analytical summary table (Table 4.1), results show the presence of some volatile organics in the extracts from samples collected from three of the four borings (SB-16, SB-17, and SB-18). Although the overall results are similar to those derived during the 1992 Site Assessment, there are notable differences. The analytical method was changed from Method 8020 to Method 8021. This change added to the number of volatile organics tested for, and lowered the detection limits. Sample extracts from two of the soil borings (SB-16 and SB-18) contained contaminants at levels which exceed the new NYSDEC guidance value for protection of groundwater, as noted on Tables 3.3 and 3.4. Both of these samples were collected from the 0 to 2 ft BGS interval. This interval was specifically targeted by the NYSDEC personnel in their request for additional sampling at the site.

The previous Site Assessment concluded that leachable quantities of these contaminants were not present in soils above NYSDEC guidance values for protection of groundwater. The results of this sampling event with the new guidance does not appear to support this conclusion.

The current data (0 to 2 ft BGS) may or may not be representative of petroleum contamination resulting from a release. The data may be representative of "false" contamination due to the overlying asphalt surface. Although we are careful to remove all visible contamination such as asphalt when initially coring a borehole, residual petroleum products are usually present in the near-surface, due to the preparatory work associated with installation of such surfaces, e.g., tar application. This makes interpretation of any data from the near-surface suspect, at best.

It is our opinion that these low values for volatile organics in the near surface soils do not constitute a condition non-protective of groundwater because: the results may be artifacts of the asphalt surface; they are not found in the deeper soils (below 2 ft).

During this sampling event, one grab sample was collected from the soil stockpile and the TCLP extract was analyzed by EPA Method 8020. The soil stockpile does not contain significant amounts of BTEX compounds at detectable levels and therefore, should not be regulated as a special waste under 6 NYCRR 360. It is recommended that it be used as fill material onsite.

TABLE 4.1

NIAGARA FALLS AFRS

SOIL SAMPLES

ANALYTICAL SUMMARY TABLE

Location	Sample I.D. No.	Sample Type	Depth Below Ground Surface (ft)	Date Collected	Contaminants Detected		Contaminants Exceed NYSDEC TCLP Extraction Guidance Values for Groundwater	Notes
					TCLP 8020	TCLP 8021/8270	C_w	
Soil Boring No. 16	10-01-SS-SB-16-00	Soil	0 to 2	9/15/93	NA	Y/N	Y	Requested per NYSDEC
	10-01-SS-SB-16-02	Soil	2 to 4	9/15/93	NA	N/N	N	Requested per NYSDEC
	10-01-SS-SB-16-04	Soil	4 to 6	9/15/93	NA	Y/N	N	Requested per NYSDEC
Soil Boring No. 17	10-01-SS-SB-17-00	Soil	0 to 2	9/15/93	NA	Y/N	N	Requested per NYSDEC
Soil Boring No. 18	10-01-SS-SB-18-00	Soil	0 to 2	9/15/93	NA	Y/N	Y	Requested per NYSDEC
	10-01-SS-SB-18-02	Soil	2 to 4	9/15/93	NA	Y/N	N	Requested per NYSDEC
	10-01-SS-SB-18-04	Soil	4 to 6	9/15/93	NA	N/N	N	Requested per NYSDEC
Soil Boring No. 19	10-01-SB-SB-19-00	Soil	0 to 2	9/15/93	NA	N/N	N	Requested per NYSDEC
	10-01-SS-SB-19-02	Soil	2 to 4	9/15/93	NA	N/N	N	Requested per NYSDEC
	10-01-SS-SB-19-04	Soil	4 to 6	9/15/93	NA	N/N	N	Requested per NYSDEC
Stockpile at Location A-3	10-01-SS-SP-01-02	Soil	2	9/15/93	Y	NA/NA	N	Requested per NYSDEC

NS = Not sampled
NA = Not analyzed
Y = Yes
N = No
C_w = NYSDEC guidance value for groundwater protection

5.0 REFERENCES

1. Engineering-Science, Initial Assessment/Records Search, December 1983.

2. Tracer Research Corporation, 1988, Soil Gas/Groundwater Investigation.

3. PEER, June 1992. Final Site Assessment Report, Jet Engine Test Stand and Soil Stockpile, 107th Fighter Interceptor Group, Niagara Falls AFRF, New York ANG, Niagara Falls, New York.

4. NYSDEC, August 1992. Petroleum-Contaminated Soil Guidance Policy. Stars Memo No. 1.

5. PEER Consultants, P.C., August 1993. Rapid Response Initiative: Site Assessment Addendum Work Plan, Jet Engine Test Stand and Soil Stockpile, 107th Fighter Interceptor Group, Niagara Falls Air Reserve Station, New York Air National Guard, Niagara Falls, New York.

6. NYSDEC 1990. Proposed New York State Petroleum Contaminated Guidance.

7. NYSDEC 1986. Primary and Principal Aquifer Determinations, Division of Water Technical and Operational Guidance Series 86-W-57.

8. USGS 1988. Unconsolidated Aquifers in Upstate New York - Niagara Sheet. WRI 88-4076.

9. PEER/Oak Ridge Quality Assurance (QA) Procedures and Environmental Sampling Operating Procedures (SOPs), PEER 1991

10. NY Conservation Department, 1964, Johnston, Richard H., Groundwater in the Niagara Falls Area, New York.

APPENDIX A

LETTERS FROM THE NYSDEC AGENT

DEE,

send ltr w/ CL: ANGRC/CEV (Kilmartin)

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York, 14203-2999

Thomas C. Jorling
Commissioner

February 9, 1993

Major William B. Vecsey
Air National Guard - Civil Engineering
107th Fighter Interceptor Group/NYANG
Niagara Falls International Airport
Niagara Falls, New York 14304-5000

RECEIVED
FEB 10 1993

Dear Major Vecsey:

Spill Number 8707568
Tank Removal Project
Niagara Falls
Niagara County

I have reviewed your February 1, 1993 submittal regarding the above-referenced spill and have the following comments:

1. Laboratory reports in Appendix I from the June 1992 report confirm that naphthalene was below method detection limits for N-1, N-2, N-3, D-1, D-2, D-3, J-1, J-2 and J-3. Therefore, you may also use these areas on site as fill.

2. We still require that area A-3 be retested using EPA Method 8020 TCLP or be remediated. Although field screen methodologies using a mobile gas chromatograph may not be suitable for comparison to regulatory criteria, they can indicate the possibility of contamination.

   Laboratory confirmation was performed on a composite sample of A-1, A-2 and A-3. Because the sample was a composite, it is possible that the soil from A-3 may have been absent in the actual analysis. Therefore, we require a grab sample be taken from A-3 and analyzed using EPA Method 8020 TCLP, or the area must be remediated.

If you have any questions, please contact me at (716) 851-7220.

Sincerely,

Salvatore A. Calandra
Environmental Engineer I

SAC:vm

cc: Mr. Ronald Gwozdek - Niagara County Health Department
Mr. William Niver - 914th TAG

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Maj V 107V
Maj G

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York, 14203-2999

Thomas C. Jorling
Commissioner

February 12, 1993

RECEIVED
FEB 17 1993

Major William B. Vecsey, Jr.
Air National Guard - Civil Engineering
107th Fighter Interceptor Group/NYANG
Niagara Falls International Airport
Niagara Falls, New York 14304-5000

Dear Major Vecsey:

Spill Number 8806429
Building 852
Niagara Falls
Niagara County

I have reviewed your February 1, 1993 submittal regarding the above-referenced spill and have the following comments:

1. The Final Site Assessment Report dated June 1992 indicates petroleum contamination from Field GC analyses performed on soil borings at shallow levels.

2. Boring logs from the June 1992 report indicate petroleum odors at some of the boring points.

3. No analytical data exists for the level or extent of contamination at shallow depths in the roadway.

4. Any petroleum contamination, which may exist, appears contained under the roadway. However, we cannot assume the contamination will not migrate. Thus, you must address the contamination before it migrates.

Therefore, we still request shallow soil borings in the roadway and the sub-surface soil and have the soil analyzed using EPA Method 8021 TCLP or direct and for EPA Method 8270 base/neutrals only TCLP or direct.

If you have any questions, please call me at (716) 851-7220.

Sincerely,

Salvatore A. Calandra
Environmental Engineer I

SAC:vm

cc: Mr. Ronald Gwozdek - Niagara County Health Department
Mr. William Niver - 914th TAG

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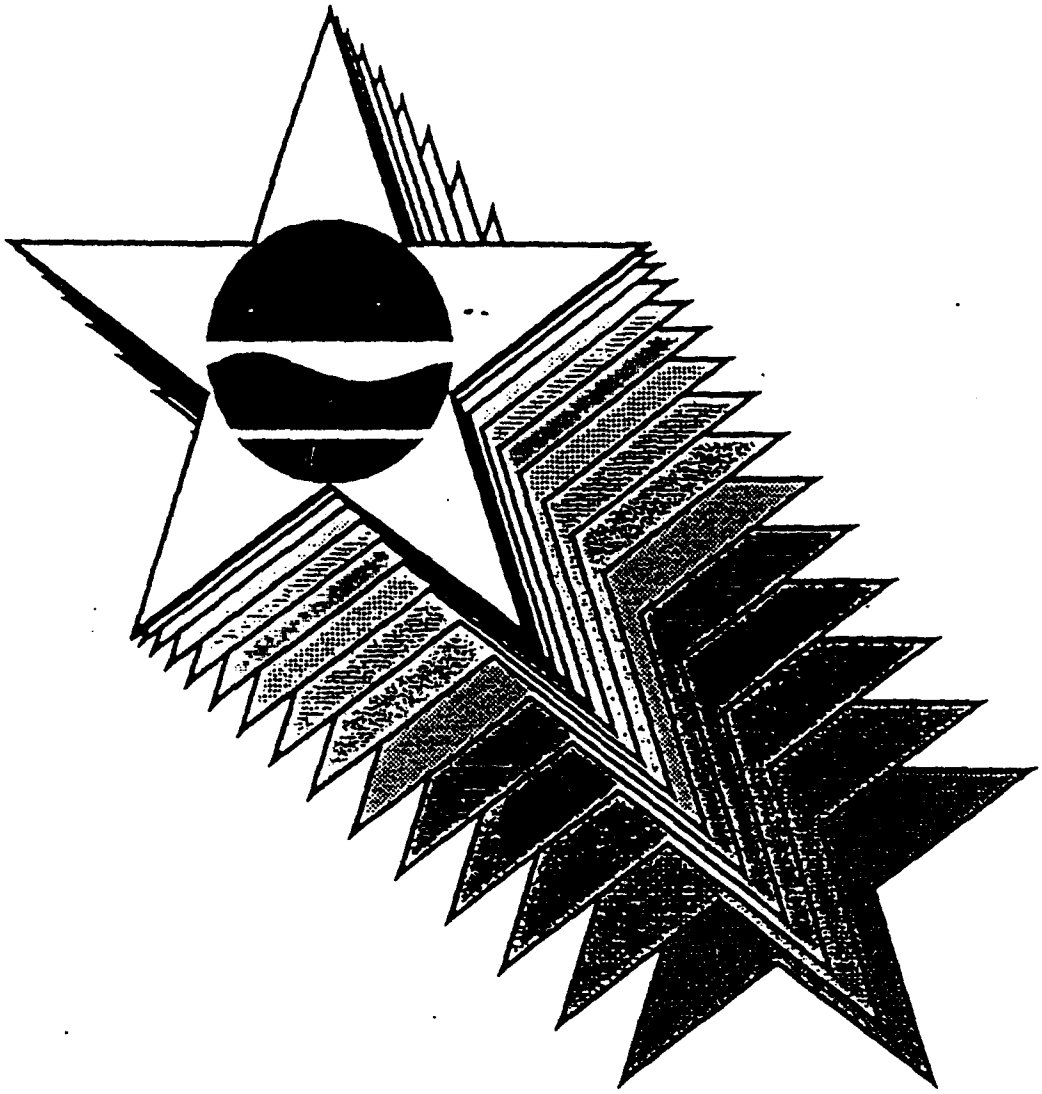
APPENDIX B

NEW YORK STATE
PETROLEUM CONTAMINATED SOIL
GUIDANCE POLICY



Spill
Technology
And
Remediation
Series

STARS Memo #1
Petroleum-Contaminated Soil Guidance Policy

Prepared by:
New York State Department of Environmental Conservatio
Division of Construction Management
Bureau of Spill Prevention and Response

August 1992

NEW YORK STATE PETROLEUM-CONTAMINATED SOIL GUIDANCE

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SECTION I
PURPOSE AND APPLICABILITY

The goal at each petroleum spill site is to remove the spilled petroleum product from the soil in the most efficient and safe manner in order that the soil may be returned to a reusable product. When complete removal is not possible, practical, or cost effective, the objective is to remediate the contaminated media to concentration levels which will protect groundwater, human health and the environment.

