OPERATION, MAINTENANCE AND MONITORING MANUAL
VOLUME 1 – GENERAL MANUAL

NIAGARA COUNTY REFUSE SITE
WHEATFIELD, NEW YORK

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GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
APR	Air Purifying Respirator
ASTM	American Standard Testing Method
C&D	Construction and Demolition
CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
CRZ	Contaminant Reduction Zone
DEC	New York State Department of Environmental Conservation
DOT	New York State Department of Transportation
EPA	United States Environmental Protection Agency
EZ	Exclusion Zone
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
HSO	Health and Safety Officer
IDLH	Immediately Dangerous Life and Health
MCCMS/MSD	Motor Control Centre Matrix Spike/Matrix Spike Duplicate
MSDS	Material Safety Data Sheet
NCR	Niagara County Refuse
NIOSH	National Institute for Occupational Safety and Health
NRC	National Response Centre
OM&M	Operation, Maintenance, and Monitoring
OSHA	Occupational Safety and Health Administration
PBS	Perimeter Barrier System
PCS	Perimeter Collection System
PEL	Permissible Exposure Limit
PID	Photoionization Detector
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
PRPs	Potentially Responsible Parties
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control

GLOSSARY

RA	Remedial Action
RDWP	Remedial Design Work Plan
ROD	Record of Decision
SAMP	Sampling, Analysis, and Monitoring Plan
SCBA	Self-Contained Breathing Apparatus
SDR	Standard Dimension Ratio
SIU	Significant Industrial User
SOPs	Standard Operating Procedures
SVOC	Semi-Volatile Organic Compound
SZ	Support Zone
TLV	Threshold Limit Value
TSC	Technical Steering Committee
USCG	United States Coast Guard
VFPE	Very Flexible Polyethylene
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This report constitutes Volume 1 (General Manual) of the Operation, Maintenance, and Monitoring (OM&M) Manual for the Niagara County Refuse (NCR) Site located in Wheatfield, New York. Volume 2 (Manufacturers Information) and Volume 3 (Record Drawings) are presented separately. The purpose of this OM&M Manual is to provide the detailed operation, maintenance, and monitoring requirements for the various components of the Remedial Action (RA) that was implemented at the NCR Site.

This OM&M Manual has been prepared in accordance with the document entitled "Remedial Design Work Plan" (RDWP), dated August 1995. The OM&M Manual presented herein was prepared for the NCR Site Technical Steering Committee (TSC).

1.1 OM&M MANUAL SCOPE

The purpose of this OM&M Manual is to detail the operation, maintenance, and monitoring requirements for the RA performed at the Site. This report is organized as follows:

• Section 1.0	Introduction;
• Section 2.0	Site Description;
• Section 3.0	Selected Remedial Action;
• Section 4.0	Sampling, Analysis, and Monitoring Plan (SAMP);
• Section 5.0	Operation of Site Systems;
• Section 6.0	Site Maintenance;
• Section 7.0	Reports;
• Section 8.0	Community Relations Plan;
• Section 9.0	Personnel;
• Section 10.0	Health and Safety Plan (HASP);
• Section 11.0	Records;
• Section 12.0	Emergency Contingency Plan; and
• Section 13.0	Record Drawings.

1.2 OM&M MANUAL REVISIONS

Over time, this OM&M Manual may require revisions to reflect better operation and maintenance activities developed by Site field personnel. The OM&M Manual also may require revisions to reflect future improvements to the remedial components. All proposed improvements to the Site remedial systems, excluding routine repair and maintenance, and all revisions or amendments to the OM&M Manual must be submitted to and approved by the United States Environmental Protection Agency (EPA) before they can be implemented.

At the end of the first year of operation, the OM&M Manual may be further amended (as necessary) to reflect experience gained during the first year.

2.0 SITE DESCRIPTION

The NCR Site is located along the eastern border of the Town of Wheatfield, Niagara County, New York, and the western border of the City of North Tonawanda and comprises an area of approximately 65 acres. The southern edge of the Site lies approximately 500 feet north of the Tonawanda Channel of the Niagara River, which is on the north side of Grand Island. The Site location is shown on Figure 2.1 and the Site layout and existing topographic conditions are shown on Figure 2.2.

The Site is bordered by active farmland to the west and vacant land proposed for residential development to the northwest. Wooded wetlands, a Niagara Mohawk Power Corporation transmission line and a right-of-way owned by the New York State Department of Transportation (DOT) border the Site to the north. The Site is bordered by woodlands and residences on Witmer Road beyond the woodlands to the east, and River Road (which is parallel to the Niagara River) to the south.

Site access is restricted to authorized vehicular traffic by secured fence gates.

2.1 SITE HISTORY

The Site operated between 1969 and 1973 as a landfill receiving both municipal and industrial waste from the surrounding regions. Refuse reported to have been disposed at the Site includes solid household, yard, institutional, commercial, industrial and agricultural wastes, construction and demolition (C&D) debris, sewage treatment plant sludges, street sweepings, and tires.

3.0 IMPLEMENTED REMEDIAL ACTION

The RA for the Site approved by the EPA and implemented by the TSC is detailed in the Record of Decision (ROD), dated September 24, 1993. The ROD is presented in Appendix A of this manual.

The major components of the Site remedy covered by this OM&M Manual are:

i) final landfill cap;

ii) Perimeter Collection System (PCS) and discharge piping;

iii) east side storm sewer;

iv) groundwater monitoring;

v) surface water monitoring; and

vi) effluent monitoring.

3.1 FINAL LANDFILL CAP

The final landfill cap was placed over the Site to reduce infiltration of precipitation into the landfill, prevent erosion of landfill materials, and eliminate direct human contact with the landfill materials. The final landfill cap extends to the perimeter barrier system (PBS), as appropriate, to limit the introduction of surface runoff into the PCS. The final landfill cap consists of the following layers, in ascending order:

i) imported clean soil;

ii) 6-inch gas venting layer;

iii) low permeability layer [40-mil very flexible polyethylene (VFPE) - both smooth and textured surfaces];

iv) geocomposite drainage net [high density polyethylene (HDPE) geonet sandwiched between two layers of geotextile on the side slopes, but only a single layer of geotextile on top of the HDPE geonet for the top slopes];

v) 24-inch barrier protection layer;

vi) 6-inch topsoil layer; and

vii) vegetative cover.

3.1.1 GRADING FILL (IMPORTED CLEAN SOIL)

Imported clean soil was used to bring the existing ground surface of the Site up to the appropriate sub-base contours.

3.1.2 GAS VENTING MEDIUM

Gas venting medium (a granular material with particles less than 3/8 inches in diameter) was placed in a 6-inch layer over the imported clean soil to act as a gas venting layer. The gas venting layer was not compacted and contained less than 5 percent fines (particles passing through a No. 200 sieve) so that the gas venting medium could provide sufficient void space to allow migration of any generated landfill gases to the passive gas vents.

3.1.3 LOW PERMEABILITY LAYER

A low permeability layer consisting of a continuous 40-mil VFPE membrane liner was installed above the gas venting layer to reduce the infiltration of precipitation into the Site. The VFPE membrane consisted of Poly-Flex VFPE liner (smooth and textured finish). The textured finish VFPE was placed on the steeper side slopes while the smooth finish VFPE was placed on the top areas of the landfill. The VFPE liner was trned down into the barrier wall trench and keyed into the clay or till to form the barrier wall.

3.1.4 GEOCOMPOSITE DRAINAGE NET

A high transmissivity layer consisting of a continuous HDPE geonet with polyester, non-woven, needle-punched geotextile fabric was installed directly on top of the low permeability layer to drain water away from the soil layers above the liner. The HDPE geonet was sandwiched between two layers of geotextile on the steeper side slopes, but only a single layer of geotextile was placed over the HDPE geonet for the top areas of the landfill. The geotextile fabric installed was FSI Fluid System Tex-Net.

3.1.5 BARRIER PROTECTION LAYER

A 24-inch barrier protection layer was placed over the geocomposite drainage net. The barrier protection layer was installed to provide physical protection (including protection from root growth and burrowing animals) and frost protection for the low permeability layer. Clean imported soil with a maximum aggregate diameter of 2 inches was used in the barrier layer.

3.1.6 TOPSOIL

A 6-inch thick topsoil layer was placed over the barrier protection layer to support a vegetative cover over the final landfill cap and to provide additional frost protection for the low permeability layer. The soil material consists of 6 inches of tilled, uncompacted soil containing organic matter. The topsoil was 6 to 25 percent organic matter with an in-place pH of 5.5 to 7.5.

3.1.7 VEGETATIVE LAYER

A vegetative layer, essential for maintaining the cap's long-term effectiveness, was planted on the surface of the cap. The vegetation serves to:

i) stabilize the soil against erosion due to runoff and wind;

ii) minimize percolation of precipitation;

iii) maximize evapotranspiration of soil moisture; and

iv) increase the aesthetic value of the cap.

Two different seed mixtures were used at the Site as shown on Plan L14. The turf seed mixture, seed mixture S1, was planted in the perimeter toe-of-slope areas/swales and consisted of Creeping Red Fescue Grass (50 lbs/acre), Kentucky Blue Grass (50 lbs/acre), and Perennial Ryegrass (60 lbs/acre). The legume seed mixture, seed mixture S2, was planted over the entire waste footprint area and consists of White Clover (5 lbs/acre), Timothy Grass (5 lbs/acre), Orchard Grass (5 lbs/acre), Smooth Bromegrass (5 lbs/acre), Perennial Ryegrass (10 lbs/acre), and Flat Pea (20 lbs/acre).

Both seed mixtures had a minimum required germination rate of 75 percent and a minimum purity of 97 percent, with not more than 0.25 percent weed seed content and no noxious weed seeds. Clover seeds were inoculated with inoculum as recommended by the manufacturer prior to plating.

The fertilizer used was FS O-F-241, Type II, Grade B. The fertilizer was granular form, free flowing, dry, and was a type recommended for grass.

The vegetative layer in the area covered with the low permeability cap will be maintained by appropriate mowing so that root penetration remains within the soil and common fill layers and will not penetrate to the depth of the liner.

3.1.8 GAS VENTING SYSTEM

The objective of the gas venting system is to prevent structural damage to the cap caused by the build-up of gas pressure beneath the liner. The gas generation rate in the landfill is very low, primarily due to the age and composition of the waste. Lateral subsurface off-Site gas migration is controlled by the PBS.

A series of passive gas vents that penetrate the low permeability layer of the landfill cap were installed at the Site. The vents convey generated gas from beneath the low permeability layer of the cap to the atmosphere. The gas percolates from the landfill through the gas venting layer materials to the gas vents.

The gas vents are constructed with 6-inch nominal diameter HDPE (SDR11) pipes for the above-ground riser pipe sections and 6-inch nominal diameter HDPE (SDR26) pipes for the below-ground sections. Pipe connections were thermally welded. Perforations in the pipe were 1/4-inch holes drilled in 4 rows, spaced at 4 inches and staggered along the pipe. Each gas vent was fitted with a VFPE boot that was heat seamed to the liner and banded to the riser pipe to form a continuous barrier to surface water infiltration.

The gas vents were set in a stone pack consisting of clean, hard, durable particles of natural aggregate conforming to the following grading requirements: 1 1/2-inch sieve, 100 percent passing by weight; 1-inch sieve, 90 to 100 percent passing by weight; and 1/2-inch sieve, 0 to 15 percent passing by weight.

The gas vents were installed at a spacing of approximately one for every 2 acres. The locations of the gas vents are shown on Plan L13. A typical detail of a gas vent is shown on Plan L15.

3.1.9 ACCESS ROADS

A gravel access road was constructed on the Site inside the fence to facilitate Site access by wheeled vehicles to the wet wells. The access road alignment is shown on Plan G3. In areas where the access road crosses a drainage ditch, culverts were installed.

3.1.10 PERIMETER FENCE

A 6-foot high chain link fence was installed along the Site perimeter as shown on Plan G4. The Site is accessed through two traffic gates and three man-gates. Fence posts are made of Schedule 40 galvanized steel pipe with welded construction and a minimum yield strength of 25 ksi. Fence fabric is 2-inch diamond mesh with interwoven 9-gage, zinc-coated wire. Posts were set in concrete.

3.2 PERIMETER COLLECTION SYSTEM

The PCS acts to hydraulically isolate the Site. The system consists of 9,900 feet of perimeter collection drain, 4 wet wells, 26 collection drain access manholes, a VFPE barrier wall, pumps, forcemain piping, electrical conduit, a control building, and a metering chamber. The PCS effluent is discharged to the City of North Tonawanda (Publicly Owned Treatment Works) POTW by forcemain. The current City of North Tonawanda Discharge Permit is presented in Appendix B.

3.2.1 UNDERGROUND COLLECTION DRAIN

The underground collection drain consisted of a corrugated 6-inch diameter perforated HDPE collection pipe (Series 601), manufactured by Advanced Drainage Systems, Inc., in an infiltration trench filled with coarse granular material. The perforated HDPE collection pipe conformed to the following specifications:

- pipe stiffness at 5 percent deflection: 24 psi (minimum);
- pipe stiffness at 10 percent deflection: 19 psi (minimum); and
- elongation: 10 percent (maximum).

The coarse granular material consisted of clean, hard, durable particles of natural aggregate with an in-place maximum hydraulic conductivity of 1×10^{-2} cm/s and conformed to the following particle size requirements:

Sieve Size	*Percent Passing by Weight*
1 1/2-inch	100
1-inch	90 - 100
1/2-inch	0 - 15
No. 200	0 - 5

The PCS alignment is shown on Plan P1 and plan and profile drawings are shown on Plans P2 through P8. The collection pipes were sloped toward the wet wells at a minimum slope of 0.3 percent. A typical cross-section of the PCS is shown on Plan P12.

3.2.2 WET WELLS AND MANHOLES

Wet wells were placed at low points in the PCS as shown on Plan P1. The wet wells were constructed of precast concrete with a nominal barrel diameter of 6 feet, except Wet Well A which was an 8-foot square chamber (doubling as the metering chamber). The wet wells were equipped with hinged manhole covers, polyethylene-coated ladder rungs, and safety cages and platforms for maintenance access. Each wet well has a sump that extends a minimum of 4 feet below the lowest collection pipe invert entering the wet well. Typical wet well details for Wet Wells B, C, and D are shown on Plan P10 and details for Wet Well A are shown on Plan P11.

Access manholes for inspection and maintenance purposes were installed at approximately 300-foot intervals along the PCS and at each significant change in direction of the PCS alignment. Access manhole locations are shown on Plan P1. Access manholes were constructed of precast concrete with a nominal barrel diameter of 4 feet. The manholes were equipped with covers and polyethylene-coated ladder rungs for maintenance access. A typical access manhole detail is shown on Plan P12.

3.2.3 BARRIER WALL

A perimeter barrier wall, which significantly reduces groundwater flow from off-Site areas to the perimeter collection drain and reduces the potential for leachate to migrate off-site, was installed along the perimeter of the Site beyond the PCS alignment. The PBS is an extension of the low permeability liner used for the cap. The liner was keyed

12 inches into the native clay/till confining unit. The low permeability layer of the cap and the barrier wall creates a continuous barrier to groundwater migration. The barrier wall alignment is shown on Plan P1 and a typical barrier wall cross-section is shown on Plan P13.

3.2.4 PUMPS, FORCEMAIN, AND MISCELLANEOUS PLUMBING

Wet Wells B, C, and D were each equipped with an electrical, submersible pump that pumps the collected groundwater by forcemain to Wet Well A. Wet Well A was equipped with a duplex electrical, submersible pump system that pumps the collected groundwater by forcemain to the City of North Tonawanda Sanitary Sewer System.

The pumps in Wet Wells B and D are Goulds Model 3885 WE1534H (1½ hp. 460 Volt, 3-phase), mounted on a PumpCon International guide rail system. The pumps in Wet Wells A and C are Goulds Model 3885 WE1534HH 1½ hp, 460 Volt, 3-phase), mounted on a Goulds Model A10-20 guide rail system.

The forcemain consists of 3-inch diameter HDPE (ASTM D1248 Type 3, Category 5, Grade P34, SDR-17) pipe installed at a minimum depth of 5 feet along much of the PCS alignment. Pipe joints were butt fused to provide a leak-tight system. The forcemain is accessible through the PCS access manholes and wet wells. The forcemain was installed within the PCS trench, except between Wet Wells B, and C where no forcemain was installed. Plans and profiles for the on-Site forcemain are shown on Plans P2 through P8. Plans and profiles for the off-Site forcemain between Wet Well A and the POTW are shown on Plan P9.

A typical wet well layout for Wet Wells B, C, and D showing a submersible pump and forcemain connection is presented on Plan P10. A layout showing the submersible pumps in Wet Well A is presented on Plan P11. A cross-section providing the forcemain location in the PCS trench and a cross-section of a manhole showing the forcemain with a section of pipe that is removable for maintenance access are shown on Plan P12.

Steel pipes used in the wet wells are ASTM A53 Grade A, Type S, Schedule 40 galvanized steel. Check valves are 2-inch diameter Pump Con BCV-2 constructed of cast iron. Ball valves are Apollo Model 76-100, stainless steel, threaded and fully ported. Two-inch diameter ball valves were installed in the wet wells and a 1/4-inch diameter ball valve was installed at the metering chamber (Wet Well A) sample port. A 1 1/2-inch diameter explosion-proof flow meter (Kent Meter T-3000 cold water turbine meter number T-3000-RUBU) was installed in Wet Well A. Each in-line device (i.e., pump, meter, valve) is fitted with unions and disconnects to simplify removal.

3.2.5 CONDUITS AND WIRING

The wet well pumps are connected to a control building by power, control, and instrumentation cables. Underground cables are contained in 2-inch diameter, polyvinyl chloride (PVC) coated steel conduits. The conduits were installed above the forcemain along the PCS alignment and are accessible through the PCS access manholes and wet wells. The conduit locations in the access manholes and in the PCS trench are shown on Plan P12.

Brightly colored, plastic, magnetic warning tape was installed above the electrical conduit, the collection drain piping, and the forcemain piping. The tape is detectable by a metal detector at a depth of 3 feet. Tape colors used at the Site are as follows:

- red - electrical conductivity;
- green - perimeter collection piping; and
- brown - groundwater forcemain piping.

3.2.6 CONTROL BUILDING

The wet well pumps are operated from a control building located beside the main Site entrance near the southeast corner of the Site. The structure is a Butler Manufacturing Company Product, PanL-Line 1 Building System erected on a concrete foundation and slab. The doors are PanL-Line 1 insulated metal doors.

3.2.7 METERING CHAMBER (WET WELL A)

An effluent monitoring port for sampling the forcemain effluent quality and monitoring the total and instantaneous flows through the forcemain is contained in Wet Well A located near the middle of the Site's southern boundary.

4.0 SAMPLING, ANALYSIS AND MONITORING PLAN (SAMP)

Monitoring at the Site, including sample collection, sample analyses, and reporting tasks must be completed to ensure the integrity and evaluate the performance of the RA system components and to meet monitoring requirements. Monitoring will be required for groundwater, surface water, and PCS effluent at the Site. Field procedures for monitoring groundwater quality and levels, monitoring surface water quality, monitoring PCS effluent quality, decontaminating equipment, and handling and shipping samples are detailed in FP-1 through FP-7 in Appendix C. The collection of representative samples and accurate data is important for the successful operation of the RA systems at the Site. If the data collected are inaccurate and the samples are not representative, incorrect decisions will be made regarding system operations and the RA systems will not work properly. The following sections describe methods that, when followed, will ensure the collection of representative samples and accurate data.

4.1 MONITORING

4.1.1 GROUNDWATER MONITORING PROGRAM

A groundwater monitoring program has been established to monitor the effectiveness of the PCS and PBS. The objective of this monitoring program is to provide data for demonstrating the effectiveness of the hydraulic containment, collection, and extraction of Site-related groundwater.

The groundwater monitoring program consists of hydraulic monitoring and groundwater quality monitoring. The data collected will be used to evaluate the performance of the PCS and PBS and to determine the necessity of implementing contingency measures. The data will also be used to determine when operation of the PCS may cease, subject to EPA approval.

The wells where samples will be collected and measurements will be made are shown on Figure 4.1. This well network will be evaluated annually to assess whether each location provides useful information and to revise the network, as required.

4.1.2 WATER LEVEL MONITORING

Water level monitoring consists of the measurement of water levels in monitoring wells to determine groundwater elevations. Water levels in four on-Site monitoring wells

(EAST "A" through EAST "D") will be measured to ensure the water levels inside the landfill are reduced by the operation of the PCS. Hydraulic monitoring locations are shown on Figure 4.1 and are listed in FP-3 (Appendix C). Groundwater levels will be determined concurrent with groundwater quality monitoring rounds at the following frequency:

- quarterly for the first two years after PCS startup;
- semi-annually for the next three years; and
- annually thereafter.

After the initial five-year period, the hydraulic monitoring program will be assessed to determine the suitability of the program and any need for modifications. If the results of groundwater quality monitoring (see Section 4.1.3) indicate that the groundwater quality monitoring frequency should be modified, the hydraulic monitoring frequency will also be modified so that groundwater level and groundwater quality monitoring continue to occur at the same frequency. The standard method for measuring water levels accurately is described in Section 4.2.3.

4.1.3 GROUNDWATER QUALITY MONITORING

Groundwater quality monitoring consists of the collection of water samples from four off-Site shallow overburden monitoring wells (NCR3S, NCR4S, NCR5S, and NCR13S), and the analysis of these samples to ensure that no off-Site chemical migration is occuring via the groundwater. These monitoring wells are shown on Figure 4.1. The initial round of groundwater samples will be collected immediately after startup of the PCS. Groundwater samples will be collected at the following frequencies:

- quarterly for the first two years after PCS startup;
- semi-annually for the next three years; and
- annually thereafter.

The program will be evaluated based on the results of the first two groundwater quality monitoring rounds to determine if the monitoring frequency can be decreased. At the end of the initial five-year period, the program will be assessed again to determine the suitability of the sampling locations, monitoring frequency, and monitoring parameters and to determine the suitability of the program. Recommendations for changes to the program including the installation or abandonment of wells may be made based on the results of monitoring or other pertinent information. The program will be assessed every five years until groundwater quality monitoring is no longer required.

Groundwater quality monitoring will include field information measured by sampling personnel (pH, conductivity, temperature, and turbidity) and laboratory analysis of the collected samples. The standard method for collecting representative groundwater samples is described in Section 4.2.4.2. Wells must be purged in accordance with the method described in Section 4.2.4.1 before samples can be collected. Laboratory analysis will include the compounds and analytes identified in FP-5 (Appendix C).

Groundwater quality will also be monitored at the PCS effluent sampling location as shown on Figure 4.1. Effluent samples collected as described in Section 4.2.6 will be analyzed and evaluated to determine the groundwater quality.

4.1.4 GROUNDWATER MONITORING CONTINGENCY PLAN

The groundwater monitoring program will monitor the performance of the PCS with respect to its design criteria and requirements. If the system is not performing as designed after the time needed to substantially attain steady-state conditions, contingency actions will be required. Detailed plans outlining contingency actions will be submitted to the EPA for review and approval prior to implementation.

4.1.5 SURFACE WATER MONITORING PROGRAM

Surface water impacts by pre-RA activities have not occurred at the Site. Therefore, it is anticipated that impacts by post-RA activities will not occur. An annual surface water quality monitoring program will be implemented to verify that surface water quality has not been impacted by the RA activities. Surface water samples will be collected annually with at least one of these sampling events occurring during wet weather. This program will terminate after two years if surface water quality remains unimpacted. The surface water sampling locations are shown on Figure 4.1.

Surface water monitoring will include field information measured by sampling personnel (pH, temperature, conductivity, and turbidity) and laboratory analysis of the collected samples. The standard method for collecting representative surface water samples is described in Section 4.2.5. Laboratory analysis will include the compounds and analytes identified in FP-6 (Appendix C).

4.1.6 EFFLUENT MONITORING PROGRAM

Groundwater from the PCS will be discharged to the City of North Tonawanda POTW without pretreatment. The monitoring station, which is located within Wet Well A, will allow both the effluent water quality and the volume of effluent to be verified by the City of North Tonawanda. The City of North Tonawanda will be given Site access to perform this confirmatory monitoring. The effluent water sampling location is shown on Figure 4.1.

Effluent sampling will be performed monthly as specified in the City of North Tonawanda Industrial Wastewater Discharge Permit (see Appendix A - Wastewater Discharge Permit). The standard method for collecting representative effluent water samples is described in Section 4.2.6. Laboratory analysis will include the compounds and analytes identified in FP-7 (Appendix C).

4.1.7 SITE ACCESS REQUIREMENTS

Prior to commencing any monitoring activity at monitoring well NCR-5S, personnel must ensure that access to the land has been granted from Forest City Enterprises. Forest City Enterprises must be notified by telephone and in writing a minimum of 2 weeks in advance of the activities to obtain access permission unless a current access agreement states otherwise. Contact information for Forest City Enterprises is as follows (update as required):

Land Owner: Forest City Land Group
Contact Name: Sandra Smith
Address: 6269 Williams Road
Niagara Falls, NY 14304
Phone: (716) 297-5600

4.2 SAMPLING

The proper collection of water levels and samples requires that a consistent set of procedures be followed for every sample location every time water levels or water samples are obtained. Following these procedures will result in the collection of good quality data that are representative of conditions at the Site.

The following subsections describe the procedures for measuring water levels, sampling groundwater, sampling surface water, and sampling PCS effluent at the Site. Procedures and protocols outlined below will be performed in conjunction with those presented in the Quality Assurance Project Plan (QAPP), contained in Appendix D to this OM&M Manual, and the Health and Safety Plan (HASP), contained in Appendix E to this OM&M Manual. Read the QAPP and the HASP before performing any sampling activities at the Site.

4.2.1 GENERAL SAMPLING PROCEDURES

It is very important that the following rules are followed while sampling.

- Do not smoke.
- Do not use insect repellents.
- Do not use wasp/hornet spray near a sampling location.
- Do not use aftershaves, perfume, cologne, or astringents.
- Be aware of wind direction. Do not run vehicles or small engines (such as generators or air compressors) upwind of a well being sampled.
- Be aware of traffic fumes from nearby activities. Suspend sampling if traffic fumes are noted. Make a note of any nearby activities or traffic on the groundwater purge and sample record logs included as Forms FP-4C and FP-5A.
- Do not handle or pour gasoline or other fuels near a well being sampled.

4.2.2 GENERAL HEALTH AND SAFETY FOR SAMPLING

Apply the following health and safety rules during collection of water samples.

- Read the HASP before going to the Site;
- Industrial quality work boots, Tyvek coveralls, nitrile gloves, and safety glasses are the minimum required personal protective equipment (PPE) for sampling;
- Do not eat or drink;
- Be aware of potential slip, trip, and fall hazards and uneven terrain;
- Be aware of hazards of working with portable machinery, electrically operated equipment, gasoline powered equipment, and high-pressure air;

- Some heavy lifting is required - use proper lifting techniques;
- Some sampling takes place near open water. Always carry a flotation device and perform sampling at these locations with a partner; and
- Use caution when opening protective covers on wells - wasps, hornets, or bees may be present.

4.2.3 WATER LEVEL MEASUREMENT

Water level measurements are required at the wells shown on Figure 4.1. In addition to providing information for determining groundwater flow directions, measuring water levels provides the following:

- accurate data for area groundwater table maps;
- an opportunity for the sampling team to become more familiar with the Site;
- an opportunity to collect data about unusual circumstances such as wells that are damaged, dry, or have become inaccessible; and
- an opportunity to inventory well conditions and to perform minor maintenance such as lubricating locks and hinges, replacing lost or faded well tags, etc.

Complete a copy of all forms within FP-2 and FP-3 (Appendix C) every time water levels are measured. An electric water level tape will be used for water level measurements in the wells. Water level measurement procedures are detailed in FP-3 (Appendix C), with all water level measurements recorded on Form FP-3D (Appendix C).

Water levels in the wet wells and total flows from the wet well pumps will also be recorded when water levels are measured in the monitoring wells. Wet well water level meter and flow meter read-outs are housed in the control building. Record the wet well water levels and flow data on Form FP-3D (Appendix C).

4.2.4 GROUNDWATER SAMPLING

4.2.4.1 WELL PURGING PROCEDURES

Prior to sampling each well, the standing water in the well will be purged so that representative, sediment-free water may be sampled. Complete a copy of all forms within FP-2, FP-3, and FP-4 (Appendix C) each time a well is purged. The standard purging method is described in detail in FP-4 (Appendix C).

The volume of water to be purged from each well depends on the depth of water in the well. The volume of water in the well (well volume) is calculated by subtracting the depth of water from the total depth of the well. This value (the water column length) is then multiplied by 0.163 (includes conversion from cubic feet to gallons) to calculate the well volume in gallons for a 2-inch diameter well.

Purging should be conducted with a dedicated bladder pump in each sampling well.

Two criteria will be used to determine if a sufficient volume of groundwater has been purged from the well to yield a representative sample. These criteria are:

- the removal of five well volumes; or
- if a well goes dry, purge to dryness on three consecutive days.

Five well volumes will be removed from each well prior to sampling unless a well goes dry during pumping. Field parameters (pH, conductivity, temperature, and turbidity) will be measured and recorded during purging. One set of readings will be taken after the removal of each well volume. Samples will be collected after purging is complete. The meters for measuring field parameters will be calibrated each morning prior to purging and the calibration will be checked at the end of each day according to the manufacturer's instructions. Recalibration of the meters will be performed more often if necessary.

If a well is pumped dry, the well will be allowed to recover for 24 hours and will be pumped dry again. This will be done for three consecutive days. Full recovery to pre-purging water levels is not required. Sampling can begin after purging on the third day if enough water is available.

4.2.4.2 GROUNDWATER SAMPLE COLLECTION PROCEDURES

Collect groundwater samples immediately after completion of well purging. Complete a copy of all forms within FP-1 and FP-5 (Appendix C), in addition to the forms required for purging, every time groundwater samples are collected. Analytical requirements and sample containers are discussed in the QAPP (Appendix D). Groundwater sample collection procedures are detailed in FP-5 (Appendix C).

Where a well will not yield the volume of water necessary to immediately fill all the required sample containers, as many of the containers as possible will be filled, with the remainder filled as water becomes available within the well. Collect samples for volatile organic compounds (VOCs) within 2 hours of completion of well purging.

Sampling in the rain should be avoided due to the potential for cross-contamination from airborne contaminants in the precipitation.

4.2.5 SURFACE WATER SAMPLING PROCEDURES

Complete a copy of all forms within FP-1 and FP-6 (Appendix C) every time surface water samples are collected. Analytical requirements and sample containers are discussed in the QAPP (Appendix D). Surface water sample collection procedures are detailed in FP-6 (Appendix C).

It is important to obtain surface water samples that are not impacted by the resuspension of sediment caused by sampling activities. Pre-plan the sampling sequence so that sampling commences at the farthest downstream sampling location and proceeds upstream.

Sampling in the rain should be avoided due to the potential for cross-contamination from airborne contaminants in the precipitation.

4.2.6 EFFLUENT SAMPLING PROCEDURES

Complete a copy of all forms within FP-1 and FP-7 (Appendix C) every time PCS effluent samples are collected. Analytical requirements and sample containers are discussed in the QAPP (Appendix D). Effluent sample collection procedures are detailed in FP-7 (Appendix C).

Sampling in the rain should be avoided due to the potential for cross-contamination from airborne contaminants in the precipitation.

4.2.7 SAMPLING DOCUMENTATION

Documentation is a critical part of sampling. The accuracy of samples collected in the field can only be proven through the exhaustive use of field records. Field conditions, collection and handling of samples, and information about each sample collected will be recorded on the standard forms in Appendix C. These forms, along with the chain-of-custody documentation and shipping manifests provide a permanent record of all significant activities completed during a sample collection event. Complete all forms with a waterproof pen to prevent smudging if the form gets wet in the field. Once complete, sign and date the bottom of each form and keep a copy at the control building.

4.2.8 SAMPLE CONTAINERS, PRESERVATION, AND LABELS

Required sample containers, sample preservation methods, and maximum sample holding times are summarized in Appendix D.

4.2.9 PACKAGING AND SHIPPING PROCEDURES

Prepare the sample containers for shipment as described in FP-1 (Appendix C).

4.2.10 HANDLING OF MATERIALS GENERATED DURING OM&M ACTIVITIES

Containerize PPE and sampling refuse (i.e., paper towels, used tin foil, tape, etc.) generated during sampling activities in plastic garbage bags and temporarily store the bags at the control building pending final disposal in accordance with all applicable Federal and New York State Regulations.

Collect all groundwater extracted during monitoring activities and discharge it to an on-Site wet well for treatment at the POTW.

4.2.11 EQUIPMENT CLEANING PROCEDURES

Clean all equipment that comes into contact with Site groundwater, surface water, or PCS effluent including water level measuring tapes and meters in accordance with the procedures described in FP-2 (Appendix C). Cleaning of dedicated sampling equipment (i.e., equipment that remains in the well after sampling) is not required.

4.3 ANALYTICAL PROGRAM

The Analytical Program is detailed in the QAPP (Appendix D) and includes analytical schedules and methods, laboratory quality control (QC) samples, reporting and deliverables, special analytical protocols, laboratory audits, and data audits.

4.4 EVALUATION OF MONITORING RESULTS

Upon receipt of groundwater, surface water, and effluent quality data, all analytical results will be evaluated to determine if the data are acceptable for use in the respective monitoring programs. A data report of groundwater and surface water monitoring will be sent to EPA following quality assurance (QA) validation within 30 days of receipt (upon request). The data will be designated as approved or not approved for evaluating the various RA systems at the Site based on the validation report. All data deemed to be acceptable, including QA/QC results, will be entered into a computer database. Under no circumstances will data that has not undergone QA validation be sent to the EPA.

Raw data packages resulting from effluent monitoring will be sent to the City of North Tonawanda for QA review within 30 days of receipt (upon request). The data will be designated as approved or not approved for evaluating the performance of the PCS after review by the City of North Tonawanda.

The procedures for evaluating analytical data resulting from Site monitoring activities are detailed in the QAPP (Appendix D).

The computer database will provide the required listing and summary tables of analyses, including a separate listing of QA/QC results. The database will be used to determine the presence of Site-related chemicals in off-Site groundwater and surface water. As additional data are generated, graphic representations of concentrations versus time may be prepared to demonstrate changes in groundwater, surface water, and effluent chemical concentrations over time.

Measured water levels will be converted to elevations and entered into a computer database. The water level data will be listed in tabular form for each round of data collected.

The evaluation of the hydraulic and water quality data will be used to determine if corrective contingency measures are required and when the system operations can be terminated.

4.5 RECORDS AND REPORTS

All field notes, field books, and completed standard forms will be stored on Site in the control building. A copy of all chain-of-custody forms, shipping manifests for analytical samples, and analytical results will also be stored in the control building.

Data Summary Reports will be submitted to the TSC at the same frequency as sampling events, after QA validation is complete. These Data Summary Reports will include analytical results, appropriate QA/QC data, and water level data. The TSC will then forward the reports to EPA and New York State Department of Environmental Conservation (DEC) at the following offices:

Mr. Kevin Lynch, Chief
- Attention: Niagara county Refuse Site Manager
Western New York Remediation Section
EPA-Region 2
290 Broadway
New York, NY 10007-1866

Mr. Martin Doster
NYSDEC - Region 9
270 Michigan Avenue
Buffalo, NY 14203-2999

Mr. Gerald J. Rider, Jr.
Operation, Maintenance, and Support Section
NYSDEC
50 Wolf Road - Room 260
Albany, NY 12233-7010

Mr. Daniel King
NYSDEC, Regional Headquarters
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

5.0 OPERATION OF SITE REMEDIAL SYSTEMS

The following sections provide instructions for operating the Site remedial systems, including startup operation and system controls and instrumentation.

5.1 SYSTEM OPERATION

The individual wet wells operate on automatic level control. Wet Well A contains two well pumps while each of the other three wet wells have only one pump. The second pump in Wet Well A is a hot spare. The pumps are not run simultaneously, as an A/off/B selector switch is provided on the central control panel to select which pump will run when the wet well is full. Two green lights on the central control panel indicate which of the two pumps is selected. Individual well pumps turn off automatically when the water level in the particular wet well is pumped down to the elevation of the low level probe. Power to the wet well pump is restored automatically when the water level in the wet well rises to the elevation of the high level probe. Wet Wells B, C and D discharge pumped water to Wet Well A, where the water collected in Wet Well A is metered as it is pumped to the municipal sewer via the off-Site forcemain. The flow total is displayed on the central control panel located in the control building.

High water level alarms are provided in each wet well, should the pump not turn on at the high level probe. When a high level is detected in any of these wet wells, an alarm light is illuminated on the central control panel located in the control building. There is one light for each wet well. In addition, the autodialer will be activated to let appropriate staff know an alarm has occurred.

A hand/off/auto switch is located on the front door of each pump motor starter. Under normal operating conditions the switch will be in the "auto" position. This will allow the pump to run under normal operating conditions via the level switches. For testing operations, the switch can be placed in the "hand" position, allowing the pump to bypass the level switches and start immediately. For maintenance, the switch can be placed in the "off" position. A red light located on the door of each motor starter will show when the pumps are on.

5.2 STARTUP OPERATION

To start the pumping system, the operator must insure the disconnect switch is "on" and the hand/off/auto switch is in "auto" for all pump motor starters. On the central control panel, the operator must position the A/off/B selector switch to select pump "A" or "B" and insure the slide switch on the front of the autodialer is in the "on" position.

5.3 ROUTINE OPERATION

The only other routine operator activity is to periodically record the total gallons of water that have been pumped to the sewer as a check that the pumps are operating at the expected flowrates. Occasionally, the operator should also change which pump is selected within Wet Well A to prevent the non-active pump from seizing up due to inactivity. At regularly scheduled intervals, the wye strainer located within Wet Well A immediately upstream of the flow meter should be cleaned and flushed to remove accumulations of debris and/or sediment.

5.4 TERMINATION OF PUMPING

The Significant Industrial User (SIU) permit (see Appendix B) includes a requirement that all pumping from the NCR Site be temporarily terminated during wet weather periods when the retention basin at the City of North Tonawanda POTW may be discharging. The OM&M Contractor will be notified of these periodic occurrences by a representative of the City of North Tonawanda.

6.0 SITE MAINTENANCE

Site maintenance requirements will include routine Site inspections, scheduled preventative maintenance, unscheduled maintenance in response to inspection reports or component failures, and record keeping for maintenance activities. Perform all system inspection and maintenance activities in strict accordance with the HASP. Write separate work plans, if necessary, for unique or complex unscheduled maintenance tasks.

6.1 SITE INSPECTIONS

6.1.1 INSPECTION SCHEDULE

An outline of the inspection and preventative maintenance schedule for the final landfill cap and the PCS is presented in Table 6.1. This schedule may be revised as more experience with the particular maintenance requirements of the Site systems is gained.

Perform any required maintenance as identified by the monthly inspections as soon as feasible following identification of a deficiency. Lower priority maintenance activities may be delayed for longer periods of time. High priority items include:

- pump failures;
- forcemain repairs;
- power failures;
- perimeter fence repairs; and
- erosion exposing multiple layers of the cap.

6.1.2 MONTHLY INSPECTIONS

Inspect the Site on a monthly basis. These inspections will ensure that the remedial system components are functioning effectively as designed. Give particular attention to the following system components:

Final Landfill Cap

- access roads;
- surface structures;

- vegetated soil cover;
- ditches and culverts;
- perimeter fencing; and
- general surface conditions.

Perimeter Collection System

- manholes;
- wet wells;
- forcemains; and
- pumps.

Groundwater Monitoring System

- groundwater monitoring wells; and
- pumps and other equipment.

Surface Water Flow Controls

- swales/ditches; and
- erosion controls.

Wetlands (Area "F")

- vegetation;
- water budget; and
- general condition of the wetlands.

The inspections will include an overall Site inspection along all access roads and perimeter security fencing. In areas that are inaccessible by vehicle, perform inspections on foot.

The monthly inspection of the PCS will include visual observation of manholes and wet wells to ensure that they are secure. Inspect the surface of the landfill cap to ensure that the integrity of the cap is being maintained. Inspect the surface of the cap for signs of damage due to loss of vegetation, settlement, erosion, and burrowing by animals. Inspect the wetlands north of the Site for signs of damage due to loss of vegetation and changes in water budget.

Record the monthly inspections on the Monthly Inspection Log (Form 1 in Appendix F). If maintenance is required in response to inspections record details on the Maintenance Report Log (Form 2 in Appendix F). Keep all original logs on file at the control building.

6.2 WETLAND MONITORING PLAN

Restored and existing wetlands will be monitored to evaluate the success of the wetland mitigation activities and to assess impacts to the long-term integrity of the wetlands.

The monitoring of restored wetlands will be conducted for a period of five full years after completion of their construction or until functional wetlands become established based on a set criteria.

The monitoring of the constructed and restored wetlands will provide a means to evaluate the success of the mitigation effort by comparing monitoring data with the performance goals of the endeavor and the baseline situation that the mitigation plan replaced. In the case of this program, one of these goals is clearly to enhance the quality of existing wetlands by the elimination of current stresses. Measurable goals are included for revegetation.

6.2.1 VEGETATION

The goal of this program is to restore 0.17 acres of wetlands and restore any wetland resources that may have been damaged by construction activities. This includes the restoration of emergent wetlands through the use of introduced plantings as well as natural succession.

Revegetation will be evaluated using permanent representative transects and by recording the vegetation in square meter plots located at regular 50-foot intervals along the transects. Percent cover, relative frequency, and wetland frequency indicator value of each species, water level, soil type, and pH will be recorded. Percent cover and the average wetland frequency indicator value for each plot will be compared to the measurable criteria for the goals established below. A minimum of two transects will be located within each of the proposed habitat types. Each plot will be photographed from the same position during each year to provide a photographic record of the wetland development.

"Percent cover" refers to the portion of a defined square meter area along a transect in the study which is covered by growth of plants identified as hydrophytes when compared with the entire square meter which can include upland species of plants, bare ground and/or open water.

The total area of hydrophytes is determined by measurement and reported as a fraction of a square meter. This fraction is multiplied by 100 to produce a percentage value. Where more than one sample is involved from comparable plots in the same habitat area, the percentage figures can be averaged to obtain a value for the overall habitat.

Measurable Criteria	*Percent Cover (+ or - 10%)*
First Year Goal	40%
Second Year Goal	50%
Third Year Goal	60%
Fourth Year Goal	70%
Fifth Year Goal	80%

The term "wetland frequency indicator value" is a method of evaluating the frequency of hydrophyte species in a wetland area and reducing these observations to a numerical value which can serve as the basis for repeated measurements in successive years.

Plant Indicator Status Categories are as follows:

Indicator Category	*(#)*	*Indicator Symbol*	*Definition*
Obligate Wetlands	1.0	OBL	Plants that occur almost always (estimated probability >99%) in wetlands under natural conditions, but may also occur rarely (estimated probability <1%) in non-wetlands
Facultative Wetland Plants	2.0	FACW	Plants that occur usually (estimated probability >67% to 99%) in wetlands, but also occur (estimated probability 1% to 33%) in non-wetlands

Indicator Category	*(#)*	*Indicator Symbol*	*Definition*
Facultative Plants	**3.0**	FAC	Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and non-wetlands

The bold numbers noted above are assigned to identify each classification uniquely. At least two transects will be established in each of the wetland habitats and plots of 1 square meter will be established at 50-foot intervals along these transects. Using the species listing identified earlier, the plants found in each of the plots will be identified and classified as to their status on the above table with the appropriate status number and entered in the log of that plot for each plant found within the plot. The average will be calculated for each lot and for each habitat based upon all of the plots present therein.

In the case of the establishment of emergent wetland habitats, a greater variety of plants may be present in the site and represented in the seed bank. Therefore, a figure of 3.0 is the initial value employed which provides equal weight to the entire range of groups. With the introduction of hydrophtye stocks and seeding as well as with appropriate management and water budget, selection pressures will allow a successional process to exert itself shifting the wetland frequency indicator value to lower numbers as the numbers of wetland species are enhanced while the number of upland species diminishes.

Evaluation of the communities within the plots along the transects over succeeding years will provide a means of generating numerical values which are capable of being compared from one season to the next to quantify the success of wetland community establishment. The location of transects and sampling plots is subject to EPA/DEC review in the field prior to approval of the monitoring effort.

The following provides an example of the expectations for the frequency indicator values during a five year period of wetland management.

Measurable Criteria	***Wetland Frequency Indicator (+ or - 0.3)***				
Wetland Habitat	***Year***				
	1	***2***	***3***	***4***	***5***
Emergent Wetland	3.00	2.67	2.33	2.00	1.67

Specific management efforts for biological communities will not be brought into play unless there is evidence that invasive species of plants such as reed grass, narrow leaf cattail, or purple loosestrife make this necessary. If these species become a problem, the area impacted will be identified and, with the consent of the EPA/DEC, methods will be applied to eliminate the problem. Methods used will include physical removal with replanting of more desirable species. Alternatively, limited and controlled burning methods may be used to eliminate these plants. The use of herbicides will not be recommended. Alternative monitoring methods may also be employed as deemed necessary to accomplish the evaluation of the biological community on Site or substituted for the above approach with EPA/DEC approval.

6.3 MAINTENANCE PLAN

Maintenance is required when inspections reveal a need to maintain one of the remedial systems or when system components malfunction. If inspections reveal that non-emergency maintenance or response is required, complete the work as soon as feasible in order to eliminate further damage and the need for emergency repairs. If a situation requires immediate action, initiate emergency remedial actions immediately. Notify DEC of all emergency actions.

All replacement equipment must be of equal or better quality than the original components and when possible should be the same make and model as the original. All replacement materials must meet or exceed the RA construction specifications. A summary of potential problems that will require maintenance and the appropriate corrective actions is summarized in Table 6.2.

Unique or complex maintenance activities including maintenance of the PBS, soil and landfill materials beneath the membrane layer of the cap, well installation or abandonment, electrical or control system repair, and any other maintenance activity not specifically covered by this OM&M Manual will require an activity specific work plan and health and safety plan. Activity specific work plans and health and safety plans will be based on the RA procedures and RA HASP and will be modified to address the specific activities. Typical maintenance activities not requiring an activity specific work plan include the following:

Final Landfill Cap

- fertilizing and restoring the Site vegetative cover, and removing/cutting weeds or bushes;
- repairing Site access roads;

- repairing surficial erosion and sloughing along the perimeter slopes;
- mowing vegetative cover;
- repairing damage caused by burrowing wildlife, presence of deep-rooted weeds, or other vegetation;
- repairing or replacing fencing, signs, and locks;
- repairing leachate seeps;
- cleaning ditches and culverts; and
- repairing swale outlets.

Perimeter Collection System

- cleaning manholes/wet wells and forcemains; and
- securing and repairing access covers.

Wetlands (Area "F")

- restoring vegetation and control and removal of undesirable vegetation; and
- repair of surficial erosion, washouts, and sediment buildup.

6.3.1 LANDFILL CAP

The purpose of the landfill cap is to reduce infiltration of precipitation into the landfill, prevent erosion of landfill materials, and eliminate direct human contact with the landfill materials. The layers of the cap work together to achieve these goals, therefore each one of the layers is necessary for the landfill cap system to function effectively. When a situation that may require maintenance is detected with the cap, correct it as soon as possible.

6.3.1.1 VEGETATIVE COVER

Visible indications of situations requiring maintenance that may occur with the vegetative cover include bare areas, dead or dying vegetation, and growth of weeds or bushes. When inspection reveals bare areas or dead or dying vegetation, perform the following actions as soon as feasible to correct the situation:

- check for cracks in the soil from which water or gas may be escaping (if identified, a subsurface investigation of the geomembrane liner is necessary - see Section 6.3.1.3);
- till the topsoil;
- re-seed and mulch; and
- cover slopes with a temporary erosion control (jute) mat.

Cut the vegetative cover in wide strips in the spring or fall such that half the landfill cover is mowed each year to prevent their roots from penetrating the cap and damaging the geonet and geomembrane liner.

6.3.1.2 BARRIER PROTECTION AND TOPSOIL LAYERS

Visible indications of situations that require maintenance of the barrier protection and topsoil layers include washout and erosion, settlement, standing water, and animal holes or burrows..

If the cap has been damaged by erosion or a washout has occurred, perform the following actions to correct the problem:

- recover the washed out soil;
- backfill with recovered soil and additional soil to the original barrier protection layer design thickness;
- place a 6-inch thick layer of topsoil over the barrier protection layer;
- check the final elevation to ensure adequate drainage; and
- seed/mulch and cover slopes with an erosion control (jute) mat.

Settlement and standing water can be corrected by either regrading or by placing additional topsoil in the low areas.

Correct animal holes or burrows by performing the following actions:

- capture and remove the rodents;
- carefully excavate the area around the burrow and inspect the VFPE liner (if the liner requires repairs follow the steps discussed in Section 6.3.1.3);
- replace the barrier protection and topsoil layers to the original design thickness; and
- seed/mulch and cover slopes with an erosion control (jute) mat.

6.3.1.3 LOW PERMEABILITY LAYER

If the 40-mil VFPE liner is punctured, take the following steps to repair it:

- carefully excavate the soil above the liner (do not use a mechanical excavator or backhoe);
- remove the geo composite drainage layer at the damaged area;
- cover the puncture with a 40-mil VFPE patch that extends a minimum of 6 inches beyond the edges of the puncture;
- seal the patch in place by extrusion welding it to the liner;
- vacuum test the seam to ensure a complete seal;
- record the results of the test, and location and size of the patch;
- replace the geo composite drainage layer and overlap 12 inches minimum;
- replace the barrier protection and topsoil layers to the original design thickness; and
- seed/mulch and cover slopes with an erosion control mat.

6.3.1.4 GROUNDWATER SEEPS

Groundwater seeps may occur where the groundwater path to the PCS is blocked or restricted. Seeps may also occur if one of the collection pipes is blocked and the PCS is flooded. A groundwater seep will appear as a groundwater discharge from the landfill slope. Corrective actions for leachate seeps require excavation below the geomembrane liner and will require an activity specific work plan and health and safety plan.

6.3.1.5 ACCESS ROADS

Visible indications of problems which may occur with Site access roads include depressed areas, loss of stone cover, washed out surface soils from adjacent areas, potholes, puddles, and obstructions.

If the road surface is washed out, take the following actions as soon as feasible:

- recover washed out soil and remove stone (as practical);
- use recovered soil to backfill the eroded areas to the original grade; and

- add new store as necessary.

When a puddle or pothole is detected, take the following actions as soon as feasible:

- backfill with new stone to original grade.

If the access road is obstructed by an object, take the following actions as soon as possible:

- remove the obstruction; and
- place the obstruction in a secure area pending off-Site disposal.

6.3.2 PERIMETER SYSTEMS AND FORCEMAIN

The purpose of the PCS is to eliminate groundwater flow from on-Site to off-Site areas, to reduce groundwater flow from overburden to bedrock beneath the Site, and to reduce the concentration of chemicals in on-Site groundwater. All of the PCS components work together to achieve these goals, therefore each component is necessary for the system to function effectively. When a problem is detected with the PCS, correct it as soon as possible.

6.3.2.1 PERIMETER COLLECTION PIPE

A visible indication of problems which may occur with the perimeter collection drain is an increase in water level in some parts of the PCS and a decrease in discharge flow. This indicates that the pipe is blocked and groundwater flow is restricted. Take the following actions as soon as possible:

- pressure flush the pipe sections that are plugged; and
- vacuum sediments and debris from manholes and wet wells.

Use pressures in the range of 500 to 1,000 psi to avoid damaging the collection pipe and/or bedding. Dispose of the material removed from downstream manholes at an approved off-Site location.

6.3.2.2 PERIMETER BARRIER WALL

Visible indications of problems which may occur with the PBS include excessive flow in the adjacent collection pipe and the dewatering of adjacent wetlands. Take the following actions as soon as possible:

- determine the section of barrier wall requiring repair;
- excavate the barrier wall;
- reconstruct the barrier wall to the original construction specifications; and
- reconstruct the excavated cap to the original lines and grades.

6.3.2.3 MANHOLES AND WET WELLS

Visible indications of problems which may occur with manholes and wet wells include cracks which allow water to infiltrate, damaged or missing covers, and loose ladder rungs or safety platforms.

If water is leaking through cracks on the inside of a manhole or wet well, repair the cracks with cement mortar. If a cover is damaged or missing, replace it. If a ladder rung or safety platform is loose, use cement mortar to re-affix the loose rung or safety platform support to the inside of the manhole or wet well.

6.3.2.4 FORCEMAIN

A visible indication of problems which may occur with the forcemain is a decrease in discharge flow. This indicates that the forcemain may be blocked or leaking.

If the forcemain is blocked, take the following actions as soon as possible:

- shut down the PCS;
- drain the section of forcemain that is blocked;
- pressure flush the forcemain section;
- vacuum sediments and debris from manholes or wet wells; and
- restart the PCS.

If the forcemain is leaking, take the following actions as soon as possible:

- shut down the PCS;
- drain the section of forcemain that is leaking;
- excavate the forcemain and repair leak;
- reconstruct the forcemain to the original construction specifications; and
- reconstruct the excavated PCS and cap to the original lines and grades.

6.3.2.5 ELECTRICAL AND CONTROL SYSTEMS

6.3.2.5.1 CONTROL PANEL

Periodically test the autodialer by forcing an alarm and verifying the first person on the dial out list is called.

There is no other preventative maintenance to be done on the control panel. If a malfunction should occur a qualified technician should do troubleshooting.

6.3.2.5.2 FIELD INSTRUMENTS

The following preventative maintenance should be performed on a periodic basis:

- Inspect all level float switches in each wet well for build-up of deposits and clean if required;
- Manually raise the high level float switches in each well and insure the alarm light in the control panel is illuminated;
- Inspect and clean the strainer in Wet Well A;
- Verify flow accumulation is indicated when a Wet Well A pump is run; and
- Have a qualified contractor test the fire/intrusion system.

If improper operation is encountered, a qualified technician should do troubleshooting.

6.3.2.5.3 ELECTRICAL EQUIPMENT

6.3.2.5.3.1 SURGE PROTECTION DEVICE

If red indicating light (LED) is "on", protection against surges, spikes and transients is reduced. Take the following actions as soon as practical:

- Open door. Observe additional red lights (LED's) "on" which indicate modules and fuses needing to be replaced.
- Ascertain that appropriate replacement parts are available.
- Electrician services will be required to replace defective components.

Free replacement modules and fuses are available from MCG Surge Protection Co. call 1-800-851-1508 or e-mail to mcginfo@mcgsurge.com

6.3.2.5.4 EXHAUST FAN

If exhaust fan does not operate when louvers have opened, check motor control center (MCC) circuit breaker is at "on" position. If "tripped," and resetting to "on" position does not restore normal operation:

- Check operation with selector switch at "hand" position. If fan motor does not operate call an electrician.
- Check operation with selector switch at "automatic" position. If temperature in room is above thermostat set point and system does not operate, call an electrician.

6.3.2.5.5 MOTOR CONTROL CENTER (MCC)

In the event any load serviced from the MCC fails to operate:

- Check circuit breakers handle position.
- If "tripped", reset to "off", lockout, tag and check connected equipment for visible damage, obstruction or other factors that would prevent proper operation.
- Repair damages and/or remove obstructing material.

- Remove tag and lock, turn circuit breaker handle to "on". If equipment does not operate and/or circuit breaker handle again trips, turn handle to "off". Electrician services will be required to further analyze and locate the malfunction.

6.3.2.5.5.1 UNIT HEATER

If unit heater and fan do not operate, check that circuit breaker at MCC is at the "on" position:

- If circuit breaker is at "tripped" position, reset to "on".
- If circuit breaker trips, call an electrician.
- If unit is still not operating, check if thermostat setting calls for heat. If unit does not operate, call an electrician.

6.3.2.6 PUMPS

If a wet well pump stops responding to the pump controls, take the following actions as soon as feasible:

- attempt to operate the pump in manual mode;
- if it does not respond, shut down lockout and tag the pumping system;
- inspect the pump for blockage;
- disconnect the pump and drain it into the wet well;
- wrap the pump in plastic sheeting;
- install spare pump;
- remove the lockout and tag and restart the pumping system; and
- clean and repair the damaged pump according to the manufacturer's instructions and store it for future use. If the pump cannot be repaired, replace the pump with a new one.

If the pump is restarting too frequently, reduce the pumping rate or increase the distance between the start and stop level probes, if possible.

6.3.3 WETLANDS

When a problem is detected with the restored wetlands to the north of the Site, correct it as soon as practical.

Visible indications of problems which may occur with the wetlands vegetation include dead or dying vegetation and growth of invasive plant species. When inspection reveals dead or dying vegetation or the presence of invasive plant species, perform the following actions as soon as feasible to correct the problem:

- remove all invasive plant species by hand or by controlled burning (with EPA/DEC approval); or
- replant with desirable species.

If the wetlands have become damaged by erosion or washout, perform the following actions to correct the problem:

- recover the washed out soil;
- backfill with recovered soil and additional soil to the original ground elevation (this may be below the water surface); and
- replant with desirable species.

If the wetlands become clogged with sediment, perform the following actions to correct the problem:

- excavate the sediment to the original ground elevation (this may be below the water surface); and
- replant with desirable species.

6.3.4 OTHER SITE SYSTEMS

Other Site systems include perimeter fences, signage, and drainage ditches. When a problem is detected with these systems, correct it as soon as practical.

6.3.4.1 PERIMETER FENCE AND SIGNS

Visible indications of problems which may occur with the perimeter fence and signs include broken locks or gates, gaps in the fence, and missing or damaged signs.

If locks or gates are missing or damaged, replace them as soon as possible. If there are gaps in the fence repair or replace the damaged section as soon as practical. If warning signs are damaged or missing, replace them as soon as practical.

6.3.4.2 DRAINAGE DITCHES AND SWALES OUTLETS

Visible indications of problems which may occur with the Site drainage ditches include bare areas, dead or dying vegetation, displaced rip rap, and the accumulation of obstructions or debris. When inspection reveals bare areas or dead or dying vegetation, perform the following actions to correct the problem:

- till the topsoil;
- re-seed and mulch; and
- cover drainage ditch with erosion control mat.

If rip rap become displaced at the swale outlets, recover the stones and replace them in their original position. Remove any obstructions or debris accumulated in the drainage ditches.

6.4 DISPOSAL OF USED MATERIAL AND WASTE

Containerize material and waste containing Site-related chemicals and temporarily stage the containers on Site. Clearly label each container. When a sufficient quantity of containers have been accumulated at the Site, ship them to a licensed off-Site disposal facility in accordance with all applicable Federal and New York State Regulations.

6.5 MAINTENANCE RECORDS

A record of all maintenance performed at the Site will be kept at the on-Site control building. The record will include a description of the work performed, who it was performed by, and comments which may arise. Form 2 (Appendix F) provides a maintenance record log for this purpose.

6.6 REMEDIAL WORKS

Should inspections reveal that non-emergency maintenance or response is required, it will be completed as soon as practical in order to preclude further damage and the need for emergency repairs. Should a situation exist requiring immediate action, on-Site personnel must initiate emergency or remedial response actions. Notify EPA and DEC of any emergency actions.

Should remedial action, both emergency or non-emergency, require excavation into the landfill cap or PBS, notify EPA prior to commencing the work.

7.0 REPORTS

Data Summary Reports, Monitoring Reports, and Inspection and Maintenance Reports will be submitted to EPA and DEC. Data Summary Reports will be submitted at the same frequency as sampling events, after QA review, as detailed in Section 4.5.

Monitoring Reports will be submitted annually and will include the results of all environmental monitoring performed at the Site during the previous year. The Monitoring Reports will include:

- analytical results and appropriate QA/QC data;
- hydraulic monitoring data;
- an evaluation of the effectiveness of the PCS, including tables and figures generated; and
- recommendations for program revisions or system revisions, if appropriate.

Inspection and Maintenance Reports will be submitted annually and will include a description of all inspection and maintenance activities performed at the Site during the previous year, including recommendations for system improvements which would reduce the need for future unscheduled maintenance activities.

Copies of all Monitoring Reports and Inspection and Maintenance Reports will be submitted to EPA and DEC at the following offices:

Mr. Kevin Lynch, Chief
- Attention: Niagara county Refuse Site Manager
Western New York Remediation Section
EPA-Region 2
290 Broadway
New York, NY 10007-1866

Mr. Martin Doster
NYSDEC - Region 9
270 Michigan Avenue
Buffalo, NY 14203-2999

Mr. Gerald J. Rider, Jr.
Operation, Maintenance, and Support Section
NYSDEC
50 Wolf Road - Room 260
Albany, NY 12233-7010

Mr. Daniel King
NYSDEC, Regional Headquarters
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

8.0 COMMUNITY RELATIONS PLAN

8.1 CITIZEN PARTICIPATION PLAN

Citizen inquiries can be directed to the EPA Niagara Falls Public Information Office at (716) 285-8842.

8.2 CONTACT LIST

For press release information contact the Region 9 Citizen Participation Specialists at:

Michael Podd
Region 9 Citizen Participation Specialist
270 Michigan Avenue
Buffalo, NY 14203
(716) 851-7220

Patty Nelson
Region 9 Citizen Participation Specialist
270 Michigan Avenue
Buffalo, NY 14203
(716) 851-7010

8.3 FREEDOM OF INFORMATION LAW

Under the Freedom of Information Law, many records are available to the public for review. To obtain information, send a written request to the address below.

Records Access Officer
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-1016
A site file available for public review is maintained at the North Tonawanda Public Library, 505 Meadow Road, North Tonawanda, NY 14120.

9.0 PERSONNEL

This section describes the required minimum experience for key project personnel, responsibilities of the personnel, the organizational structure, and lines of communication and authority for the performance of the OM&M Manual at the Site.

9.1 ORGANIZATION

The OM&M Manual will be carried out by an OM&M Contractor(s) selected by the TSC. The evaluation of monitoring results, preparation of monitoring reports, design of significant contingency measures, and Site oversight/construction management will be coordinated by an OM&M Project Manager retained by the TSC. The organization chart including chains of command for the performance of the OM&M Manual is presented on Figure 9.1.

9.2 PERSONNEL REQUIREMENTS

Personnel requirements for the various OM&M activities are presented in Table 9.1.

9.3 RESPONSIBILITIES AND DUTIES

The RD/RA Participation Agreement among the Potentially Responsible Parties (PRPs) provides for OM&M as follows:

- Treat leachate discharged via off-Site forcemain - City of North Tonawanda;
- Collect groundwater, surface water, and effluent samples - City of Niagara Falls;
- Perform hydraulic monitoring - City of Niagara Falls;
- Lab analysis of all collected water samples - City of North Tonawanda;
- Prepare Data Summary Reports - TSC;
- Assemble information and prepare reports to EPA - TSC (or OM&M Project Manger/Contractor); and
- All other OM&M costs including inspection, operation, maintenance - TSC.

A description of the required duties and qualifications of the key personnel is presented below.

The TSC will have responsibility for overseeing/ensuring performance of administrative functions in accordance with the OM&M Manual. The TSC will assign an OM&M Project Manager and will retain the services of an OM&M Contractor(s) to perform the OM&M tasks. The OM&M Project Manager and the OM&M Contractor may be the same entity.

OM&M Project Manager

The TSC will assign an OM&M Project Manager who will have overall responsibility for the evaluation of monitoring results, preparation of monitoring reports, design of significant contingency measures, and Site oversight/management. The OM&M Project Manager will coordinate communications between the EPA, TSC, and OM&M Contractor(s). The OM&M Project Manager will ensure that adequate resources are committed by the OM&M Contractor(s) to properly manage monitoring and construction activities and will have 10 years or more of related experience.

OM&M Contractor's Project Manager

The OM&M Contractor will assign a Project Manager, subject to the approval of the OM&M Project Manager. The OM&M Contractor's Project Manager will have overall responsibility for the performance of all OM&M activities involving the OM&M Contractor. The OM&M Contractor's Project Manager will ensure adequate resources are committed by the OM&M Contractor to perform required activities and will have 10 years or more of related experience.

9.4 WORKER HEALTH AND SAFETY TRAINING

Prior to performing any Site activities, all personnel who will be or are expected to be involved with Site activities will attend a Health and Safety/Site Indoctrination Session.

The training program will stress the importance that each attendee understands the basic principles of personnel protection and safety, be able to perform their assigned job tasks in a safe and environmentally responsible manner, and be prepared to respond in an appropriate manner to any emergency which may arise. A description of the Site will be included and the various components of the HASP will be presented followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel not successfully completing this training program will not be permitted to enter or work at the Site. Personnel successfully completing this training program shall sign an acknowledgment form, a copy of which is presented as Attachment E1 in Appendix E (HASP).

Personnel involved in water sampling and/or handling, confined space entry, PCS and/or forcemain system cleaning or repair, cap repair (beneath the liner), and liner repair will require Occupational Safety and Health Administration (OSHA) training as defined by 29 CFR 1910.120. The Site Health and Safety training will be given in addition to the basic training required under OSHA and is not intended to meet the requirements of 29 CFR 1910.120. Prior to working in or entering an exclusion zone environment (as defined in the HASP), all personnel will be required to provide documentation to the OM&M Project Manager indicating successful completion of the training requirements of 29 CFR 1910.120. This includes a certificate for the initial 40 hours of training, a current eight-hour refresher certificate, and additional eight-hour certificates for managers or supervisors.

10.0 HEALTH AND SAFETY PLAN

The Health and Safety Plan (HASP) is detailed in Appendix E.

11.0 RECORDS

All records resulting from OM&M activities will be stored on Site in the control building and will be available for inspection by EPA personnel.

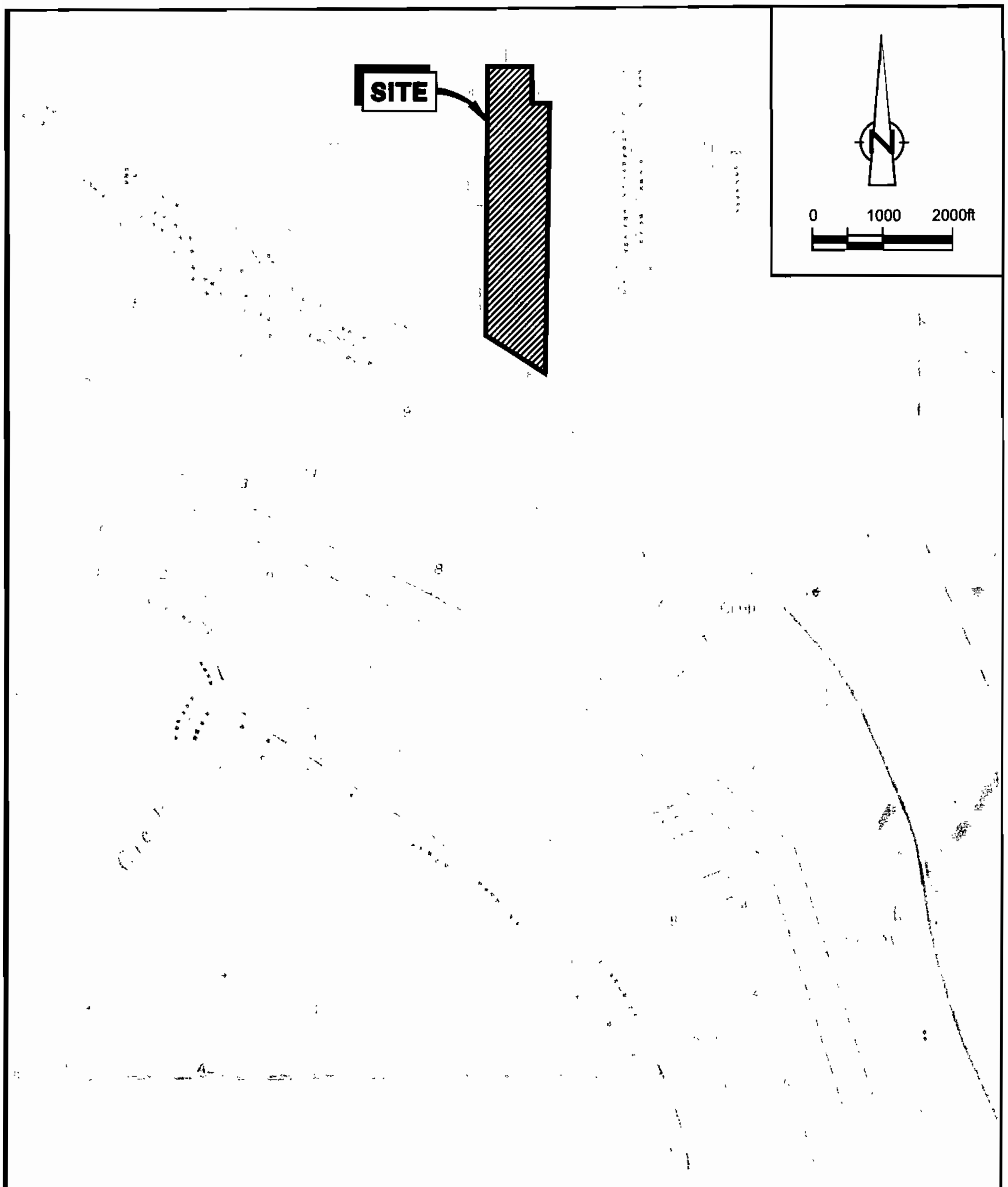
12.0 EMERGENCY CONTINGENCY PLAN

The Emergency Contingency Plan, including contingency actions for emergency spill response, fire/explosion, personal injury and toxic exposures, public notification, and emergency telephone numbers is detailed in the HASP (Appendix E).

13.0 RECORD DRAWINGS

Record drawings are provided in Volume 3.