The Petroleum-Contaminated Soil Guidance Policy is intended to provide direction on the handling, disposal and/or reuse of non-hazardous petroleum-contaminated soils. The reuse or disposal options for excavated soils vary depending on the level of treatment provided consistent with protecting the public health and the environment. While this document does not establish standards, it is intended as guidance in determining whether soils have been contaminated to levels which require investigation and remediation.

This document also constitutes a determination of beneficial use by the Department, as defined in Solid Waste Regulation NYCRR Part 360. Petroleum-contaminated soil, if determined to satisfy the criteria herein, can be reused or disposed of as directed in this guidance. Therefore, soils which meet beneficial use conditions are no longer a solid waste in accordance with NYCRR Part 360-1.2(a)(4).

This guidance is intended for Regional Spill Investigators, Regional Solid Waste staff and responsible parties to assist them in determining the acceptability of remedial activities at a petroleum spill site or in determining the acceptability of a site assessment. It may be applied to both excavated and non-excavated material. The evaluation method and guidance values included in this guidance may be used to determine the limits of contamination, such as defining the extent of contamination in an excavation which contains contaminated material. Situations may exist where results of sampling analysis will require interpretations or subjective judgement, as with certain nuisance characteristics such as odors. These interpretations and judgements will be made solely by the DEC representative on site. There may be instances where the DEC will opt to digress from this guidance to establish cleanup goals reflecting site-specific circumstances at a particular petroleum spill site.

The guidance may also be used by responsible parties to develop corrective action plans which will achieve the criteria set forth in this document.

Robert G. Hampston Director Division of Construction Management	Norman H. Nosenchuck Director Division of Solid Waste

SECTION II

HAZARDOUS WASTE DETERMINATION

An initial determination[1] must be made on all excavated petroleum-contaminated soil as to whether or not it is a hazardous waste. The hazardous waste determination typically involves laboratory analysis to quantify contaminant concentrations in the waste material. The DEC and EPA regulations, however, allow the generator of the waste to use knowledge of the waste and/or laboratory analysis to make a hazardous waste determination. Petroleum-contaminated soils are generally stored on site while laboratory analysis results are obtained and evaluated. As long as the material is segregated from the environment by impervious material, such as polyethylene sheeting, the petroleum-contaminated soil may remain on site until appropriate laboratory results are available and interpreted.

A petroleum-contaminated soil is considered a characteristic hazardous waste when it exhibits any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity, as defined in 6NYCRR Part 371, Section 371.3, or 40 CFR Section 261. Knowledge of soils contaminated with virgin petroleum products indicates that those waste materials do not demonstrate ignitability, corrosivity, or reactivity characteristics. Therefore, the only characteristic of concern for virgin petroleum-contaminated soil is toxicity. The Toxicity Characteristic (TC) Rule identifies benzene and lead as compounds which may cause petroleum-contaminated waste to be hazardous. Analysis of additional parameters may be necessary for petroleum-contaminated soil located at sites where other contaminants may be present. Refer to Appendix A for more specific information regarding the procedures for hazardous waste determination, and the TC Rule regulatory levels.

If the contaminated soil has been excavated and if the hazardous waste criteria apply, then the contaminated soil is classified as a hazardous waste. Excavated soil which is hazardous due to any non-petroleum component will be referred to the Division of Hazardous Waste Remediation, and the Division of Hazardous Substances Regulation to determine appropriate remedial actions.

If in-situ soil is contaminated by a petroleum product, and if the above hazardous waste criteria are met, the site will be remediated under the direction of the Bureau of Spill Prevention and Response to provide for protection of human health and environmental quality. In-situ soil, which violates any of the hazardous waste criteria due to any non-petroleum component, will be referred to the Division of Hazardous Waste Remediation, and the Division of Hazardous Substances Regulation to determine appropriate remedial actions.

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[1] In-situ or excavated soils which could contain contaminants *other than petroleum* products, by virtue of laboratory analysis, site history, visual observations, etc., will be sampled and analyzed by either the responsible party or by the Bureau of Spill Prevention and Response (BSPR). The Division of Hazardous Substances Regulation (DHSR) will provide assistance to BSPR staff (for state-funded projects) and responsible parties in making hazardous waste determinations for their generated waste.

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SECTION III

SOIL CLEANUP GUIDELINES

There are four essential guidelines which must be satisfied in order for soil to be considered acceptably remediated or not sufficiently contaminated. These are: A) protection of the groundwater; B) protection of human health; C) protection of fish and wildlife and the environment in which they live; and D) protection against objectionable nuisance characteristics. Compliance with these guidelines is satisfied by analysis of soil samples for contaminant concentrations and leachability, and subsequent comparison of the sampling results to guidance values, values which have been determined to be acceptable by DEC.

Contaminant concentrations are determined using EPA standard Methods 8021 or 8270. Leachability is determined using a procedure known as the Toxicity Characteristic Leaching Procedure (TCLP). Satisfactory protection of groundwater is indicated by TCLP Extraction Guidance Values or by TCLP Alternative Guidance Values. Satisfactory protection of human health is indicated by Human Health Guidance Values. Satisfactory protection of water body sediment is indicated by Sediment Guidance Values. Finally, satisfactory protection against objectionable nuisance characteristics is indicated by the lack of odor and by each contaminant concentration being less than 10,000 ppb. Tables 1 and 2 in Section VIII list the contaminants of concern and their corresponding guidance values for acceptable soil concentrations for components of gasoline and fuel oil, respectively. Analysis of additional parameters may be necessary for petroleum-contaminated soil located at sites where other contaminants may be present.

The procedures used when evaluating soil samples to satisfy these guidelines are discussed further in this section.

A. Protection of Groundwater

The presence of a contaminant in the soil does not determine its potential for groundwater contamination. Soil particles can adsorb contaminants which will not be released through infiltration and groundwater recharge mechanisms. Therefore, it is the leachability of the soil which must be measured. To be protective of groundwater quality, the soil must not leach contaminants to the groundwater at concentrations which violate groundwater standards. The Toxicity Characteristic Leaching Procedure (TCLP) has been accepted by the Department[2] as a method of determining leachability of petroleum-contaminated soil.

The Toxicity Characteristic Leaching Procedure (TCLP) is an extraction process designed to address the leaching potential of organic and inorganic contaminants. It is used to simulate the actual site-specific leaching potential of individual contaminants present in the soil. In the extraction process, the soil sample is mixed with an acid solution and shaken for

[2] Accepted by NYSDEC Cleanup Standards Task Force.

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approximately eighteen hours. For non-volatile organic and inorganic compounds, the soil/acid solution is filtered to produce an extract liquid. For volatile organic compounds, the soil/acid solution is held in a Zero Headspace Extractor (ZHE), preventing the escape of volatile organics, and a liquid extract is squeezed out of the soil/acid solution. The extracted liquid is then analyzed to determine the concentration of the petroleum compounds in question. If the concentrations in the extract are less than or equal to the groundwater standards, then the soil may be considered environmentally acceptable for groundwater protection. Tables 1 and 2 in Appendix B identify the TCLP Extraction Guidance Values for the primary components of gasoline and fuel oil. The tabulated TCLP Extraction Guidance Values are equal to the NYSDEC groundwater standards or the NYSDOH drinking water standards, whichever is more stringent.

An alternative approach to the actual extraction process of the TCLP laboratory procedure which may be a cost-saving shortcut is to evaluate the concentration of the contaminant in the soil and mathematically determine if it will satisfy the leachate criteria. The TCLP laboratory procedure requires the soil sample to be diluted by a ratio of 20:1 when preparing the sample for the acidic extraction, and subsequent leachate analysis. Assuming that the entire mass of the contaminants present in the soil will leach out during the extraction process, the dilution factor of 20 can be applied to the actual soil contaminant concentration to give a maximum possible contaminant concentration obtainable in the leachate.

If a contaminant concentration in the soil is known, then the maximum possible contaminant concentration in the TCLP extract can be determined by the following equation:

$$\left[\begin{array}{l}\text{Contaminant}\\ \text{Concentration}\\ \text{in Soil}\\ \text{(ug/kg or ppb)}\end{array}\right] \div 20 = \left[\begin{array}{l}\text{Maximum Possible}\\ \text{Contaminant}\\ \text{Concentration}\\ \text{in Extract}\\ \text{Liquid (ug/l or ppb)}\end{array}\right]$$

If the maximum possible contaminant concentration in the extract liquid, as determined by the above equation, is less than or equal to the contaminant's TCLP Extraction Guidance Value, then the contaminant satisfies the groundwater quality protection criterion. If the calculated maximum possible contaminant concentration in the extract liquid is greater than the TCLP Extraction Guidance Value, then no conclusion can be drawn and groundwater quality protection must be confirmed by actually performing the TCLP extraction for that contaminant.

<u>Example:</u>

If the total concentration of Toluene in the soil as determined by

Method 8021 is 100 ug/kg or 100 ppb for Sample A and 140 ug/kg or 140 ppb for Sample B, and the groundwater standard is 5 ppb then:

Sample A is: 100 ug/kg ÷ 20 = 5 ug/l = 5 ppb
Sample B is: 140 ug/kg ÷ 20 = 7 ug/l > 5 ppb

Sample A is considered to have satisfied groundwater protection by the TCLP extraction test for Toluene at 5 ppb. In Sample B, the calculated extract value is greater than 5 ug/l, therefore, no conclusion can be drawn from the calculation, and an actual TCLP extraction test must be performed.

To simplify this alternative approach, TCLP Alternative Guidance Values, which are equal to 20 times the TCLP Extraction Guidance Values, have been included in Tables 1 and 2. Therefore, if a contaminant's soil concentration is known, it can simply be compared to the TCLP Alternative Guidance Values.

The above methodology can also be used to make the hazardous waste determination, with the soil or sediment concentration compared to the respective hazardous waste limit for the leachate. A considerable decrease in analytical costs may be realized if the above equation is used to evaluate contaminant concentration acceptability.

In summary, if the contaminant concentrations in the soil are less than or equal to the TCLP Alternative Guidance Values, or if the contaminant concentrations in the soil extract are less than or equal to the TCLP Extraction Guidance Values, then the soil is considered environmentally acceptable for groundwater quality protection.

B. Protection of Human Health

Protection of human health is an essential requirement of both treatment and reuse of petroleum-contaminated soil. EPA has published health-based standards for many contaminants in soil. The standards are contained in the Health Effects Assessment Summary Table (HEAST REPORT). These standards were derived from methodologies based on soil ingestion values for carcinogens and systemic toxicants.

The appropriate health-based soil Guidance Values are listed in Tables 1 and 2 for the primary components of gasoline and fuel oil.

If the contaminant concentrations in the soil are less than or equal to the Human Health Guidance Values, then the soil is considered safe for human health concerns.

Protection of fish and wildlife must be satisfied when dealing with contaminated sediment. Some Sediment Guidance Values for protection of aquatic life and animals which consume aquatic life, have been developed and are noted in Tables 1 and 2. Where sediments are contaminated, these Guidance Values should be used. The appropriate natural resource division (eg. Marine, Fish & Wildlife, etc.) should be contacted for situations involving sediment contaminants which do not have tabulated Sediment Guidance Values. If a spill has occurred at a location that may be sensitive to wildlife (eg. wetlands), the Division of Fish and Wildlife should be consulted to determine whether the soil cleanup levels are adequate for natural resource protection.

If the contaminant concentrations in the sediment are less than or equal to the tabulated Sediment Guidance Values, then the sediment is considered environmentally acceptable for fish and wildlife concerns.

D. Protection Against Objectionable Nuisance Characteristics

Petroleum-contaminated soil must not exhibit objectionable nuisance characteristics to be eligible for some reuse options described later in this guidance and listed in Table 3.

1) Petroleum-Type Odors

The soil must not exhibit any discernible petroleum-type odors in order to be considered for the reuse options identified later in this guidance. Odor determinations for state-funded spill projects will be made by the Regional Spill Investigator. Odor determinations for responsible party (RP) sites are the responsibility of the RP. The Regional Spill Investigator may or may not be available to assess the odor criteria at all sites. When the Regional Spill Investigator is on-site, he/she may override the decision of the RP if, in the investigator's opinion, sufficient odors still persist. Determinations by DEC Spill Investigators do not relinquish a responsible party's responsibilities or liabilities under the law.

2) Contaminant Concentrations

The soil shall not contain any contaminant at a concentration above **10,000 ug/kg (10,000 ppb)**. This maximum individual contaminant concentration should support the above odor determination, since some petroleum constituents will not leach at high concentrations but may exhibit odors.

If the soil does not exhibit petroleum-type odors and does not contain any individual contaminant at greater than 10,000 ppb, then the soil is considered acceptable for nuisance characteristics.

SECTION IV

GUIDANCE VALUES

A. Gasoline-Contaminated Soils

Table 1 lists the primary gasoline components of concern. The table identifies the compound names, the preferred EPA laboratory methods for determining contaminant concentration, the detection limits for a liquid matrix (water), the detection limits for a solid matrix (soil), the TCLP Extraction Guidance Values (C_w), the TCLP Alternative Guidance Values (C_s), the Human Health Guidance Values (C_h), and the Sediment Guidance Values (C_s).

Although EPA Method 8021 is preferred, other laboratory methods may be used with prior approval from the DEC Regional Spill Investigator. Other proposed methods should be evaluated on their ability to quantify the compounds of concern at acceptable detection levels.

The tabulated detection limits are the practical quantitation limits (PQLs). The PQL is the lowest level that can be measured within specified limits of precision during routine laboratory operations on most matrices. Efforts should be made to obtain the best detection possible when selecting a laboratory.

To demonstrate groundwater quality protection via the TCLP Extraction Method, the concentration of the hydrocarbon compound in the TCLP extract, as determined by EPA Method 8021 for a <u>liquid matrix</u>, must be less than or equal to the TCLP Extraction Guidance Value, C_w.

-or-

To demonstrate groundwater quality protection via the TCLP Alternative Method, the concentration of the hydrocarbon compound in the soil, as determined by EPA Method 8021 for a <u>solid matrix</u>, must be less than or equal to the TCLP Alternative Guidance Value, C_s.

To demonstrate human health protection, the concentration of the hydrocarbon compound in the soil, as determined by EPA Method 8021 for a <u>solid matrix</u>, must be less than or equal to the Human Health Guidance Value, C_h.

To demonstrate fish and wildlife protection, the concentration of the hydrocarbon compound in the soil, as determined by EPA Method 8021 for a <u>solid matrix</u>, must be less than or equal to the Sediment Guidance Value C_s. Meeting this requirement is only necessary when dealing with contaminated sediment.

To demonstrate nuisance protection, the soil must not exhibit petroleum-type odors, and must not contain any contaminant at greater than 10,000 ppb, as determined by EPA Method 8021 for a solid matrix.

When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard, as long as the reported laboratory detection limits are reasonably close to the listed PQLs.

B. Fuel Oil-Contaminated Soil

Table 2 lists the primary fuel oil components of concern. As with Table 1, Table 2 identifies compound names, preferred EPA laboratory methods, detection limits, and Guidance Values.

Although EPA Methods 8021 and 8270 are preferred for identifying compounds of concern for gasoline and fuel oil, other laboratory methods may be used with prior approval from the DEC Regional Spill Investigator. Other proposed methods should be evaluated on their ability to quantify the compounds of interest at acceptable detection levels.

Since there is no single laboratory method which will analyze for all of the volatile and semi-volatile compounds of concern, it is generally necessary to use more than one laboratory method for fuel oil analysis. Both volatile and semi-volatile compounds must be addressed initially, but a reduced list of analytes may be acceptable for subsequent sampling depending upon the initial results.

As with Table 1, the detection limits in Table 2 are PQLs. Efforts should be made to obtain the best detection possible when selecting a laboratory.

Experience has shown that soil containing some of the insoluble semi-volatile compounds at high concentrations can exhibit a distinct odor even though the substances will not leach from the soil. Therefore, the maximum individual contaminant concentration of 10,000 ppb is instituted to help address this problem. In addition, anytime a soil exhibits discernible petroleum odors, even if it has met the numerical criteria, it shall not be considered clean enough for some reuse options under 6NYCRR Part 360, as described later in this document.

Odor determination is subjective. Since there is no recognized odor measuring device, some discrepancies may arise between responsible parties and the DEC on this subject. In order to document odor determinations and to address the need for remediation due to odors, the following approaches may be considered: (1) direct the laboratory to identify and quantify all pollutants present in the soil and/or leachate samples instead of just the

method's target compounds; and (2) establish site-specific conditions based on an evaluation of the characteristics of the site. The determination and evaluation of odors remains a subject requiring further research and policy development.

Some of the semi-volatiles are carcinogens, and subsequently have groundwater quality Guidance Values of 0.002 ppb. The TCLP Extraction Guidance Values are 0.002 ppb, and the TCLP Alternative Guidance Values are 0.04 ppb. The solid matrix detection limit does not approach this low value. Therefore, when these compounds are determined to be present, the TCLP Extraction Method and the Alternative Guidance Values must be satisfied to demonstrate groundwater quality protection for these particular contaminants. The following compounds listed in Table 2 are affected by this limitation: benzo(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; benzo(a)pyrene; chrysene; benzo(ghi)perylene; and indeno(1,2,3-cd)pyrene.

Particular attention should be paid to the Human Health Guidance Values for fuel oil-contaminated soil. While the majority of the semi-volatiles have health Guidance Values considerably higher than the contaminant concentration generally encountered at spill sites, there are seven compounds listed in Table 2 which have Human Health Guidance Values lower than the detection limits. When any of these compounds (benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene and dibenz(a,h)anthracene) are present, the Human Health Guidance Value most likely will be the limiting factor for achieving acceptable cleanup levels.

To demonstrate groundwater quality protection via the TCLP Extraction Method, the concentrations of the hydrocarbon compounds in the TCLP extract, as determined by EPA Methods 8021 and 8270 Base/Neutral for a <u>liquid matrix</u>, must be less than or equal to the TCLP Extraction Guidance Value, C_w;

-or-

To demonstrate groundwater quality protection via the TCLP Alternative Method, the concentrations of the hydrocarbon compounds in the soil, as determined by EPA Methods 8021 and 8270 Base/Neutral for a <u>solid matrix</u>, must be less than or equal to the TCLP Alternative Guidance Value, C_a. As described above, the TCLP Alternative Method is not a sufficient demonstration of groundwater protection for some contaminants.

To demonstrate human health protection, the concentrations of the hydrocarbon compounds in the soil, as determined by EPA Methods 8021 and 8270 Base/Neutral for a <u>solid matrix</u>, must be less than or equal to the Human Health Guidance Value, C_h.

To demonstrate fish and wildlife protection, the concentrations of the hydrocarbon compounds in the soil, as determined by EPA Methods 8021

and 8270 Base/Neutral for a solid matrix, must be less than or equal to the Sediment Guidance Value, C_s. Meeting this requirement is only necessary when dealing with contaminated sediment.

To demonstrate nuisance protection, the soil must not exhibit petroleum-type odors, and must not contain any contaminant at greater than 10,000 ppb, as determined by EPA Methods 8021 and 8270 Base/Neutral for a solid matrix.

When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard, as long as the reported laboratory detection limits are reasonably close to the listed PQLs.

SECTION V

LABORATORY ANALYSIS

There are a variety of laboratory methods, established by the USEPA and the NYS Department of Health (DOH), which can be used to analyze petroleum-contaminated soils. The selection of appropriate laboratory methods depends on the compounds of concern, the detection limits for each compound, the nature of the samples to be analyzed, the capabilities of the laboratory, and the regulatory limits or Guidance Values to be achieved. The methods recommended and most often used for petroleum-contaminated soils are EPA Standard Methods 8021, 8270 (Base/Neutrals) and the TCLP extraction process. In every case, the NYSDEC will evaluate laboratory results from NYSDOH-approved laboratories only.

Each laboratory method identifies compounds which can be quantified with an acceptable degree of precision and accuracy. Many laboratory methods have petroleum compounds as target compounds, along with non-petroleum compounds. Method 8270, for example, identifies acid extractable hydrocarbons and base/neutral extractable hydrocarbons. The semi-volatile constituents of petroleum products are a sub-set of the base/neutral extractable compounds under Method 8270. Therefore, when requesting this analysis, base/neutrals only should be specified.

Some laboratories may be able to quantify non-target compounds of concern with particular methods. For example, there is no laboratory method which lists MTBE (methyl t-butyl ether) as a target compound; however, laboratories can include MTBE in their analysis using Method 8021. Therefore, when requesting this analysis, Method 8021 plus MTBE should be specified.

Each laboratory method establishes minimum concentrations of the target compounds which can be detected under ideal conditions using that particular procedure. These Method Detection Limits (MDLs) are rarely achievable under actual conditions in an analytical laboratory. Laboratories report their actual detection limits as Practical Quantitation Limits (PQLs). The PQLs for analysis on a liquid matrix are generally four times the MDLs. With a solid matrix, the PQLs will be affected by the quantity of contamination present, categorized as low, medium or high concentrations. Lower PQLs are generally possible with low level soil contamination. Laboratories must identify their PQLs when reporting analytical results.