FIGURES



SOURCE: U.S.G.S., SW/4 TONAWANDA 15' QUADRANGLE, OHIO

figure 2.1

SITE LOCATION
OPERATION, MAINTENANCE AND MONITORING MANUAL
NIAGARA COUNTY REFUSE SITE
Wheatfield, New York

CRA

05723-00(017)GN-WA001 OCT 25/2000

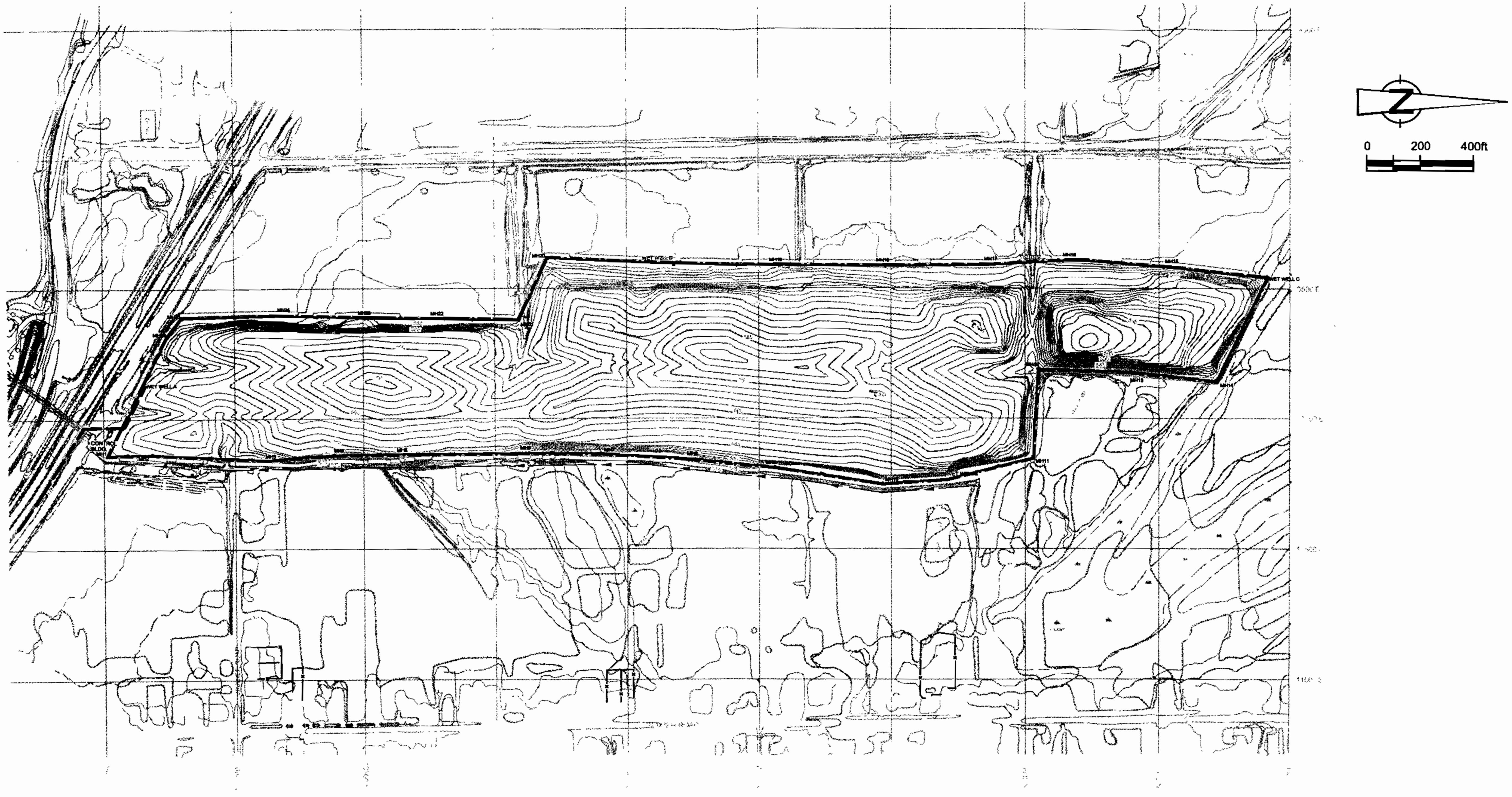
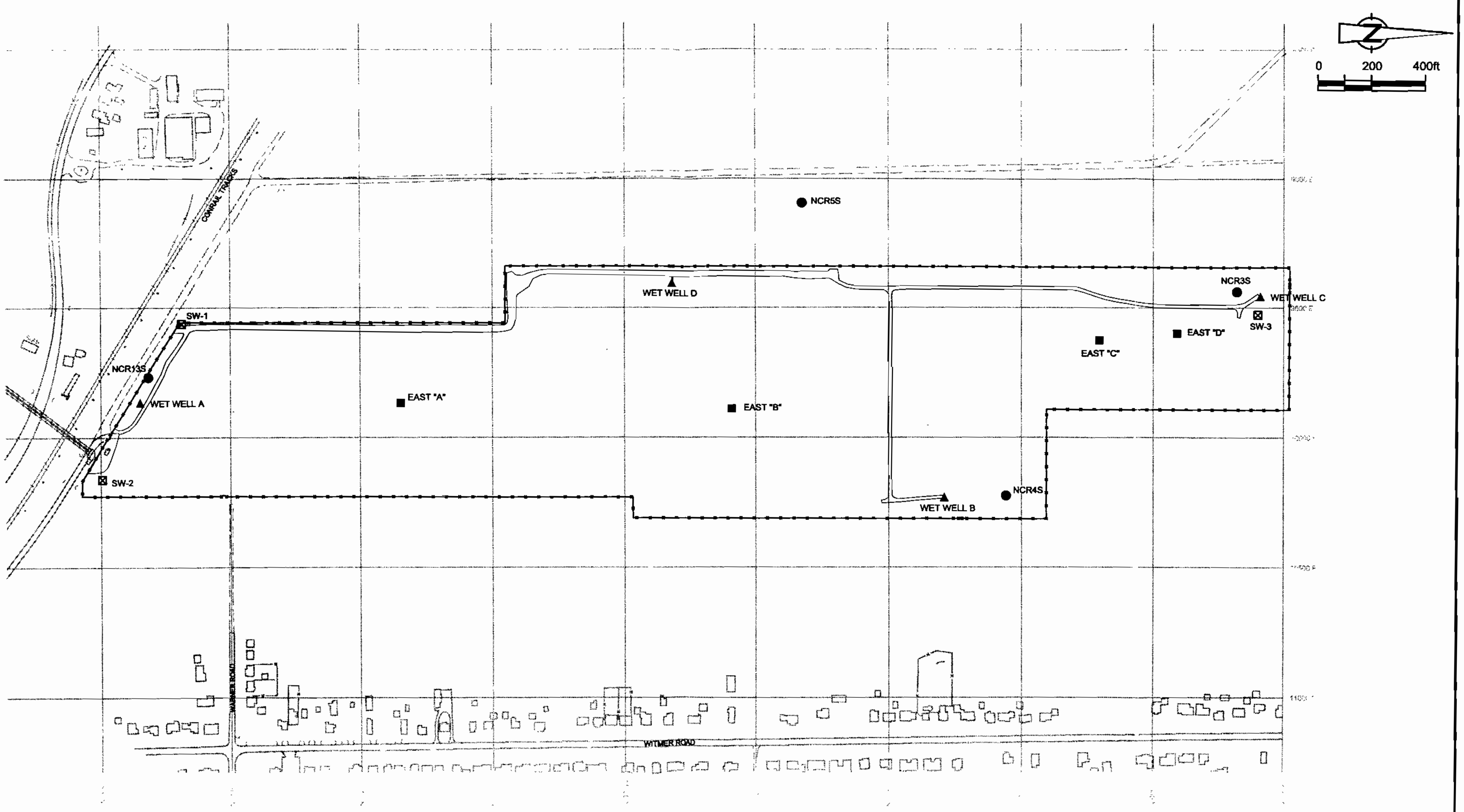


figure 2.2

SITE LAYOUT
NIAGARA COUNTY REFUSE SITE
Wheatfield, New York

CRA

05723-00(017)GN-WA007 OCT 25/2000



LEGEND

■ EAST "A"	HYDRAULIC MONITORING LOCATION
☒ SW-2	SURFACE WATER MONITORING LOCATION
▲ WET WELL A	EFFLUENT MONITORING LOCATION
● NCR13S	GROUNDWATER QUALITY MONITORING LOCATION

figure 4.1

MONITORING NETWORK
OPERATION, MAINTENANCE AND MONITORING MANUAL
NIAGARA COUNTY REFUSE SITE
Wheatfield, New York

CRA

05723-00(017)GN-WA002 OCT 25/2000

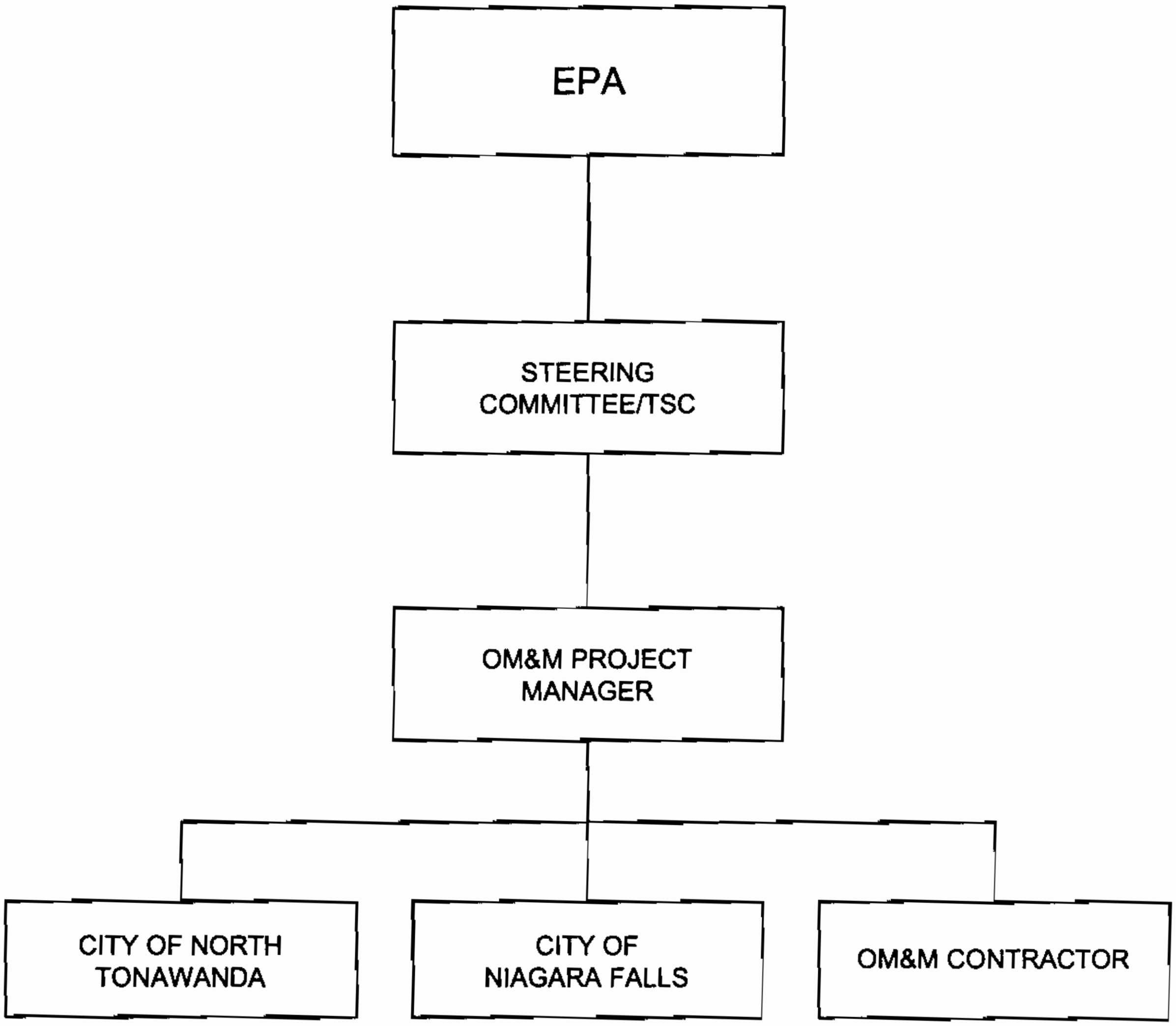


figure 9.1

ORGANIZATIONAL CHART
OPERATION, MAINTENANCE AND MONITORING MANUAL
NIAGARA COUNTY REFUSE SITE
Wheatfield, New York

CRA

TABLES

TABLE 6.1

MONTHLY INSPECTION AND PREVENTATIVE MAINTENANCE
OPERATION AND MAINTENANCE MANUAL
NCR SITE, WHEATFIELD, NEW YORK

	Item	*Inspect For*
1.	**Perimeter Collection System**	
	Manholes	- cover on securely - condition of cover - condition of inside of manhole - flow unrestricted, manhole free of obstructions
	Wet Wells	- cover on securely - condition of cover - condition of inside of wet well
2.	**Landfill Cap**	
	Vegetated Soil Cover	- erosion, bare areas, washouts, leachate seeps, length of vegetation, dead/dying vegetation
	Access Roads	- erosion, obstructions, potholes, puddles, debris
	Perimeter Fence	- integrity of fence, gates, locks, placement and condition of signs
	Vegetation	- bare areas, length of vegetation, dead/dying vegetation
	Drainage Ditches	- sediment build-up, erosion, condition of erosion protection, obstructions, dead/dying vegetation
	Culverts	- sediment build-up, erosion, condition of erosion protection, obstructions, debris
3.	**Wetlands**	
	Vegetation	- dead or dying vegetation, presence of invasive species such as reed grass, narrow leaf cattail, or purple loosestrife
	General Condition	- erosion, washouts, sediment build-up

TABLE 6.2

POTENTIAL PROBLEMS AND APPROPRIATE CORRECTIVE ACTIONS
OPERATION AND MAINTENANCE MANUAL
NCR SITE, WHEATFIELD, NEW YORK

Areas of Concern	*Potential Problem*	*Action*
Perimeter Collection System/Forcemain		
Perimeter Collection Pipe/Forcemain	Blockage in pipe. Will restrict groundwater flow. Water level may not be maintained at desired elevations.	Pressure flush pipe sections that are plugged. Vacuum sediments and debris from manholes and wet wells.
Barrier Wall	Leakage through barrier wall. Dewatering of adjacent wetlands. Excessive flow in collection pipe.	Determine section of barrier wall requiring repair. Excavate and reconstruct barrier wall to original construction specifications.
Final Landfill Cap		
Vegetated Soil Cover	Washout and erosion of vegetation, topsoil, clay, or sand. Typically on steep slopes.	Take immediate action to prevent further erosion and to protect exposed refuse. Recover washed out soil. This material may be used to restore the eroded area. Backfill with additional soil to original cover design thickness. Re-seed. If seeding slopes, erosion control mat is recommended.
	Bare areas.	Loosen and till topsoil. Re-seed and mulch as necessary. Perform restoration as so as feasible.
	Settlement of original cover. Standing water. Dry bare areas.	Assess size of settlement and potential impact to drainage or low permeability layer Till topsoil and grade. Add additional topsoil if necessary. Check final elevation to ensure adequate drainage. Re-seed and mulch. Regrading of topsoil should be sufficient to correct minor ponding. Additional soil may be required for significant ponding.
	Dead/dying vegetation (potential for erosion).	Till topsoil and re-seed. Cover with erosion control mat or mulch.
	Weeds/bushes. Deterioration of desired vegetation. Potential penetration through cover if left unattended.	Remove all bushes and tall weeds. Re-seed as required. Perform annually as a minimum.
	Animal holes/burrows. Safety hazard. Potential for soil cover erosion.	Capture and remove rodents. Excavate area carefully and inspect VFPE liner. Seal any holes in liner. Replace topsoil as required in specifications. Seed and mulch.

TABLE 6.2

POTENTIAL PROBLEMS AND APPROPRIATE CORRECTIVE ACTIONS
OPERATION AND MAINTENANCE MANUAL
NCR SITE, WHEATFIELD, NEW YORK

Areas of Concern	*Potential Problem*	*Action*
Landfill Cap (continued)		
Sideslopes	Groundwater seeps.	Strip topsoil and remove cap material. Excavate through material/layer restricting leachate flow to collection system. Replace and compact material to required specifications. Replace topsoil and apply seed and mulch. Pressure flush leachate collection system.
	Bare areas, dead or dying vegetation	Till topsoil, re-seed and mulch as necessary. Perform restoration as soon as feasible
	Washed out surface soils.	Recover washed out soils. Use this material to restore the eroded area. Backfill to original grade. Seed and mulch. Cover edge slopes with erosion control mat.
Access Roads	Potholes or puddles (potential safety hazard).	Backfill to original grade. Seed and mulch.
	Obstructions (safety hazard).	Remove obstruction as soon as possible. Place in secure area pending off-Site disposal.
Other Site Systems		
Gates and Locks	Vandalism. Site security.	Replace and secure locks as necessary. Make sure locks are operational.
Perimeter Fence	Forced entry or seasonal damage.	Repair or replace as needed.
Signs	Tampering or theft.	Repair or replace signs.
Ditches/Swale Outlets	Sediment or obstruction in ditch, swale, or culvert.	Remove sediment and stockpile as topsoil for future repairs.
	Smothering of vegetation and interruption of normal surface water flow.	Replace vegetation or re-seed and mulch if damaged.
	Rip rap displaced.	Replace rip rap as necessary.
Other Unforeseen Problems		Record problem on Inspection Log. Notify Project Manager for appropriate action.

TABLE 9.1

PERSONNEL REQUIREMENTS
OPERATION AND MAINTENANCE MANUAL
NCR SITE, WHEATFIELD, NEW YORK

Monitoring and Testing Activities

• groundwater monitoring	one or two person monitoring/sampling crew
• surface water monitoring	one or two person monitoring/sampling crew
• effluent monitoring	one person monitoring/sampling crew

Inspection Activities

• all inspection activities except those requiring confined space entry	one Inspector
• all inspection activities requiring confined space entry	one Inspector and two Support Persons

Maintenance Activities

• all maintenance activities	OM&M Contractor's crew

Operation Activities

• all operation activities	as appropriate

APPENDIX A

RECORD OF DECISION

RECORD OF DECISION
DECISION SUMMARY

Niagara County Refuse Site

Wheatfield, Niagara County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 1993

TABLE OF CONTENTS

ATTACHMENTS

SITE NAME, LOCATION AND DESCRIPTION

The Niagara County Refuse Site (the "Site") is a former municipal landfill, comprised of approximately 50 acres, located along the eastern border of the Town of Wheatfield, New York and the western border of the City of North Tonawanda. The southern edge of the Site lies approximately 500 feet north of the Niagara River.

The Site is generally surrounded to the west by active farmland; to the north by wooded wetlands, a clay mining operation, a Niagara-Mohawk Power Corporation transmission line, and a right-of-way owned by the New York State Department of Transportation (NYSDOT); to the east by woodlands and low-density housing (approximately 1000 feet from the Site boundary); and to the south by access roads, railroad tracks, River Road, and the Niagara River. (See Figure 1).

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Refuse disposal operations commenced at the Site in 1969 by the Niagara County Refuse Disposal District (NCRDD). The landfill was operated by completing a series of six excavations into the clay/upper till layer underlying the Site. The excavations were each filled with compacted solid waste, creating the six distinct cells which comprise the landfill. Wastes reported to have been disposed of at the Site include household, yard, institutional, commercial, industrial, demolition and construction, agricultural, sewage treatment plant sludges, street sweepings, and tires. Municipal refuse and industrial wastes were commingled throughout the landfill.

In 1973, the NCRDD reportedly constructed a compacted clay barrier seal around the perimeter of the Site, thereby reducing the potential for contaminants to migrate off-site. In addition, two feet of clay were reported to have been placed on the side slopes and one foot of clay placed over the top of the landfill. The Site continued to be operated by the NCRDD until October 1976 at which time it was officially closed. Any exposed refuse at that time was reported to have been covered with about 20 inches of dirt and clay, and then graded. The Town of Wheatfield acquired ownership of the Site from the NCRDD in June 1977.

Beginning in 1980, the Site became the focus of several investigations by the EPA, NYSDEC, and United States Geological Survey (USGS). The investigations were comprised of limited sampling of on-site soils, ground water, drainage swale surface water and sediments (drainage swales are surface runoff ditches that separate each landfill cell and surround the Site perimeter), as well as some off-site soil, surface water, and sediment sampling. Volatile organic compounds (VOCs), primarily methylene chloride, semi-volatile organic compounds (SVOCs), primarily phenolic compounds, phthalates, and polycyclic aromatic hydrocarbons (PAHs), pesticides, and metals were detected at varying concentrations in Site media. Based on the results of these investigations, the Site was placed on the National Priorities List (NPL) in September 1983.

In March 1989, a group of fourteen (14) Potentially Responsible Parties (PRPs) entered into an agreement with the EPA to conduct an RI/FS for the Site. The RI field activities were initiated in 1990 and completed in August 1991. These activities included: a topographic and property survey of the Site; a biota survey; ambient air sampling; collection and analysis of 26 subsurface soil samples, nine leachate seep samples (seven liquid and two soil), 18 drainage swale sediment samples, ten drainage swale surface water samples, and two sets of ground-water samples from each monitoring well; the excavation of three test pits; permeability testing of the hydrogeologic units beneath the Site; and completion of a field tile investigation in the field west of the Site (field tiles are placed in agricultural areas to facilitate drainage). Figure 2 indicates soil boring/monitoring well locations at the Site. The draft RI Report was completed in 1992 and finalized in 1993. The draft FS Report for the Site was completed in May 1993 and finalized in July 1993.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI report, FS report, and the Proposed Plan for the Site were released to the public for comment on July 24, 1993. These documents were made available to the public at two information repositories maintained at the North Tonawanda Public Library in North Tonawanda, New York and at the EPA Region II Office in New York City. The notice of availability for the above-referenced documents was published in the Niagara County Gazette on July 24, 1993. The public comment period on these documents was held from July 24, 1993 to August 22, 1993.

On August 5, 1993, EPA conducted a public meeting at the Wheatfield Town Hall, to inform local officials and interested citizens about the Superfund process, to present the Proposed Plan for the Site, including the preferred alternative for remediation of the Site, and to respond to any questions from area residents and other attendees. The comments received at the public meeting generally focused on the project schedule and the negotiation process which follows the completion of this ROD. There were also suggestions provided to facilitate the remedial action; *e.g.*, using clay currently mined in the vicinity of the Site for the landfill cap.

Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF RESPONSE ACTION

This is the first and only planned action for the Site. The primary objectives of this action are to control the source of contamination at the Site and to reduce and minimize the migration of contaminants into Site media thereby minimizing any health and ecological impacts.

In addition to the impacts measured and reported in the RI concerning traditional Site media (*e.g.*, ground water, surface water, sediments, etc.), the RI identified sensitive wetland areas at the Site, particularly in the area immediately north of the landfill. The ecological risk assessment performed as part of the Site risk assessment indicated that the potential for chronic impacts to occur in resident species in the northern wetland area had been established. Additionally, stressed vegetation has been observed in the northern wetland area which may have been induced by the Site. It is therefore necessary for the selected remedial alternative to include the following steps with regard to the wetlands:

- Perform a pre-design phase wetlands delineation and assessment of the delineated area in accordance with state and federal guidance which will include additional surface water and sediment samples to adequately quantify any chemical impacts on the wetlands that may exist and, based on sampling results, perform a supplemental ecological risk analysis;
- If the supplemental ecological risk analysis indicates adverse impacts on the wetlands, the contaminated areas of the affected wetlands may be removed, placed under the cap prior to closure, and the excavated areas restored or the cap itself may be extended over the area of contamination. Any significant net loss of wetlands or wetland function will require mitigation.

SUMMARY OF SITE CHARACTERISTICS

This section summarizes the findings of the RI. A statistical summary of the analytical data collected for the Site, listed by chemical and medium, can be found in Table f of Appendix II. The results of the RI indicated the following:

* Commingled industrial and municipal solid wastes were disposed of throughout the landfill cells. The landfill cells are completed in the clay/upper till unit (discussed below).

* The following four hydrogeologic units were identified at the Site: silt unit; clay/upper till unit; lower till unit; and bedrock unit. The silt unit is present across the Site outside the limits

of the landfill cells, varying in thickness from one (1) to eight (8) feet, and exhibits a relatively low hydraulic conductivity, which, along with the clay seal that may have been placed along the landfill perimeter, has minimized the potential for horizontal migration of contaminants from the landfill. The clay/upper till unit is present beneath the silt unit with an average thickness of 30 feet; this unit is characterized as an aquitard due to low hydraulic conductivities measured in the unit and similarly has minimized the potential for vertical migration of contaminants from the landfill. The lower till unit is present beneath the clay/upper till unit with an average thickness of 15.7 feet. The bedrock unit beneath the lower till unit is a highly fractured water-bearing unit characterized as a usable aquifer by the NYSDEC.

* Ground-water flow beneath the Site varies in each hydrogeologic unit. The lower till unit and bedrock unit are the primary water-bearing formations. Ground-water flow in the lower till is to the southwest in the southern half of the Site and towards the north/northwest in the northern half of the Site. The ground-water flow in the upper bedrock is generally towards the west in the southern two-thirds of the Site and to the north/northwest in the northern one-third of the Site. The upper bedrock aquifer is recharged by the Niagara River.

* Surface water runoff drains from the Site via the drainage swales. The drainage pattern for the southern two-thirds of the Site channels into an underground culvert that empties into the Niagara River and the northern one-third of Site drains into the wetland area to the north of the Site (see Figure 2). The field tile drains to the west of the landfill are hydraulically connected to the surface drainage pattern of the Site.

* Leachate mounding occurs within the landfilled material. Leachate seeps, in the form of toe discharges from the side slopes of the landfill, have developed. Samples taken of the liquid leachate indicate the presence of VOCs, SVOCs, pesticides, and metals. Toluene and ethylbenzene were the most frequently detected VOCs (five samples out of seven total), with a maximum concentration of 350 parts per billion (ppb) and 680 ppb, respectively. Phenols and phthalates were prevalent SVOCs in the leachate samples; Bis (2-Ethylhexyl) phthalate was the most frequently detected SVOC (present in all seven leachate samples), with an estimated maximum concentration of 10 ppb. The pesticides 4,4'-DDT and delta-BHC were present in three out of the seven leachate samples and the metals arsenic, barium, chromium, iron, lead, magnesium, manganese, and zinc were detected in all seven leachate samples. The maximum concentration of each exceeded the maximum contaminant level (MCL) established by the EPA and/or the Ambient Water Quality Standard (AWQS) established by NYSDEC for drinking water.

* Subsurface soil samples, taken during monitoring well installa-

tion from depths of less than one foot to more than 50 feet, indicate a limited presence of VOCs and SVOCs. Methylene chloride was the VOC detected with greatest frequency (ten samples out of 28 total), with a maximum concentration of 49 ppb. Bis (2-Ethylhexyl) phthalate was the most frequently detected SVOC (four out of 28 total samples), with a maximum concentration of 1500 ppb.

* Samples taken of Site sediments from the drainage swales traversing the Site indicate the presence of VOCs, SVOCs, pesticides, and metals. Methylene chloride and acetone were the most frequently detected VOCs (11 samples out of 18 total), with a maximum concentration of 73 ppb and an estimated maximum concentration of 89 ppb, respectively; bis (2-ethylhexyl) phthalate was the most frequently detected SVOC (11 samples out of 18 total), with a maximum concentration of 3900 ppb. The pesticide delta-BHC was present in seven out of 18 samples with a maximum concentration of 5.4 ppb. Metals occur naturally in soils and sediments (most metals were consistently detected in all 18 samples); however, mercury, which is attributable to mercury cell process waste sludges deposited in the landfill, was detected in 12 out of 18 samples, at a maximum concentration (1.1 parts per million (ppm)) slightly higher than regional background. Cadmium, magnesium, and nickel were other metals detected in sediments at maximum concentrations in excess of regional background levels.

* Surface-water samples, also collected from the drainage swales at the Site, indicate a limited presence of VOCs, SVOCs, pesticides, and metals. Carbon disulfide was the most frequently detected VOC (three of ten samples), with a maximum concentration of 8 ppb. Bis (2-Ethylhexyl) phthalate was the most frequently detected SVOC (six out of ten samples) with a maximum concentration of 1000 ppb. The pesticides 4-4'DDT and heptachlor epoxide were detected in one sample out of ten at levels that slightly exceeded the EPA MCL and/or the NYS AWQS for drinking water. Iron, lead, magnesium, and manganese were metals that were detected in all surface water samples at levels above the EPA MCL and/or the NYS AWQS.

* Ground-water samples were taken from three water-bearing zones identified at the Site: shallow overburden zone (corresponding to the silt unit described above); deep overburden zone (corresponding to the clay/upper till and lower till units described above); and upper bedrock zone (corresponding to the bedrock unit described above). Analysis of the shallow overburden zone samples indicated maximum concentration exceedances of the EPA MCL or maximum contaminant level goal (MCLG) and/or New York State Department of Health (NYSDOH) MCL for the metals chromium, iron, manganese, and sodium (although iron and sodium levels in regional ground water typically exceed MCLs). Deep overburden zone samples also showed maximum concentration exceedances of the EPA MCL or MCLG and/or NYSDOH MCL for chromium, iron, manganese, and sodium and additionally for lead. Ground-water samples taken in the bedrock zone indicated maximum concentration exceedances of the EPA and/or

NYSDOH MCL or MCLG for iron and sodium. All three water-bearing zones showed either a negligible impact from VOCs, SVOCs, and pesticides or no impact at all.

* The ambient air quality measured across the Site did not exceed NYS acceptable ambient air levels.

* The compound 2,4,5-trichlorophenol was not confirmed in any of the chemical samples analyzed for the Site and, therefore, a dioxin-screening program was not required.

SUMMARY OF SITE RISKS

EPA conducted a baseline risk assessment to evaluate the potential risks to human health and the environment associated with the Niagara County Refuse Site in its current state. The Risk Assessment focused on contaminants in the surface soil, subsurface soil, ground water, surface water, sediments, and leachate which are likely to pose significant risks to human health and the environment. The summary of the contaminants of concern in sampled matrices is listed in Table a and the contaminant levels used for the human health risk calculations are listed in Table f.

Human Health Risk Assessment

EPA's baseline risk assessment addressed the potential risks to human health by identifying several potential exposure pathways by which the public may be exposed to contaminant releases at the Site under current and future land-use conditions. Exposures were assessed for both potential present and future land use scenarios. A total of 21 exposure pathways were evaluated under possible on-site current and future land-use conditions. These exposure pathways are listed in Table b. As illustrated in Table b, the future potential risk associated with the ingestion of ground water by area residents was calculated. The present and future potential risk associated with incidental ingestion of on-site surface soils and drainage swale sediments by a youthful trespasser and the future potential risk associated with incidental ingestion of on-site subsurface soils and drainage swale sediments by excavation workers were also quantified pathways. Similarly, the present and future potential risk associated with dermal contact with drainage swale sediments and dermal contact and incidental ingestion of leachate soils by a youthful trespasser and the future potential risk associated with dermal contact with drainage swale sediments by excavation workers were also calculated. Reasonable maximum exposures were evaluated for all scenarios.

Under current EPA guidelines, the likelihood of carcinogenic (cancer-causing) and noncarcinogenic effects due to exposure to Site chemicals are considered separately. It was assumed that the toxic effects of the site-related chemicals would be additive.

Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of milligrams/kilogram-day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds across all media that impact a particular receptor population.

An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The reference doses for the compounds of concern at the Site are presented in Table c. A summary of the noncarcinogenic risks associated with exposure to these chemicals across various exposure pathways is found in Table d.

It can be seen from Table d that the HI for noncarcinogenic effects from the future potential ingestion of Site ground water by area residents is 5, therefore, noncarcinogenic effects may occur under this scenario. The potential noncarcinogenic risk is attributable to several inorganics, including aluminum, antimony, arsenic, iron, and manganese.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely. The SF for the compounds of concern are presented in Table c.

For known or suspected carcinogens, EPA considers excess upper-bound individual lifetime cancer risks of between 10^{-4} to 10^{-6} to be acceptable. This level indicates that an individual has approximately a one in ten thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the Site. As indicated in Table e, an incremental risk was calculated for each of the quantified exposure pathways from Table b. This includes a risk of $2x10^{-4}$ for the future potential risk associated with the ingestion of Site perimeter ground water by area residents, a $1x10^{-4}$ risk for the future potential risk associated with the ingestion of ground water beneath the northern landfill cell by area residents, a $4x10^{-6}$ risk for the present and future potential risk associated with the ingestion of Site surface soils by a youthful trespasser, and a $5x10^{-6}$ risk for the present and future potential risk associated with the ingestion of Site sediments by a youthful trespasser. Other calculated risks were $7x10^{-7}$ for the future potential risk from the ingestion of subsurface soils by an excavation worker, $9x10^{-7}$ for the future potential risk from the ingestion of sediments by an excavation worker, and $9x10^{-6}$ for the present and future potential risk from the ingestion of leachate soils by a youthful trespasser.

The greatest carcinogenic risk attributable to the Site is the potential future risk associated with the ingestion of Site perimeter ground water by area residents. This generated a risk of $2x10^{-4}$, which is at the margin of the NCP's acceptable risk range. This risk is primarily attributable to the metal arsenic, although the levels detected in Site ground-water wells were below the EPA and New York State Department of Health (NYSDOH) maximum contaminant level (MCL).

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the Risk Assessment provides upper-bound estimates of the risks to populations near the Site, and is highly unlikely to underestimate actual risks related to the Site.

An estimate of central tendency risk can be obtained by substituting average or median values for upper bound values. This is most useful for the exposure pathway which results in the highest estimated carcinogenic or non carcinogenic risk, i.e., ground-water ingestion. Applying these lower values to risk calculations results in the following changes in risk values:

- carcinogenic risk decreases by a factor of 4.8, and
- noncarcinogenic risk decreases by a factor of 1.4.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the Risk Assessment Report.

The greatest carcinogenic risk attributable to the Site is associated with the ingestion of ground water. The cancer risk is based on current levels of ground-water contaminants. If no action is taken with respect to the landfill, the continued release of contaminants into Site ground water could result in a greater cancer risk at some point in the future. Additionally, significant noncarcinogenic effects from the ingestion of Site ground water by area residents has also been established in the Risk Assessment. Therefore, based on the results of the Risk Assessment, the EPA has determined that actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present a potential threat to public health, welfare, or the environment.

Ecological Risk Assessment

Potential risks to the environmental receptors associated with the Niagara County Refuse Site were identified in the ecological risk assessment. The ecological risk assessment identified surface water and sediments as the primary media pathways that potentially impact local species and sensitive environments. Surface water and sediment samples collected from the northern wetland area, the northern drainage swales, and the southern drainage swales as well as samples from leachate seeps and surface soils were representative of potential exposure media. Surface-water and sediment concentrations of metals (primarily aluminum, lead, and zinc) and pesticides (primarily 4,4-DDT) may result in adverse acute and/or chronic effects in aquatic organisms within the drainage swales and streams present on the Site or in close proximity. Acute toxic effects may also occur in aquatic organisms within the southern drainage swale due to elevated metal concentrations detected in the swale surface water.

Based upon the computed risk indices for the northern wetland stream and the northern and southern drainage swales, quantified by using exposure and toxicity data to estimate the potential impact on the ecosystem, the potential for chronic impacts to occur in resident species has been established (*i.e.*, the risk indices were greater than one). Acute effects are also likely to occur to organisms in the southern drainage swale. Additionally, stressed vegetation has been observed in the northern wetland area which may have been induced by the Site.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment. The primary objectives of this action are to control the source of contamination at the Site and to reduce and minimize the migration of contaminants into Site media thereby minimizing any health and ecological impacts.

The following remedial action objectives were established for the Site:

- Preventing direct contact with landfill contents;
- Controlling surface water runoff and erosion;
- Collecting and treating landfill leachate;
- Controlling landfill gas;
- Preventing the infiltration of contaminants into ground water; and
- Remediating contaminated wetland areas, if necessary.

However, this action does not propose to remediate the ground water as the greatest carcinogenic risk attributable to the Site is the future potential risk associated with the ingestion of Site perimeter ground water by area residents. Currently, area residents are provided with water through a municipal water supply. Implementation of the selected remedy will prevent further degradation of the ground water. Long-term ground-water and surface-water monitoring will be implemented to ensure that the remediation is effective.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. It also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified.

This ROD evaluates in detail, six remedial alternatives for addressing the contamination associated with the Niagara County Refuse Site. The time to implement a remedial alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate with the responsible parties, or procure contracts for design and construction, or conduct operation and maintenance (O&M) at the Site.

The remedial alternatives are:

ALTERNATIVE 1: NO ACTION

Capital Cost: $ 0
O&M Cost: $ 2200/yr (for 5 year reviews for a 30-year period)
Present Worth Cost: $ 30,500
Implementation Time: None

CERCLA requires that the "no-action" alternative be considered as a baseline for comparison with other alternatives. Under this alternative, no action would be taken to contain wastes, reduce infiltration into the landfill, eliminate areas of exposed waste, or control and treat leachate discharging from the landfill. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the remedial action be reviewed at least once every five years.

ALTERNATIVE 2: INSTITUTIONAL CONTROLS

Capital Cost: $ 267,400
O & M Cost: $ 130,300/yr (monitoring program)
Present Worth Cost: $ 2,501,900
Implementation Time: 6 months

This alternative would consist of deed and access restrictions and an environmental monitoring program. The deed restrictions would be designed to prevent direct contact with the subsurface waste material in the landfill by limiting future Site use. Access would be restricted by the construction of a perimeter fence with locked gates. Ground-water and surface-water monitoring, designed to track any contaminant migration from the landfill, would be conducted on a quarterly basis. No remedial action would be taken with regard to the leachate seeps. Five-year Site reviews would again be required.

ALTERNATIVE 3: RCRA "C" STANDARD CAP

Capital Cost: $ 21,196,050 (avg.)
O & M Cost: $ 150,300/yr
Present Worth Cost: $ 23,774,550 (avg.)
Implementation Time: 2 years

This alternative would include the deed and access restrictions and monitoring program described in Alternative 2, above, with the addition of the following remedial measures:

- Grading of the landfill (either minimal grading for capping each distinct cell, extensive grading for capping all cells under one contiguous cap, or a configuration between the two extremes). The final grading configuration would be determined during the remedial design phase of the project, largely based on cost and the availability of fill material to achieve proper drainage;

- Construction of a Resource Conservation and Recovery Act (RCRA) Subtitle C Standard Cap, comprised of 24 inches of compacted clay liner, high-density polyethylene (HDPE) liner, 12-inch sand drainage layer, 24 inches of fill, six inches of topsoil, and grass cover. Figure 3 illustrates a typical section for a RCRA Standard Cap;

- Construction of a clay perimeter barrier wall;

- A gas venting system beneath the cap. It is anticipated that a system of gas venting trenches would be installed beneath the cap instead of a 12-inch gas venting layer, due to the current low volume of gas generated by the landfill (approximately 126 cubic feet per minute (cfm)). The final gas venting configuration will be determined in the remedial design phase; and

- Removal of the field tile drains to the west of the landfill which have been hydraulically connected with Site drainage patterns and their placement under the cap prior to closure.

The EPA's Hydrogeologic Evaluation of Landfill Performance (HELP) Model was utilized to evaluate percolation rates under the RCRA "C" Cap configuration and yielded a 25 gallon per day (gpd) estimate of leachate generation. Based on this relatively small amount of leachate for a 50-acre Site, a variance from the RCRA "C" Standard Cap design would be sought to omit the leachate collection system. Five-year Site reviews would again be required.

ALTERNATIVE 4: NYS STANDARD CAP CONSISTENT WITH 6NYCRR PART 360

Capital Cost: $ 15,779,200 (avg.)
O & M Cost: $ 150,300/yr
Present Worth Cost: $ 18,357,550 (avg.)
Implementation Time: 2 years

This alternative would include the deed and access restrictions, monitoring program, re-grading, clay barrier wall, gas venting, and field tile drain removal described in Alternative 3 above. The NYS Standard Cap, constructed to meet the standards for municipal solid waste facilities in accordance with 6 NYCRR Part 360, has the following configuration:

- A minimum of eighteen inches of compacted clay liner (or 40 mil geomembrane), 24 inches of low permeability drainage material, six inches of topsoil, and grass cover. This differs from the RCRA "C" Standard Cap configuration in that 18 inches of clay liner is required as opposed to 24 inches, the 40 mil geomembrane can replace the clay liner under the NYS configuration as opposed to being required in addition to the clay liner under the RCRA configuration, a 24-inch drainage layer is required as opposed to a 12-inch layer, and six inches of topsoil is called for as opposed to 24 inches. Figure 4 illustrates a typical section for a NYS Standard Cap.

No remedial action would be taken with regard to the leachate seeps under this alternative. Five-year Site reviews would again be required.

ALTERNATIVE 5: NYS STANDARD CAP, LEACHATE COLLECTION WITH ON-SITE TREATMENT

Capital Cost: $ 17,459,400 (avg.)
O & M Cost: $ 360,300/yr
Present Worth Cost: $ 23,650,900 (avg.)
Implementation Time: 3 years

This alternative would be identical to Alternative 4 with the addition of leachate collection and on-site treatment. As with Alternative 4, this option includes deed and access restrictions, a monitoring program, re-grading, a clay barrier wall, gas venting, field tile drain removal, and construction of a NYS Standard Cap. Again, the EPA's HELP Model was utilized to evaluate percolation rates under the NYS Standard Cap configuration and yielded a 6600 gpd estimate of leachate generation. Based on this figure, the leachate collection system would consist of the following:

* Eight-inch diameter perforated HDPE pipe installed around the perimeter of the Site above the water table with an approximate length of 10,000 feet;

* Installation of the system in a granular trench with a geotextile liner installed at the clay/granular interface and the granular trench connected to the cap's gas collection trenches;

* Approximately four pumping stations to properly convey the leachate in the system (final configuration to be determined during the remedial design phase of the project);

* In order to meet the requirements of 6NYCRR Part 360 for a leachate collection and removal system, the option for the installation of extraction wells with submersible pumps to actively extract leachate from the landfill and through the collector system for treatment. The need for an active leachate collection system in conjunction with the passive system described above will be determined in the remedial design phase of the project; and

* Leachate would be discharged to an on-site treatment facility.

Figure 5 illustrates the leachate subsurface perimeter drain and gas collection system.

Based on the representative leachate data for the Site, the following is an outline of the key components of an on-site treatment system:

* Physical and/or chemical pretreatment to reduce metal concentrations and minimize solid formation. This may involve

aeration and/or pH adjustment followed by flocculation;

- Aerobic biological treatment, using a suitable system for dealing with high strength and variable effluents; and
- Activated granular carbon treatment, which may be required for final polishing depending on action-specific ARARs.

The on-site treatment plant would be located on a parcel of land adjacent to the southwest corner of the Site. The effluent from this treatment plant would be discharged in accordance with NYSDEC discharge criteria into the ditch that runs along the southern portion of the Site which connects to the underground culvert that drains to the Niagara River.

Five-year Site reviews would again be required.

ALTERNATIVE 6: NYS STANDARD CAP, LEACHATE COLLECTION WITH OFF-SITE TREATMENT

Capital Cost: $ 16,740,200 (avg.)
O & M Cost: $ 198,700/yr
Present Worth Cost: $ 20,151,300 (avg.)
Implementation Time: 2 years

This alternative would be identical to Alternative 5 with the exception of off-site treatment of collected leachate instead of on-site. As with Alternative 5, this option includes deed and access restrictions, a monitoring program, re-grading, a clay barrier wall, gas venting, field tile drain removal, and construction of a NYS Standard Cap. The method of leachate collection would also be identical to that proposed in Alternative 5. For Alternative 6, however, collected leachate would be treated at an off-site facility. The City of North Tonawanda's publically owned treatment works (POTW) has been assumed for costing purposes to be the off-site treatment facility. The ultimate off-site facility chosen will be determined during the remedial design phase of the project. Under this alternative, leachate collected from the Site would be pumped via direct discharge by forcemain to the City of North Tonawanda's sanitary sewer system to be treated at the City's POTW (if the North Tonawanda POTW is determined in the design phase to be a suitable treatment facility). The physical point of connection to the sanitary sewer system will also be determined during the remedial design phase of the project based on an investigation of the sewer system proposed to transport the leachate, which will evaluate the ability of the sewer system to transport the leachate to the POTW without overflows from the system or backup into adjacent services. Based on preliminary data, it is not expected that pretreatment of the leachate will be necessary; however, under the State Pollutant Discharge Elimination System (SPDES) permit for the North Tonawanda POTW, the POTW alone must determine if the leachate from the Site will require pretreatment. A leachate characterization treatability study, including the Toxicity Characteristic Leaching Procedure (TCLP), will be required during the design phase of the project to confirm that the selected facility will be able to accommodate the Site leachate without pretreatment.

Five-year Site reviews would again be required under this alternative.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, a detailed analysis of each alternative is required. The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against these criteria.

The following "threshold" criteria must be satisfied by any alternative in order to be eligible for selection:

1. *Overall protection of human health and the environment* addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. *Compliance with ARARs* addresses whether or not a remedy would meet all of the applicable (legally enforceable), or relevant and appropriate (requirements that pertain to situations sufficiently similar to those encountered at a Superfund site such that their use is well suited to the Site) requirements of federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs between alternatives:

3. *Long-term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. *Reduction of toxicity, mobility, or volume via treatment* refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants or contaminants at the Site.

5. *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. *Implementability* refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. *Cost* includes estimated capital and operation and maintenance costs, and the present-worth costs.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

8. *State acceptance* indicates whether, based on its review of the RI/FS and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with the preferred alternative.

9. *Community acceptance* refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Factors of community acceptance to be discussed include support, reservation, and opposition by the community.

A comparative analysis of the remedial alternatives based upon the evaluation criteria noted above follows.

- <u>Overall Protection of Human Health and the Environment</u>

Alternatives 3, 4, 5, and 6 would provide permanent overall protection of human health and the environment by containing waste with a landfill cap, controlling landfill gas through venting, and preventing potential contaminant migration with the construction of a clay barrier wall. Alternative 3 effectively minimizes the amount of leachate generated by the landfill, while Alternatives 5 and 6 control and treat the generated leachate. Alternatives 3, 5, and 6 are, therefore, more effective in achieving the remedial objectives for the Site.

Alternative 4 eliminates contact with landfilled wastes, but does not address leachate seeps that would continue to occur under this alternative. Alternative 1 (No Action) and Alternative 2 (Institutional Controls) are not protective of human health and the environment because they do not eliminate potential contact with landfilled wastes and do not minimize rainfall infiltration into the landfill, thereby preventing further leaching of contaminants into the environment. In addition, Alternatives 1 and 2 do not control the leachate seeps. Therefore, Alternatives 1 and 2 were eliminated from consideration and will not be discussed further.

- Compliance with ARARs

The principal action-specific ARARs for the Site include RCRA Subtitle C and 6NYCRR Part 360 requirements, the NYSDEC State Pollutant Discharge Elimination System (SPDES) for the discharge of treatment system effluent, federal Guidelines and Standards for effluent discharge to a POTW (including the Clean Water Act and RCRA permits by rule for a POTW), and state regulations for the control of surface water runoff. The main purpose of a NYCRR Part 360 Standard Cap is to construct a landfill cover with a permeability less than or equal to the existing liner, which in this case is the natural low permeability clay on which the landfill is sited. Alternatives 4, 5, and 6 will require the clay cover to have a post-compaction maximum remolded coefficient of permeability of 1x10-7 cm/sec throughout its thickness to comply with the regulation. Alternatives 3 and 4 would be in compliance with action-specific ARARs with the exception of the RCRA and NYS Part 360 regulations requiring a leachate collection system. Alternative 3 would reduce the leachate generation to approximately 25 gpd, a quantity for which a variance from the regulation would be requested. Under Alternative 4, however, approximately 6600 gpd would be generated and a leachate collection system would be warranted. Alternative 4, therefore, does not meet the requirements for action-specific ARARs. Alternatives 5 and 6 would be in compliance with all action-specific ARARs. Alternative 5 would also require compliance with the substantive requirements of state air and discharge permits in its implementation. The implementation of Alternative 6 would also have to meet the federal requirements for discharge to a POTW (40 CFR Part 403) and the City of North Tonawanda's Sewer Use Ordinance (if the North Tonawanda POTW is determined in the design phase to be a suitable treatment facility). Federal and state action-specific air ARARs which would have to be met in the implementation of Alternative 6 include 40 CFR 50 (federal air quality standards for particulate matter and lead) and 6NYCRR Part 373 (control of wind dispersal of particulate matter).

Since the landfill ceased operations in October 1976, prior to the effective date of the RCRA Subtitle C regulations (November 19, 1980), and the remedy does not involve the disposal of RCRA-regulated waste, the RCRA Subtitle C closure standards are not applicable. However, available information indicates that hazardous substances disposed of at the landfill may be similar to RCRA wastes. In addition, the purpose of some of the RCRA closure requirements is similar to the purpose of this CERCLA action. For these and other reasons, certain of the RCRA Subtitle C closure requirements, although not applicable, are relevant and appropriate for the remedial action at this landfill. Accordingly, Alternatives 3, 4, 5, and 6 will comply with all provisions of the RCRA hazardous waste landfill closure regulations which are relevant and appropriate to the Site; specifically, 40 CFR Part

264, Subpart N, Sections 264.303 and 264.310, as well as the NYS Part 360 regulations for closure.

RCRA Land Disposal Restrictions (LDRs) preclude the placement of restricted hazardous waste into a land disposal unit. For the LDRs to be applicable to a CERCLA response, the action must constitute placement of a restricted RCRA hazardous waste. Because the waste is being capped in place, LDRs do not apply except for Alternative 6, which involves transferring the leachate off-site for treatment. Therefore, Alternative 6 will include a leachate characterization treatability study, including the TCLP, to confirm that the off-site facility will be able to accommodate the Site leachate without pretreatment.

Principal location-specific ARARs for the Site include Section 404 of the Clean Water Act of 1972, as amended (CWA), New York Code of Rules and Regulations Wetlands Permit (6NYCRR Part 663), the National Historic Preservation Act, the Coastal Zone Management Act, and the Farmland Protection Policy Act. Construction of a cap and leachate collection system may result in some net loss of wetlands that will require mitigation; any action taken at the Site in the wetlands area will require compliance with Section 404 of the CWA and 6NYCRR Part 663. The National Historic Preservation Act will require the performance of a Stage IA cultural resources survey. The Coastal Zone Management Act will require that a coastal zone consistency determination be performed. The Farmland Protection Policy Act will require a determination of impacts on adjacent agricultural lands. Alternatives 3, 4, 5, and 6 would each be in compliance with all location-specific ARARs.

- <u>Long-Term Effectiveness and Permanence</u>

A landfill cap is considered a reliable remedial measure that, when properly designed and installed, provides a high level of protection. Provided that the cap is maintained, Alternatives 3, 5, and 6 are each effective and permanent in the long-term. Direct contact with landfill contents would be eliminated, leachate generation and migration would be significantly reduced, minimizing the potential for surface water and sediment contamination, and lateral landfill gas migration would also be effectively controlled. Alternative 4 would likely result in the continued occurrence of leachate seeps and is therefore less effective in the long-term.

Post-closure operation and maintenance requirements would ensure the continued effectiveness of the landfill cap, landfill gas ventilation system, and any of the leachate system options.

- Reduction in Toxicity, Mobility, or Volume via Treatment

None of the proposed alternatives reduces the toxicity, mobility, or volume of landfill waste through treatment. The mobility of contaminants would, however, be significantly reduced by the installation of a cap. Alternative 3 is the most effective in reducing the volume of leachate generated as it is the most restrictive cap configuration with respect to infiltration. However, without leachate collection and treatment, the toxicity and mobility of contaminants in the leachate would not be effectively reduced. Alternative 4 is effective in reducing the volume of leachate generated, but also has no effect on the toxicity and mobility of contaminants in the leachate since there is no collection and treatment.

Only Alternatives 5 and 6 effectively reduce the volume of leachate generated and the toxicity and mobility of the contaminants in the leachate through collection and treatment.

- Short-Term Effectiveness

The installation of a cap for Alternatives 3, 4, 5, and 6 would not result in any short-term impacts which can not be readily mitigated and controlled. Alternative 3 would result in a greater increase in traffic flow along local roads because the RCRA Cap requires more materials than the NYS Standard Cap. This traffic would raise dust and increase noise levels locally. However, this activity is expected to be of short duration and measures can be taken to minimize these impacts.

Short-term risks to workers could be increased to the extent that surficial wastes are encountered during landfill capping activities. However, these risks will be properly mitigated through the implementation of a site-specific Health and Safety Plan for all on-site workers.

Alternatives 3, 4, 5, and 6 have high short-term effectiveness, when considering the length of time needed for construction. Alternatives 3, 4, and 6 would each be completed within a two-year period to allow for compaction and settlement of fill material over the winter season. Alternative 5 would likely require an additional year for construction to allow for building an on-site leachate treatment system.

- Implementability

All of the alternatives are implementable from an engineering standpoint. Each alternative utilizes commercially available products and accessible technology.

Alternatives 5 and 6 also involve common construction practices in the installation of the perimeter subsurface leachate collection system. The on-site leachate treatment facility for Alternative 5 would require treatability studies to determine the appropriate technology components prior to final design.

The implementation of off-site treatment for Alternative 6 is contingent upon acceptance and approval by the off-site treatment facility.

- Cost

The capital costs for Alternatives 3, 4, 5, and 6 range from $15.8 million for Alternative 4, which does not include leachate collection/treatment, to $21.2 million for Alternative 3, which uses the most cap materials. Alternatives 3 and 4 have the lowest O & M costs, $150,300, since they do not require leachate collection/treatment and Alternative 5 has the highest O&M cost, $360,000, due to maintenance of an on-site treatment facility. The range in net present worth costs runs from $18.4 million for Alternative 4, the least material and O&M intensive alternative to $23.8 million for Alternative 3, the most material intensive alternative.

- State Acceptance

The State of New York concurs with the selected remedy.

- Community Acceptance

All comments submitted during the public comment period were evaluated and are addressed in the attached Responsiveness Summary (Appendix V).

SELECTED REMEDY

EPA has determined after reviewing the alternatives and public comments, that Alternative 6 is the appropriate remedy for the Site, because it best satisfies the requirements of CERCLA and the NCP's nine evaluation criteria for remedial alternatives.

The major components of the selected remedy are as follows:

1) Capping of the landfill with a NYS Solid Waste Standard Cap, meeting 6NYCRR Part 360 requirements, including a minimum of 18 inches of compacted clay liner with a post-compaction maximum remolded coefficient of permeability of $1x10^{-7}$ cm/sec throughout its

Can we use 40 mil HDPE

thickness, 24 inches of low permeable fill, six inches of topsoil, and a grass cover (see Figure 4). Grading of the landfill will be based on the final capping configuration (either minimal grading for capping each distinct cell, extensive grading for capping all cells under one contiguous cap, or a configuration between the two extremes) to be determined during the remedial design phase of the project, largely based on cost and the availability of fill material to achieve proper drainage. Clean fill will be necessary to properly grade the Site. The low permeability soil cover will be placed on a minimum four (4) percent slope along the upper portions of the landfill to promote positive surface-water drainage and a maximum 33 percent slope along the lower portions of the landfill to minimize erosion;

2) Construction of a clay barrier wall around the perimeter of the landfill. The barrier wall will extend from the cap to the clay/upper till unit underlying the Site and will minimize the potential for leachate and gas migration from the landfill to the surrounding shallow silt unit;

3) Construction of a gas venting system consisting of a gas venting layer or trenches underlying the low permeability cap material, connected to perimeter trench vents surrounding the landfill and/or vertical vent pipes along the cap of the landfill. The gas venting system will be located within the clay barrier wall to increase its effectiveness in controlling horizontal landfill gas migration;

4) Removal of the field tile drains to the west of the landfill which have been hydraulically connected with Site drainage patterns and their placement under the cap prior to closure.

5) Construction of a leachate collection system, consisting of approximately 10,000 feet of eight-inch diameter perforated HDPE pipe installed around the perimeter of the Site above the water table. The system will be installed in a granular trench with a geotextile liner installed at the clay/granular interface and the granular trench connected to the cap's gas collection trenches (see Figure 5). Approximately four pumping stations will be installed to properly convey the leachate in the system; an option for the installation of extraction wells with submersible pumps to actively extract leachate from the landfill and through the collector system will be determined in the remedial design phase of the project. Treatment of the collected leachate will be done at an off-site treatment facility. The City of North Tonawanda's POTW has been assumed for costing purposes to be the off-site treatment facility. The ultimate off-site facility chosen will be determined during the remedial design phase of the project. Although it is unlikely that the leachate will require pretreatment prior to its release from the Site, the treatment facility alone must determine if any pretreatment is necessary. A leachate characterization treatability study, including the TCLP, will be performed during the remedial design phase to allow the treatment facility to make

this determination. Collected leachate will be pumped by forcemain to the City of North Tonawanda's sanitary sewer system (if the North Tonawanda POTW is determined in the design phase to be a suitable treatment facility). The physical point of connection to the sanitary sewer system will be determined during the remedial design phase of the project based on an investigation of the sewer system proposed to transport the leachate, which will evaluate the ability of the sewer system to transport the leachate to the POTW without overflows from the system or backup into adjacent services. The leachate will then be treated at the off-site facility;

6) Performance of a pre-design phase wetlands delineation and assessment in accordance with state and federal guidance. This includes taking additional surface water and sediment samples to adequately quantify any chemical impacts on the wetlands that may exist. Based on sampling results, a supplemental ecological risk analysis will be performed. If the supplemental ecological risk analysis indicates adverse impacts on the wetlands, the contaminated areas of the affected wetlands may be removed, placed under the cap prior to closure, and restored or the cap itself may be extended over the area of contamination. Any significant net loss of wetlands or wetland function will require mitigation.

7) Compliance with all ARARs, including the location-specific ARARs identified in this ROD. This will include the performance of a Stage IA cultural resources survey, a coastal zone consistency determination, and a determination of impacts on adjacent agricultural lands.

8) Implementation of deed restrictions designed to prevent direct contact with the subsurface waste material in the landfill by limiting future Site use. Access to the Site will be restricted by the construction of a perimeter fence with locked gates;

9) Implementation of long-term maintenance and operation of the landfill cap, gas venting, and leachate systems to provide for inspections and repairs;

10) Implementation of long-term air and water quality monitoring; and

11) An evaluation of Site conditions at least once every five years to determine if a modification to the selected alternative is necessary.

STATUTORY DETERMINATIONS

As previously noted, CERCLA mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. CERCLA also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified.

For the reasons discussed below, EPA has determined that the selected remedy meets the requirements of CERCLA.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. Contact with landfilled wastes would be eliminated through capping, landfill gases would be controlled through venting, and potential contaminant migration through surface water and ground water to the surrounding environment would be prevented through the construction of the clay barrier wall and the collection and treatment of leachate.

Compliance with ARARs

The selected remedy will be in compliance with all ARARs. Action-specific ARARs for the selected remedy include 6NYCRR Part 360 requirements, federal requirements for effluent discharge to a POTW (40 CFR Part 403), state regulations for the control of surface-water runoff, federal and state air ARARs (40 CFR 50 and 6NYCRR Part 373, respectively), and the City of North Tonawanda's Sewer Use Ordinance (if the North Tonawanda POTW is determined in the design phase to be a suitable treatment facility). Landfill closure will also comply with all provisions of RCRA hazardous waste landfill closure regulations which are relevant and appropriate to the Site. Location-specific ARARs for the selected remedy include Section 404 of the Clean Water Act, as amended, New York Code of Rules and Regulations Wetlands Permit (6NYCRR Part 663), the National Historic Preservation Act, the Coastal Zone Management Act, and the Farmland Protection Policy Act.

Cost-Effectiveness

The selected remedy is the least costly remedy that achieves all the goals of the response action.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable. The selected remedy provides the best balance of trade-offs among the alternatives with respect to the evaluation criteria.

Preference for Treatment as a Principal Element

The selected remedy does not satisfy the statutory preference for remedies that employ treatment to reduce the toxicity, mobility, or volume of the hazardous substances, pollutants or contaminants at a site. It is not practicable (or within the limited scope of this action) to treat the hazardous substances, pollutants or contaminants at the Site, because the contaminant source, the Site itself, can not be effectively excavated and treated due to its large size and the absence of hot spots representing major sources of contamination.

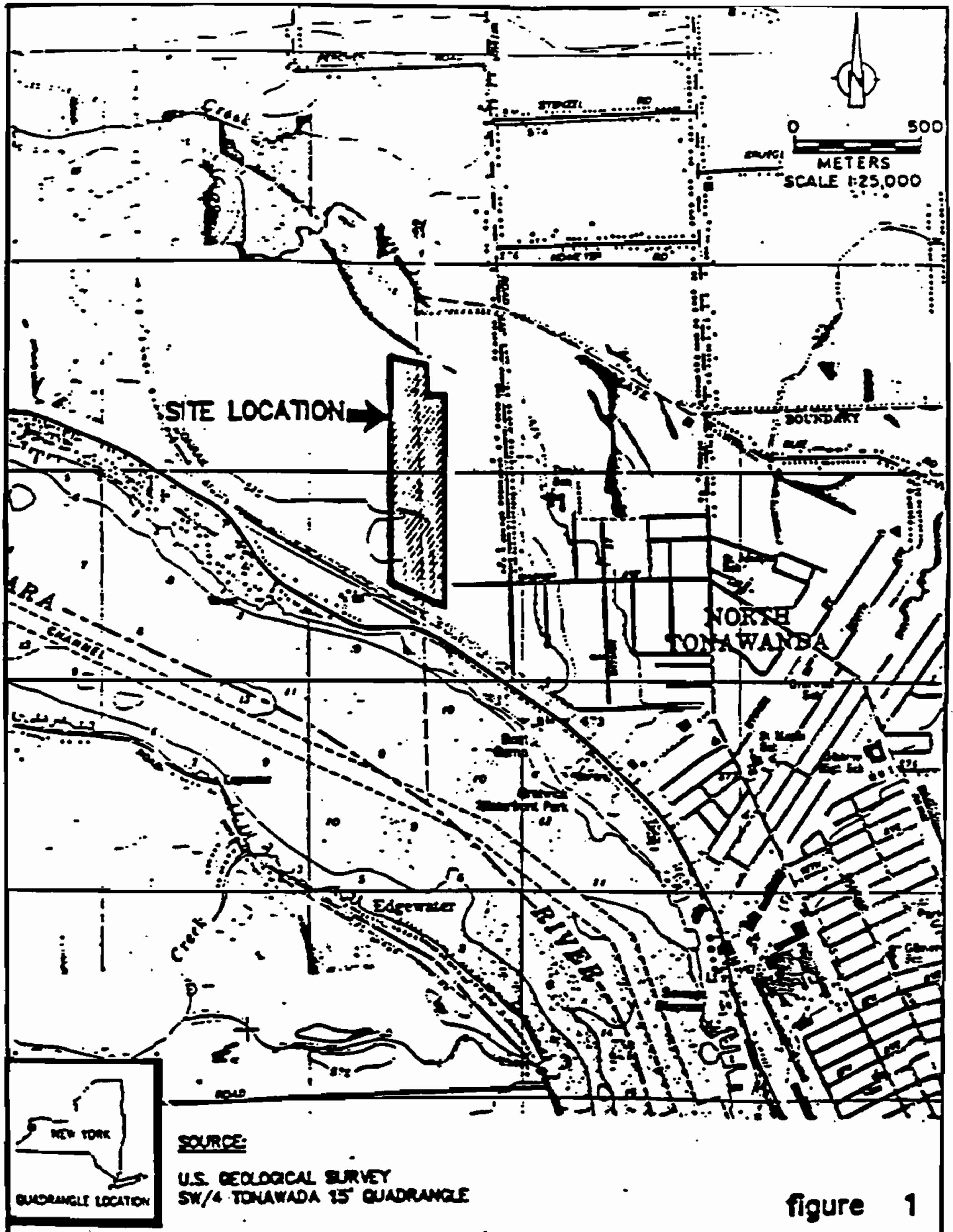
A review of the remedial action will be conducted five years after the commencement of the remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment, because this remedy will result in hazardous substances remaining on-site above health-based levels.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred alternative presented in the Proposed Plan.

APPENDIX I

FIGURES

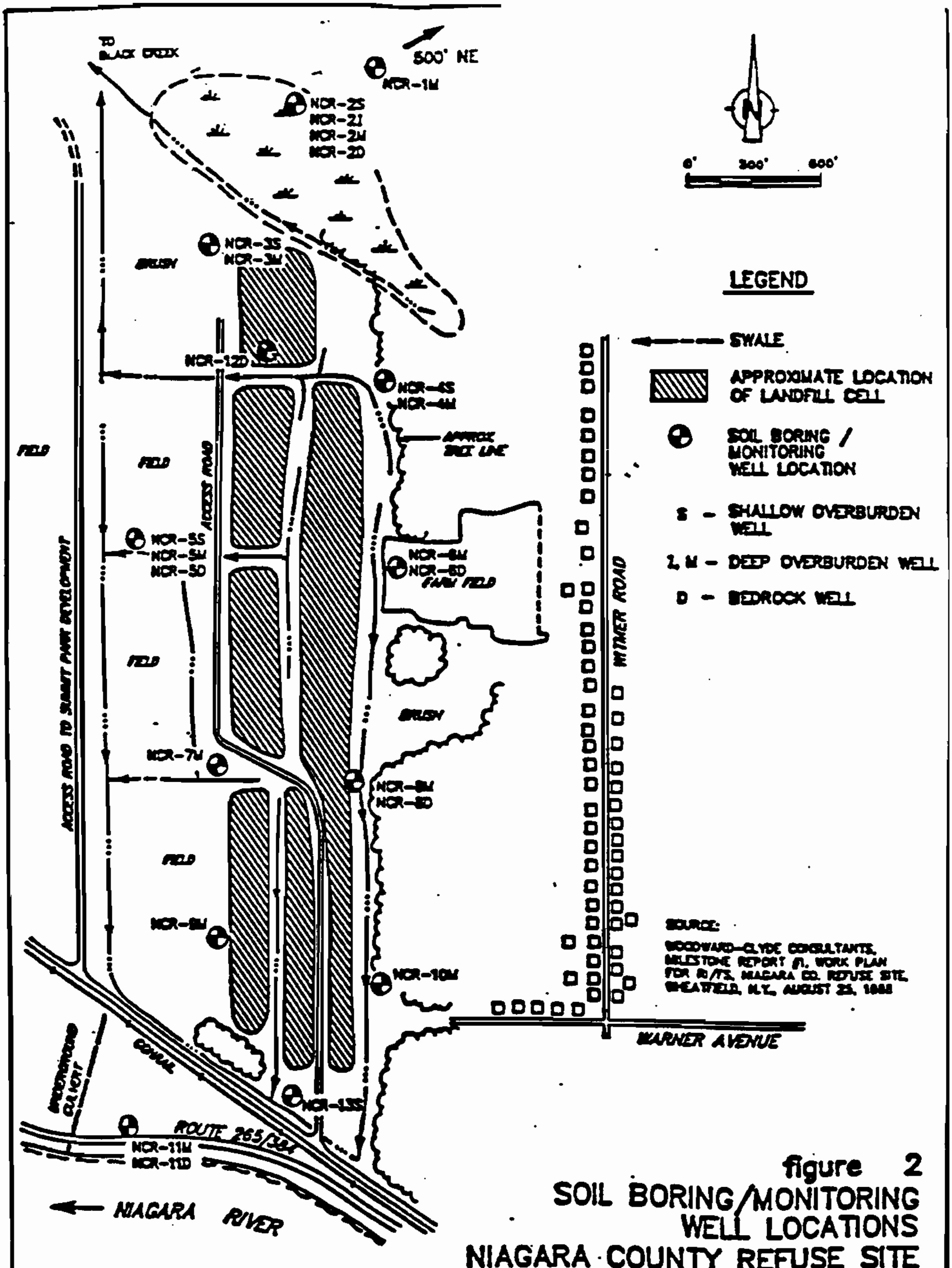


SOURCE:

U.S. GEOLOGICAL SURVEY
SW/4 TONAWADA 15' QUADRANGLE

figure 1

SITE LOCATION
NIAGARA COUNTY REFUSE SITE
Wheatfield, N.Y.



SOURCE:
WOODWARD-CLYDE CONSULTANTS, MILESTONE REPORT #1, WORK PLAN FOR RI/FS, NIAGARA CO. REFUSE SITE, WHEATFIELD, N.Y., AUGUST 25, 1988

figure 2
SOIL BORING/MONITORING WELL LOCATIONS
NIAGARA COUNTY REFUSE SITE
Wheatfield, N.Y.

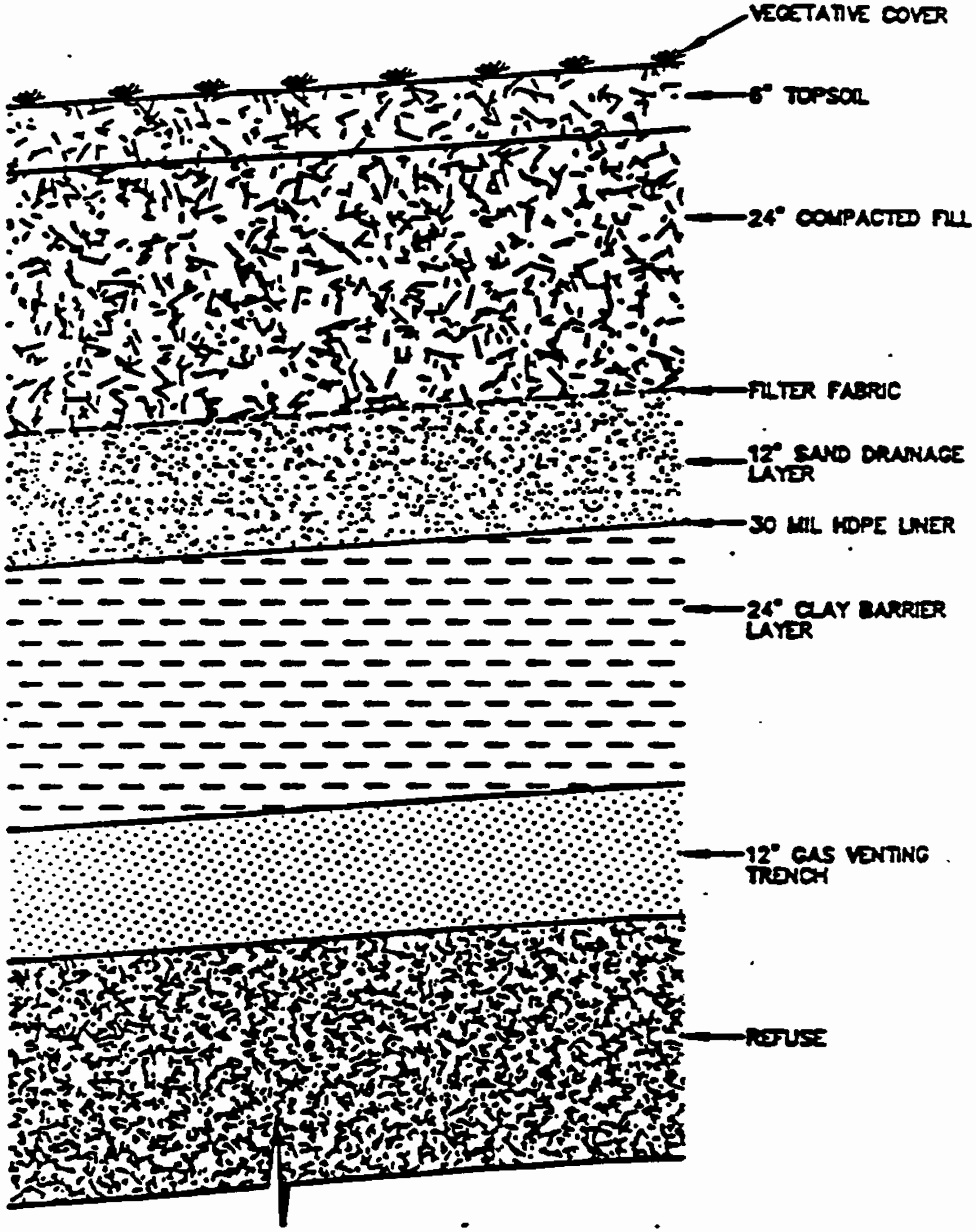


figure 3
TYPICAL SECTION RCRA LANDFILL CAP

NIAGARA COUNTY REFUSE SITE
Wheatfield, N.Y.

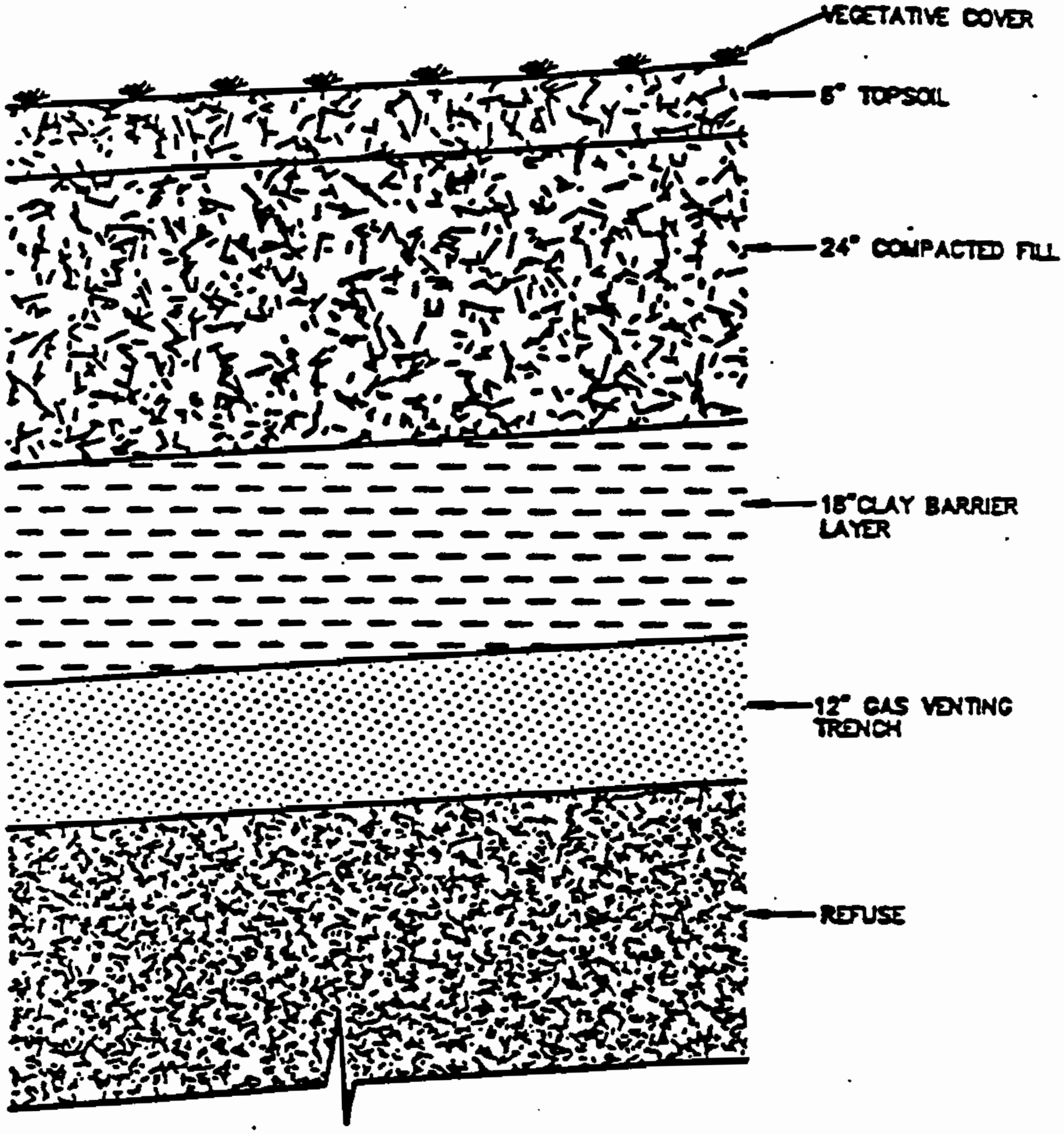


figure 4

TYPICAL SECTION NEW YORK STATE SANITARY LANDFILL CAP

NIAGARA COUNTY REFUSE SITE
Wheatfield, N.Y.