Laboratories and methods to be utilized should be selected according to the best detection possible for the compounds of interest, and the regulatory or guidance levels needed to be achieved. For example, Table 2 indicates [illegible] naphthalene is a target compound for Method 8021 and Method 8270. Both [illegible] methods can provide detection levels in a liquid matrix below the TCLP Extraction Guidance Value of 10 ppb. Therefore, either method could be used for analysis of a liquid matrix of naphthalene. However, for a solid matrix, Method 8021 is capable of providing much better detection of naphthalene than Method 8270. If the soil concentrations for naphthalene will be compared to the TCLP Alternative Guidance Value of 200 ppb, then Method 8021 should be used instead of Method

8270. If the soil concentrations for naphthalene will be compared only with the nuisance protection level of 10,000 ppb, or the Human Health Guidance Value of 300,000 ppb, then both Method 8021 and Method 8270 are capable of providing satisfactory detection levels for naphthalene.

Initial laboratory analysis should address the full range of compounds which may be present, considering the petroleum products involved. In consideration of prior laboratory results, potential contaminants may be eliminated from subsequent sampling analysis lists. As the contaminants are identified or eliminated, it may be appropriate to change laboratory methods during a project, to avoid unnecessary laboratory expenses. In addition, it may be appropriate to discuss analytical work with the laboratory in terms of the actual compounds of interest rather than method numbers and their defined target compounds. The final laboratory results for a project, however, should address the same full range of compounds as the initial sampling results, to confirm that the interim results did not overlook the appearance of other compounds. For example, gasoline-contaminated soil which is undergoing on-site bioremediation should be analyzed initially using Method 8021 plus MTBE. If only benzene, toluene, ethyl benzene and xylenes are detected, then Method 8020 could be used for interim sampling events. Upon completion of the bioremediation project, the soil should be analyzed using Method 8021 plus MTBE, to demonstrate the satisfaction of the Guidance Values applicable to the selected reuse option.

A detailed description of analytical protocols and procedures is available in the DEC Sampling Guidelines and Protocols manual.

SECTION VI

SAMPLING

Samples should be collected in such a manner so as to best characterize the extent of contamination of the soil in question. There is no specific number or type of samples which will apply to all situations and best engineering judgement will have to be used. The type of sample, grab or composite, will vary depending upon the constituent being identified. While grab samples come from one location, composites come from several locations and are joined to form one sample. When volatiles are in question, care must be taken when collecting composite samples to minimize the loss of volatiles during handling. In order to minimize handling of volatiles, several grab samples are preferred, with confirmatory composite samples. When sampling for semi-volatiles, several composite samples are preferred, with confirmatory grab samples.

The treatment process (if any) will also have a bearing as to how well a soil may be characterized. Low temperature thermal treatment units (e.g. rotary kiln dryers) process soil resulting in a more homogeneous mixture than would be obtained from a stationary pile. The following guidance is offered to assist the Regional Spill Investigator in determining the number and types of samples which should be requested for various treatment scenarios. More comprehensive samples may be required depending on the reuse or disposal alternative to be used.

The responsible party and the Regional Spill Investigator should agree on a sampling plan and review procedure before the samples are collected. All sample results submitted for regulatory compliance must be analyzed by New York State Department of Health approved laboratories.

A detailed description of soil sampling protocols and procedures is available in the DEC Sampling Guidelines and Protocols manual.

A. Tank Pit

If there is a question as to the extent of residual contamination, or if comprehensive documentation is necessary, a tank pit may be sampled for laboratory analysis.

A total of five samples should be taken from the excavation. One composite sample from each of the side walls at a distance approximately one third up from the bottom of the pit. Several samples should also be collected to form one composite sample from the bottom of the pit. Any remaining samples should be grab samples from areas with greater potential for contamination such as stained soils, adjacent to a corrosion hole, opposite a manway, or opposite a tank opening. All samples shall be taken no less than six inches below the exposed surface being sampled. Samples for compositing should be taken from random locations on the floor and walls of the tank pit.

B. Soil Pile

The number of samples required for an excavated pile will be related to the quantity of soil stockpiled. The table below can be used as a guide in determining the appropriate number of samples. If, in the opinion of the Regional Spill Investigator, additional samples are warranted, they should be requested.

Recommended Number of Soil Pile Samples

CONTAMINANT	SEMI-VOLATILES		VOLATILES	
SAMPLE TYPE	Grab	Composite	Grab	Composite
SOIL QUANTITY (yd^3)				
0-50	1	1	1	1
50-100	1	2	2	1
100-200	1	3	3	1
200-300	1	4	4	1
300-400	2	4	4	2
400-500	2	5	5	2
500-800	2	6	6	2
800-1000	2	7	7	2
>1000 - Proposed Sampling plan shall be submitted for approval on site specific basis				

Best engineering judgement is needed to determine the most appropriate sampling locations. The objective of the sampling is to characterize the extent of contamination of the pile. Consideration should be given to how the soil was stockpiled. Is the most contaminated soil toward the top? Are areas visibly contaminated? How high and how long is the pile? It may be preferable to divide the pile into manageable segments. Samples should be taken from within the pile. Surface soil should not be used as sampling material. Samples shall be collected in accordance with proper sample collection techniques. All samples must be collected in glass containers with air-tight sealable tops.

Using the above sampling table, considering the factors mentioned above, and applying best engineering judgement, an acceptable evaluation of the contaminant concentrations in the soil can be made.

C. Processed Soil

Processed soil is soil which undergoes physical handling during a treatment process. Examples of treatment processes are rotary kiln dryers (low temperature thermal treatment units) or soil washing units. Soil under these conditions are more homogeneously mixed; therefore, individual

samples are more likely to characterize the entire lot. Since these processes are continuous in nature, the samples should be collected over a period of time similar to that described below:

1) A sample may be collected every twenty minutes for a period of two hours. The samples are then mixed to form one composite sample. This frequency will continue until all soils are processed. The twenty minute composite interval is a guideline which can be adjusted based on the amount of soil processed and the processing period. Testing protocols are specifically defined in the treatment unit's operating permit.

2) At least one grab sample should be taken for every two sets of composites.

3) A minimum of two samples (1 grab, 1 composite) should be taken for any treated soil batch.

D. Aboveground (Ex-Situ) Treatment

Typical aboveground treatment technologies are bioremediation and soil vapor extraction. Soil remediated under these conditions will be mixed (tilled) and spread evenly over a wide area. The soil will be spread to a uniform thickness, usually no higher than two feet, although depths may be higher for soil vapor extraction treatment. The shallow depth makes sample collection an easy process. The number of required samples can be based on the quantity of soil being treated (see above table). Depth of the sample can be anywhere from six inches to the bottom of the treatment layer. Care must be taken not to penetrate the liner material. The sampling locations and depths must be randomized.

E. Non-Excavated (In-Situ) Treatment

Treatment of non-excavated soil is similar to aboveground treatment in that the contamination is spread over a wide area. It differs, however, in that the depths of the contaminated zone are varied and usually extend much deeper. Once the volume of contaminated material is determined, the above table can be used to determine the number of required samples. The sampling locations and depths must be randomized.

SECTION VII

MANAGEMENT OF EXCAVATED (EX-SITU) CONTAMINATED SOILS

Once non-hazardous petroleum-contaminated soil is moved from its original state, it is by definition a solid industrial waste and must be managed in accordance with Part 360 and transported in accordance with Part 364 regulations. There are several alternatives available to properly handle this contaminated soil.

A. Soils Which Do Not Meet Guidance Values

Soils which do not meet the guidance values can be processed under a specific DEC Beneficial Use Determination (BUD), such as at an approved hot-mix asphalt batching plant or at a cold-mix asphalt plant, disposed of at a DEC authorized landfill, or treated on site.

1) Reuse Under Specific Beneficial Use Determinations

The DEC Division of Solid Waste has made Beneficial Use Determinations (BUD's) under 6 NYCRR Part 360, identifying recycling or re-use activities which are not subject to Part 360 regulations. The use of petroleum-contaminated soil in a manufacturing process to produce a marketable product may be eligible for BUD issuance. Each manufacturing process operator must maintain compliance with the specific requirements of the issued BUD. Hot-mix and cold-mix asphalt manufacturing are two examples of processes which have received BUD's, and other processes may be approved by the Division of Solid Waste in the future.

a. Reuse at an Approved Asphalt Batching Plant

Several asphalt plants have been authorized to accept non-hazardous contaminated soil, for use as aggregate, provided the plant is in compliance with any other DEC regulations which may apply to the facility. For example, the use of petroleum-contaminated soil may require a modification of the facility's air emission permit.

b. Production of Cold-Mix Asphalt

A Beneficial Use Determination (BUD) has been issued to the process which combines liquid asphalt emulsion with the contaminated soil to produce a cold-mix asphalt. Approval to process petroleum-contaminated soil to produce a cold-mix asphalt is issued by the Spill Response Program. The applicant must satisfy specific testing requirements prior to receiving approval to process. Each BUD identifies allowable uses for

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the manufactured cold-mix asphalt and any qualifying conditions and post-treatment testing protocols.

These asphalt products, if being stockpiled or transported for disposal rather than reuse, no longer meet the requirements for these BUDs and are subject to all applicable regulatory provisions of 6NYCRR Parts 360 and 364.

PCS containing asphalt products, which are left in a stockpile and are not being beneficially used, remain a solid waste until such use is accomplished. These materials shall be removed from the stockpile for beneficial use in accordance with their beneficial use approval requirements, or disposal if necessary, as rapidly as possible.

2) Disposal at an Authorized Landfill

A DEC-authorized landfill is one which either has an operating permit or is under a consent order. While this is not the preferred method of dealing with contaminated soil, it may be the most economical or, due to site constraints, the only alternative. Additional restrictions may be required by the landfill operators prior to accepting materials at their facilities.

3) Treatment On Site

Non-hazardous petroleum-contaminated soil may be treated on the site of generation without a DEC Part 360 Permit. Depending on the treatment technologies being utilized, other DEC permits may be required for air emissions and water discharges.The soil treatment processes may involve excavation of soils, securely stockpiling the soils until treatment is initiated, aboveground treatment of the soils, and/or placement of soils back into an excavation for treatment. The Regional Spill Investigator should require a remedial plan, signed by the responsible party, prior to the placement of contaminated soils into an excavation for treatment.

If the soil is to be placed back in an excavation for treatment, and if the excavation is determined to be uncontaminated, the excavation must be prepared and lined in such a manner to protect it against contamination from the soil which will be treated. However, if the excavation is contaminated it shall be the decision of the Regional Spill Investigator as to whether a liner is necessary.

All excavated soil shall be placed on an impervious material (eg: polyethylene sheeting) with the sides banked so as to control and contain run-off. During periods when no treatment is on-going, the surface of the pile(s) must also be covered with an impervious material.

The site may have to be evaluated for its impact to the ambient air. Cross media contamination shall be minimized and aesthetic or nuisance issues shall be addressed. If space on the site is limited, or if the protection of the public health is in jeopardy, then on-site treatment will not be allowed and soil must be removed to a permitted location for treatment or disposal.

There are several methods of on-site soil treatment. Typical among these are soil venting, bioremediation, soil washing and low temperature thermal treatment. All treatment should be evaluated based on its ability to achieve the desired result in the most economical and efficient manner.

B. Soils Which Meet Guidance Values

The reuse options available for de-contaminated soil depends upon which particular Guidance Values are satisfied by the soil. Table 3 identifies the reuse options and the Guidance Values which must be met to use each reuse option.

As described earlier, the DEC Division of Solid Waste (DSW) has issued a Generic Beneficial Use Determination (BUD) which exempts petroleum-contaminated soils, which have been successfully incorporated into an asphalt product by a Bureau of Spill Prevention and Response (BSPR) approved producer and which will be utilized in a bonified paving project.

In addition, the DSW has determined that soils which satisfy the appropriate Guidance Values and which will be reused as highway sub-base material, fill for the original excavation, fill elsewhere on the site of generation, or fill off-site at pre-approved locations, are being beneficially used and are exempt from the provisions of 6NYCRR Part 360. These soils are also exempt from 6NYCRR Part 364 since they no longer meet the Part 364 definition of "solid waste".

The reuse options are not listed as a hierarchy; however, off-site reuse is generally less desirable. The Regional Spill Supervisor or his/her designee will review all appropriate soil sampling data to determine if the criteria has been met for the requested reuse option. Upon request from the responsible party, the evaluation of the submitted data shall be documented with a statement from the Regional Spill Supervisor that the soil does or does not meet the criteria for the desired reuse option. The DEC and its designee assume no liability when evaluating data for a responsible party with regard to the reuse or disposal of the soil in question. The generator of the soil has the ultimate responsibility for the accurate and precise characterization, and the safe and proper reuse or disposal of the material. In addition, soil which is being reused off site shall not be allowed to be transported prior to the receipt of the laboratory reports confirming that the

soil has satisfied the appropriate Guidance Values of this guidance document. **The responsible party shall maintain all field data, laboratory results, and final disposition records for three years.**

The possible reuse options are presented below. Additional uses of decontaminated petroleum-contaminated soil may be identified in a Part 360 Permit or BUD for a specific facility.

1) Reuse as a Construction Material

Soil which satisfies the Guidance Values for groundwater protection, human health protection and nuisance characteristics can be reused as construction material. Construction material can include hot asphalt, cold-mix asphalt, concrete, roadway sub-base, etc. Final destination of the soil shall be identified prior to removal from the site.

2) Returned to the Original Excavation

Soil which satisfies the Guidance Values for groundwater protection, human health protection, and nuisance characteristics, can be placed back in the hole from which it was excavated.

3) Placed Elsewhere on Site

Soil which satisfies the Guidance Values for groundwater protection, human health protection, and nuisance characteristics, can be placed anywhere within the confines of the contiguously-owned property from which it originated.

4) Reuse Off-Site at a Pre-Approved Location

The Regional Spill Engineer and Regional Solid Waste Engineer may approve a request for an off-site reuse location for remediated soil which satisfies the Guidance Values for groundwater protection, human health protection, and nuisance characteristics. Sites which may be considered for this option are industrial sites, authorized construction and demolition debris landfills, petroleum storage facilities, authorized landfills, or other locations where public access is limited. Written approval must be received from the property owner(s) prior to exercising this reuse option. The responsible party may submit such a request to the Regional Spill Engineer who will coordinate with the Regional Solid Waste Engineer to approve or disapprove the request.

C. Rock Debris

Rock debris, for purposes of this policy, is defined as those rocks which are four (4) inches or greater in diameter. They shall be cleaned of any packed-on petroleum-contaminated soil. These rocks are not treated as a solid waste and can be disposed of as construction and demolition debris.

If rock debris cannot be separated from the petroleum-contaminated soil, it shall be handled as a solid waste in accordance with NYCRR Part 360 and/or Part 364 requirements.

SECTION VIII

MANAGEMENT OF NON-EXCAVATED (IN-SITU) CONTAMINATED SOIL

In-situ contaminated soil may pose a threat to the groundwater, human health and the environment. These sites must be evaluated to determine the extent of contamination and the appropriate investigative or remedial actions necessary. The soil may be treated in-situ and evaluated by the same guidelines as excavated soil, while taking into account site-specific considerations and conditions.

Additional guidance will be developed to establish procedures for evaluating the potential impacts of non-excavated (in-situ) contaminated soils. Issues which should be considered when evaluating in-situ contaminated soil are environmental sensitivity of the site, level of residual contamination, soil characteristics, depth to groundwater, present and potential land use. A proper sampling plan will be necessary to determine the number, quantity and depth of samples to properly characterize the site.

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SECTION IX

REFERENCES

NYS Department of Environmental Conservation, Cleanup Standards Task Force, DRAFT Cleanup Policy and Guidelines, October 1991.

NYS Department of Environmental Conservation, Division of Hazardous Substances Regulation, 6NYCRR Part 364, Waste Transporter Permits, January 12, 1990.

NYS Department of Environmental Conservation, Division of Hazardous Substances Regulation, 6NYCRR Part 371 Identification and Listing of Hazardous Wastes, December 25, 1988.

NYS Department of Environmental Conservation, Division of Solid Waste, 6NYCRR Part 360 Solid Waste Management Facilities, May 28, 1991.

NYS Department of Environmental Conservation, Division of Water, Sampling Guidelines and Protocols, March 1991.

NYS Department of Environmental Conservation, Division of Water, Spill Response Guidance Manual, January 1990.

NYS Department of Environmental Conservation, Division of Water, Technical and Operation Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values, November 15, 1991.

US Environmental Protection Agency, 40 CFR Part 261 Identification and Listing of Hazardous Wastes, June 29, 1990.

US Environmental Protection Agency, Health Effects Assessment Summary Table, April 4, 1991.

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APPENDIX A

HAZARDOUS WASTE DETERMINATION AND REGULATORY LEVELS

Based on knowledge of the waste, soils contaminated with virgin petroleum products do not exhibit the above properties, and do not have to be tested for the corrosivity characteristic.

C. Reactivity:

A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:

1) It is normally unstable and readily undergoes violent change without detonating.

2) It reacts violently with water.

3) It forms potentially explosive mixtures with water.

4) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in quantity sufficient to present a danger to human health or the environment.

6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

8) It is a forbidden explosive, a Class A explosive or a Class B explosive.

Based on knowledge of the waste, soils contaminated with virgin petroleum products do not exhibit the above properties, and do not have to be tested for the reactivity characteristic.

D. Toxicity:

If the Toxicity Characteristic Leaching Procedure (TCLP) extract from a representative sample of the waste contain any of the contaminants identified in the attached listing of Hazardous Waste Regulatory levels at concentrations equal to or greater than the values listed, it is a hazardous waste.

With respect to petroleum-contaminated soil, the primary compound of concern is benzene. If the benzene concentration in a TCLP extract is equal

to or greater than 500 ppb, the contaminated material is a characteristic hazardous waste. For gasoline contaminated soil, toxicity for lead must also be evaluated.

The regulatory level of benzene in the soil is determined by analyzing the soil using the TCLP extraction method and determining the concentration in the extract.

A second method of determination is to identify the total concentration of the contaminant in the soil. If the total concentration is less than the regulatory level, then the leachate level could not possibly exceed the standard. This approach would save laboratory costs because the TCLP would not have to be run. If the total concentration in the soil exceeds the regulatory level required in the extract, no conclusion can be drawn from these results and a complete TCLP must be run.

Additional Information on Toxicity Characteristics

On March 29, 1990, the U.S. Environmental Protection Agency established the Toxicity Characteristic (TC) Rule. The TC Rule expands the list of contaminants by which a waste can be classified as hazardous due to toxicity, and it replaces the Extraction Procedure Toxicity (EP Tox) with the Toxicity Characteristic Leaching Procedure (TCLP). The TC Rule's specified contaminant list includes the same 14 metals and pesticides as the original toxicity list, plus 25 additional organic chemicals. Each of the 39 listed contaminants has the potential for rendering a particular material a characteristic hazardous waste due to toxicity. Since benzene is one of the 25 organic compounds added to the toxicity list, and since benzene is commonly found in petroleum products, it is possible that petroleum-contaminated soil may classify as a hazardous waste. Limited relief from these hazardous waste regulations is currently available because the TC Rule has specifically deferred petroleum-contaminated soil, groundwater, and debris generated from underground storage tank (UST) releases, until the impact of the regulation is further evaluated.

UST sites are essentially those sites which have underground storage tanks containing transportation fuels, such as gasoline, jet fuel, aviation gas, and diesel fuel. (See 40 CFR Section 280.12 for a more complete definition). The TC Rule does not apply to petroleum-contaminated media produced by a leak from an UST, including associated underground piping. However, DEC regulations state that the materials contaminated by transportation fuels can be hazardous wastes if they exhibit other hazardous waste characteristics, such as toxicity due to lead.

The TC Rule, as published on March 29, 1990, became effective on September 25, 1990, for large-quantity generators, and March 29, 1991, for small quantity generators. Large quantity generators are defined as those parties who generate 2,200 pounds or more of hazardous waste in any month. Small quantity generators are those parties who generate between 220 and 2,200 pounds of hazardous waste in any month. Until the DEC adopts the TC Rule, waste generators must comply with both the EPA and DEC waste regulations. Refer to the specific regulations of interest for more information.

HAZARDOUS WASTE REGULATORY LEVELS
FOR TOXICITY CHARACTERISTIC

CONSTITUENT	REGULATORY LEVEL (mg/L)
Arsenic	5.0
Barium	100.0
Benzene	0.5*
Cadmium	1.0
Carbon tetrachloride	0.5*
Chlordane	0.03*
Chlorobenzene	100.0*
Chloroform	6.0*
Chromium	5.0
o-Cresol	200.0*
m-Cresol	200.0*
Cresol (TOTAL)	200.0*
2,4-D	10.0
1,4-Dichlorobenzene	7.5*
1,2-Dichloroethane	0.5*
1,1-Dichloroethylene	0.7*
2,4-Dinitrotoluene	0.13*
Endrin	0.02
Heptachlor (and its epoxide)	0.008*
Hexachlorobenzene	0.13*
Hexachlor 1,3butadiene	0.5*
Hexachloroethane	3.0*
Lead	5.0
Lindane	0.4
Mercury	0.2

HAZARDOUS WASTE REGULATORY LEVELS
FOR TOXICITY CHARACTERISTIC (Cont'd)

CONSTITUENT	REGULATORY LEVEL (mg/L)
Methoxychlor	10.0
Methyl ethyl ketone	200.0*
Nitrobenzene	2.0*
Pentachlorophenol	100.0*
Pyridine	5.0*
Selenium	1.0
Silver	5.0
Tetrachloroethylene	0.7*
Toxaphene	0.5
Trichloroethylene	0.5*
2,4,5-Trichlorophenol	400.0*
2,4,6-Trichlorophenol	2.0*
2,4,5-TP (Silvex)	1.0
Vinyl chloride	0.2*

* New Toxicity Characteristics Effective 9/25/90

APPENDIX B

GUIDANCE VALUES AND REUSE OPTIONS

TABLE 1
Guidance Values For Gasoline Contaminated Soil*

Compound	EPA Method	Detection Limit[1] (ppb)		TCLP Extraction Guidance Value[2] C_w (ppb)	TCLP Alternative Guidance Value C_a (ppb)	Human Health Guidance Value C_h (ppb)	Sediment Guidance Value C_s (ppb)
		Liquid	Solid				
Benzene	8021 (8020)	1	2	0.7	14	2.4×10^4	
Ethylbenzene	8021 (8020)	1	2	5	100	8.0×10^6	
Toluene	8021 (8020)	1	2	5	100	2.0×10^7	
o-Xylene	8021 (8020)	2	2	5	100	2.0×10^8	
m-Xylene	8021 (8020)	2	2	5	100	2.0×10^8	
p-Xylene	8021 (8020)	2	2	5	100	***	
Mixed Xylenes	8021 (8020)	2	2	5	100	2.0×10^8	
Isopropylbenzene	8021	1	1	5	100	***	
n-Propylbenzene	8021	1	1	5	100	***	
p-Isopropyltoluene	8021	1	1	5	100	***	
1,2,4-Trimethylbenzene	8021	1	1	5	100	***	
1,3,5-Trimethylbenzene	8021	1	1	5	100	***	
n-Butylbenzene	8021	1	1	5	100	***	
sec-Butylbenzene	8021	1	1	5	100	***	
Naphthalene	8021	1	1	10	200	3.0×10^5	
Methyl t-butyl ether (MTBE)[3]	8021 (8020)	1	1	50	1,000	***	

*Nuisance Characteristics Guidance:
No petroleum-type odors.
No individual contaminant in soil at greater than 10,000 ppb.