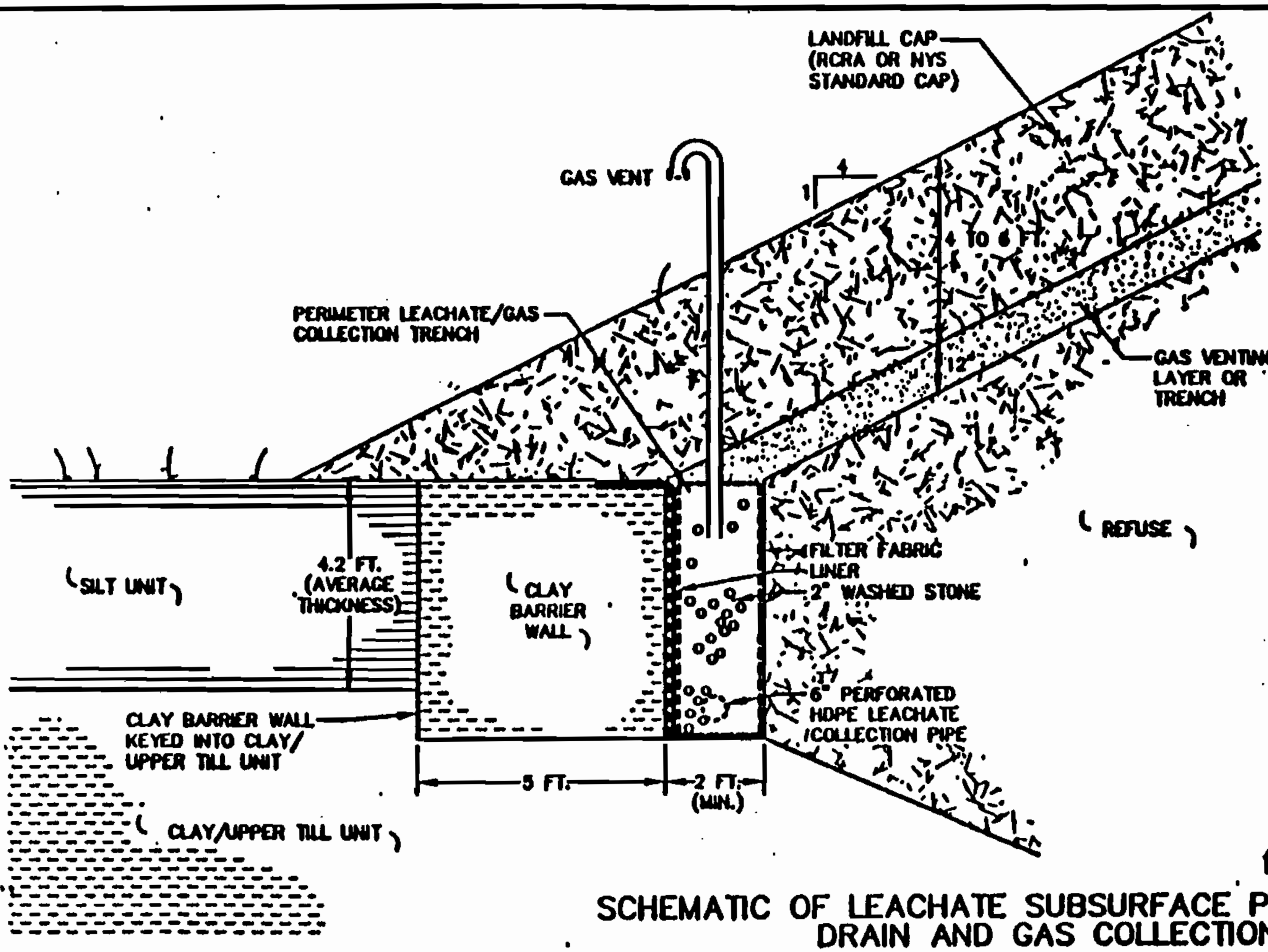


figure 5

SCHEMATIC OF LEACHATE SUBSURFACE PERIMETER DRAIN AND GAS COLLECTION SYSTEM

NIAGARA COUNTY REFUSE SITE
Wheatfield, N.Y.

APPENDIX II

TABLES

Table a NIAGARA COUNTY REFUSE SITE: CONTAMINANTS OF CONCERN

	Surface Soil	Subsurface Soils	Landfill Perimeter Ground Water	NCR 12D Ground Water	Drainage Swale Surface Water	Drainage Swale Sediments	Leachate Soil	Leachate Water
Volatiles								
Acetone	X	X	X	X		X		X
Benzene			X	X		X		X
2-Butanone				X				X
1,4-Dichlorobenzene				X			X	
Methylene Chloride	X	X	X	X		X	X	X
Styrene	X			X				
Trichloroethylene	X	X		X				
1,2,4-Trimethylbenzene				X				
Vinyl Chloride	X	X						
BNAs								
Benzo(a)anthracene						X	X	
Benzo(a)pyrene						X		
Bis(2-ethylhexyl)phthalate	X	X	X	X	X	X	X	X
4-Chloroaniline								X
2,4-Dimethylphenol				X	X			X
2,6-Dinitrotoluene								X
2-Methylphenol				X				X
4-Methylphenol		X		X			X	X
Naphthalene		X		X			X	X
Phenanthrene		X				X	X	X
Phenol			X	X	X			X
Pesticides								
Aldrin			X			X	X	X
Delta-BHC	X		X		X	X	X	X

Table a (CONTINUED)

	Surface Soil	Subsurface Soils	Landfill Perimeter Ground Water	NCR 12D Ground Water	Drainage Swale Surface Water	Drainage Swale Sediments	Leachate Soil	Leachate Water
4,4'-DDE			X			X	X	
4,4'-DDT			X		X	X		X
Dieldrin			X			X	X	
Heptachlor			X	X				X
Heptachlor Epoxide		X	X		X	X		
Inorganics								
Aluminum	X	X	X	X	X	X	X	X
Antimony		X	X	X		X		
Arsenic	X	X	X	X	X	X	X	X
Barium	X	X	X	X	X	X	X	X
Beryllium	X	X	X	X	X	X	X	X
Cadmium			X		X	X	X	X
Cobalt	X	X	X	X	X	X	X	X
Copper	X	X	X	X	X	X	X	X
Cyanide					X			
Iron	X	X	X	X	X	X	X	X
Lead	X	X	X		X	X	X	X
Manganese	X	X	X	X	X	X	X	X
Mercury		X				X	X	X
Nickel	X	X	X	X	X	X	X	X
Silver			X	X				
Thallium		X			X			
Vanadium	X	X	X	X	X	X	X	X
Zinc	X	X	X	X	X	X	X	X

Table b NIAGARA COUNTY REFUSE SITE: SUMMARY OF EXPOSURE PATHWAYS

		Time-Frame Evaluated		Degree of Assessment			
Pathway	Receptor	Present	Future	Quant.	Qual.	Rationale for Selection or Exclusion	Data Grouping
Ground Water							
Ingestion of Ground Water	Resident	No	Yes	X	X	Adjacent areas are zoned residential. Although residents currently rely on municipal water, ground water is potable. No private domestic or industrial use wells are known to exist.	All ground water samples (NCR 12D ground water evaluated separately. See 5. on page 2). Impact on downstream water supplies evaluated qualitatively.
Inhalation of Ground Water Contaminants During Showers	Resident	No	No			Concentrations of volatiles in ground water are low.	
Inhalation of Contaminants that Volatilize from Ground Water and Seep into Basements	Resident	No	No			Concentrations of volatiles in ground water are low. Horizontal flow of ground water away from the site appears to be limited.	
Dermal Contact with Ground Water	Resident	No	No			Considered insignificant compared to other ground water exposures.	
Surface Soils							
Incidental Ingestion of Onsite Surface Soils	Trespasser	Yes	Yes	X		Onsite trespassers have been observed.	All surface soils (0'- 2').
Dermal Contact with Onsite Surface Soils^a	Trespasser	No	No			Onsite trespassers have been observed. Exposures expected to be minimal.	
Inhalation of VOC Emissions and Particulates from Surface Soils	Trespasser	No	No			Concentrations in surface soils are low.	

Table b (CONTINUED)

		Time-Frame Evaluated		Degree of Assessment			
Pathway	Receptor	Present	Future	Quant.	Qual.	Rationale for Selection or Exclusion	Data Grouping
Subsurface Soils							
Incidental Ingestion of Onsite Subsurface Soils	Excavation Worker	Yes	Yes	X		Exposure to subsurface soils (2' to 15') may occur during excavations for utility and landfill maintenance.	All subsurface soils less than or equal to 15'.
Dermal Contact with Onsite Subsurface Soils*	Excavation Worker	No	No			Exposure to subsurface soils (2' to 15') may occur during excavations for utility and landfill maintenance. Exposures expected to be minimal.	
Sediments							
Incidental Ingestion of Drainage Swale Sediments	Trespasser	Yes	Yes	X		Onsite trespassers have been observed.	All sediment samples.
	Excavation Worker	No	Yes	X		Exposure to drainage swale sediments may occur during utility and landfill maintenance.	
Dermal Contact with Drainage Swale Sediments**	Trespasser	Yes	Yes	X		Onsite trespassers have been observed.	All sediment samples.
	Excavation Worker.	No	Yes	X		Exposure to sediments may occur during utility and landfill maintenance.	
Inhalation of VOC Emissions and Particulates from Drainage Swale Sediments	Trespasser	No	No			Moisture content, absence of physical disturbance and vegetation limits release of particulates. Vegetative cover limits VOC emissions.	
	Excavation Worker	No	No				
Surface Water							
Incidental Ingestion of Surface Water	Trespasser	No	No			Anticipated activity involves negligible exposure via the oral route.	

Table b (CONTINUED)

Pathway	Receptor	Time-Frame Evaluated		Degree of Assessment		Rationale for Selection or Exclusion	Data Grouping
		Present	Future	Quant.	Qual.		
Dermal Contact with Surface Water	Trespasser	No	No			Anticipated activity involves limited exposure. Concentrations in surface water are low.	
Leachate Soils							
Incidental Ingestion of Leachate Soils	Trespasser	Yes	Yes	X		Onsite trespassers have been observed and may occasionally contact leachate seep.	All leachate soil samples.
Dermal Contact with Leachate Soils	Trespasser	Yes	Yes	X		Onsite trespassers have been observed and may occasionally contact leachate seep.	All leachate soil samples.
Inhalation of VOC Emissions and Particulates from Leachate Soils	Trespasser	No	No			Generally wet conditions of leachate limits particulate emissions. Low VOC concentrations in soil (water) suggest insignificant air releases.	
Leachate Water							
Incidental Ingestion of Leachate Water	Trespasser	No	No			Anticipated activity involves negligible exposure. Seeps are periodic.	
Dermal Contact with Leachate Water	Trespasser	No	No			Anticipated activity involves negligible exposure. Seeps are periodic.	
Inhalation of VOC Emissions	Trespasser	No	No			Low VOC concentrations in soil (water) suggest insignificant air releases.	
Home Grown Produce							
Ingestion of Contaminated Home Grown Produce	Adjacent Resident	No	No			Farm field adjacent to the site. Existence of home grown produce contaminated by contaminants emanating from the site is unknown.	

*not evaluated quantitatively, per EPA guidance (no cadmium, PCBs, dioxin detected).

**cadmium only

Table c TOXICITY VALUES FOR THE NCR SITE CONTAMINANTS OF CONCERN.

CHEMICAL	CARCINOGENIC				CHRONIC		SUBCHRONIC	
	Weight of Evidence Classification		Oral Slope Factor (mg/kg/day)-1		Chronic Oral RfD (mg/kg/day)		Subchronic Oral RfD (mg/kg/day)	
Volatiles								
Acetone	D	a			1.00E-01	a	1.00E+00	b
Benzene	A	a	2.90E-02	a				
2-Butanone (MEK)	D	a			5.00E-02	b	5.00E-01	b
1,4 Dichlorobenzene (para)	C	b	2.40E-02	b	1.00E-01	d	1.00E-01	i
Methylene chloride	B2	a	7.50E-03	a	6.00E-02	a	6.00E-02	b
Styrene	B2	b	3.00E-02	b	2.00E-01	a	2.00E+00	b
Trichloroethylene	B2	b	1.10E-02	b	6.00E-03	d	6.00E-03	i
1,2,4 Trimethylbenzene	D	j			6.00E-04	d	6.00E-04	i
Vinyl chloride (chloroethylene)	A	b	1.90E+00	b				
BNAs								
Benzo(a)anthracene	B2	a	5.79E-01	e				
Benzo(a)pyrene	B2	a	5.79E+00	a				
Bis(2-ethylhexyl)phthalate	B2	a	1.40E-02	a	2.00E-02	a	2.00E-02	b
4-Chloroaniline	–				4.00E-03	a	4.00E-03	b
2,4-Dimethylphenol					2.00E-02	b	2.00E-01	b
2,6-Dinitrotoluene	B2	b	6.80E-01	b, k				
2-Methylphenol (o-cresol)	–	b			5.00E-02	a	5.00E-01	b
4-Methylphenol (p-cresol)	C	a			5.00E-02	b	5.00E-01	b
Naphthalene	D	a			4.00E-03	b	4.00E-02	b
Phenanthrene	D	a						
Phenol	D	a			6.00E-01	a	6.00E-01	b
Pesticides								
Aldrin	B2	a	1.70E+01	a	3.00E-05	a	3.00E-05	b
delta-BHC	–							
4,4' DDE	B2	a	3.40E-01	a				
4,4' DDT	B2	a	3.40E-01	a	5.00E-04	a	5.00E-04	b
Dieldrin	B2	a	1.60E+01	a	5.00E-05	a	5.00E-05	b
Heptachlor	B2	a	4.50E+00	a	5.00E-04	a	5.00E-04	b
Heptachlor epoxide	B2	a	9.10E+00	a	1.30E-05	a	1.30E-05	i
Inorganics								
Aluminum	D	d			1.00E+00	d	1.00E+00	i
Antimony	–	a			4.00E-04	a	4.00E-04	b
Arsenic	A	a	1.75E+00	f	3.00E-04	a	1.00E-03	b
Barium	–	a			5.00E-02	b	5.00E-02	b
Beryllium	B2	a	4.30E+00	a	5.00E-03	a	5.00E-03	b
Cadmium (j)	B1	a			5.00E-04	a, g	5.00E-04	i
Cobalt	–					d		
Copper	D	e			4.00E-02	d	4.00E-02	i
Cyanide	D	a			2.00E-02	a	2.00E-02	b
Iron	D	d			5.00E-01	d	5.00E-01	i
Lead	B2	a						

Table c TOXICITY VALUES FOR THE NCR SITE CONTAMINANTS OF CONCERN. (cont.).

EMICAL	CARCINOGENIC			CHRONIC		SUBCHRONIC	
	Weight of Evidence Classification		Oral Slope Factor (mg/kg/day)-1	Chronic Oral RfD (mg/kg/day)		Subchronic Oral RfD (mg/kg/day)	
Manganese	D	a		1.00E-01	a	1.00E-01	b
Mercury	D	a		3.00E-04	b	3.00E-04	b
Nickel	A	a		2.00E-02	a, h	2.00E-02	b
Silver	D	a		5.00E-03	a	3.00E-03	b
Thallium	–			7.00E-05	b	7.00E-04	b
Vanadium	D	c		7.00E-03	b	7.00E-03	b
Zinc	D	a		2.00E-01	b	2.00E-01	b

a. From Integrated Risk Information System (IRIS) 5/1/92.
b. From Health Effects Assessment Summary Tables (HEAST) FY 1991.
c. From Drinking Water Regulations and Health Advisories, April 1992.
d. Interim value from ECAO. See text for specific reference.
e. Oral slope factor for B(a)P used for B(a)A (classified as a B2 carcinogen) with a TEF of 0.1 applied.
f. Arsenic oral slope factor derived from unit risk in IRIS.
g. Cadmium RfD is for water. 1.0E-03 mg/kg/day is RfD for food.
h. Value is for nickel soluble salts.
i. Chronic RfD used as Subchronic RfD if no Subchronic value is available per RAGS.
Dermal toxicity values for cadmium have been derived from oral toxicity values applying an absorption factor of 0.01 (10%) per EPA guidance (see text for specific reference). The RfD for both chronic and subchronic dermal exposure is 5.00E-05 mg/kg/day.
k. Value used applies to mixture of 2,4- and 2,6-dinitrotoluene.
l. Carcinogenic Weight of Evidence Classification obtained from Health Effects Assessment document, not IRIS or HEAST.

Table d SUMMARY OF NONCARCINOGENIC HAZARD INDICES (HI) FOR THE NCR SITE

Scenario	Receptor	Present/Future		Chronic HI
Ground Water - Perimeter				
Ingestion	Resident	F		5E+00*
Ground Water - Northern Landfill Cell				
Ingestion	Resident	F		4E+00*
Surface Soil				
Ingestion	Youth Trespasser	P/F		9E-02
Subsurface Soil				
Ingestion	Excavation Worker	F		7E-01a
Sediments				
Ingestion	Youth Trespasser	P/F		1E-01
Dermal Contact	Youth Trespasser	P/F		2E-03
			Total	1E-01
Ingestion	Excavation Worker	F		7E-01a
Dermal Contact	Excavation Worker	F		1E-03a
			Total	7E-01a
Leachate Soils				
Ingestion	Youth Trespasser	P/F		3E-03
Dermal Contact	Youth Trespasser	P/F		9E-05
			Total	3E-03

Table [illegible] SUMMARY OF CARCINOGENIC RISK ESTIMATES FOR THE NCR SITE

Scenario	Receptor	Present/Future	Incremental Risk
Ground Water - Perimeter			
Ingestion	Resident	F	2E-04**
Ground Water - Northern Landfill Cell			
Ingestion	Resident	F	1E-04*
Surface Soil			
Ingestion	Youth Trespasser	P/F	4E-06*
Subsurface Soil			
Ingestion	Excavation Worker	F	7E-07
Sediments			
Ingestion	Youth Trespasser	P/F	5E-06*
Ingestion	Excavation Worker	F	9E-07
Leachate Soils			
Ingestion	Youth Trespasser	P/F	9E-08

*Exceeds 10^{-6} risk

**Exceeds 10^{-4} risk

Table ,

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE.

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

-- TYPE-Surface Soils --

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Vinyl Chloride	1	13	240.00	240.00	MCR-13(0-0.8')	8.03	30.23	10.00	13.0
Methylene Chloride	6	13	6.50	22.00	RA-3	6.40	10.81	5.20	6.5
Acetone	4	13	6.50	17.00	RA-3	7.63	10.48	10.00	13.0
1,1,1-Trichloroethane	2	13	3.00	6.10	MCR-8(0.0-2.0')	3.16	3.65	5.20	6.5
Trichloroethylene	2	13	20.00	33.00	MCR-13(0-0.8')	3.34	11.03	5.20	6.5
Styrene	1	13	1.40	1.40	MCR-13(0-0.8')	2.70	3.34	5.20	6.5
1,2-Dichloroethylene (total)	1	13	440.00	440.00	MCR-13(0-0.8')	4.50	66.20	5.20	6.5
bis(2-Ethylhexyl)phthalate	2	13	700.00	1035.00	RA-9	326.36	651.00	340.00	1200.0
Delta-BHC	1	13	1400.00	1400.00	RA-8	2465.09	14133.06	1100.00	14000.0
Aluminum	13	13	6650000.00	26000000.00	MCR-8(0.0-2.0')	10575373.34	16336085.76	*	*
Arsenic	13	13	3700.00	30000.00	MCR-11A(0-3.2')	10570.94	22102.73	*	*
Barium	13	13	16600.00	135000.00	MCR-11B(0-3.2')	50755.91	103377.50	*	*
Beryllium	11	13	260.00	1100.00	MCR-8(0.0-2.0')	407.32	800.73	100.00	100.0
Calcium	13	13	3160000.00	68900000.00	RA-14	14630170.16	72547700.00	*	*
Chromium, total	13	13	6600.00	31000.00	MCR-8(0.0-2.0')	14130.55	21035.94	*	*
Cobalt	13	13	3000.00	14000.00	MCR-8(0.0-2.0')	5566.08	8044.25	*	*
Copper	13	13	7400.00	32000.00	MCR-13(0-0.8')	12066.15	19933.59	*	*
Iron	13	13	10305000.00	31000000.00	MCR-8(0.0-2.0')	14095316.02	19370206.45	*	*
Lead	11	11	4900.00	175000.00	MCR-11B(0-3.2')	15213.35	143636.63	*	*
Magnesium	13	13	2050000.00	25500000.00	RA-14	7162960.35	15744003.91	*	*
Manganese	13	13	63000.00	575000.00	RA-8	259790.95	403275.13	*	*
Nickel	13	13	9050.00	36000.00	MCR-11B(0-3.2')	16035.72	19755.66	*	*
Potassium	13	13	737000.00	6300000.00	MCR-8(0.0-3.0')	1404302.59	3031111.61	*	*
Sodium	11	13	85000.00	690000.00	MCR-7(0.0-2.0')	207903.45	455773.00	100000.00	100000.0
Vanadium	13	13	13100.00	37000.00	MCR-8(0.0-2.0')	19905.94	25647.40	*	*
Zinc	13	13	30700.00	105000.00	MCR-11B(0-3.2')	60734.90	68600.54	*	*

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

-- TTPS-Subsurface Soils --

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Vinyl Chloride	1	10	310.00	310.00	MCR-13(2.5-3.5)	6.70	57.50	11.00	15.0
Methylene Chloride	4	10	3.50	17.00	MCR-13(2.5-3.5)	6.91	43.50	5.60	150.0
Acetone	1	10	50.00	50.00	MCR-6(2.0-6.0')	8.00	28.45	11.00	64.0
1,1,1-Trichloroethane	3	10	5.60	5.70	MCR-10(2-4')	3.37	4.23	5.60	7.0
Trichloroethylene	4	10	6.00	15.00	MCR-6(2.0-6.0')	5.23	13.57	5.60	7.0
1,2-Dichloroethylene (total)	2	10	160.00	320.00	MCR-9M(2.0-6.0)	7.14	700.91	5.60	7.0
4-Methylphenol	1	9	60.00	60.00	TESTPIT3R	107.26	301.60	350.00	860.0
Benzoic Acid	1	9	220.00	220.00	TESTPIT3R	683.67	1731.05	1700.00	4200.0
Naphthalene	1	9	43.00	43.00	TESTPIT3R	177.96	356.10	350.00	860.0
2,4,5-Trichlorophenol	1	9	50.00	50.00	TESTPIT3R	746.69	4813.05	1700.00	4200.0
Phenanthrene	1	9	60.00	60.00	TESTPIT3R	184.67	313.76	350.00	860.0
Fluoranthene	1	9	86.00	86.00	TESTPIT3R	192.31	303.04	350.00	860.0
Pyrene	1	9	67.00	67.00	TESTPIT3R	186.95	303.03	350.00	860.0
Chrysene	1	9	46.00	46.00	TESTPIT3R	170.30	346.10	350.00	860.0
bis(2-Ethylhexyl)phthalate	1	9	160.00	160.00	TESTPIT3R	205.93	263.00	350.00	860.0
Di-n-octylphthalate	1	9	52.00	52.00	MCR-6(2.0-6.0')	184.86	336.66	350.00	860.0
Alpha-BHC	1	10	260.00	260.00	MCR-8M(2.0-6.0)	3623.01	26050.69	1000.00	21000.0
Heptachlor epoxide	1	9	500.00	500.00	MCR-5(5.4-7.0')	3744.96	27961.33	1000.00	21000.0
Aluminum	9	9	5000000.00	35000000.00	MCR-3M(4-6')	11370066.01	30395607.03	*	*
Antimony	1	10	13000.00	13000.00	MCR-5(5.4-7.0')	6323.13	7610.93	8000.00	12000.0
Arsenic	10	10	3100.00	26000.00	MCR-3M(4-6')	9302.10	30313.47	*	*
Barium	9	10	13000.00	160000.00	MCR-3M(4-6')	37407.33	1777260.35	1100.00	1100.0
Beryllium	8	10	200.00	960.00	MCR-3M(4-6')	301.53	1115.53	140.00	160.0
Calcium	10	10	3600000.00	90000000.00	MCR-3M(4-6')	83360085.40	300630777.00	*	*
Chromium, total	10	10	4000.00	3000[illegible].00	MCR-3M(4-6')	23701.03	38750.69	*	*
Cob	10	10	2100.00	15[illegible]	MCR-3M(4-6')	5910.77	13070.41	*	[illegible]
[illegible]	10	10	4000.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

---------- TYPE=Subsurface Soils ----------

(continued)

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Iron	9	9	8700000.00	31000000.00	MCR-3M(4-6')	16382639.60	26166137.31	.	.
Lead	10	10	6300.00	20500.00	TESTPIT3R	11809.43	16354.01	.	.
Magnesium	9	9	3300000.00	39000000.00	MCR-5(5.4-7.0')	13373993.45	54063053.04	.	.
Manganese	9	9	190000.00	1300000.00	MCR-3M(4-6')	403370.01	1001137.35	.	.
Mercury	1	10	330.00	330.00	TESTPIT3R	35.03	61.63	50.00	110.0
Nickel	10	10	3600.00	30000.00	MCR-3M(4-6')	12620.08	32719.44	.	.
Potassium	10	10	470000.00	6000000.00	MCR-3M(4-6')	1970690.33	4619607.63	.	.
Selenium	1	10	830.00	830.00	TESTPIT3R	630.00	4467.37	340.00	5000.0
Sodium	10	10	120000.00	920000.00	MCR-3M(4-6')	303499.10	606389.35	.	.
Thallium	1	10	610.00	610.00	MCR-3M(4-6')	316.10	319.11	340.00	500.0
Vanadium	10	10	6300.00	36000.00	MCR-3M(4-6')	18616.98	33301.39	.	.
Zinc	10	10	35000.00	135000.00	TESTPIT3R	64390.05	104379.30	.	.

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE.

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

-- TYPE=Deep Subsurface Soils --

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Vinyl Chloride	1	11	190.00	190.00	MCR-5(44-47')	7.77	30.03	11.00	12.0
Methylene Chloride	2	11	20.00	40.00	MCR-2(24-24.7')	4.37	10.33	5.40	5.9
Acetone	3	11	50.00	90.00	MCR-13(23-26')	9.30	41.03	11.00	15.5
2-Butanone (MEK)	1	10	10.00	10.00	MCR-3M(24-26')	5.99	6.06	11.00	12.0
Trichloroethylene	1	11	14.00	14.00	MCR-10(26-28')	3.31	8.06	5.35	5.9
Toluene	2	11	3.60	51.00	MCR-13(23-26')	3.71	11.64	5.35	5.9
Ethylbenzene	2	11	5.00	65.00	MCR-5(44-47')	3.90	14.66	5.35	5.9
Styrene	2	11	4.90	39.00	MCR-5(44-47')	3.73	9.06	5.35	5.9
Total Xylenes	1	11	36.00	36.00	MCR-13(23-26')	3.43	7.10	5.35	5.9
1,2-Dichloroethylene (total)	1	11	390.00	390.00	MCR-5(44-47')	4.34	87.03	5.35	5.9
Phenol	1	10	6550.00	6550.00	MCR-13(23-26')	351.27	1335.13	340.00	390.0
2-Methylphenol	1	10	330.00	330.00	MCR-13(23-26')	106.43	330.00	340.00	390.0
4-Methylphenol	1	10	290.00	290.00	MCR-13(23-26')	190.60	211.65	340.00	390.0
Benzoic Acid	1	9	3190.00	3190.00	MCR-13(23-26')	1801.59	1391.15	1700.00	1900.0
Di-n-butylphthalate	1	10	630.00	630.00	MCR-13(23-26')	190.47	366.13	340.00	390.0
Benzylbutylphthalate	3	10	1300.00	3000.00	MCR-13(23-26')	349.01	1063.36	340.00	390.0
bis(2-Ethylhexyl)phthalate	3	10	1400.00	2000.00	MCR-13(23-26')	363.50	3664.65	340.00	390.0
Di-n-octylphthalate	1	10	150.00	150.00	MCR-3M(24-26')	106.03	205.93	340.00	540.0
Delta-BHC	1	11	35000.00	35000.00	MCR-13(23-26')	6533.72	9770.73	9000.00	13000.0
Aroclor-1254	1	11	67000.00	67000.00	MCR-13(23-26')	104763.00	130636.73	300000.00	350000.0
Aluminum	11	11	3300000.00	8500000.00	MCR-10(26-28')	5978744.69	8739973.07	.	.
Antimony	3	11	13000.00	30000.00	MCR-7(44-46')	5409.47	13064.03	5080.00	9780.0
Arsenic	11	11	1900.00	13000.00	MCR-2(24-24.7')	6534.36	11576.45	.	.
Barium	11	11	55000.00	300000.00	MCR-1(44-46')	64704.33	115555.75	.	.
Beryllium	8	11	330.00	400.00	MCR-10(44-46')	304.03	401.30	130.00	[illegible]
Cadm	1	11	3600.00	360	MCR-13(23-26')	339.43	610.05	300.00	[illegible]
Calci	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

-- TYPE=Deep Subsurface Soils --

(continued)

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Chromium, total	11	11	3500.00	12000.00	MCR-10(44-46')	7988.36	11288.53	.	.
Cobalt	11	11	1500.00	6050.00	MCR-3M(24-26')	3533.03	5436.63	.	.
Copper	11	11	6300.00	16700.00	MCR-12(22-26')	9631.73	14040.23	.	.
Iron	11	11	5300000.00	14100000.00	MCR-3M(24-26')	8389097.40	12220271.78	.	.
Lead	11	11	4900.00	14750.00	MCR-13(22-26')	8153.51	11071.50	.	.
Magnesium	11	11	16000000.00	53000000.00	MCR-7(44-46')	29700080.30	47403410.33	.	.
Manganese	11	11	320000.00	530000.00	MCR-2(24-24.7')	407760.34	496264.54	.	.
Mercury	1	11	150.00	150.00	MCR-13(22-26')	30.71	53.35	50.00	60.0
Nickel	11	11	3500.00	12050.00	MCR-3M(24-26')	7965.00	10990.65	.	.
Potassium	11	11	660000.00	3600000.00	MCR-7(44-46')	1044177.97	3901307.71	.	.
Sodium	11	11	210000.00	390000.00	MCR-13(22-26')	285031.32	331093.15	.	.
Vanadium	11	11	7400.00	17000.00	MCR-10(44-46')	11940.53	15307.72	.	.
Zinc	10	10	5400.00	120000.00	MCR-2(24-24.7')	42731.41	130347.99	.	.

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

-- TYPE-Landfill Leachate - Soil --

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Methylene Chloride	1	2	67.00	67.00	SUMP-1-R	22.42	67.00	15.00	15.0
1,4-Dichlorobenzene (para)	1	2	1200.00	1200.00	SUMP-3-R	848.53	1200.00	1200.00	1200.0
4-Methylphenol	1	2	440.00	440.00	SUMP-3-R	513.81	440.00	1200.00	1200.0
Naphthalene	1	2	240.00	240.00	SUMP-3-R	379.47	240.00	1200.00	1200.0
2-Methylnaphthalene	1	2	120.00	120.00	SUMP-3-R	268.33	120.00	1200.00	1200.0
Acenaphthene	1	2	100.00	100.00	SUMP-3-R	244.95	100.00	1200.00	1200.0
Phenanthrene	1	2	470.00	470.00	SUMP-3-R	531.04	470.00	1200.00	1200.0
Anthracene	1	2	190.00	190.00	SUMP-3-R	337.64	190.00	1200.00	1200.0
Di-n-butylphthalate	2	2	81.00	350.00	SUMP-3-R	168.37	350.00	.	.
Fluoranthene	1	2	480.00	480.00	SUMP-3-R	536.66	480.00	1200.00	1200.0
Pyrene	1	2	840.00	840.00	SUMP-3-R	709.93	840.00	1200.00	1200.0
Benzylbutylphthalate	1	2	1200.00	1200.00	SUMP-3-R	848.53	1200.00	1200.00	1200.0
Benzo(a)anthracene	1	2	210.00	210.00	SUMP-3-R	354.96	210.00	1200.00	1200.0
Chrysene	1	2	200.00	200.00	SUMP-3-R	346.41	200.00	1200.00	1200.0
bis(2-Ethylhexyl)phthalate	1	2	750.00	750.00	SUMP-3-R	670.82	750.00	1200.00	1200.0
Delta-BHC	1	2	2100.00	2100.00	SUMP-1-R	3694.59	2100.00	13000.00	13000.0
Aldrin	1	2	2100.00	2100.00	SUMP-1-R	3694.59	2100.00	13000.00	13000.0
Dieldrin	1	2	3300.00	3300.00	SUMP-1-R	4860.70	3300.00	13000.00	13000.0
4,4-DDE	1	2	690.00	690.00	SUMP-1-R	2117.70	690.00	13000.00	13000.0
gamma-chlordane	1	2	1200.00	1200.00	SUMP-1-R	2792.85	1200.00	13000.00	13000.0
Aluminum	2	2	7810000.00	11700000.00	SUMP-3-R	9559131.76	11700000.00	.	.
Arsenic	2	2	7000.00	12000.00	SUMP-3-R	9165.15	12000.00	.	.
Barium	2	2	110000.00	110000.00	SUMP-1-R	110000.00	110000.00	.	.
Beryllium	2	2	290.00	600.00	SUMP-3-R	417.13	600.00	.	.
Cadmium	1	2	710.00	710.00	SUMP-3-R	386.13	710.00	420.00	420.0
Ca[illegible]m	2	2	78600000.00	81400000.00	SUMP-1-R	79987749.04	81400000.00	.	.
Ch[illegible]um, total	2	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

-- TYPE=Landfill Leachate - Soil --

(continued)

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Cobalt	3	3	4700.00	6000.00	SUMP-3-R	4653.33	6000.00	.	.
Copper	3	3	29400.00	67000.00	SUMP-3-R	37407.60	67000.00	.	.
Iron	3	3	23400000.00	35700000.00	SUMP-3-R	26523050.30	35700000.00	.	.
Lead	3	3	40000.00	110000.00	SUMP-1-R	66332.50	110000.00	.	.
Magnesium	3	3	29700000.00	31300000.00	SUMP-1-R	30409506.39	31300000.00	.	.
Manganese	3	3	441000.00	511000.00	SUMP-3-R	474711.49	511000.00	.	.
Mercury	3	3	390.00	1200.00	SUMP-3-R	684.11	1200.00	.	.
Nickel	3	3	16100.00	18700.00	SUMP-3-R	17351.37	18700.00	.	.
Potassium	3	3	1390000.00	2890000.00	SUMP-3-R	2004270.44	2890000.00	.	.
Sodium	3	3	361000.00	394000.00	SUMP-1-R	379222.09	394000.00	.	.
Vanadium	3	3	16300.00	23100.00	SUMP-3-R	19404.30	23100.00	.	.
Zinc	3	3	102000.00	119000.00	SUMP-3-R	110172.59	119000.00	.	.

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

[illegible]-Drainage Swale Sediments

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Methylene Chloride	10	20	13.00	73.00	SED-13-R	27.55	40.44	26.50	30.0
Acetone	11	20	12.00	89.00	SED-11-R	17.25	37.77	15.00	61.0
1,1-Dichloroethane	1	20	19.00	19.00	SED-14-R	4.61	5.77	7.00	11.0
1,1,1-Trichloroethane	2	20	3.00	3.00	SED-7-R	4.09	4.69	7.00	11.0
Benzene	1	20	3.00	3.00	SED-14-R	4.31	4.56	7.00	11.0
Phenanthrene	6	20	40.00	180.00	SED-10-R	411.35	1410.18	900.00	2100.0
Di-n-butylphthalate	1	20	140.00	140.00	SED-12-R	743.56	997.61	960.00	2100.0
Fluoranthene	7	20	63.00	330.00	SED-10-R	401.56	1045.63	1100.00	2100.0
Pyrene	7	20	50.00	310.00	SED-10-R	475.31	1077.70	1100.00	2100.0
Benzo(a)anthracene	4	20	83.00	210.00	SED-10-R	567.53	1077.44	900.00	2100.0
Chrysene	5	20	120.00	370.00	SED-8-R	545.96	1007.82	900.00	2100.0
bis(2-Ethylhexyl)phthalate	11	20	110.00	3900.00	SED-10-R	881.06	1127.78	760.00	2100.0
Di-n-octylphthalate	1	20	390.00	390.00	SED-15-R	773.36	832.35	900.00	2100.0
Benzo(b)fluoranthene	4	20	130.00	330.00	SED-8-R	618.30	944.03	900.00	2100.0
Benzo(k)fluoranthene	3	20	160.00	350.00	SED-8-R	651.18	964.55	900.00	2100.0
Benzo(a)pyrene	3	20	140.00	350.00	SED-8-R	699.43	990.79	900.00	2100.0
Benzo(g,h,i)perylene	1	20	330.00	330.00	SED-8-R	1661.53	3363.60	900.00	6300.0
Delta-BHC	7	20	1700.00	5400.00	SED-4-R	3690.39	8760.08	3500.00	36000.0
Gamma-BHC	2	20	920.00	1800.00	SED-17-R	3703.10	8714.11	3700.00	36000.0
Aldrin	2	20	1100.00	2000.00	SED-10-R	3603.05	8073.89	3500.00	36000.0
Heptachlor epoxide	3	20	900.00	3100.00	SED-17-R	3633.55	10156.63	3700.00	36000.0
Dieldrin	3	20	1000.00	3350.00	SED-11-R	3099.56	11901.79	3600.00	56000.0
4,4-DDE	3	20	1100.00	20000.00	SED-17-R	3305.00	17101.00	3700.00	54000.0
Endrin	3	20	7600.00	10000.00	SED-10-R	3535.21	17360.16	3500.00	54000.0
Endosulfan II	3	20	3700.00	7800.00	SED-6-R	7603.06	23635.50	4700.00	54000.0
4,4-DD	1	20	6700.00	6700	[illegible]-12-R	3066.00	23305.60	3500.00	5400[illegible]
4,4-[illegible]	2	2[illegible]	[illegible]	7[illegible]	[illegible]	7437.34	20533.03	3500.00	71[illegible]

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

---------- TTFS-Drainage Swale Sediments ----------

(continued)

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Methoxychlor	1	20	16000.00	16000.00	SED-7-R	14474.54	63047.39	7300.00	370000.0
Aluminum	20	20	6400000.00	37000000.00	SED-16-R	14790176.31	20603775.34	*	*
Antimony	1	20	15200.00	15200.00	SED-12SP	6300.67	7263.19	8600.00	15000.0
Arsenic	20	20	710.00	37600.00	SED-10-R	14770.00	34174.30	*	*
Barium	20	20	64500.00	318000.00	SED-9-R	150553.56	126267.93	*	*
Beryllium	20	20	400.00	1300.00	SED-16-R	763.37	877.54	*	*
Cadmium	3	20	840.00	2100.00	SED-10-R	416.41	690.26	400.00	1500.0
Calcium	20	20	5170000.00	115000000.00	SED-10-R	31375400.03	71761993.64	*	*
Chromium, total	20	20	13400.00	34000.00	SED-16-R	22303.94	25934.49	*	*
Cobalt	20	20	4000.00	17700.00	SED-10-R	9190.33	11302.33	*	*
Copper	20	20	10400.00	41950.00	SED-4SP	30670.80	36489.57	*	*
Iron	20	20	8590000.00	69000000.00	SED-9-R	22610606.63	29144379.32	*	*
Lead	20	20	21000.00	100000.00	SED-8-R	63413.93	56343.47	*	*
Magnesium	20	20	4310000.00	48700000.00	SED-10-R	11974230.01	19963784.70	*	*
Manganese	20	20	117000.00	695000.00	SED-8-R	367373.04	539964.90	*	*
Mercury	13	20	80.00	1650.00	SED-4SP	333.36	430.01	60.00	300.0
Nickel	20	20	7400.00	35400.00	SED-16-R	21637.57	26940.53	*	*
Potassium	20	20	1320000.00	6360000.00	SED-16-R	3336463.71	4331300.40	*	*
Selenium	1	10	710.00	710.00	SED-12SP	333.33	304.77	500.00	930.0
Sodium	20	20	340000.00	3360000.00	SED-12SP	550360.01	915004.60	*	*
Vanadium	20	20	12000.00	49000.00	SED-16-R	29690.60	35634.33	*	*
Zinc	20	20	66000.00	393000.00	SED-11-R	130034.74	193367.09	*	*

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

-------------------- TYPE=Northern Landfill Cell Ground Water --------------------

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Methylene Chloride	1	3	12.50	12.50	MCR-12DGF	5.00	12.50	4.00	4.0
Acetone	3	3	46.00	330.00	MCR-12DGF	54.69	30702535833601	21.50	21.5
Carbon Disulfide	3	3	0.45	1.00	MCR-12D-II	0.63	3.34	.	.
1,1-Dichloroethane	1	3	1.00	1.00	MCR-12DGF	0.63	3.09	1.00	1.0
cis-1,2-Dichloroethylene	1	3	0.35	0.35	MCR-12DGF	0.44	0.74	1.00	1.0
Chloroform	1	3	5.50	5.50	MCR-12DGF	1.11	143050073.90	1.00	1.0
2-Butanone (MEK)	3	3	15.00	60.50	MCR-12DGF	35.83	8700.95	.	.
Trichloroethylene	1	3	9.50	9.50	MCR-12DGF	1.33	2241049355649.3	1.00	1.0
Benzene	2	3	0.70	5.00	MCR-12DGF	1.31	4190054.40	1.00	1.0
4-Methyl-2-Pentanone	1	3	6.50	6.50	MCR-12DGF	3.65	44.10	5.00	6.0
2-Hexanone (MBK)	1	3	4.00	4.00	MCR-12DGF	3.11	5.00	5.00	6.0
Tetrachloroethylene	1	3	1.00	1.00	MCR-12DGF	0.63	3.09	1.00	1.0
Toluene	3	3	1.00	49.50	MCR-12DGF	5.30	7.1270411178E17	.	.
Ethylbenzene	1	3	9.50	9.50	MCR-12DGF	1.33	2241049355649.3	1.00	1.0
Styrene	3	3	2.00	67.00	MCR-12DGF	7.30	3.0305003115E16	.	.
1,4-Dichlorobenzene (para)	2	3	0.50	0.00	MCR-12DGF	2.15	340390071.49	5.00	5.0
Isopropylbenzene	1	1	0.30	0.30	MCR-12DGF	0.30	0.30	.	.
Naphthalene	1	1	0.80	0.80	MCR-12DGF	0.80	0.80	.	.
1,2,4-Trimethylbenzene	1	1	0.95	0.95	MCR-12DGF	0.95	0.95	.	.
1,3,5-Trimethylbenzene	1	1	0.30	0.30	MCR-12DGF	0.30	0.30	.	.
Total Xylenes	3	3	0.95	36.00	MCR-12DGF	3.67	306938173112047	.	.
Phenol	3	3	775.00	2650.00	MCR-12DGF	1350.75	80530.74	.	.
2-Methylphenol	3	3	16.50	175.00	MCR-12DGF	40.70	80736007.94	.	.
4-Methylphenol	3	3	31.00	365.00	MCR-12DGF	60.94	349618243.69	.	.
2,4-Dimethylphenol	3	3	2.00	27.00	MCR-12DGF	8.74	497721907.73	.	.
D[illegible] ethylphthalate	1	3	3.00	[illegible].00	MCR-12D-I	8.16	6406961063.06	5.00	7.0
[illegible]	[illegible]	3	[illegible]	[illegible]	[illegible]	0.22	45617066.94	5.00	4.0

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

-- TYPE=Northern Landfill Cell Ground Water --

(continued)

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Gamma-BHC	1	3	0.41	0.41	NCR-12D-II	3.71	5.2075636357810	10.00	50.0
Heptachlor	2	3	0.59	6.70	NCR-12D-I	6.62	6.0538131067815	50.00	50.0
Endosulfan sulfate	1	3	0.69	0.69	NCR-12D-II	7.01	6.4996957302830	20.00	100.0
Aluminum	2	3	99.30	223.50	NCR-12DUP	130.40	1075.46	200.00	200.0
Antimony	2	3	26.60	44.75	NCR-12DUP	35.54	603.75	30.00	30.0
Arsenic	1	3	2.50	2.50	NCR-12DUP	1.70	6.33	3.00	3.0
Barium	3	3	9.45	97.60	NCR-12DUP	22.56	173036744.37	•	•
Beryllium	1	3	1.00	1.00	NCR-12DUP	0.63	2.99	1.00	1.0
Calcium	3	3	379000.00	511000.00	NCR-12D-II	450740.06	667440.07	•	•
Chromium, total	1	3	32.05	32.05	NCR-12DUP	5.90	13314306663.30	5.00	5.0
Cobalt	1	3	0.40	0.40	NCR-12DUP	4.19	106.96	5.00	7.0
Copper	1	3	31.00	31.00	NCR-12DUP	4.53	300314050543706.0	3.00	4.0
Iron	3	3	631.50	655.50	NCR-12DUP	641.42	655.50	•	•
Magnesium	3	3	61500.00	97150.00	NCR-12D-I	83172.83	172250.50	•	•
Manganese	3	3	21.30	26.25	NCR-12D-II	23.33	26.25	•	•
Nickel	1	3	22.00	22.00	NCR-12DUP	7.60	83333.06	7.00	11.0
Potassium	3	3	9990.00	117500.00	NCR-12DUP	25957.52	653736000476.73	•	•
Selenium	1	3	1.00	1.00	NCR-12DUP	4.03	1132070340.20	15.00	30.0
Silver	1	3	4.25	6.25	NCR-12DUP	2.77	11.95	4.00	5.0
Sodium	3	3	66050.00	83050.00	NCR-12DUP	72631.71	82942.70	•	•
Vanadium	1	3	15.25	15.25	NCR-12DUP	3.94	2570741.58	4.00	4.0
Zinc	2	3	13.25	15.70	NCR-12D-II	13.44	22.21	20.00	20.0

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

TYPE=Landfill Perimeter Ground Water

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Methylene Chloride	1	31	4.00	4.00	MCR-2I-II	1.50	1.97	1.00	5.0
Acetone	3	45	5.50	37.00	MCR-11D&P	2.66	3.30	1.00	37.0
Chloroform	1	45	1.00	1.00	MCR-11D&P	0.51	0.53	1.00	1.0
Benzene	1	45	1.00	1.00	MCR-2M-I	0.51	0.52	1.00	1.0
Toluene	1	45	5.00	5.00	MCR-2M-I	0.53	0.61	1.00	1.0
Ethylbenzene	1	45	1.00	1.00	MCR-2M-I	0.51	0.53	1.00	1.0
Total Xylenes	1	45	6.00	6.00	MCR-2M-I	0.53	0.65	1.00	1.0
Phenol	4	45	1.00	6.00	MCR-6S-I	2.40	2.67	5.00	10.0
Diethylphthalate	2	45	1.00	2.00	MCR-8M-II	2.45	2.60	3.00	10.0
Pentachlorophenol	1	45	3.00	3.00	MCR-13S-I	9.94	10.03	20.00	50.0
Di-n-butylphthalate	1	45	1.00	1.00	MCR-4M-I	2.40	2.64	5.00	10.0
Benzylbutylphthalate	2	45	2.00	4.00	MCR-5M-I	2.40	2.60	3.00	10.0
bis(2-Ethylhexyl)phthalate	9	45	0.60	23.00	MCR-5S-I	2.33	3.44	1.00	10.0
Alpha-BHC	2	45	0.54	0.65	MCR-3M-I	4.33	6.08	3.00	50.0
Beta-BHC	2	45	10.00	49.00	MCR-3S-I	5.06	7.70	3.00	50.0
Delta-BHC	3	45	0.51	1.20	MCR-3S-I	4.01	6.96	0.04	50.0
Gamma-BHC	6	45	0.05	3.00	MCR-11D-II	3.03	5.04	3.00	50.0
Heptachlor	16	45	0.70	90.00	MCR-13S-II	3.67	8.00	1.00	50.0
Aldrin	1	45	0.09	0.09	MCR-9M-I	4.57	6.56	3.00	50.0
Heptachlor epoxide	1	45	0.06	0.06	MCR-11D-I	4.57	6.57	3.00	50.0
Dieldrin	1	45	0.50	0.50	MCR-10M-I	8.93	13.06	6.00	100.0
4,4-DDE	10	45	0.05	670.00	MCR-11D-II	8.50	33.27	0.70	100.0
4,4-DDD	1	45	240.00	240.00	MCR-11D-II	9.61	15.34	6.00	100.0
Endosulfan sulfate	3	45	0.09	54.00	MCR-11D-II	8.86	14.23	6.00	100.0
4,4-DDT	3	45	140.00	670.00	MCR-11D-II	10.67	21.83	6.00	100.0
Methoxychlor	3	45	3.80	[illegible]	MCR-6S-I	37.04	60.47	3.00	[illegible]
[illegible] ketone	1	45	2.40	[illegible]	MCR-11D-II	[illegible]	[illegible]	[illegible]	[illegible]

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

---TYPE=Landfill Perimeter Ground Water ---

(continued)

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Detected Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Endrin aldehyde	3	45	2.50	7.60	MCR-11D-II	6.94	12.03	1.70	100.0
alpha-chlordane	4	45	0.62	3.30	MCR-4S-II	4.56	0.78	3.00	500.0
gamma-chlordane	2	45	1.00	15.00	MCR-11D-II	3.08	9.24	0.74	500.0
Aluminum	33	44	75.00	88800.00	MCR-2S-I	543.04	10125.76	35.00	320.0
Antimony	6	41	33.10	69.00	MCR-11DEP	13.96	16.30	13.00	30.0
Arsenic	30	44	3.00	16.40	MCR-1M-II	2.95	5.73	2.00	3.0
Barium	44	45	3.40	431.00	MCR-2S-I	36.84	139.76	200.00	200.0
Beryllium	8	45	1.00	3.10	MCR-2S-I	0.61	0.77	1.00	1.0
Cadmium	3	43	4.40	5.00	MCR-11M-I	2.13	3.30	4.00	4.0
Calcium	44	44	35600.00	577000.00	MCR-2S-II	316449.56	498505.03	*	*
Chromium	17	45	7.50	134.00	MCR-3D-I	7.33	46.36	5.00	5.0
Cobalt	9	45	6.60	43.00	MCR-2S-I	4.15	6.00	5.00	7.0
Copper	22	45	3.10	137.00	MCR-2S-II	5.51	25.00	3.00	4.0
Iron	43	45	59.50	300000.00	MCR-2S-I	1367.70	30423.70	42.00	307.0
Lead	11	43	2.60	77.00	MCR-2S-I	3.07	12.05	1.00	37.0
Magnesium	44	44	20500.00	340000.00	MCR-11M-I	66075.61	117065.09	*	*
Manganese	42	45	17.35	3930.00	MCR-2S-II	135.41	1071.35	33.70	57.7
Mercury	2	44	1.30	1.00	MCR-2S-I	0.11	0.16	0.20	0.3
Nickel	10	44	9.50	155.00	MCR-3S-I	12.21	53.64	7.00	11.0
Potassium	44	44	1370.00	34300.00	MCR-2S-I	6710.23	10036.01	*	*
Silver	3	43	5.00	6.50	MCR-11DEP	3.36	3.63	4.00	5.0
Sodium	43	43	15100.00	3610000.00	MCR-3S-II	93015.46	193169.53	*	*
Vanadium	10	45	4.70	110.00	MCR-2S-I	4.03	14.76	4.00	4.0
Zinc	31	44	3.70	600.00	MCR-2S-II	33.06	101.98	9.30	90.0

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

---TYPE=Drainage Swale Surface Water ---

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Carbon Disulfide	2	11	0.45	8.00	SW-10-R	2.36	4.37	5.00	5.0
1,1,1-Trichloroethane	1	11	2.00	2.00	SW-6-R	2.45	3.00	5.00	5.0
4-Methyl-2-Pentanone	1	11	2.00	2.00	SW-11-R	4.60	5.66	10.00	10.0
Tetrachloroethylene	1	11	4.00	4.00	SW-10-R	2.61	3.06	5.00	5.0
Toluene	2	11	2.00	2.00	SW-11-R	2.40	3.00	5.00	5.0
Ethylbenzene	1	11	1.00	1.00	SW-13	2.30	3.05	5.00	5.0
Total Xylenes	1	11	3.00	3.00	SW-11RF	2.56	3.00	5.00	5.0
Phenol	1	11	11.00	11.00	SW-6-R	5.33	6.34	9.00	10.0
2,4-Dimethylphenol	2	11	3.00	6.50	SW-11-R	4.84	5.67	9.00	10.0
Benzoic Acid	1	11	5.00	5.00	SW-13	31.00	33.51	47.00	51.0
Diethylphthalate	1	11	0.55	0.55	SW-11-R	4.05	6.36	9.00	10.0
Di-n-butylphthalate	2	11	0.30	0.40	SW-11-R	3.05	13.93	9.00	10.0
bis(2-Ethylhexyl)phthalate	8	11	0.70	1000.00	SW-10-R	9.10	1007.71	10.00	10.0
Delta-BHC	2	11	14.00	31.00	SW-6-R	9.39	24.55	9.40	51.0
Gamma-BHC	1	11	5.10	5.10	SW-2-R	7.47	10.26	9.40	51.0
Heptachlor epoxide	1	11	16.00	16.00	SW-8-R	8.10	30.43	9.40	51.0
4,4-DDT	1	11	40.00	40.00	SW-6-R	17.00	44.51	10.00	100.0
Aluminum	11	11	426.00	35300.00	SW-13	1563.81	20069.50	.	.
Arsenic	4	11	3.10	10.60	SW-13	3.62	17.03	6.00	6.0
Barium	11	11	55.00	456.00	SW-13	111.07	306.03	.	.
Beryllium	1	11	2.10	2.10	SW-8-R	1.00	1.29	1.00	2.0
Cadmium	1	11	5.70	5.70	SW-13	2.64	3.31	4.00	5.0
Calcium	11	11	46000.00	286000.00	SW-13	120300.45	237431.36	.	.
Chromium, total	2	11	26.00	30.00	SW-8-R	8.17	34.00	10.00	10.0
Cobalt	2	11	10.00	[illegible]	SW-13	6.30	11.57	7.00	[illegible]
Copper	4	11	31.00	[illegible]	SW-13	16.00	67.07	50.00	[illegible]
Iron	[illegible]	[illegible]	401	[illegible]	[illegible]	210	750.	[illegible]	[illegible]

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

--TYPE=Drainage Swale Surface Water --

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit.	Min. Detect. Limit	Max. Detect. Limit
Lead	11	11	6.10	353.00	SW-8-R	24.95	507.30	.	.
Magnesium	11	11	20500.00	211000.00	SW-1187	59307.65	113435.60	.	.
Manganese	11	11	37.00	1690.00	SW-8-R	139.55	3236.35	.	.
Nickel	6	11	37.00	63.00	SW-8-R	17.07	43.30	20.00	20.0
Potassium	11	11	5050.00	211000.00	SW-1187	21577.36	135458.43	.	.
Sodium	11	11	29800.00	303500.00	SW-11-R	93516.53	343707.26	.	.
Thallium	1	11	4.40	4.40	SW-1187	2.63	3.95	5.00	5.0
Vanadium	3	11	9.10	61.00	SW-13	11.65	20.05	20.00	20.0
Zinc	6	11	24.00	2360.00	SW-13	45.10	3607.53	20.00	20.0
Cyanide	4	11	15.60	40.60	SW-7-R	8.86	35.00	10.00	10.0

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

-- TYPE=Landfill Leachate - Water --

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Methylene Chloride	1	8	470.00	470.00	SEEP-13-R	16.00	5561.40	5.00	300.0
Acetone	2	8	490.00	2200.00	SEEP-13-R	41.90	147304.93	10.00	300.0
2-Butanone (MEK)	4	8	96.00	1400.00	SEEP-13-R	77.11	36909.03	10.00	300.0
Benzene	3	8	36.00	50.00	SEEP-16-R	10.60	636.31	5.00	100.0
4-Methyl-2-Pentanone	3	8	3.00	21.00	SEEP-16-R	15.14	433.80	10.00	300.0
2-Hexanone (MBK)	2	8	11.00	270.00	SEEP-SSF	21.54	667.06	10.00	300.0
Toluene	6	8	3.00	410.00	SEEP-SSF	21.66	90616.00	5.00	5.0
Chlorobenzene	3	8	26.00	56.00	SEEP-16-R	12.61	393.01	5.00	100.0
Ethylbenzene	6	8	3.00	600.00	SEEP-16-R	22.32	149334.64	5.00	35.0
Total Xylenes	5	8	13.00	1600.00	SEEP-SSF	51.73	3142838.60	5.00	35.0
Phenol	6	8	45.00	1000.00	SEEP-7-R	116.80	3300392.06	10.00	11.0
1,3-Dichlorobenzene	1	8	6.00	6.00	SEEP-16-R	7.32	39.07	10.00	160.0
1,2-Dichlorobenzene	1	8	16.00	16.00	SEEP-16-R	8.30	80.03	10.00	160.0
2-Methylphenol	7	8	12.00	960.00	SEEP-7-R	155.33	81553.74	10.00	10.0
4-Methylphenol	6	8	400.00	3750.00	SEEP-8-R	360.17	30560106.20	10.00	11.0
2,4-Dimethylphenol	7	8	10.00	900.00	SEEP-16-R	61.26	3356.23	10.00	10.0
Benzoic Acid	2	8	4300.00	12000.00	SEEP-7-R	167.31	8364706.70	40.00	800.0
Naphthalene	4	8	0.60	200.00	SEEP-5-R	11.51	3970.03	10.00	160.0
4-Chloroaniline	1	8	160.00	160.00	SEEP-SSF	7.00	103.78	10.00	11.0
2-Methylnaphthalene	1	8	5.00	5.00	SEEP-21-R	7.07	30.96	10.00	160.0
2,6-Dinitrotoluene	1	8	51.00	51.00	SEEP-7-R	9.57	107.91	10.00	160.0
Acenaphthene	3	8	0.80	1.00	SEEP-21-R	3.76	163.63	10.00	160.0
Diethylphthalate	7	8	1.00	85.00	SEEP-7-R	13.90	333.93	10.00	10.0
Fluorene	2	8	0.60	1.00	SEEP-21-R	4.46	156.10	10.00	160.0
N-Nitrosodiphenylamine	3	8	2.00	7.00	SEEP-16-R	6.66	90.40	10.00	160.0
Phenanthrene	3	8	1.00	[illegible]	SEEP-16-R	9.60	66.79	10.00	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SUMMARY STATISTICS FOR THE NIAGARA COUNTY REFUSE SITE. (continued).

SUMMARY STATISTICS FOR SITE, BY CHEMICAL AND MEDIUM/AREA

all in units of parts per billion, except pesticides/PCBs which are in units of parts per trillion

-- TYPE=Landfill Leachate - Water --

(continued)

Analyte	Num. Times Detected	Num. Samples Analyzed	Lowest Detected Conc.	Highest Detected Conc.	Highest Conc. Locat.	Geom. Mean Conc.	95 Pct. Upp. Conf. Limit	Min. Detect. Limit	Max. Detect. Limit
Benzylbutylphthalate	2	8	0.90	4.00	SEEP-5-R	5.63	77.10	10.00	160.0
bis(2-Ethylhexyl)phthalate	7	8	0.70	10.00	SEEP-5-R	4.11	154.01	160.00	160.0
Delta-BHC	3	8	19.00	100.00	SEEP-5-R	27.49	433.83	0.40	100.0
Gamma-BHC	1	8	52.00	52.00	SEEP-14-R	23.57	939.93	0.40	535.0
Heptachlor	3	8	81.00	1100.00	SEEP-8-R	23.44	14360.69	0.40	97.0
Aldrin	1	8	82.00	82.00	SEEP-16-R	10.66	1306.50	0.40	535.0
4,4-DDD	1	8	15.00	15.00	SEEP-13-R	21.96	899.77	0.40	535.0
4,4-DDT	3	8	44.00	110.00	SEEP-10-R	71.41	655.50	10.00	1050.0
Aluminum	8	8	1140.00	325000.00	SEEP-14-R	7047.36	1304135.71	.	.
Arsenic	8	8	9.50	50.60	SEEP-18-R	20.03	41.56	.	.
Barium	8	8	147.00	7610.00	SEEP-10-R	756.29	9253.53	.	.
Beryllium	1	8	3.20	3.20	SEEP-14-R	1.35	3.05	3.00	10.0
Cadmium	2	8	6.10	9.00	SEEP-16-R	4.37	17.83	5.00	50.0
Calcium	8	8	93000.00	396000.00	SEEP-14-R	153062.09	379944.47	.	.
Chromium, total	8	8	26.00	110.00	SEEP-SWP	53.19	105.03	.	.
Cobalt	4	8	12.50	93.00	SEEP-21-R	17.04	170.00	10.00	100.0
Copper	5	8	20.00	99.00	SEEP-16-R	33.26	130.36	20.00	50.0
Iron	8	8	13555.00	390000.00	SEEP-10-R	43700.50	1010524.33	.	.
Lead	8	8	17.40	1010.00	SEEP-16-R	115.74	3660.17	.	.
Magnesium	8	8	107000.00	419000.00	SEEP-7-R	254061.73	633266.14	.	.
Manganese	8	8	76.00	2960.00	SEEP-14-R	393.71	6077.09	.	.
Mercury	2	8	0.50	0.50	SEEP-16-R	0.15	0.44	0.20	0.2
Nickel	8	8	34.00	157.00	SEEP-SWP	90.73	166.97	.	.
Potassium	8	8	26300.00	645000.00	SEEP-21-R	303462.06	1098064.38	.	.
Sodium	8	8	84000.00	1660000.00	SEEP-21-R	524001.63	4053790.60	.	.
Vanadium	4	8	21.00	33.00	SEEP-5-R	17.91	31.93	30.00	60.0
Zinc	8	8	304.00	1410.00	SEEP-7-R	564.09	3309.09	.	.

APPENDIX III

ADMINISTRATIVE RECORD INDEX

NIAGARA COUNTY REFUSE
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

1.0 SITE IDENTIFICATION

1.1 Background - RCRA and other information

P. 100001 - 100260 Report: Engineering Investigations at Inactive Hazardous Waste Sites Phase II Investigation, prepared by EA Science and Technology, November 1987. Attached are Appendix 1.4.3-2 report: Preliminary Evaluation of Chemical Migration To Groundwater and The Niagara River from Selected Waste Disposal Sites, prepared by the U.S. Geological Survey in cooperation with NYSDEC, August 12, 1985, Appendix 1.4.3-4 report: Inspection Report NCSWD-Wheatfield Site, prepared by Niagara County Health Department, May 13, 1983, Appendix 1.4.4-1 report: Draft Remedial Action Master Plan for Niagara County Refuse Disposal Hazardous Waste, prepared by Camp Dresser & McKee Inc., CH2M Hill, Conestoga-Rovers & Associates Limited, C.C. Johnson and Associates, September 9, 1982, Appendix 1.4.4-2 memorandum to Mr. Robert J. Mitrey from Mr. Yavuz Erk, re: EPA Testing Results for the Niagara County Refuse Disposal Site, December 29, 1980, and Appendix 1.4.4-3 report: Evaluation of Analytical Chemical Data from Niagara County Refuse, prepared by NUS Corporation, December 2, 1983.

3.0 REMEDIAL INVESTIGATION

3.2 Sampling and Analysis Data/Chain of Custody Forms

P. 300001 - 300280 Report: Remedial Investigation Sample Summary Report, prepared by Conestoga-Rovers & Associates, August 16, 1991.

3.3 Work Plans

P. 300281 - 300627 Report: Quality Assurance Project Plan (QAPP) Remedial Investigation, prepared by Conestoga-Rovers & Associates, May, 1990.

P. 300628 - 300677 Report: Health and Safety Plan Remedial Investigation, prepared by Conestoga-Rovers & Associates, April, 1990.

P. 300678 - 300818 Report: Project Operations Plan Remedial Investigation, prepared by Conestoga-Rovers & Associates, April 1990.

P. 300819 - 300930 Report: Final Work Plan Remedial Investigation and Feasibility Study, prepared by EBASCO Services, Inc., March 1988.

P. 300931 - 301117 Report: Final Remedial Action Master Plan prepared by CH2M Hill, January 5, 1983.

3.4 Remedial Investigation Reports

P. 301118 - 301771 Report: Final Risk Assessment Niagara County Refuse Site Wheatfield, New York Risk Assessment, prepared by TRC Environmental Corporation, July 22, 1993.

P. 301772 - 302252 Report: Remedial Investigation (RI) Report Volume I - Text, prepared by Conestoga-Rovers & Associates, July 1992.

P. 302253 - 303198 Report: Remedial Investigation (RI) Report Volume II - Appendices A-P, prepared by Conestoga-Rovers & Associates, July 1992.

P. 303199 - 304242 Report: Remedial Investigation (RI) Report Volume III - Form I Data Laboratory Reports, prepared by Conestoga-Rovers & Associates, July 1992.

P. 304243 - 304385 Report: Technical Memorandum No. 1 Niagara County Refuse Site Wheatfield, New York, prepared by Conestoga-Rovers & Associates, December 20, 1991.

3.5 Correspondence

P. 304386 - 304390 Letter to Mr. Richard M. Frankoski, Manager, Environmental Properties, BP America Incorporated, from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, re: comments on EPA Baseline Risk Assessment, June 9, 1993.

P. 304391 - 304396 Letter to Mr. Michael Negrelli, USEPA Region II, from Mr. R. M. Frankoski, Manager, Environmental Properties, BP America Incorporated, re: baseline risk assessment, April 15, 1993. Attached is memo to NCR Technical Committee from Mr. Ed Roberts, Conestoga-Rovers Associates, re: NCR Site, EPA's Risk Assessment, March 12, 1993.

P.	304397 - 304398	Letter to Mr. Richard M. Frankoski, Manager, Environmental Properties, BP America Incorporated, from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, re: Niagara County Refuse Site, Wheatfield, New York Remedial Investigation (RI) Report - Risk Assessment, January 28, 1993.
P.	304399	Letter to Mr. Michael Walters, ERRD, USEPA Region II, from Mr. Steven M. Scharf, Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: NYSDOH review of Risk Assessment Report, August 27, 1992.
P.	304400 - 304405	Letter re: Responses to USEPA Comments of June 25, 1992 Technical Review of the Revised Draft Remedial Investigation (RI) Report Niagara County Refuse Site (NCR), July 24, 1992.
P.	304406 - 304409	Letter to Mr. Richard Frankoski, Manager, Environmental Properties, BP America Incorporated, from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, re: Technical Review of the Revised Draft Niagara County Refuse Superfund Site, Remedial Investigation (RI) Report, June 25, 1992.
P.	304410 - 304411	Letter to Mr. Michael Walters, USEPA Region II from Mr. Steven M. Scharf, Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: revised Remedial Investigation (RI) Report, June 25, 1992.
P.	304412 - 304473	Letter to Mr. Mike Walters, Project Officer, Niagara County Refuse - Wheatfield Site, ERRD, USEPA Region II from Mr. R.M. Frankoski (by E. Roberts), Manager, Environmental Properties, BP America, re: revisions to Remedial Investigation (RI) Report, May 1, 1992. Attached are Responses to USEPA Comments of March 23, 1992 Technical Review of the Remedial Investigation (RI) Report Niagara County Refuse (NCR).
P.	304474	Letter to Mr. Michael Walters, USEPA Region II, from Mr. Steven M. Scharf, Project Engineer, Remedial Section A, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: meeting with PRPs to discuss deficiencies in the Remedial Investigation (RI) Report and commencement of the Feasibility Study (FS), March 26, 1992.

P.	304475 - 304485	Letter (fax) to Mr. Mike Walters, USEPA, from Mr. R.M. Frankoski, HSEQ Department, BP America, re: Responses to USEPA Comments of January 10, 1992 Technical Review of the Remedial Investigation (RI) Report Niagara County Refuse Site (NCR), February 27, 1992.
P.	304486 - 304487	Letter to Mr. Michael Walters, ERRD, USEPA Region II, from Mr. Steven M. Scharf, Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: review of technical memorandum by NYSDEC Division of Water (DOW), February 10, 1992. Attached is memorandum to Mr. Robert Schick, Chief, Remedial Action Section A, BWRA, from Mr. Robert Wither, Chemical Systems Section, BWFD, DOW, re: review of December 20, 1991, addendum to the remedial investigation report, January 31, 1992.
P.	304488 - 304489	Letter to Mr. Michael Walters, USEPA Region II, from Mr. Steven M. Scharf, Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: PRP technical memorandum regarding the resampling of monitoring well NCR-12D and the further investigation of the field tile, January 24, 1992.
P.	304490 - 304493	Letter to Mr. Michael Walters, ERRD, USEPA Region II, from Mr. Steven M. Scharf, Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: NYSDEC and NYSDOH review of draft Remedial Investigation (RI) report, December 12, 1991.
P.	304494 - 304504	Letter to Ms. Carole Peterson, Chief, New York/ Caribbean Compliance Branch, ERRD, USEPA, from Mr. Ed Roberts, P. Eng., Conestoga-Rovers & Associates Limited, re: response to November 13, 1991, letter and comments during preparation of Risk Assessment, November 22, 1991. Attached is USEPA - CLP Inorganic Analysis Data Sheet.
P.	304505	Letter to Mr. Richard Frankoski, Manager, Environmental Properties, BP America Inc., from Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, re: The Draft Niagara County Refuse Remedial Investigation Report, November 13, 1991.

P. 304506 - 304507 Letter to Mr. Richard Frankoski, Facility Coordinator, B/P America Inc., JoAnn E. Gould, Esq., Saperston & Day, P.C. and David Bell, Esq., B/P America Inc., from Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, re: proposed revised schedule for completion of RI activities, April 19, 1991.

P. 304508 - 304511 Letter to Ms. Carole Peterson, Chief, New York/ Caribbean Compliance Branch, ERRD, USEPA, Michael Mintzer, Esq., Office of Regional Counsel, USEPA Region II, and Mr. Steven Scharf, Bureau of Case Management, Division of Hazardous Waste Management, NYSDEC, from JoAnn E. Gould, Esq., Saperston & Day, P.C., re: procurement of laboratory for analytical work, March 11, 1991.

P. 304512 - 304513 Letter to Mr. Richard Frankoski, Facility Coordinator, B/P America Inc., JoAnn E. Gould, Esq., Saperston & Day, P.C. and David Bell, Esq., B/P America Inc., from (Mr. Melvin Hauptman for) Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, re: procurement of laboratory for analytical work, February 21, 1991.

P. 304514 - 304525 Letter to Carole Petersen, Chief, New York/ Caribbean Compliance Branch, ERRD, USEPA, from Ms. JoAnn E. Gould, Saperston & Day, P.C., re: Niagara County Refuse Superfund Site, Wheatfield, New York Administrative Order on Consent, Index No. II CERCLA-90209, November 21, 1990. Attached is memo to Mr. Dick Frankoski from Mr. Ed Roberts and Mr. Jim Kay, re: USEPA comments for the NCR site, installation of additional monitoring wells, November 20, 1990.

P. 304526 Letter to Mr. Mike Walters, Chief, Site Compliance Branch, ERRD, USEPA Region II, from Mr. Tony Misercola, Project Chemist, Conestoga-Rovers & Associates, Inc., re: modifications to the scope of work, October 4, 1990.

P. 304527 - 304532 Letter to Chief, Site Compliance Branch, ERRD, USEPA Region II, Chief, New York Super Fund Branch, ORC, USEPA Region II, Bureau of Case Management, Division of Hazardous Waste Management, NYSDEC, from Ms. JoAnn E. Gould, Saperston & Day, P.C., re: insurance coverage of remedial contractors and subcontractors, July 24, 1990. Attached are Certificates of Insurance.

P.	304533 - 304534	Letter to Ms. Suzanne Jacquett, Environmental Engineer, USEPA Region II, from Mr. Anthony J. Misercola, Conestoga-Rovers & Associates, re: Air Sample Volumes Niagara County Refuse (NCR) Site Remedial Investigation, May 11, 1990.
P.	304535 - 304538	Letter to Mr. Ralph DeLeonardis, Manager, Environmental Properties, BP America Inc., from Ms. Carole Petersen, Chief, New York Compliance Branch, ERRD, re: Finalization of the Quality Assurance Project Plan and the Air Monitoring Requirements for the Remedial Investigation of the Niagara County Site, May 7, 1990.
P.	304539 - 304548	Letter to Mr. Ralph DeLeonardis, Manager, Environmental Properties, BP America Inc., from Ms. Carole Petersen, Chief, New York/Caribbean Compliance Branch, ERRD, re: Review of Remedial Investigation Plans for the Niagara County Refuse Site, Wheatfield, New York, March 26, 1990. Attached are responses to comments regarding the Quality Assurance Project Plan and Air Monitoring Requirements.
P.	304549 - 304554	Letter to Mr. Kevin Lynch, USEPA Region II, Western New York/Niagara Area Compliance Section, from Mr. Paul Dicky, Assistant Public Health Engineer, Niagara County Health Department, re: fish kill investigation, March 8, 1990. Attached are memorandum to Mr. John McMahon (Attention: Mr. Paul Foersch) from Mr. James J. Devald, re: fish kill investigation, and report: Niagara County Department of Health Report of Investigation.
P.	304555 - 304617	Letter to Mr. Ralph DeLeonardis, Manager, Environmental Properties, BP America Inc., from Mr. Ed Roberts, P. Eng., Conestoga-Rovers & Associates, re: Response to Final EPA Comments on NCR POP, OAPP and HASP, November 13, 1989. Attached are report: Revised Tables for Inclusion in OAPP, report: Monitoring Well Specifications, and report: Typical Groundwater and Soil Sampling Data Sheets.
P.	304618 - 304622	Report: Responses to USEPA Comments of October 12, 1989 Air Sampling Program Niagara County Refuse Site, prepared by Conestoga-Rovers & Associates, (undated).