(1) The listed Detection Limits are Practical Quantitation Limits (PQLs). The Method Detection Limit (MDL) is the best possible detection. Laboratories report the Practical Quantitation Limit (PQL), which is generally 4 times the MDL. Efforts should be made to obtain the best detection possible when selecting a laboratory. When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard.

(2) The TCLP Extraction Guidance Values are equal to the NYSDEC groundwater quality standards or Guidance Values, or the NYSDOH drinking water quality standards or Guidance Values, whichever is more stringent.

(3) Methyl t-butyl ether (MTBE) is not a target compound of Methods 8021 and 8020, but MTBE may be determined using these methods with appropriate quality assurance and quality control measures.

*** No Guidance Value identified in EPA HEAST Report.

TABLE 2
Guidance Values for Fuel Oil Contaminated Soil*

Compound	EPA Method	Detection Limit[1] (ppb)		TCLP Extraction Guidance Value[2] C_w (ppb)	TCLP Alternative Guidance Value C_a (ppb)	Human Health Guidance Value C_h (ppb)	Sediment Guidance Value C_s (ppb)	
		Liquid	Solid				Fresh	Marine
Benzene	8021 (8020)	1	2	0.7	14	2.4×10^4		
Ethylbenzene	8021 (8020)	1	2	5	100	8.0×10^6		
Toluene	8021 (8020)	1	2	5	100	2.0×10^7		
o-Xylene	8021 (8020)	2	2	5	100	2.0×10^8		
m-Xylene	8021 (8020)	2	2	5	100	2.0×10^8		
p-Xylene	8021 (8020)	2	2	5	100	***		
Mixed Xylenes	8021 (8020)	2	2	5	100	2.0×10^8		
Isopropylbenzene	8021	1	1	5	100	***		
n-Propylbenzene	8021	1	1	5	100	***		
p-Isopropyltoluene	8021	1	1	5	100	***		
1,2,4-Trimethylbenzene	8021	1	1	5	100	***		
1,3,5-Trimethylbenzene	8021	1	1	5	100	***		
n-Butylbenzene	8021	1	1	5	100	***		
sec-Butylbenzene	8021	1	1	5	100	***		
t-Butyl benzene	8021	1	1	5	100	***		
Naphthalene[3]	8021 (8270)	1 (6)	1 (330)	10	200	3.0×10^5		
Anthracene	8270	8	330	50	1,000	2.0×10^7		
Fluorene	8270	8	330	50	1,000	3.0×10^6		
Phenanthrene	8270	22	330	50	1,000	***		
Pyrene	8270	8	330	50	1,000	2.0×10^6		
Acenaphthene	8270	8	330	20	400	5.0×10^6		
Benzo(a)anthracene	8270	31	330	.002	.04[4]	220	33	18
Fluoranthene	8270	9	330	50	1,000	3.0×10^6		

(CONTINUED ON THE NEXT PAGE)

TABLE 2 (Cont'd)
Guidance Values for Fuel Oil Contaminated Soil*

Compound	EPA Method	Detection Limit (ppb)		TCLP Extraction Guidance Value[3] C_w (ppb)	TCLP Alternative Guidance Value C_a (ppb)	Human Health Guidance Value C_h (ppb)	Sediment Guidance Value C_s (ppb)	
		Liquid	Solid				Fresh	Marine
Benzo(b)fluoranthene	8270	19	330	.002	.04[4]	220	33	18
Benzo(k)fluoranthene	8270	10	330	.002	.04[4]	220	33	18
Chrysene	8270	10	330	.002	.04[4]	***	33	18
Benzo(a)pyrene	8270	10	330	.002	.04[4]	61	33	18
Benzo(g,h,i)perylene	8270	10	330	.002	.04[4]	***		
Indeno(1,2,3-cd)pyrene	8270	10	330	.002	.04[4]	***		
Dibenz(a,h)anthracene	8270	10	330	50	1,000	14		

* Nuisance Characteristics Guidance:
No Petroleum-type odors.
No individual contaminant in soil at greater than 10,000 ppb.

[1] The listed Detection Limits are Practical Quantitation Limits (PQL's). The Method Detection Limit (MDL) is the best possible detection. Laboratories report the Practical Quantitation Limit (PQL), which is generally 4 times the MDL. Efforts should be made to obtain the best detection possible when selecting a laboratory. When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard.

[2] The TCLP Extraction Guidance Values are equal to the NYSDEC groundwater quality standards or Guidance Values, or the NYSDOH drinking water quality standards or Guidance Values, whichever is more stringent.

[3] For naphthalene analysis in a liquid matrix, both Method 8021 and Method 8270 can provide satisfactory levels for comparison to the C_w of 10 ppb.

For naphthalene analysis in a solid matrix, Method 8021 is preferred over Method 8270 for comparison to the C_a of 200 ppb. If the C_a Guidance Value is not being used in the soil evaluation, then both Method 8021 and 8270 can provide satisfactory detection levels for comparison to the C_h of 3.0×10^6, and nuisance characteristic of 10,000 ppb.

[4] Due to the high detection limit for a solid matrix, the TCLP Extraction Method must be used to demonstrate groundwater quality protection for these compounds.

*** No Guidance Value identified in EPA HEAST Report.

TABLE 3
Soil Reuse Options

Reuse Option	Minimum Criteria To Be Met[1]		
	Protection of Groundwater	Protection of Human Health	Protection Against Nuisance Characteristics
Asphalt[2] or Concrete Manufacturing			
Cold-Mix Asphalt[2]			
Construction Material	X	X	X
Fill for Original Excavation	X	X	X
Fill Elsewhere On-Site	X	X	X
Off-Site at Pre-Approved Location	X	X	X

[1] In addition, the criteria for protection of fish and wildlife must be met when sediments are the waste materials being handled, and when these soils or sediments are being disposed in surface waters, marine waters, or wetland areas.

[2] The soils must satisfy the criteria established under the particular BUD issuance.

APPENDIX C

FIELD CHANGE FORMS

FIELD CHANGE NO. 1
PAGE 1 OF 2

FIELD CHANGE FORM

PROJECT: NIAGARA FALLS SITE ASSESSMENT ADDENDUM
PROJECT NO.: 1443-K10
APPLICABLE DOCUMENT: SITE ASSESSMENT ADDENDUM WORK PLAN, AUGUST 1993

REQUESTED CHANGE:
(A) ADJUST LOCATION AND NUMBER OF SOIL BORINGS AND (B) TOTAL DEPTH OF BORINGS (SEE ATTACHED)

☐ MAJOR CHANGE ☒ MINOR CHANGE

REASON FOR CHANGE:
(A) REQUESTED BY S. CALANDRA OF NYSDEC TO ROSS WILLIAMS OF POETH ON 9-14-93 IN PRESENCE OF MAJ. GARRISON, NYANG
(B) ADJUSTMENT FROM 8 FT BGS TO 6 FT BGS TO MAINTAIN TOTAL FOOTAGE AT 24 FT. CALANDRA IS FOCUSING ON 0 TO 2 FT BGS ZONE.

RECOMMENDED DISPOSITION:
APPROVAL.

IMPACT ON PRESENT AND COMPLETED WORK:
ASSURES NYSDEC ACCEPTANCE OF WORK AND SATISFACTION OF REQUIREMENTS IN NYSDEC LETTERS OF 8-9 AND 8-12-93

FINAL DISPOSITION:

REQUESTED BY: CHARLENE MORROW, PROGRAM MANAGER — NAME AND TITLE — SIGNATURE AND DATE 9-1

APPROVALS:

ACCEPT	REJECT			
☑	☐	SITE MANAGER:		DATE: 09-14-93
☑	☐	PROGRAM MANAGER:		DATE: 9-14-93
☑	☐	CLIENT PROJECT MANAGER:		DATE: 9/15/93

FIELD CHANGE NO. 2
PAGE 2 OF 2

FIELD CHANGE FORM

PROJECT: NIAGARA FALLS SITE ASSESSMENT ADDENDUM

PROJECT NO.: 1443-K10

APPLICABLE DOCUMENT: SITE ASSESSMENT ADDENDUM WORK PLAN, AUGUST 1993

REQUESTED CHANGE:

ADJUST NUMBER OF SAMPLES PER BORING SELECTED FOR LABORATORY ANALYSIS FROM "A MAXIMUM OF 3" TO "A MINIMUM OF 2"

☐ MAJOR CHANGE ☒ MINOR CHANGE

REASON FOR CHANGE:

MAINTAINS TOTAL ANALYTICAL COST WITHIN PLANNED BUDGET AND ALLOWS NYSDEC REQUIREMENTS TO BE MET

RECOMMENDED DISPOSITION:

APPROVAL.

IMPACT ON PRESENT AND COMPLETED WORK:

MINIMAL.

FINAL DISPOSITION:

REQUESTED BY: CHARLENE MARROW, PROGRAM MANAGER — Charlene Marrow 9-14-93
NAME AND TITLE — SIGNATURE AND DATE

APPROVALS:

ACCEPT	REJECT			
☑	☐	SITE MANAGER:	[signature]	DATE: 09-14-93
☑	☐	PROGRAM MANAGER:	Charlene Marrow	DATE: 9-14-93
☑	☐	CLIENT PROJECT MANAGER:	[signature]	DATE: 9/15/93

APPENDIX D

CHAIN-OF-CUSTODY FORMS

PEER Consultants, P.C.

CHAIN-OF-CUSTODY RECORD

COC # PEER-0029

PROJECT NO. 1443-K10-92

PROJECT NAME NIAGARA FALLS ANGB

SAMPLERS (SIGNATURE)

ITEM NO.	DATE (MM/DD/YY)	TIME (MILITARY)	COMP	GRAB	SAMPLE NUMBER	MATRIX (1)	NUMBER, TYPE, AND VOLUME OF CONTAINERS	ANALYSES	PRESERVATIVES
1	9/15/93	0950		/	10-01-SS-SB-16-00	S	2-40 ML VIALS	TCLP-8021	4°C
2	9/15/93	0950		/	10-01-SS-SB-16-00	S	1-250 ML JAR	TCLP-8270	4°C
3	9/15/93			/	DUPLICATE	S	2-40 ML VIALS	TCLP-8021	4°C
~~4~~	~~9/15/93~~			~~/~~	~~10-01-SS-SB-16-00~~ DUPLICATE	~~S~~	~~1-250 ML JAR~~	~~TCLP-8270~~	~~4°C~~
5	9/15/93	1005		/	10-01-SS-SB-16-02	S	2-40 ML VIALS	TCLP-8021	4°C
6	9/15/93	1005		/	10-01-SS-SB-16-02	S	1-250 ML JAR	TCLP-8270	4°C
7	9/15/93	1230		/	10-01-SS-SP-01-02	S	2-40 ML VIALS	TCLP-8020	4°C
					~~10-01-SS-SB-16-02~~	~~S~~	~~1-250 ML JAR~~		
8	9/15/93	1010		/	10-01-SS-SB-16-04	S	2-40 ML VIALS	TCLP-8021	4°C
9	9/15/93	1010		/	10-01-SS-SB-16-04	S	1-250 ML JAR	TCLP-8270	4°C
10	9/15/93	1045		/	10-01-SS-SB-17-00	S	2-40 ML VIALS	TCLP-8021	4°C
11	9/15/93	1045		/	10-01-SS-SB-17-00	S	1-250 ML JAR	TCLP-8270	4°C
12	9/15/93	1105		/	10-01-SS-SB-18-00	S	2-40 ML VIALS	TCLP-8021	4°C

Relinquished By: (Signature)	Date/Time	Received By: (Signature)
	9/15 1700	
Relinquished By: (Signature)	Date/Time	Received By: (Signature)
Relinquished By: (Signature)	Date/Time	Received By: (Signature)

Analytical Laboratory: ECOTEST LABORATORY, 377 SHEFFIELD AVE, N BABYLON, NY 11703

Contact: TOM POWELL

Phone No: (516) 422-5777

Send results to:

PEER CONSULTANTS, P.C.
575 Oak Ridge Turnpike
Oak Ridge, TN 37830
Attn: ROSS WILLIAMS
(615) 483-3191

Distribution:
White Copy Accompanies Shipment
Yellow Copy to Project Manager
Pink Copy for Field Files

(1) S - Soil SD - Sediment SL - Sludge SW - Solid Waste
GW - Ground Water SW - Surface Water LW - Liquid Waste

PEER Consultants, P.C.

CHAIN-OF-CUSTODY RECORD

COC # PEER-0030

PROJECT NO. 1443-K10-92

PROJECT NAME NIAGARA FALLS ANGB

SAMPLERS (SIGNATURE) [signature]

ITEM NO.	DATE (MM/DD/YY)	TIME (MILITARY)	COMP	GRAB	SAMPLE NUMBER	MATRIX (1)	NUMBER, TYPE, AND VOLUME OF CONTAINERS	ANALYSES	PRESERVATIVES
13	9/15/93	1105		/	10-01-SS-SB-18-00	S	1-250 ML JAR	TCLP-8270	4°C
14	9/15/93	1115		/	10-01-SS-SB-18-02	S	2-40 ML VIALS	TCLP-8021	4°C
15	9/15/93	1115		/	10-01-SS-SB-18-02	S	1-250 ML JAR	TCLP-8270	4°C
16	9/15/93	1125		/	10-01-SS-SB-18-04	S	2-40 ML VIALS	TCLP-8021	4°C
17	9/15/93	1125		/	10-01-SS-SB-18-04	S	1-250 ML JAR	TCLP-8270	4°C
18	9/15/93	1145		/	10-01-SS-SB-19-00	S	2-40 ML VIALS	TCLP-8021	4°C
19	9/15/93	1145		/	10-01-SS-SB-19-00	S	1-250 ML JAR	TCLP-8270	4°C
20	9/15/93	1155		/	10-01-SS-SB-19-02	S	2-40 ML VIALS	TCLP-8021	4°C
21	9/15/93	1155		/	10-01-SS-SB-19-02	S	1-250 ML JAR	TCLP-8270	4°C
22	9/15/93	1205		/	10-01-SS-SB-19-04	S	2-40 ML VIALS	TCLP-8021	4°C
23	9/15/93	1205		/	10-01-SS-SB-19-04	S	1-250 ML JAR	TCLP-8270	4°C

Relinquished By: (Signature)	Date/Time	Received By: (Signature)
[signature]	9/15 1700	
Relinquished By: (Signature)	Date/Time	Received By: (Signature)
Relinquished By: (Signature)	Date/Time	Received By: (Signature)

Analytical Laboratory: TOM POWELL
ECOTEST LABORATORY
377 SHEFFIELD AVE
N. BABYLON, NY 11703

Contact:

Phone No: (516) 422-5777

Send results to:
PEER CONSULTANTS, P.C.
575 Oak Ridge Turnpike
Oak Ridge, TN 37830
Attn: ROSS WILLIAMS
(615) 483-3191

Distribution:
White Copy Accompanies Shipment
Yellow Copy to Project Manager
Pink Copy for Field Files

24	9/15/93	1500	SD - Sediment	X	RINSATE	SL - Sludge	2	2-40 ML VIALS	TCLP 8021	4°C
	S - Soil					SW - Solid Waste				
	GW - Ground Water		SW - Surface Water			LW - Liquid Waste				
25	9/9/93	1310			TRIP BLANK (TB3)			2-40 ML VIALS	TCLP 8021	4°C

APPENDIX E

SUBSURFACE LOGS

Date: 9-15-93 Started: 0945 Finished: 1015 Sheet 1 of 1	**PEER Consultants, P.C.** **Subsurface Log**	Hole No. SB16 TOC G.W. Elevation

Project: Niagara Falls ANGB
1443-K-10

Location: Niagara Falls, NY
Building 852

DEPTH FT.	SAMPLES	SAMPLE NO.	Blows on Sampler 0 to 6	6 to 12	12 to 18	N	SAMPLE RECOVERY	Soil or Rock Classification	Notes and Well Construction
								Medium grained, dark bwom SAND and ROCK FRAGMENTS, some Silt and Clay (dry, firm)	4" ASPHALT Not enough sample remained for a headspace (OVA) reading. 30 ppmv OVA reading on spoon.
2		00	N/A	15	11	17	33%		
								Dark brown CLAY, some Silt, trace sand (moist, stiff)	HEADSPACE (OVA) READING = 450 ppmv. 40 ppmv OVA reading on spoon.
4		02	3	8	9	10	60%		
								Dark brown and gray CLAY, some Silt, trace sand (moist to wet, stiff)	HEADSPACE (OVA) READING = 160 ppmv. 18 ppmv OVA reading on spoon.
6		04	6	7	9	11	90%		
									Boring terminated at 6'

N = No. blows to drive ___" spoon ___" with ___lb. pin wt. falling ___" per blow.
CLASSIFICATION:
C = No. blows to drive ___" spoon ___" with ___lb. weight falling ___" per blow.
METHOD OF INVESTIGATION:

Date: 9-15-93 Started: 1030 Finished: 1040 Sheet 1 of 1	**PEER Consultants, P.C.** **Subsurface Log**	Hole No. SB17 TOC G.W. Elevation

Project: Niagara Falls ANGB
1443-K-10

Location: Niagara Falls, NY
Building 852

DEPTH FT.	SAMPLES	SAMPLE NO.	Blows on Sampler 0 to 6	6 to 12	12 to 18	N	SAMPLE RECOVERY	Soil or Rock Classification	Notes and Well Construction
								Dark brown, coarse SAND and ROCK FRAGMENTS, some Silt and Clay (dry, compact). Grades to dark brown and gray CLAY, some rock fragments and Sand (wet, hard)	6" ASPHALT Not enough sample remained for a headspace (OVA) reading. No OVA readings on spoon.
2		00	N/A	32	21	27	30%		
								Boring terminated at 2'	

N = No. blows to drive ___" spoon ___" with ___lb. pin wt. falling ___" per blow.
CLASSIFICATION:
C = No. blows to drive ___" spoon ___" with ___lb. weight falling ___" per blow.
METHOD OF INVESTIGATION:

Date: 9-15-93 Started: 1050 Finished: 1120 Sheet 1 of 1	**PEER Consultants, P.C.** **Subsurface Log**	Hole No. SB18 TOC G.W. Elevation

Project: Niagara Falls ANGB 1443-K-10

Location: Niagara Falls, NY Building 852

DEPTH FT.	SAMPLES	SAMPLE NO.	Blows on Sampler 0 to 6	6 to 12	12 to 18	N	SAMPLE RECOVERY	Soil or Rock Classification	Notes and Well Construction
								Dark brown and gray, coarse SAND and ROCK FRAGMENTS, some Silt and Clay, grades to increasing Silt and Clay (moist, compact)	3" ASPHALT Not enough sample remained for a headspace (OVA) reading. Distinct hydrocarbon odor, > 1000 ppmv OVA reading on spoon.
2		00	N/A	21	23	26	30%		
								Dark brown to gray CLAY, trace sand (saturated, hard)	HEADSPACE (OVA) READING = 520 ppmv. Distinct hydrocarbon odor. Water in hole. > 1000 ppmv OVA readings on spoon.
4		02	5	11	18	21	30%		
								Dark brown to gray CLAY, trace sand. (Saturated, hard)	HEADSPACE (OVA) READING = 70 ppmv. Slight hydrocarbon odor. 850 ppmv OVA reading on spoon.
6		04	12	13	23	24	90%		
									Boring terminated at 6'

N = No. blows to drive ___" spoon ___" with ___lb. pin wt. falling ___" per blow.

CLASSIFICATION:

C = No. blows to drive ___" spoon ___" with ___lb. weight falling ___" per blow.

METHOD OF INVESTIGATION:

Date: 9-15-93 Started: 1130 Finished: 1200 Sheet 1 of 1	**PEER Consultants, P.C.** **Subsurface Log**	Hole No. SB19 TOC G.W. Elevation

Project: Niagara Falls ANGB
1443-K-10

Location: Niagara Falls, NY
Building 852

DEPTH FT.	SAMPLES	SAMPLE NO.	Blows on Sampler 0 to 6	6 to 12	12 to 18	N	SAMPLE RECOVERY	Soil or Rock Classification	Notes and Well Construction
								Bark brown, coarse SAND and ROCK FRAGMENTS, some Silt and Clay. (dry, compact)	4" ASPHALT. Not enough sample remaind·· for a headspace (OVA) reading. 58 ppmv OVA reading on spoon.
2		00	N/A	14	18	20	30%		
								Dark brown and gray CLAY, some Silt, trace sand. (wet, stiff)	HEADSPACE (OVA) READING = 99 ppmv. No OVA reading on spoon.
4		02	5	12	11	14	80%		
								Dark brown and gray CLAY, some Silt, trace sand. (wet, hard)	HEADSPACE (OVA) READING = 26 ppmv. No OVA reading on spoon.
6		04	7	11	14	27	80%		
									Boring terminated at 6'.

N = No. blows to drive ___" spoon ___" with ___lb. pin wt. falling ___" per blow.
CLASSIFICATION:
C = No. blows to drive ___" spoon ___" with ___lb. weight falling ___" per blow.
METHOD OF INVESTIGATION:

APPENDIX F

SUMMARY OF OVA HEADSPACE READINGS

SUMMARY OF OVA HEADSPACE READINGS		
Location	**Depth (ft BGS)**	**OVA Reading (ppmv)**
SB16	0-2	NS[1]
SB16	2-4	450
SB16	4-6	160
SB17	0-2	NS
SB18	0-2	NS
SB18	2-4	520
SB18	4-6	70
SB19	0-2	NS
SB19	2-4	99
SB19	4-6	26

[1] NS = No sample; not enough soil remained to allow for a headspace reading.