P. 304623 - 304636 Letter to Mr. R.A. DeLeonardis, Manager, Environmental Properties, BP America Inc., from Ms. Carole Petersen, Chief, New York/Caribbean Compliance Branch, ERRD, re: USEPA review of Project Operations Plan, Health and Safety Plan, and Quality Assurance Project Plan, October 12, 1989. Attached are comments.

P. 304637 - 304638 Letter to Mr. Michael Walters, USEPA Region II, from Mr. Robert W. Schick, P.E., Chief, Remedial Section A, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: NYSDEC comments on Project Operations Plan, Health and Safety Plan, and Quality Assurance Project Plan, June 7, 1989.

4.0 FEASIBILITY STUDY

4.2 Feasibility Study Work Plans

P. 400001 - 400030 Report: Scoping Plan for Streamlined Feasibility Study, prepared by Conestoga-Rovers & Associates, February 15, 1993.

4.3 Feasibility Study Reports

P. 400031 - 400321 Report: Streamlined Feasibility Study, prepared by Conestoga-Rovers & Associates, July 12, 1993.

4.4 Proposed Plan (SOP, FOP)

P. 400322 - 400335 Proposed Plan for Niagara County Refuse, July 1993.

4.6 Correspondence

P. 400336 - 400338 Letter to Mr. Mike Negrelli, Project Officer, Niagara County Refuse Wheatfield Site, from Mr. R.M. Frankoski (by J. Kay), Manager, Environmental Properties, re: Comments on Superfund Proposed Plan, August 18, 1993.

P. 400339 - 400365 Report: Responses to USEPA Comments received June 14, 1993 on "Streamlined Feasibility Study" Niagara County Refuse Site Wheatfield, New York, May 1993, prepared by Conestoga-Rovers Associates, July 3, 1993.

P. 400366 - 400368 Letter to Mr. Michael Negrelli, USEPA Region II, from Mr. Steven M. Scharf P.E., Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: NYSDEC and NYSDOH review of the draft Feasibility Study (FS), June 22, 1993.

P. 400369 - 400382 Letter to Mr. Richard M. Frankoski, Manager, Environmental Properties, BP America Incorporated, from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, re: comments on Streamlined Feasibility Study, June 14, 1993. Attached are comments.

P. 400383 - 400385 Letter to Mr. Richard M. Frankoski, Manager, Environmental Properties, BP America Incorporated, from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, re: Niagara County Refuse Site, Wheatfield, New York Scoping Plan for Streamlined Feasibility Study, March 2, 1993.

P. 400386 - 400387 Letter to Mr. Kevin M. Lynch, Section Chief, ERRD, USEPA Region II, from Mr. Robert W. Schick, P.E., Chief, Remedial Section A, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, re: FS scoping document, March 1, 1993.

P. 400388 - 400389 Letter to Mr. Steven Scharf, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, NYSDEC, from Ms. Dawn E. Hettrick, Assistant Sanitary Engineer, Bureau of Environmental Exposure Investigation, NYSDOH, re: review of draft final Risk Assessment (RA), July 31, 1992.

6.0 STATE COORDINATION

6.3 Correspondence

P. 600001 Letter to Mr. George Pavlou, Director, ERRD, USEPA Region II from Ms. Ann Hill De Barbieri, Deputy Commissioner, Office of Environmental Remediation, re: Proposed Remedial Action Plan (PRAP), July 26, 1993.

7.0 ENFORCEMENT

7.4 Consent Decrees

P. 700001 - US EPA Administrative Order on Consent for
700018 Remedial Investigation Feasibility Study, Index No. II CERCLA-90209, March 30, 1989.

7.8 Correspondence

P. 700019 - Letter to Daniel M. Darragh, Esq., Jack Litmer,
700020 Esq., BP America Inc. and Mr. Dick Frankoski, Manager, Environmental Properties, BP America Inc. from Ms. Carole Petersen, Chief, New York/ Caribbean Superfund Branch II, ERRD, re: Niagara County Refuse Superfund Site, Wheatfield, New York Administrative Order on Consent, Index No. II CERCLA-90209, January 8, 1991.

P. 700021 - Letter to Daniel M. Darragh, Esq., Jack Litmer,
700022 Esq., BP America Inc. and Mr. Dick Frankoski, Manager, Environmental Properties, BP America Inc. from Ms. Carole Petersen, Chief, New York Caribbean Compliance Branch, re: Niagara County Refuse Superfund Site, Wheatfield, New York Administrative Order on Consent, Index No. II CERCLA-90209, November 7, 1990. EPA Region II,

9.0 NATURAL RESOURCE TRUSTEES

9.4 Correspondence

P. 900001 - Letter to Mr. Vince Pitruzzello, Chief, Program
900004 Support Branch, ERRD, USEPA, from Mr. Jonathan P. Deason, (by Mr. Willie R. Taylor), Director, Office of Environmental Affairs, US Department of the Interior, re: preliminary natural resources survey, October 17, 1990.

10.0 PUBLIC PARTICIPATION

10.2 Community Relations Plans

P. 1000001 - Final Community Relations Plan for Niagara County
1000031 Refuse, prepared by TRC Environmental Corp., July 29, 1993.

10.3 Public Notices

P. 1000032 Public notice: Public Comment on the Proposed Plan for the Niagara County Refuse Site, (undated).

10.4 Public Meeting Transcripts

P. 1000033 - 1000066 Meeting transcript: Superfund Proposed Plan Niagara County Refuse Superfund Site, August 5, 1993.

APPENDIX IV

STATE LETTER OF CONCURRENCE

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Thomas C. Jorling
Commissioner

SEP 17 1993

Mr. George Pavlou, P.E.
Acting Director
Emergency & Remedial Response Division
U.S. Environmental Protection Agency
Region II
26 Federal Plaza - Rm 737
New York, New York 10278

Dear Mr. Pavlou:

Re: Niagara County Refuse Site, Wheatfield (T), Niagara County, New York, Site No. 9-32-026

The Record of Decision (ROD) for the Niagara County Refuse (NCR) site has been reviewed by the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH). This ROD concerns the NCR landfill closure, the only currently identified operable unit for this site.

The NYSDEC and NYSDOH concur with the selected remedy listed in the ROD. This Alternative includes a standard Title 6 NYCRR Part 360 Solid Waste Landfill cap with a clay barrier wall, leachate collection, gas venting, field tile drain removal, long term monitoring and erosion control. In addition, a wetlands assessment will be performed as part of the remedial design.

If you have any questions, please contact Mr. Robert W. Schick, P.E., of my staff, at 518/457-4343.

Sincerely,

Ann Hill DeBarbieri

Ann Hill DeBarbieri
Deputy Commissioner
Office of Environmental Remediation

cc: C. Petersen, USEPA
K. Lynch, USEPA
M. Negrelli, USEPA
D. Hettrick, NYSDOH

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

Niagara County Refuse Superfund Site

INTRODUCTION

This Responsiveness Summary provides a summary of citizen's comments and concerns and the U.S. Environmental Protection Agency's (EPA's) responses to those comments regarding the Remedial Investigation/Feasibility Study (RI/FS) Reports and Proposed Plan for the Niagara County Refuse Site ("the Site"). All comments summarized in this document have been considered in the EPA's final decision for selection of a remedial alternative for the Niagara County Refuse Site.

OVERVIEW

The EPA held the public comment period from July 24, 1993 through August 22, 1993 to provide interested parties with the opportunity to comment on the RI/FS and Proposed Plan for the Site. A public meeting was held to discuss the remedial alternatives described in the FS and to present the EPA's preferred remedial alternative for remediation of the Site. The meeting was held at the Wheatfield Town Hall, Wheatfield, New York on August 5, 1993 at 7:00 p.m.

At the time of the public comment period, the EPA published its preferred alternative for the Site, specifically construction of a New York State (NYS) Standard Landfill Cap, with a leachate collection system and off-site leachate treatment. Public reaction to the preferred alternative was favorable; no comments were received during the public comment period which were contrary to the preferred alternative.

The EPA screened possible alternatives, giving consideration to the following nine key criteria:

- Threshold Criteria, including:
    - overall protection of human health and the environment; and
    - compliance with Federal, State, and local environmental and health laws.
- Balancing Criteria, including:
    - long-term effectiveness;
    - short-term effectiveness;
    - reduction of mobility, toxicity, or volume;
    - ability to implement; and
    - cost.
- Modifying Criteria, including:
    - State acceptance; and

- community acceptance.

The EPA weighed State and community acceptance of the remedy prior to reaching the final decision regarding the selected remedy for the Site. The selected remedy provides the best balance of trade-offs from among the alternatives with respect to the nine criteria that the EPA uses for evaluation.

BACKGROUND ON COMMUNITY INVOLVEMENT

The public generally appears to understand that there is a low threat of contaminant migration and that the public water supply will not be impacted. Therefore, community concern regarding the site-related contamination is not perceived as high.

The EPA's community relations efforts included the following: a Community Relations Plan (CRP) was formulated, including an outline of community concerns, required and suggested community relations activities, and a comprehensive list of federal, state, and local contacts; and Site information repositories were established, one located at the EPA Region II office in New York City and the other located at the North Tonawanda Public Library in North Tonawanda, New York. The information repositories, which contain the RI/FS Report and other relevant documents, were updated periodically. Revising and updating the CRP was initiated in August 1993. A final CRP, including an updated outline of community concerns and an updated contact list, was submitted in August 1993 for inclusion in the information repositories. Additionally, the EPA Proposed Plan, describing the Agency's proposed remedial action for the Site, was sent to the information repositories and distributed to citizens and officials noted on the Site mailing list for review at the opening of the public comment period.

To obtain public input on the RI/FS and the proposed remedy, the EPA held a public comment period from July 24, 1993 to August 22, 1993. A public meeting notice appeared in the July 24, 1993 edition of the *Niagara Gazette*, and a public meeting was held on August 5, 1993. Approximately 25 people attended the meeting. The audience consisted of local businessmen, residents, and state and local government officials. The question and answer session lasted approximately 15 minutes, during which time the EPA was asked questions concerning the Site's responsible parties, scheduling issues, wetland concerns, and the extent of landscaping following remediation. A summary of the questions posed during the meeting is included in the following section.

COMPREHENSIVE SUMMARY OF COMMENTS AND RESPONSES

Public comments on the Proposed Plan submitted between July 24 and August 22, 1993 are summarized and addressed below. Section A summarizes those comments received at the public meeting held on August 5, 1993. Section B summarizes the written comments received during the public comment period.

A. Comments Received at Public Meeting

A summary of the comments provided by the public at the August 5, 1993 public meeting, as well as the EPA's response to those comments, follows. The comments are characterized by topic.

Schedule

- A representative from a State Senator's office asked why the proposed remedy would not be implemented until the summer of 1996 as the Site has been on the Superfund list since 1973.

  EPA Response: The schedule presented at the public meeting is fairly conservative. The time frames presented represent an average which the EPA hopes to improve on, but realistically the design phase is a two-year process which is anticipated to start in the summer of 1994 and construction of the design is expected to take two years as well. Prior to the design start date, there is a negotiation period with the Responsible Parties which may take approximately six months. The negotiation period is an important part of the Superfund program in that it gives the Responsible Parties the opportunity to perform the work at the Site themselves, which often saves time in the long run. There are also a number of pre-design studies required prior to the start of the design phase, such as a wetlands delineation and assessment, design treatability studies, a cultural resources survey, a coastal zone consistency determination, and agricultural lands impact determination. These pre-design studies are discussed in the Compliance with ARARs section of the ROD. Finally, the Site has been on the Superfund National Priorities List since 1983, not 1973. Negotiations, work plan review and approval, remedial investigation sampling, data validation, the development, review, and approval of the RI and FS reports are all activities that have preceded the Proposed Plan presented in 1993.

Landscaping

- The Wheatfield Town Supervisor stated for the record that he would like to see a berm and planting around the standard fence after it is installed around the Site so there is a natural screening to the area.

  EPA Response: As stated in the Proposed Plan and in the ROD, Site access will be restricted by the construction of a perimeter fence with locked gates. The addition of a berm and plantings around the fence is an option to be considered in the design phase of the project.

Implementation of the Remedial Alternative

- The Wheatfield Town Supervisor suggested that a clay mining operation located nearby should be used to supply the clay required to implement the preferred alternative. Stockpiling available clay at the Site would maintain reasonable costs as opposed to having the clay transported from further away at a later time.

  EPA Response: The EPA agrees that it is worthwhile to consider cost-saving measures such as stockpiling available clay at the Site. This is an option to be considered during the design phase of the project.

Responsible Parties

- A representative from a State Senator's office asked how the negotiations with the responsible parties were progressing.

  EPA Response: The negotiations pertaining to the potentially responsible parties (PRPs) involvement in Site cleanup will commence following the signing of the ROD and sending Special Notice letters to the PRPs inviting them to negotiate with the EPA for implementation of the remedy. The statutory time period for negotiations is one hundred and twenty days.

- A representative from a State Senator's office asked if the negotiations with the responsible parties could potentially affect the cleanup schedule.

  EPA Response: The EPA has been very successful at adhering to the statutory one hundred and twenty day negotiation period schedule, which has been included in the overall cleanup schedule for the Site. At the end of the negotiation period, three scenarios exist: the PRPs can enter into a consent decree with the EPA to carry out the Site remedy; the EPA can unilaterally administratively order the PRPs to carry out the Site remedy; or the EPA can use the Superfund and assign contractors to implement the cleanup strategy. Although each scenario involves a slightly different time frame, the overall Site cleanup schedule would not be widely affected.

- The Wheatfield Town Supervisor asked if all of the responsible municipalities have been identified as responsible parties.

  EPA Response: Not all municipalities that the EPA believes to be liable with respect to the Site signed the consent order to perform the RI/FS.

- The Wheatfield Town Supervisor asked if the EPA has authority under the law to compel the responsible parties to "come on line."

  EPA Response: The EPA has authority to administratively order PRPs to implement a remedy and may also, through the courts, seek to enforce administrative orders and seek to recover costs.

- The Wheatfield Town Supervisor asked if the municipalities who have already recognized their responsibility as responsible parties have the right to withdraw from their previous commitment.

  EPA Response: Municipalities who have signed an agreement with the EPA cannot withdraw their commitment to carry out the terms of that agreement. PRPs who satisfy their obligations with respect to a Consent Decree will have statutory protection against contribution lawsuits. The law allows parties who have signed on to sue recalcitrant parties.

Construction of Wetlands

- The Wheatfield Town Supervisor suggested that new enhanced wetlands could be constructed in the area west of the Site and east of the haul road. This area would have the natural barrier of the haul road itself and the created wetlands to prevent migration to the west. Creating the enhanced wetlands would also create an additional availability of clay for the cap.

  EPA Response: As stated in the Proposed Plan and in this ROD, a wetlands delineation and assessment will be required for the existing wetlands at the Site. A supplemental ecological risk analysis will be performed which may require the removal of contaminated wetland areas and placement of the removed wetlands under the cap prior to closure, or the cap itself may be extended over the areas of contamination. Any significant net loss of wetlands or wetland function will require mitigation which may include the creation of additional wetlands. Therefore, the construction of new wetlands in the area west of the Site may be a suitable option to be considered in the design phase of the project.

Construction of an Access Road

- The Wheatfield Town Supervisor stated that there is no longer a direct access road or right-of-way to the Site as there had once been. The current owners of the property around Forest City Enterprises have no access to this land for future development; the Town of Wheatfield has no access for emergency vehicles. The Supervisor requested that the EPA address this issue with the responsible parties during the negotiations.

EPA Response: The need for maintaining access to surrounding lands for future development is also open for consideration during the design phase of the project.

Transcript of the Public Meeting

- The Wheatfield Town Supervisor requested that he be sent a copy of the transcript of the public meeting.

  EPA Response: A copy of the transcript of the public meeting has been provided to the Wheatfield Town Supervisor directly. A copy of the transcript is also available in the Administrative Record for the Site, located in the information respositories.

B. Comments Received in Written Correspondence

The following correspondence (see Attachment A) was received during the public comment period:

- Letter to Mr. Mike Negrelli, USEPA Region II, from R. M. Frankoski by J. Kay, Conestoga-Rovers & Associates Limited, re: Comments on Superfund Proposed Plan, Niagara County Refuse Superfund Site, August 18, 1993.

A summary of the comments contained in the above letter as well as the EPA's response to those comments, follows.

Comment 1

On page 3 of the Proposed Plan, the fourth sentence of the third full paragraph should read as follows: "Toluene *and ethylbenzene* were the most frequently detected VOCs (five samples out of seven total), with maximum concentrations of 350 parts per billion (ppb) *and 680 ppb, respectively.*"

Response

The EPA agrees with this comment and has incorporated the comment as written in the "Summary of Site Characteristics" section of the ROD.

Comment 2

On page 3 of the Proposed Plan, the fifth sentence of the third full paragraph should read as follows: "...Bis (2-Ethylhexyl) phthalate was the most frequently detected SVOC (present in all seven leachate samples) with *an estimated* maximum concentration of

10 ppb."

Response

The EPA agrees with this comment and has incorporated the comment as written in the "Summary of Site Characteristics" section of the ROD.

Comment 3

On page 3 of the Proposed Plan, the second sentence of the fifth full paragraph should be revised to indicate that acetone was detected at an estimated maximum concentration of 89 ppb.

Response

The EPA agrees with this comment and has incorporated the comment as written in the "Summary of Site Characteristics" section of the ROD.

Comment 4

On page 4 of the Proposed Plan, the first paragraph of the section entitled "Summary of Site Risk" should be revised to reflect that CRA on behalf of the PRP Committee also conducted a Baseline Risk Assessment as part of the RI Report. It is requested that the first paragraph be replaced with the following wording from pages 2 and 3 of the Streamlined FS:

"A Baseline Risk Assessment was conducted by TRC Environmental Corporation (TRC) for the EPA. The results of the Risk Assessment are presented in the report entitled "Final Risk Assessment, Niagara County Refuse Site, Wheatfield, New York, Work Assignment: CO2089 (Ref. No. 1-635-259)" dated January 21, 1993 (BRA-TRC). The BRA-TRC characterized the current and potential threats to human health and the environment that may be posed by the presence and/or release of hazardous substances and/or pollutants or contaminants from the Site. A Baseline Risk Assessment was also conducted by CRA (BRA-CRA) and was included as part of the RI Report. However, the BRA-TRC is, according to the EPA, the correct risk assessment for the Site. Therefore, all references to the Baseline Risk Assessment in this Proposed Plan are specifically to the BRA-TRC."

Response

The EPA has provided an addendum to the RI Report for the Site, which includes the following statement: "The baseline risk assessment performed by Conestoga-Rovers & Associates (CRA), which is presented in Section 7.0 of the RI Report, is not the official baseline risk assessment for the Site. Readers should refer to the EPA baseline risk assessment in [the] information repository under separate cover, entitled "Final Risk Assessment, Niagara County

Refuse Site, Wheatfield, New York" (July, 1993), prepared for the EPA by TRC Environmental Corporation. References throughout the RI Report to the CRA risk assessment should be substituted for the EPA risk assessment." This provides a distinction between the EPA Baseline Risk Assessment for the Site and the report prepared by CRA and is included in the Administrative Record for the Site. As such, and by virtue of being reiterated in this Responsiveness Summary, the EPA does not agree that the reference to both risk assessments is appropriate in the ROD text.

Comment 5

On pages 6 through 10 of the Proposed Plan, the costs presented for Alternatives 2 through 6 represent those presented in the draft Streamlined FS submitted to the EPA in May 1993. The costs should be revised to reflect those costs presented in the final Streamlined FS submitted to the EPA in July 1993.

Response

The EPA agrees with this comment and has revised the cost figures in the ROD in accordance with the costs presented in the July 1993 Streamlined FS.

Comment 6

On page 7 of the Proposed Plan, under Alternative 5, the description of the leachate collection system should be generalized. The references to the minimum elevation of the leachate collection system at 566.00 feet AMSL and four pumping stations should either be deleted or preceded by the qualifier "approximately." The exact minimum leachate collection system elevation and number of manholes will be determined as part of the Remedial Design.

Response

The EPA agrees with this comment and under the "Description of Remedial Alternatives" section of the ROD, Alternative 5 has been revised by the deletion of the reference to the minimum elevation of the leachate collection system and the reference to the pumping stations has been revised to read "Approximately four pumping stations to properly convey the leachate in the system (final configuration to be determined during the remedial design phase of the project)." The same revisions apply to the "Selected Remedy" section of the ROD.

Comment 7

On page 7 of the Proposed Plan, the final grading configuration described in the first paragraph should also include a reference that the "fill material" may include "clean demolition and construction debris."

Response

Although the fill material may include clean demolition and construction debris, the EPA does not concur with the necessity of defining the fill constituents in the ROD.

Comment 8

On page 8 of the Proposed Plan, the off-site leachate treatment discussed for Alternative 6 specifies the North Tonawanda POTW. It is recommended that Alternative 6 generally state that the leachate treatment will be performed at an off-site POTW to be determined during the RD and not specifically state North Tonawanda.

Response

The EPA agrees with this comment but since the cost figures provided for Alternative 6 were based on leachate treatment at the North Tonawanda POTW, the EPA has revised Alternative 6 in the ROD as follows: "For Alternative 6, however, collected leachate would be treated at an off-site facility. The City of North Tonawanda's publically owned treatment works (POTW) has been assumed for costing purposes to be the off-site treatment facility. The ultimate off-site facility chosen will be determined during the remedial design phase of the project." The same revision applies to the "Selected Remedy" section of the ROD.

Comment 9

Regarding Figures 1 and 2 of the Proposed Plan, the figure (Figure 2) used to present the soil boring and groundwater sampling locations is not representative of current Site conditions. The figure identifies three active excavation areas which were active in October 1973, prior to Site closure in 1976. Also, Figure 1 is of poor quality and difficult to read. It is suggested that Figures 1.1 and 4.2 from the RI Report be used and issued as part of the ROD.

Response

Figure 1 and Figure 2 have both been revised in the ROD based on the corresponding Figures from the RI Report.

APPENDIX V

RESPONSIVENESS SUMMARY
ATTACHMENT A

LETTERS SUBMITTED DURING THE PUBLIC COMMENT PERIOD

CRA
Consulting Engineers

CONESTOGA-ROVERS & ASSOCIATES LIMITED
651 Colby Drive
Waterloo, Ontario, Canada N2V 1C2
(519) 884-0510 Colby Office Fax: (519) 884-0525
(519) 725-3313 Bathurst Office (519) 725-1394

August 18, 1993

Mr. Mike Negrelli
Project Officer, Niagara County Refuse
- Wheatfield Site
Emergency and Remedial Response Division
U.S. EPA Region II
26 Federal Plaza
Room 747
New York, New York 10278

ORIGINAL-
This Document Previously
Transmitted By Telecopier

Dear Mr. Negrelli:

Re: Comments on Superfund Proposed Plan
Niagara County Refuse Superfund Site
Town of Wheatfield
Niagara County, New York

This letter prepared on behalf of the Niagara County Refuse Site PRP Committee (PRP Committee) serves to provide comments on the proposed plan for the Niagara County Refuse (NCR) Site.

The PRP Committee has reviewed the proposed plan and is supportive of the preferred alternative; however, the following comments are provided to clarify inconsistencies between the proposed plan and the Remedial Investigation (RI) Report and Streamlined Feasibility Study (FS). These clarifications should be incorporated into the ROD, where applicable.

Comment 1 - Pg. 3

The fourth sentence of the third full paragraph should read as follows: "Toluene *and ethylbenzene* were the most frequently detected VOCs (five samples out of seven total), with maximum concentrations of 350 parts per billion (ppb) *and 680 ppb, respectively.*"

Comment 2 - Pg. 3

The fifth sentence of the third full paragraph should read as follows: "... Bis (2-Ethyhexyl) phthalate was the most frequently detected SVOC (present in all seven leachate samples) with *an estimated* maximum concentration of 10 ppb."

Comment 3 - Pg. 3

The second sentence of the fifth full paragraph should be revised to indicate that acetone was detected at an estimated maximum concentration of 89 ppb.

Comment 4 - Pg. 4

The first paragraph of the section entitled "Summary of Site Risk" should be revised to reflect that CRA on behalf of PRP Committee also conducted a Baseline Risk Assessment as part of the RI Report. It is requested that the first paragraph be replaced with the following wording from Pages 2 and 3 of the streamlined FS:

"A Baseline Risk Assessment was conducted by TRC Environmental Corporation (TRC) for the EPA. The results of the Risk Assessment are presented in the report entitled "Final Risk Assessment, Niagara County Refuse Site, Wheatfield, New York, Work Assignment: C02089 (Ref. No. 1-635-259)" dated January 21, 1993 (BRA-TRC). The BRA-TRC characterized the current and potential threats to human health and the environment that may be posed by the presence and/or release of hazardous substances and/or pollutants or contaminants from the Site. A Baseline Risk Assessment was also conducted by CRA (BRA-CRA) and was included as part of the RI Report. However, the BRA-TRC is, according to the EPA, the correct risk assessment for the Site. Therefore, all references to the Baseline Risk Assessment in this proposed plan are specifically to the BRA-TRC."

Comment 5 - Pg. 6 to 10

The costs presented for Alternatives 2 through 6 represent those presented in the draft Streamlined FS submitted to the EPA in May 1993. The costs should be revised to reflect those costs presented in the final Streamlined FS submitted to the EPA in July 1993.

Comment 6 - Pg 7

Under Alternative 5, the description of the leachate collection system should be generalized. The references to the minimum elevation of the leachate collection system at 566.00 feet AMSL and four pumping stations should either be deleted or preceded by the qualifier "approximately". The exact minimum leachate collection system elevation and number of manholes will be determined as part of the Remedial Design.

Comment 7 - pg. 7

The final grading configuration described in the first paragraph on Page 7 should also include a reference that the "fill material" may include "clean demolition and construction debris".

Comment 8 - pg. 8

The off-Site leachate treatment discussed for Alternative 6 specifies the North Tonawanda POTW. It is recommended that Alternative 6 generally state that leachate treatment will be performed at an off-Site POTW to be determined during the RD and not specifically state North Tonawanda.

Comment 9 - Figures 1 and 2

The figure (Figure 2) used to present the soil boring and groundwater sampling locations is not representative of Current Site conditions. The figure identifies three active excavation areas which were active in October 1973, prior to Site closure in 1976. Also, Figure 1 is of poor quality and difficult to read. It is suggested that Figures 1.1 and 4.2 from the RI report be used and issued as part of the ROD.

Sincerely,

James Kay for

R. M. Frankoski by J. Kay
Manager, Environmental Properties

DF/csm/3

APPENDIX B

WASTEWATER DISCHARGE PERMIT

CITY OF NORTH TONAWANDA
INDUSTRIAL WASTEWATER DISCHARGE PERMIT

CITY OF NORTH TONAWANDA

4/5/95

INDUSTRIAL WASTEWATER DISCHARGE PERMIT

Permit Number: 2628010

In accordance with the provisions of the Clean Water Act as amended, all terms and conditions set forth in this permit, the City of North Tonawanda Local Sewer Use Ordinance and any applicable Federal, State or local laws or regulations, authorization is hereby granted to: Niagara County Department of Public Works

Engineering Department
59 Park Avenue
Lockport, New York 14094

Classified by S.I.C. Number(s): _N/A_

the discharge of: groundwater and other wastes generated during Remedial Action construction and implementation into the City of North Tonawanda Sewerage System.

This permit is granted in accordance with an application filed on __/__/__ in the offices of the Treatment Plant Superintendent located at 830 River Road, and in conformity with specifications and other required data submitted in support of the above named application, all of which are filed with and considered part of this permit. This permit is also granted in accordance with discharge limitations and requirements, monitoring and reporting requirements, and all other conditions set forth in Parts I and II hereof.

Effective this 1 day of February, 1999

To expire the 31 day of January, 2001

Paul Joseph

Treatment Plant Superintendent

Signed this 19 **day of** January **1999**

PART I. SPECIFIC CONDITIONS

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date of this permit and lasting until the expiration date, discharge from the permitted facility outfall(s) shall be limited and monitored by the permittee as specified below (Refer to attached map for sampling and monitoring sites).

Sample Point	Parameter	Discharge Limitations mg/l except pH Daily Max.	Sampling Period	Sampling Type
001	Total Flow		1 Sampling Day Monthly	
7/	Benzene	Monitor Only	1 Sampling Day Monthly	
7/	2-Butanone	Monitor Only	1 Sampling Day Monthly	
7/	Chlorobenzene	Monitor Only	1 Sampling Day Monthly	
7/	1,1-Dichloroethane	Monitor Only	1 Sampling Day Monthly	
7/	1,2-Dichloroethylene	Monitor Only	1 Sampling Day Monthly	
7/	Ethylbenzene	Monitor Only	1 Sampling Day Monthly	
7/	Methylene Chloride	Monitor Only	1 Sampling Day Monthly	
7/	Styrene	Monitor Only	1 Sampling Day Monthly	

Sample Point	Parameter	Discharge Limitations mg/l except pH Daily Max.	Sampling Period	Sampling Type
7/	Toluene	Monitor Only	1 Sampling Day Monthly	
7/	Xylenes (total)	Monitor Only	1 Sampling Day Monthly	
7/	1,4-Dichlorobenzene	Monitor Only	1 Sampling Day Monthly	
4/	Phenols (4AAP)	5/	1 Sampling Day Monthly	
/	2-Methylphenol	Monitor Only	1 Sampling Day Monthly	
7/	3&4 Methylphenol	Monitor Only	1 Sampling Day Monthly	
7/	Dibenzofuran	Monitor Only	1 Sampling Day Monthly	
7/	Aluminum	2.0	1 Sampling Day Monthly	
	Chromium	4.7	1 Sampling Day Monthly	
	Lead	4.6	1 Sampling Day Monthly	
	Nickel	3.4	1 Sampling Day Monthly	
4/	Zinc	5/	1 Sampling Day Monthly	

Sample Point	**Parameter**	**Discharge Limitations mg/l except pH Daily Max.**	**Sampling Period**	**Sampling Type**
	Iron	10	1 Sampling Day Monthly	
7/	Magnesium	Monitor Only	1 Sampling Day Monthly	
7/	Manganese	Monitor Only	1 Sampling Day Monthly	
7/	Sodium	Monitor Only	1 Sampling Day Monthly	
	pH	Monitor Only	1 Sampling Day Monthly	
7/	BOD	Monitor Only	1 Sampling Day Monthly	
7/	Total Suspended Solids	Monitor Only	1 Sampling Day Monthly	
7/	Total Phosphorous	Monitor Only	1 Sampling Day Monthly	

PART I. SPECIFIC CONDITIONS

B. DISCHARGE REPORTING REQUIREMENTS

During the period beginning the effective date of this permit and lasting until the expiration date, discharge monitoring results shall be summarized and reported by the permittee on the no later than the days specified below.

Sample Point	Parameter	Initial Monitoring Report	Subsequent Monitoring Reports
001	Total Flow		Monthly
	Benzene		Monthly
	2-Butanone		Monthly
	Chlorobenzene		Monthly
	1,1-Dichloroethane		Monthly
	1,2-Dichloroethylene		Monthly
	Ethylbenzene		Monthly
	Methylene Chloride		Monthly
	Styrene		Monthly
	Toluene		Monthly
	Total Xylenes		Monthly
	1,4-Dichlorobenzene		Monthly
	Phenols (4AAP)		Monthly
	2-Methylphenol		Monthly
	3 & 4 - Methylphenol		Monthly
	Dibenzofuran		Monthly
	Aluminum		Monthly
	Chromium		Monthly

PART I. SPECIFIC CONDITIONS

C. SPECIAL REQUIREMENTS

1) This permit is written for a duration of two years. Upon renewal of this permit, all parameters will be re-evaluated to develop a parameter list based on chemical concentrations present in the extracted groundwater.

2) Frequency of monitoring is to be re-evaluated after the first year.

3) All monitoring reports (initial and subsequent), are to be received by the Superintendent, no later than twenty-eight (28) days after the end of the monitoring period.

4) In accordance with Section 75-10 of the North Tonawanda Sewer Use Law, the City is granting a variance for the discharge of four pollutants, Total Phenolic Compounds ~~and~~, Zinc, Aluminum and Iron respectively. This granting of this variance for these four parameters is based on two factors. The first is that it will cause undue hardship to require the pretreatment of the wastewater before discharge. Secondly the discharge of these pollutants at the proposed concentrations will not cause adverse effects on the receiving stream water quality, the waste water treatment plant or the safety of plant personnel.

5) The following mass limits will apply to the discharge of Phenols (4AAP), ~~and~~ Zinc, Aluminum and Iron.
Phenols (4AAP) - .964 lbs/day
Zinc - .318 lbs/day
Aluminum - 1.3 lbs/day
Iron - 7.14 lbs/day

6) It is required that the Permittee have a Site Operations Manual available at all times. All emergency phone numbers must be listed in an appropriate place for easy access by operations personnel. A log of pumping operations must be maintained on site and The permittee shall not discharge to the City of North Tonawanda sewerage treatment works during overflow conditions. The permittee is required to cease all pumping operations

upon verbal request of the North Tonawanda Wastewater Treatment Plant Superintendent or his assigns. Pumping operations shall not recommence until approved by the North Tonawanda Wastewater Treatment Plant Superintendent or his assigns.

7) Analysts are required to use GC/MS method detection limits for most organics (if GC/MS is appropriate); GC/ECD for PCBS/Pesticides and GF method detection limits for metals (where GF is appropriate), as contained in attachment 5 of the NYSDEC TOGs 1.3.8 - New Discharges to Publicly Owned Treatment Works - dated 10/26/94.

NYS New Dischar Form
for new or increased harges
Niagara County Landfill

POTW NAME AND SPDES PERMIT NUMBER	2. NAME AND ADDRESS OF PROPOSED DISCHARGE
ity of North Tonawanda Wastewater Treatment Plant	Niagara County Refuse Site
0 River Road	
orth Tonawanda, New York 14120	
PDES #NY0026280	Discharge of 5 gallons/minute = 7,200 g/d

LOCATION OF PROPOSED DISCHARGE

amer Road sanitary sewer
ischarge = 7200 gallons/day
ischarge would commence upon approval.

Substance	NT Reg Limit (PPM)	4. Flow (MGD)	5. Prop. Max. Dis. Conc. (PPM) @ 5gpm	6. Pres. POTW Rem. % **	7. Prop. Addit. Loading Max lbs.	8. Pres. Perm. Loading Tot. lbs	9. Non Ind. Loading lbs.	10. Pres. Hdwks. Loading lbs.	11. Allow. Hdwks. Loading Max. lbs.	12. Proj. Hdwks. Loading Max. lbs	13. Proj. Effluent Loading Max. lbs
cetone		0.0072	0.0019		0.000114					0.000	0.000
enzene /3		0.0072	0.0110	0.74	0.000661	0.05		0.05	0.48	0.051	0.013
lorobenzene /2 /4		0.0072	0.0180	0.83	0.001081	1.00		1.00	3.65	1.002	0.170
1-Dichloroethane		0.0072	0.0029		0.000174			0.00	0.51	0.000	0.000
2-Dichloroethylene /4		0.0072	0.0035	0.76	0.000210					0.000	0.000
4-Dichlorobenzene /2 /4		0.0072	0.0081	0.80	0.000486	1.00		1.00	5.00	1.001	0.200
hylbenzene /3		0.0072	0.0052	0.68	0.000312	0.05		0.05	0.78	0.050	0.016
ethylene Chloride (Dichloromethane) /2 /4		0.0072	0.1200	-0.34	0.007206	1.00		1.00	3.43	1.008	1.351
Methyl-2-pentanone		0.0072	0.0051		0.000306					0.000	0.000
yrene		0.0072	0.0050		0.000300					0.000	0.000
phthalene /3		0.0072	0.0010	0.91	0.000060	0.05		0.05	0.17	0.050	0.005
Methylphenol		0.0072	0.4200		0.025220					0.025	0.025
(2-Ethylhexyl) Phthalate		0.0072	0.0002		0.000012			0.00	0.27	0.000	0.000
benzofuran		0.0072	0.0033		0.000198					0.000	0.000
trachloroethylene		0.0072	0.0016		0.000096	0.05		0.05	0.44	0.050	0.050
luene /2 /4		0.0072	0.0270	0.60	0.001621	1.00	0.38	1.38	1.53	1.383	0.553
chloroethylene /2 /4		0.0072	0.0043	0.33	0.000258			0.00	2.99	0.000	0.000

NYS New Discharge Form
for new or increased discharges
Niagara County Landfill

Substance	NT Reg Limit (PPM)	4. Flow (MGD)	5. Prop. Max. Dis. Conc. (PPM)	6. Pres. POTW Rem. % **	7. Prop. Addit. Loading Max lbs.	8. Pres. Perm. Loading Tot. lbs	9. Non Ind. Loading lbs.	10. Pres. Hdwks. Loading lbs.	11. Allow. Hdwks. Loading Max. lbs.	12. Proj. Hdwks. Loading Max. lbs	13. Proj. Effluent Loading Max. lbs
			@ 5gpm								
ıminum	2.0	0.0072	21.0000		1.261008					1.261	1.261
ırium		0.0072	0.4100		0.024620					0.025	0.025
senic /4	4.9	0.0072	0.0055	0.33	0.000330			0.00	0.32	0.000	0.000
ıdmium /4	0.3	0.0072	0.0011	0.26	0.000066	0.04		0.04	0.59	0.043	0.032
ıbalt		0.0072	0.0058		0.000348					0.000	0.000
ıromium /4	4.7	0.0072	0.0780	0.69	0.004684	4.31		4.31	2.45	4.319	1.339
ıpper /4	3.9	0.0072	0.0600	0.79	0.003603	0.73	4.56	5.30	3.10	5.299	1.113
ʼanide /2 /4	5.0	0.0072	0.0190	0.47	0.001141	0.53		0.53	5.28	0.535	0.284
ad /4	4.6	0.0072	0.0860	0.71	0.005164	0.13		0.13	15.70	0.134	0.039
ınadium		0.0072	0.0400		0.002402					0.002	0.002
ɛrcury /3	0.0	0.0072	0.0007	0.79	0.000041	0.01		0.01	0.125	0.008	0.001
ckel /2 /4	3.4	0.0072	0.1700	0.06	0.010208	0.47		0.47	3.51	0.482	0.453
ıc /2 /4	14.0	0.0072	5.3000	0.52	0.318254	0.64	15.06	15.71	31.25	16.024	7.691
4-Methylphenol		0.0072	0.2600		0.015612					0.016	0.016
enols (4AAP) /2 /4	4.0	0.0072	16.0000	0.74	0.960768	4.90	2.75	7.65	28.85	8.611	2.239
Butanone		0.0072	0.1100		0.006605				2.17	0.007	0.007
tal Xylenes		0.0072	0.0200		0.001201				0.11	0.001	0.001
lcium		0.0072	360.0000		21.617280				1.08	21.617	21.617
n	10.0	0.0072	120.0000		7.205760				0.11	7.206	7.206
tassium		0.0072	170.0000		10.208160				1.08	10.208	10.208
gnesium		0.0072	200.0000		12.009600				0.11	12.010	12.010
inganese		0.0072	2.5000		0.150120				1.08	0.150	0.150
dium		0.0072	710.0000		42.634080				0.02	42.634	42.634
lcium		0.0072	360.0000		21.617280					21.617	21.617

If Substance not denoted by sub note /2, Allowable Mass is calculated using MDL in accordance with TOGs guidance @ 13 MGD.