APPENDIX G

LABORATORY RESULTS

ECOTEST LABORATORIES, INC. ENVIRONMENTAL TESTING

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/1 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443-K1092-QAQC-TCLPBN
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-16-00, 09:50am
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8270.
Amended Report.

DIRECTOR

rn= 17856 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/1 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-16-00, 09:50am

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	2	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	17	
o Xylene	ug/L*	18	
Xylene	ug/L*	35	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	84	
tert-Butylbenzene	ug/L*	16	
124-Trimethylbenzene	ug/L*	160	
sec-Butylbenzene	ug/L*	<1	
p-Isopropyltoluene	ug/L*	19	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	17	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR_____

rn= 17857 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC.

ENVIRONMENTAL TESTING

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/3 11/02/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Rose Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1442K1092-0A00-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/13/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-16-02, 10:05

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	<1	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	<2	
o Xylene	ug/L*	<1	
Xylene	ug/L*	<3	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	<1	
tert-Butylbenzene	ug/L*	<1	
124-Trimethylbenzene	ug/L*	<1	
sec-Butylbenzene	ug/L*	<1	
p-Isopropyltoluene	ug/L*	<1	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	<1	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Analyzed by Method 8021.
Amended Report.
Corrected report.

DIRECTOR

17861 HYSOOK ID# 10330

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934020/3 11/02/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443-K1092-OAOC-TCLPBH
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-16-02, 10:05
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Analyzed by Method 8270.
Amended Report.
Corrected report.

DIRECTOR

ECOTEST LABORATORIES, INC. ENVIRONMENTAL TESTING

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/4 01/25/94

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SP-01-02, 12:30

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	<1	
Ethyl Benzene	ug/L*	1	
m + p Xylene	ug/L*	<2	
o Xylene	ug/L*	<1	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8020.
Amended Report.
Corrected Report.

DIRECTOR

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/5 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443-K1092-QAQC-TCLPBN
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-16-04, 10:10
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8270.
Amended Report.

DIRECTOR_____

rn= 17863 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/5 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-16-04, 10:10

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	1	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	<2	
o Xylene	ug/L*	<1	
Xylene	ug/L*	<3	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	<1	
tert-Butylbenzene	ug/L*	<1	
124-Trimethylbenzene	ug/L*	<1	
sec-Butylbenzene	ug/L*	1	
p-Isopropyltoluene	ug/L*	<1	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	<1	

-
-
-

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR

rn= 17864 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/6 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443-K1092-QAQC-TCLPBN
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-17-00, 10:45
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8270.
Amended Report.

DIRECTOR

rn= 17865 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/6 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-17-00, 10:45

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	2	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	3	
o Xylene	ug/L*	1	
Xylene	ug/L*	4	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	2	
tert-Butylbenzene	ug/L*	<1	
124-Trimethylbenzene	ug/L*	3	
sec-Butylbenzene	ug/L*	<1	
p-Isopropyltoluene	ug/L*	<1	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	<1	

-
-
-

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR_____

rn= 17866 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/7 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443-K1092-QAQC-TCLPBN
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-18-00, 11:05
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8270.
Amended Report.

DIRECTOR

rn= 17867 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/7 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-18-00, 11:05

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	1	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	2	
o Xylene	ug/L*	<1	
Xylene	ug/L*	3	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	37	
tert-Butylbenzene	ug/L*	2	
124-Trimethylbenzene	ug/L*	15	
sec-Butylbenzene	ug/L*	<1	
p-Isopropyltoluene	ug/L*	12	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	2	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR

rn= 17868 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/8 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: CiagaraFalls, ANGB, 1443-K1092-QAQC-TCLPBN
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-18-02, 11:15
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8270.
Amended Report.

DIRECTOR

rn= 17869 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. ENVIRONMENTAL TESTING

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/8 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-18-02, 11:15

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	<1	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	<2	
o Xylene	ug/L*	<1	
Xylene	ug/L*	<3	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	5	
tert-Butylbenzene	ug/L*	<1	
124-Trimethylbenzene	ug/L*	4	
sec-Butylbenzene	ug/L*	<1	
p-Isopropyltoluene	ug/L*	3	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	<1	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR

rn= 17870 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/9 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443-K1092-QAQC-TCLPBN
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-18-04, 11:25
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8270.
Amended Report.

DIRECTOR

rn= 17871 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/9 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-18-04, 11:25

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	<1	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	<2	
o Xylene	ug/L*	<1	
Xylene	ug/L*	<3	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	<1	
tert-Butylbenzene	ug/L*	<1	
124-Trimethylbenzene	ug/L*	<1	
sec-Butylbenzene	ug/L*	<1	
p-Isopropyltoluene	ug/L*	<1	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	<1	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR_____

rn= 17872 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/10 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443-K1092-QAQC-TCLPBN
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-19-00, 11:45
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8270.
Amended Report.

DIRECTOR

rn= 17873 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/10 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-19-00, 11:45

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	<1	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	<2	
o Xylene	ug/L*	<1	
Xylene	ug/L*	<3	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	<1	
tert-Butylbenzene	ug/L*	<1	
124-Trimethylbenzene	ug/L*	<1	
sec-Butylbenzene	ug/L*	<1	
p-Isopropyltoluene	ug/L*	<1	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	<1	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR

rn= 17874 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/11 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443-K1092-QAQC-TCLPBN
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-19-02, 11:55
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

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cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8270.
Amended Report.

DIRECTOR_____

rn= 17875 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/11 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-19-02, 11:55

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	<1	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	<2	
o Xylene	ug/L*	<1	
Xylene	ug/L*	<3	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	<1	
tert-Butylbenzene	ug/L*	<1	
124-Trimethylbenzene	ug/L*	<1	
sec-Butylbenzene	ug/L*	<1	
p-Isopropyltoluene	ug/L*	<1	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	<1	

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-
-

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR_____

rn= 17876 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/12 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443-K1092-QAQC-TCLPBN
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-19-04, 12:05
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

-
-
-

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8270.
Amended Report.

DIRECTOR

rn= 17877 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. ENVIRONMENTAL TESTING

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/12 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, #10-01-SS-SB-19-04, 12:05

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	<1	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	<2	
o Xylene	ug/L*	<1	
Xylene	ug/L*	<3	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	<1	
tert-Butylbenzene	ug/L*	<1	
124-Trimethylbenzene	ug/L*	<1	
sec-Butylbenzene	ug/L*	<1	
p-Isopropyltoluene	ug/L*	<1	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	<1	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR

17878 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/2 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443-K1092-QAQC-TCLPBN
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, Duplicate
UNITS: ug/L*

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Naphthalene	<10	
Acenaphthene	<10	
Fluorene	<10	
Phenanthrene	<10	
Anthracene	<10	
Fluoranthene	<10	
Pyrene	<10	
Benzo(a)anthracene	<10	
Chrysene	<10	
Benzo(b)fluoranthene	<10	
Benzo(k)fluoranthene	<10	
Benzo(a)pyrene	<10	
Indeno(1,2,3-cd)pyrene	<10	
Dibenzo(a,h)anthracene	<10	
Benzo(ghi)perylene	<10	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8270.
Amended Report.

DIRECTOR

rn= 17858 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/2 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC-TCLPZHE
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Soil sample, Duplicate

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L*	<1	
Toluene	ug/L*	<1	
Ethyl Benzene	ug/L*	<1	
m + p Xylene	ug/L*	<2	
o Xylene	ug/L*	<1	
Xylene	ug/L*	<3	
Isopropylbenzene	ug/L*	<1	
n-Propylbenzene	ug/L*	<1	
135-Trimethylbenzene	ug/L*	<1	
tert-Butylbenzene	ug/L*	<1	
124-Trimethylbenzene	ug/L*	<1	
sec-Butylbenzene	ug/L*	<1	
p-Isopropyltoluene	ug/L*	<1	
n-Butylbenzene	ug/L*	<1	
Naphthalene	ug/L*	<1	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR_____

rn= 17859 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/14 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Water sample, Trip Blank

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Benzene	ug/L	<1	
Toluene	ug/L	<1	
Ethyl Benzene	ug/L	<1	
m + p Xylene	ug/L	<2	
o Xylene	ug/L	<1	
Xylene	ug/L	<3	
Isopropylbenzene	ug/L	<1	
n-Propylbenzene	ug/L	<1	
135-Trimethylbenzene	ug/L	<1	
tert-Butylbenzene	ug/L	<1	
124-Trimethylbenzene	ug/L	<1	
sec-Butylbenzene	ug/L	<1	
p-Isopropyltoluene	ug/L	<1	
n-Butylbenzene	ug/L	<1	
Naphthalene	ug/L	<1	

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR

rn# 17880 NYSDOH ID# 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C934028/13 10/14/93

Peer Consultants, P.C.
575 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
ATTN: Ross Williams

SOURCE OF SAMPLE: NiagaraFalls, ANGB, 1443K1092-QAQC
COLLECTED BY: Client DATE COL'D:09/15/93 RECEIVED:09/16/93

SAMPLE: Water sample, Rinsate

ANALYTICAL PARAMETERS		
Benzene	ug/L	<1
Toluene	ug/L	<1
Ethyl Benzene	ug/L	<1
m + p Xylene	ug/L	<2
o Xylene	ug/L	<1
Xylene	ug/L	<3
Isopropylbenzene	ug/L	<1
n-Propylbenzene	ug/L	<1
135-Trimethylbenzene	ug/L	<1
tert-Butylbenzene	ug/L	<1
124-Trimethylbenzene	ug/L	<1
sec-Butylbenzene	ug/L	<1
p-Isopropyltoluene	ug/L	<1
n-Butylbenzene	ug/L	<1
Naphthalene	ug/L	<1

ANALYTICAL PARAMETERS

cc:

REMARKS: * Analysis performed on TCLP leachate according to USEPA Method 1311.
Anaylzed by Method 8021.
Amended Report.

DIRECTOR

rn= 17879 NYSDOH ID# 10320

APPENDIX H

TABLE H.1

RECOMMENDED DISPOSAL OPTIONS - INVESTIGATION DERIVED WASTE

Container I.D. and Waste Type	Date of Containerization or Stockpiling	Amount	Waste Constituents Above Guidance Levels	Disposal Options
Drum "SB-16, SB-17, SB-18, SB-19" Soil Cuttings	09/15/93	0.33 yds^3	1,3,5-Trimethylbenzene 84 µg/L 1,2,4-Trimethylbenzene 160 µg/L tert-Butylbenzene 16 µg/L p-Isopropyltoluene 19 µg/L Napthalene 17 µg/L	Hot or Cold Batch Asphalt Mixing Facility
Drum "SB-16, SB-17, SB-18, SB-19" Decontamination Water	09/15/93	5 gallons	NA	NA
Soil Stockpile	12/16/91	355 yds^3	ND	1) Construction Material 2) Onsite Fill Material 3) Offsite Fill Material

* The STARS Memo #1, Petroleum Contaminated Soil Guidance Policy, has made various disposal or reuse options available for petroleum contaminated soils which do not exhibit hazardous waste characteristics (i.e., flammability, corrosivity, reactivity, toxicity). These reuse options are discussed in Table 3, Appendix B of the Guidance document. In general, these soils may be reused as a construction material, fill for the original excavation, fill elsewhere onsite, or it may be used offsite at a pre-approved location.