Percent as decimal fraction.

Controlled by NYSDEC Bioaccumulative and Persistent Substances List.

Allowable Headworks Loading Mass taken from North Tonawanda Mass Allocation Manual.

Removal efficiency based on removals at the Niagara Falls WWTP

Removal efficiency based on removals at the North Tonawanda WWTP

REQUEST FOR SEWER USE ORDINANCE VARIANCE

REQUEST FOR SEWER USE ORDINANCE VARIANCE

REQUEST FOR SEWER USE ORDINANCE VARIANCE

File: DEC

Wastewater Treatment Plant
CITY OF NORTH TONAWANDA
830 River Road
North Tonawanda, New York 14120
(716) 695 - 8560

Paul J. Drof
Superintendent

Stephen J. Sabo
Chief Operator

John C. Maurer
Maintenance Supervisor

David W. Kosztowniak
Sanitary Chemist

9/20/97

NYSDEC
Mr. Robert Locey
Environmental Engineer I
270 Michigan Avenue
Buffalo, New York 14203-2999

Subject: Niagara County Landfill

Dear Mr Locey:

We wish to thank you for your review of the City's New Discharge submittal dated September 17, 1996. This letter is in response to your comments of March 18, 1997. We will attempt to follow your numbered statements first and comment on your first paragraph at the end. Please accept the following :

1. As we had stated in our recent meeting, the New Discharge form was submitted using information from the two sample wells. We felt this appropriate, since the well with the highest concentrations had the lowest flow and vice versa. To assume a scenario of the proposed 5 gpm discharge, coupled with the highest reported concentrations of each substance, would have skewed the factual information to present a higher poundage discharge. The city has been under the belief that factual information should be presented on the New Discharge form and any proposed change of discharge be handled by letter or report. If this is not the case, please advise us accordingly.

2. The concentrations and flows presented on the form, are from the CRA analytical report for the respective well sites. The flows and the concentrations on the form are proportioned mathematically, to depict the correct poundage to be discharged. If the Department wishes to have the City depict the scenario of the proposed 5 gpm discharge, we will change the form accordingly and resubmit the form.

3. The City feels that the Department is correct with regard to the City's presumptive remarks on whether the wastewater is hazardous or non-hazardous. We will reserve comment on this issue until all information has been reviewed by CRA, presented to you and a decision made by the Department of whether the waste is considered hazardous or non-hazardous.

4. The Department is also correct in pointing out the error in the location of discharge stated on the New Discharge form submittal. The location of discharge should have been presented as the Warner Road sanitary sewer. The retention basin overflow, as you state, is downstream of the proposed discharge site. The City will control any discharge from the site in two different ways. One- Greater Retention Basin Control will take place in inclement weather to ensure all upstream discharges from the site, are in fact treated and not allowed to be discharge from the Basin without treatment. Two- The site will be controlled with a City Industrial Waste discharge permit. The permit will include requirements of no discharge, when required by the City. The discharge will be retained on-site, until the Superintendent allows the discharge to continue.

5. With regard to the bioaccumulative and persistent substances, the City will coordinate its efforts with CRA in its review of site investigation information. Many of these substances were analyzed for during the initial analysis. However, we will require testing for all bioaccumulative and persistent substances to be believed present, if any, after this review. All analysis, if required will follow proper protocol.

With regard to your opening paragraph, the maximum concentrations of Zinc and Phenol do exceed the concentrations listed in the City's present SUO. However, there are extenuating circumstances involved with the present SUO.

A. The present SUO is old and quite outdated.

B. The City is presently developing a SUO based on mass discharge.

C. Although the proposed SUO has not yet been approved, certain sections do demonstrate that the acceptance of the mass discharge from the NC site will not cause any SPDES violations, will not cause plant interference or pass through, will not cause worker safety problems or cause the sludge to be contaminated to a point of changing present sludge disposal methods.

D. Considering the scenario of a 5 gpm discharge, the mass discharged will be .318 lbs. of Zinc and .964 lbs. of Phenol respectively. The amount of mass discharged for these substances from this site, will be inconsequential when matched against the allowable mass that can be accepted into the treatment facility.

E. As the discharge would continue to the City sewer system, it is expected that the concentrations will decrease substantially over time.

F. The City does believe that a potential for a SUO variance under Section 75-10 does exist. Severe hardship, based on cost benefit can be demonstrated with any cost/benefit analysis of the two alternatives of requiring pretreatment of the discharge, against discharge to the City system without pretreatment, utilizing all present information.

The City looks forward to meeting with the Department to clarify any of the above comments as soon as possible.

If you have any further questions, do not hesitate to contact the writer.

Sincerely,

Paul Joseph Drof

Paul Joseph Drof
Superintendent

PJD:DM
PC: File-DEC ✓

SEWER USE ORDINANCE VARIANCE APPROVAL

28 November 1997

Mr. Rick Hoekstra
CRA
651 Colby Drive
Waterloo, Ontario N2V 1C2

Re: Niagara County Refuse Site
Sewer Use Ordinance Variance under Section 75-10 Approval

Dear Mr Hoekstra:

The City of North Tonawanda will grant a variance for Zinc (Total) and Phenol (Total) under Section 75-10 of the City Code. This variance is granted based on demonstrable severe hardship.

The severe hardship involves the following circumstances:

Headwork analysis demonstrates that the acceptance of the discharge will not cause any SPDES violations, will not cause plant interference or pass through, will not cause worker safety problems or cause the sludge to be contaminated to a point of changing present disposal methods.

At a discharge rate of 5 gpm, the mass discharged will be .318 lbs. Of Zinc and .964 lbs. Of Phenol respectively. This amount will be inconsequential when matched to the allowable mass to be acceptable by calculated head works loading.

As the discharge continues over time the concentrations are expected to decrease substantially based upon past engineering experience.

The alternative of requiring pretreatment of the discharge would cause severe hardship based upon any cost/benefit analysis with no appreciable environmental gain.

This approval was discussed with the New York State Department of Environmental Conservation Region 9 on November 21, 1997 and they are in concurrence. The Industrial Wastewater Discharge permit will be amended to reflect this variance. If you have any questions please contact the writer.

Sincerely,

Paul Joseph Drof

Paul Joseph Drof

LETTER FROM
ROBERT LOCEY, ENVIRONMENTAL ENGINEER, DEC
TO PAUL DROF, SUPERINTENDENT, CITY OF NORTH TONAWANDA WWTP
DATED MARCH 2, 1998

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
270 Michigan Avenue, Buffalo New York 14203-2999
(716) 851-7070

John P. Cahill
Commissioner

March 2, 1998

Mr. Paul Drof
Superintendent
City of North Tonawanda WWTP
830 River Road
North Tonawanda, New York 14120

Dear Mr. Drof:

This is in response to your March 2, 1998 letter regarding the Niagara County Refuse Site. The Potentially Responsible Parties for the site have requested a variance from the City's Sewer Use Ordinance (SUO) limits for Total Zinc and Total Phenolics so that wastewater from the site can be discharged to the City sewers without pretreatment. During our November 21, 1998 meeting we concluded that the City has the authority to grant such a variance. Furthermore, we agreed that the City would issue a Significant Industrial User (SIU) permit for the discharge which addresses the following issues:

1. Include a "no discharge" requirement in the SIU permit for periods of wet weather when the retention basin at the City WWTP may be discharging.

2. Include a special monitoring program in the SIU permit which would involve more frequent monitoring at the Niagara County Refuse Site during the initial 6 month or 1 year discharge period.

3. Issue the SIU permit to the legal entity that is responsible for the site.

4. Include "monitor only" discharge limitations with minimum detection limits for all parameters of concern that are not specifically limited in the SUO.

5. Verify the flow rate of the discharge from the site. Data submitted by the City indicates that the flow rate would be 3 to 5 gallons per minute, but more recently CRA indicated that it might be as low as 0.5 gallons per minute.

6. The City must complete its review of existing site data to ascertain whether bioaccumulative and persistent toxic substances are present or absent.

If you have any questions regarding this, please call me at 851-7070.

Sincerely,

Robert Locey

Robert Locey
Environmental Engineer I

RLL:vam

REPORT ON ACCEPTANCE OF LEACHATE
(CITY OF NORTH TONAWANDA)

REPORT ON ACCEPTANCE OF LEACHATE

NIAGARA COUNTY REFUSE SITE

NORTH TONAWANDA WASTEWATER TREATMENT FACILITY

February 27, 1998

On September 17, 1996 the City of North Tonawanda (City) submitted a request to the New York State Department of Environmental Conservation (DEC), in accordance with the DEC TOGs 1.3.8 Guidance Document. Certain deficiencies were noted by the Department and so noted in a letter to Mr. Paul Drof, dated March 18, 1997. The City responded to the deficiencies on September 20, 1997. A meeting with Mr. Robert Locey of the Department followed, which led to the development of this report. The following is an attempt to clarify any questions raised previously and submit all information required by the Department.

1. Willingness to accept

The City is willing to accept a daily discharge of approximately 7,200 gallons per day of leachate generated by the remediation of the Niagara County Refuse Site. The site is located on the Western boundary of the City of North Tonawanda.

2. Hazardous Waste

The City originally presumed the wastewater generated from the site, to be non-hazardous, based on site investigation by Conestoga-Rovers and Associates (CRA). The data submitted for review was obtained from the Streamlined Feasibility Study-Niagara County Refuse Site, Wheatfield, New York dated July 20, 1994. Although CRA analytical information indicates that the generated waste is most likely non-hazardous, the City is considering the site as hazardous, due to the potential for listed wastes being disposed of at the site. However, once discharge is made to the City's sanitary sewer system, it would render this point moot, based on the Domestic Sewage Study Exclusion.

3. Discharge Point

The generated waste would be discharged directly to the 8" Warner Road sanitary sewer and would occur upstream of the retention basin overflow. However, the discharge will be controlled by City of North Tonawanda retention basin control, requirements of the Significant Industrial User Permit to be issued to the permittee, the Niagara County Department of Public Works (NCDPW), who will be the responsible party for operation of the site. A Site Operations Manual will be developed by CRA and conformance to the Manual will be a requirement of the SIU permit.

4. Local Sewer Use Ordinance requirements

The proposed discharge will meet all local sewer ordinance requirements except for Aluminum, Zinc, Phenols (4AAP) and Iron, Under 75-5C of the ordinance, the Superintendent has the ability to accept the elevated levels of Aluminum and Iron. With regard to the proposed discharge of Zinc and Phenol, the following was submitted to the Department in Mr. Drof's September 20, 1997 letter.

A. The present SUO is old and quite outdated.

B. The City is presently developing a SUO based on mass discharge.

C. Although the proposed SUO has not yet been approved, certain sections do demonstrate that the acceptance of the mass discharge from the NC site will not cause any SPDES violations, will not cause plant interference or pass through, will not cause worker safety problems or cause the sludge to be contaminated to a point of changing present sludge disposal methods.

D. Considering the scenario of a 5 gpm discharge, the mass discharged will be .318 lbs. of Zinc and .964 lbs. of Phenol respectively. The amount of mass discharged for these substances from this site, will be inconsequential when matched against the allowable mass that can be accepted into the treatment facility.

E. As the discharge would continue to the City sewer system, it is expected that the concentrations will decrease substantially over time.

F. The City does believe that a potential for a SUO variance under Section 75-10 does exist. Severe hardship, based on cost benefit can be demonstrated with any cost/benefit analysis of the two alternatives of requiring pretreatment of the discharge, against discharge to the City system without pretreatment, utilizing all present information.

Based on the above, the City will include both concentration and mass limits in the SIU permit issued for the site. The variance, for the discharge of these two pollutants, would be based on 75-10 of the City's SUO, and so noted in the Special Requirements Section of the SIU permit.

The proposed discharge will meet 40 CFR 403.5, all applicable pretreatment standards, Maximum Allowable Headworks Loadings and Odor Control requirements. Compliance with the City's SPDES permit, will be maintained.

5. Bioaccumulative and Persistent Substances

A report entitled "NYSDEC DIVISION OF WATER TOGS 1.3.8 BIOACCUMULATIVE AND PERSISTENT SUBSTANCES", developed by CRA, is attached and made part of this report, explaining the existence/non-existence of these substances. Since Mercury was only detected in an associated blank, it has not been included under the variance provisions of the City's SUO.

6. Dilution

The concentrations and mass, listed on the New Discharge Form are expected maximum levels respectively and will not be achieved through dilution.

7. Sludge

The sludge will be disposed of at BFI in Niagara Falls, N.Y.

8. Responsibilities of Participants

Meeting SIU requirements will be the responsibility of the NCDPW. They will also be responsible for all pumping and maintenance of the site. Niagara Falls will be responsible for all field sample collection. The City of North Tonawanda will be responsible for all analytical requirements and treatment of the proposed discharge at the North Tonawanda WWTF.

9 New Discharge Form

The New Discharge Form, which is attached, is based on the proposed discharge of 5 gpm. The form also shows that discharge will be to the Warner Road sanitary sewer.

If there are any further questions, or more information is required, please contact Mr. Paul Drof.

NYS New Dis ge Form
for new or incre discharges
Niagara County Landfill

1. POTW NAME AND SPDES PERMIT NUMBER

City of North Tonawanda Wastewater Treatment Plant
830 River Road
North Tonawanda, New York 14120
SPDES #NY0026280

2. NAME AND ADDRESS OF PROPOSED DISCHARGE

Niagara County Refuse Site

Discharge of 5 gallons/minute = 7,200 g/d

3. LOCATION OF PROPOSED DISCHARGE

Warner Road sanitary sewer
Discharge = 7200 gallons/day
Discharge would commence upon approval.

4. Substance	NT Reg Limit (PPM)	4. Flow (MGD)	5. Prop. Max. Dis. Conc. (PPM) @ 5gpm	6. Pres. POTW Rem. % **	7. Prop. Addit. Loading Max lbs.	8. Pres. Perm. Loading Tot. lbs.	9. Non Ind. Loading lbs.	10. Pres. Hdwks. Loading lbs.	11. Allow. Hdwks. Loading Max. lbs.	12. Proj. Hdwks. Loading Max. lbs	13. Proj. Effluent Loading Max. lbs
Acetone		0.0072	0.0019		0.000114					0.000	0.000
Benzene /3		0.0072	0.0110	0.74	0.000661	0.05		0.05	0.48	0.051	0.013
Chlorobenzene /2 /4		0.0072	0.0180	0.83	0.001081	1.00		1.00	3.65	1.002	0.170
1,1-Dichloroethane		0.0072	0.0029		0.000174			0.00	0.51	0.000	0.000
1,2-Dichloroethylene /4		0.0072	0.0035	0.76	0.000210					0.000	0.000
1,4-Dichlorobenzene /2 /4		0.0072	0.0081	0.80	0.000486	1.00		1.00	5.00	1.001	0.200
Ethylbenzene /3		0.0072	0.0052	0.68	0.000312	0.05		0.05	0.78	0.050	0.016
Methylene Chloride (Dichloromethane) /2 /4		0.0072	0.1200	-0.34	0.007206	1.00		1.00	3.43	1.008	1.351
4-Methyl-2-pentanone		0.0072	0.0051		0.000306					0.000	0.000
Styrene		0.0072	0.0050		0.000300					0.000	0.000
Naphthalene /3		0.0072	0.0010	0.91	0.000060	0.05		0.05	0.17	0.050	0.005
2-Methylphenol		0.0072	0.4200		0.025220					0.025	0.025
Bis (2-Ethylhexyl) Phthalate		0.0072	0.0002		0.000012			0.00	0.27	0.000	0.000
Dibenzofuran		0.0072	0.0033		0.000198					0.000	0.000
Tetrachloroethylene		0.0072	0.0016		0.000096	0.05		0.05	0.44	0.050	0.050
Toluene /2 /4		0.0072	0.0270	0.60	0.001621	1.00	0.38	1.38	1.53	1.383	0.553
Trichloroethylene /2 /4		0.0072	0.0043	0.33	0.000258			0.00	2.99	0.000	0.000

NYS New Discharge Form
for new or increased discharges
Niagara County Landfill

4. Substance	NT Reg Limit (PPM)	4. Flow (MGD)	5. Prop. Max. Dis. Conc. (PPM) @ 5gpm	6. Pres. POTW Rem. % **	7. Prop. Addit. Loading Max lbs.	8. Pres. Perm. Loading Tot. lbs.	9. Non Ind. Loading lbs.	10. Pres. Hdwks. Loading lbs.	11. Allow. Hdwks. Loading Max. lbs.	12. Proj. Hdwks. Loading Max. lbs	13. Proj. Effluent Loading Max. lbs
Aluminum	2.0	0.0072	21.0000		1.261008					1.261	1.261
Barium		0.0072	0.4100		0.024620					0.025	0.025
Arsenic /4	4.9	0.0072	0.0055	0.33	0.000330			0.00	0.32	0.000	0.000
Cadmium /4	0.3	0.0072	0.0011	0.26	0.000066	0.04		0.04	0.59	0.043	0.032
Cobalt		0.0072	0.0058		0.000348					0.000	0.000
Chromium /4	4.7	0.0072	0.0780	0.69	0.004684	4.31		4.31	2.45	4.319	1.339
Copper /4	3.9	0.0072	0.0600	0.79	0.003603	0.73	4.56	5.30	3.10	5.299	1.113
Cyanide /2 /4	5.0	0.0072	0.0190	0.47	0.001141	0.53		0.53	5.28	0.535	0.284
Lead /4	4.6	0.0072	0.0860	0.71	0.005164	0.13		0.13	15.70	0.134	0.039
Vanadium		0.0072	0.0400		0.002402					0.002	0.002
Mercury /3	0.0	0.0072	0.0007	0.79	0.000041	0.01		0.01	0.125	0.006	0.001
Nickel /2 /4	3.4	0.0072	0.1700	0.06	0.010208	0.47		0.47	3.51	0.482	0.453
Zinc /2 /4	14.0	0.0072	5.3000	0.52	0.318254	0.64	15.06	15.71	31.25	16.024	7.691
3&4-Methylphenol		0.0072	0.2600		0.015612					0.016	0.016
Phenols (4AAP) /2 /4	4.0	0.0072	16.0000	0.74	0.960768	4.90	2.75	7.65	28.85	8.611	2.239
2-Butanone		0.0072	0.1100		0.006605				2.17	0.007	0.007
Total Xylenes		0.0072	0.0200		0.001201				0.11	0.001	0.001
Calcium		0.0072	360.0000		21.617280				1.08	21.617	21.617
Iron	10.0	0.0072	120.0000		7.205760				0.11	7.206	7.206
Potassium		0.0072	170.0000		10.208160				1.08	10.208	10.208
Magnesium		0.0072	200.0000		12.009600				0.11	12.010	12.010
Manganese		0.0072	2.5000		0.150120				1.08	0.150	0.150
Sodium		0.0072	710.0000		42.634080				0.02	42.634	42.634
Calcium		0.0072	360.0000		21.617280					21.617	21.617

* If Substance not denoted by sub note /2, Allowable Mass is calculated using MDL in accordance with TOGs guidance @ 13 MGD.

** Percent as decimal fraction.

/1 Controlled by NYSDEC Bioaccumulative and Persistent Substances List.

/2 Allowable Headworks Loading Mass taken from North Tonawanda Mass Allocation Manual.

/3 Removal efficiency based on removals at the Niagara Falls WWTP

/4 Removal efficiency based on removals at the North Tonawanda WWTP

TABLE 1

REPRESENTATIVE GROUNDWATER CONCENTRATIONS
NIAGARA COUNTY REFUSE SITE
WHEATFIELD, NEW YORK

	Estimated Perimeter Collection System Concentration (µg/L)	***Total Loading to Sewer (Lbs/Yr)***
Volatiles		
Acetone	1.9	0.042
Benzene	11	0.24
2-Butanone	110	2.3
Chlorobenzene	18	0.40
1,1-Dichloroethane	2.9	0.064
1,2-Dichloroethene (total)	3.5	0.077
Ethylbenzene	5.2	0.11
Methylene chloride	120	2.7
4-Methyl-2-pentanone	5.1	0.11
Styrene	5.0	0.11
Tetrachloroethene	1.6	0.035
Toluene	27	0.60
Trichloroethene	4.3	0.094
Total xylenes	20	0.43
Semi-Volatiles		
bis(2-Ethylhexyl)phthalate	0.24	0.0053
Dibenzofuran	3.3	0.072
1,4-Dichlorobenzene	8.1	0.18
Naphthalene	1.0	0.021
2-Methylphenol	420	9.2
Phenol	16000	353
3 & 4-Methylphenol	260	5.7
Metals		
Aluminum	21000	459
Barium	410	9.0
Calcium	360000	7824
Cadmium	1.1	0.025
Cobalt	5.8	0.13
Chromium	78	1.7
Copper	60	1.3
Iron	120000	2617
Potassium	170000	3659
Magnesium	200000	4387
Manganese	2500	55
Sodium	710000	15610
Nickel	170	3.8
Lead	86	1.9
Vanadium	40	0.88
Zinc	5300	116
Arsenic	5.5	0.12
Mercury	0.031	0.00068
Wet Chemistry		
Cyanide, total	19	0.42

Notes:

(1) - Average of wells East A, East B, and East C.
(2) - Average of test pit samples TP-2 and TP-24A.

TABLE 5.1

REPRESENTATIVE LEACHATE CONCENTRATIONS
FINAL DESIGN REPORT
NIAGARA COUNTY REFUSE SITE
WHEATFIELD, NEW YORK

	Landfill Wells (1) Concentration (µg/L)	*Perimeter Test (2) Pits Concentration (µg/L)*	*Landfill Wells Flow Rate (Lbs/Yr)*	*Perimeter Test Pits Flow Rate (Lbs/Yr)*	*Total Loading to Sewer (Lbs/Yr)*
Volatiles					
Acetone	0	2.4	0	0.042	0.012
Benzene	37.5	4.225	0.16	0.074	0.24
2-Butanone	525	0	2.3	0	2.3
Chlorobenzene	17.5	18.275	0.077	0.32	0.10
1,1-Dichloroethane	14.5	0	0.064	0	0.064
1,2-Dichloroethene (total)	17.5	0	0.077	0	0.077
Ethylbenzene	22.5	0.85	0.10	0.015	0.11
Methylene chloride	615	0	2.7	0	2.7
4-Methyl-2-pentanone	25.5	0	0.11	0	0.11
Styrene	25	0	0.11	0	0.11
Tetrachloroethene	7.95	0	0.035	0	0.035
Toluene	135	0.55	0.59	0.0097	0.60
Trichloroethene	21.5	0	0.094	0	0.094
Total xylenes	76	5.5	0.33	0.097	0.43
Semi-Volatiles					
bis(2-Ethylhexyl)phthalate	0	0.3	0	0.0053	0.005
Dibenzofuran	0	4.125	0	0.072	0.072
1,4-Dichlorobenzene	0	10.075	0	0.18	0.18
Naphthalene	0	1.2	0	0.021	0.021
2-Methylphenol	2100	0	9.2	0	9.2
Phenol	80500	0	353	0	353
3 & 4-Methylphenol	1300	0	5.7	0	5.7
Metals					
Aluminum	22300	20600	98	361	459
Barium	333.5	431.75	1.5	7.6	9.0
Calcium	1035500	187000	4542	3281	7824
Cadmium	5.6	0	0.025	0	0.025
Cobalt	28.75	0	0.13	0	0.13
Chromium	251.5	34.95	1.1	0.613	1.7
Copper	0	74.975	0	1.3	1.3
Iron	426000	42625	1869	748	2617
Potassium	433500	100150	1902	1757	3659
Magnesium	504500	123900	2213	2174	4387
Manganese	7985	1120.75	35	20	55
Sodium	1186500	593000	5205	10405	15610
Nickel	697.5	42.25	3.1	0.741	3.8
Lead	207.5	55.175	0.91	0.968	1.9
Vanadium	28.5	43.1	0.13	0.756	0.88
Zinc	25250	304.5	111	5.3	116
Arsenic	6.3	5.25	0.028	0.092	0.12
Mercury	0.155	0	0.00068	0	0.00068
Wet Chemistry					
Cyanide, total	0	23.75	0	0.42	0.42

Notes:

(1) - Average of wells East A, East B, and East C.

(2) - Average of test pit samples TP-2 and TP-21A.

NYSDEC DIVISION OF WATER TOGS 1.3.8
BIOACCUMULATIVE AND PERSISTENT SUBSTANCES

Name	*Total Loading to Sewer (lbs/yr)*
Aldrin	ND
4-Bromophenyl phenyl ether	ND
Chlordane	ND
4-Chlorophenyl phenyl ether	ND
4,4'-DDD; p,p'-DDD; 4,4'-TDE; p,p'-TDE	ND
4,4'-DDE; p,p'-DDE	ND
4,4'-DDT; p,p'-DDT	ND
Dieldrin	ND
Endrin	ND
Heptachlor	ND
Heptachlor epoxide	ND
Hexachlorobenzene	ND
Hexachlorobutadiene; hexachloro-1,3-butadiene	ND
Hexachlorocyclohexane; BHC	ND
alpha-Hexachlorocyclohexane; alpha-BHC	ND
beta-Hexachlorocyclohexane; beta-BHC	ND
gamma-Hexachlorocyclohexane; gamma-BHC; Lindane	ND
delta-Hexachlorocyclohexane; delta-BHC	ND
Mercury	0.00068 *
Methoxychlor	ND
Mirex; dechlorane	NA
Octachlorostyrene	NA
Pentachlorobenzene	NA
Photomirex	NA
Polychlorinated Biphenyls; PCBs	ND
2,3,7,8-TCDD	NA
1,2,3,4-Tetrachlorobenzene	NA
1,2,4,5-Tetrachlorobenzene	NA
Toxaphene	ND

Notes:

*	Mercury was not detected in the composite groundwater sample collected from the NCR Site wells; however, it was detected at a concentration of 0.31J µg/L in the associated duplicate. Assuming a flow rate from the wells of 1 gpm, the calculated loading of mercury to the sewer was 0.00068 pounds per year.
ND	Specific compound/analyte was not detected at or above method detection limit in any of the samples collected.
NA	Analysis for the specific compound was not performed because the compound is not on the Target Compound List. The specific compound was not disposed of at the Site.

APPENDIX C

FIELD PROCEDURES

APPENDIX C

FIELD PROCEDURES

FP-1 PACKING AND SHIPPING SAMPLES

Scope: This procedure describes the method for packing and shipping samples.

Purpose: The purpose of describing this procedure is to ensure that proper QA/QC procedures are followed and the groundwater, surface water, and effluent samples will not be damaged during shipment.

Equipment:

☐ sample coolers
☐ ice
☐ freezer bags
☐ paper towel
☐ garbage bags
☐ chain-of-custody forms
☐ packing tape
☐ filled sample containers
☐ trip blanks
☐ packing material (bubble pack)
☐ custody seal tape
☐ shipment manifests

Procedure:

☐ 1. Prior to the start of the field sampling, contact the courier to arrange pick-ups and determine the "no-later-than" time for having the shipment ready.

☐ 2. Do not ship samples on Fridays unless the lab is open and will receive the samples on Saturday. You must check with the lab to determine this. If shipping samples for Saturday delivery, ensure the proper boxes are checked on the shipping manifest so the courier will know to deliver the coolers on Saturday.

☐ 3. Wear a clean pair of nitrile gloves when handling sample bottles.

☐ 4. Plan time to pack the samples. Proper packing takes time.

☐ 5. Wipe containers with paper towels. Place paper towels in garbage bags for disposal.

☐ 6. Place clear, wide packing tape over sample labels.

Procedure:

☐ 7. Ensure that all "Hazardous Material" stickers/markings have been removed from the coolers.

☐ 8. Always use more coolers and padding instead of crowding samples.

☐ 9. Wrap each sample container in bubble pack. Do not bulk pack; each sample must be individually padded. Place the sample containers in the cooler with the lids up. Do not lay the sample containers flat. Add extra packing material on top of the sample containers to fill up any spaces.

☐ 10. Large glass containers (1 liter and up) require much more space and padding between containers.

☐ 11. Double-check to ensure all trip blanks have been included as specified in the QAPP.

☐ 12. Do not rely on ice for padding because it reduces in volume when it melts.

☐ 13. Always double bag the ice in sealable freezer bags. Place freezer bags containing ice in cooler. Samples must stay at 4°C or the analysis performed by the lab will be useless. The ice will ensure that the samples remain at 4°C during shipping. Do not place loose ice in the cooler because it will melt and leak out during shipping.

☐ 14. Complete the chain-of-custody form and place it in a sealed freezer bag. Place the freezer bag on top of the samples inside the cooler.

☐ 15. Place custody seals (two, minimum) on each cooler. For coolers with hinged lids, place both seals on the opening edge of the lid. For coolers without hinges, place seals on opposite corners of the lid. Place clear tape over the custody seals. If you do not have custody seal tape, sign the packing tape across the lid edge where you would have placed custody seals.

Procedure:

☐ 16. Ship samples by overnight courier. Some overnight couriers do not provide "overnight" shipment to/from some locations. Do not assume; call the courier in advance before the start of the sampling activities.

☐ 17. Keep copies of all shipment manifests and chains-of-custody in the field file at the control building.

FP-2 SAMPLING EQUIPMENT DECONTAMINATION PROCEDURE

Scope: This procedure describes the method for cleaning sampling and monitoring equipment.

Purpose: The purpose of describing this procedure is to avoid or limit the potential for cross-contamination due to use of dirty equipment.

Equipment:

- ☐ work boots, nitrile gloves, Tyveks, safety glasses
- ☐ non-phosphate detergent
- ☐ de-ionized water
- ☐ tap water
- ☐ 10 percent nitric acid (HNO_3 - ultrapure)
- ☐ methanol (pesticide grade or better)
- ☐ hexane (pesticide grade or better)
- ☐ scrub brush
- ☐ abrasive pads (sponge-type pads)
- ☐ paper towels
- ☐ aluminum foil
- ☐ plastic bags
- ☐ shallow tubs/buckets
- ☐ squirt bottles
- ☐ equipment to be cleaned

Procedure:

☐ 1. Read the HSCP.

☐ 2. Ensure that all liquids (used tap water, soapy water, de-ionized water, nitric acid, methanol, and hexane) used in this procedure are contained in a tub or bucket.

☐ 3. Use a new pair of nitrile gloves. Undertake additional glove changes as necessary.

☐ 4. Mix up soap/water wash in clean tub or bucket.

☐ 5. Disassemble all equipment as appropriate.

☐ 6. Remove all visible sediment/soil by scrubbing with brushes and abrasive pads.

FP-2 SAMPLING EQUIPMENT DECONTAMINATION PROCEDURE

Procedure:

☐ 7. Wash equipment with soapy water using scrub brush, or abrasive pad to remove all discoloration.

☐ 8. Rinse equipment with tap water.

☐ 9. Skip Step 10 through Step 13 when decontaminating the electronic water level indicator, pH meter, conductivity meter, thermometer, and turbidity meter. Nitric acid, methanol, and hexane cannot be used because they will damage these instruments.

☐ 10. Rinse equipment with 10 percent nitric acid.

☐ 11. Rinse equipment with tap water.

☐ 12. Rinse equipment with methanol.

☐ 13. Rinse equipment with hexane.

☐ 14. Rinse with de-ionized water two times.

☐ 15. Allow equipment to air dry.

☐ 16. When dry, reassemble equipment and wrap it aluminum foil to avoid contaminating the equipment.

☐ 17. Check the QAPP to determine if a rinse blank is required. The rinse blank is used to check the cleaning process. Collect the rinse blank by pouring de-ionized water over the item of cleaned equipment and catching the water in an appropriate set of sample containers.

☐ 18. Pour cleaning liquids (used tap water, soapy water, de-ionized water, nitric acid, methanol, and hexane) into an on-Site wet well.

FP-3 WATER LEVEL MEASUREMENT PROCEDURE

Scope: This procedure describes the method for measuring water levels with an electronic water level indicator.

Purpose: The purpose of describing this procedure is to assure accurate measurement of water levels.

Equipment:
☐ Complete equipment list (Form FP-3A).
☐ Copies of FP-2, FP-3, and all associated forms.

Procedure:

☐ 1. Read the HSCP.

☐ 2. Complete "Before Going to Site" section of Form FP-3B.

☐ 3. Check that the water level indicator battery is working. Check the tape for damage.

☐ 4. Decontaminate the probe and tape by following the method detailed in Form FP-2.

☐ 5. Locate and identify well. See Table FP-3.1 for the list of wells for water level measurements. Inspect well and complete appropriate row on Form FP-3C.

☐ 6. Use a new pair of disposable nitrile gloves at each well. Undertake additional glove changes as necessary. Wear Tyvek coveralls and safety glasses.

☐ 7. Remove the cap from the well, check for the measuring point mark on the well riser and for any sharp edges that may damage the indicator tape.

☐ 8. Lower the probe into the center of the well until a contact with the water surface is indicated either by audible alarm, light, or meter deflection.

Procedure:

☐ 9. Mark and hold the tape at the measuring point and repeat the measurement.

☐ 10. Read off the measurement and record it with date and time of the measurement on Form FP-3D. Read measurements to ±0.01 feet.

☐ 11. Retract the tape by winding onto the spool. Wipe the tape with a clean paper towel as it comes out of the well. Decontaminate the probe and tape as specified in Form FP-2.

☐ 12. If there is any uncertainty that the correct well is being monitored, measure the total depth of the well using a tape with a solid weight. Compare the measured depth to the known recorded depth.

☐ 13. Pour used cleaning liquids (tap water, soapy water, de-ionized water, nitric acid, acetone, and hexane) into an on-Site wet well.

☐ 14. Move to next well and begin procedure again at step 5.

☐ 15. When all wells are inspected and measured, enter the control building and record the total flows and water levels for each wet well on Form FP-3D.

☐ 16. Complete "At Site" and "After Leaving Site" sections of Form FP-3B.

☐ 17. Check box under "Water Level" column on Form 1 (Appendix F) beside the appropriate month.

TABLE FP-3.1

WATER LEVEL MONITORING LOCATIONS
OPERATION, MAINTENANCE AND MONITORING MANUAL
NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Well No.	*Northing*	*Easting*	*Top of Casing (ft.)*	*Ground Elevation (ft.)*	*Bottom of Well (ft.)*	*Depth of Well (ft.)*	*Screen Length (ft.)*
EAST "A"	10653.53	9867.48					
EAST "B"	11909.15	9889.51					
EAST "C"	13295.44	9624.70					
EAST "D"	13589.83	9598.93					

FREQUENCY (See Form 1 - Appendix F)

Quarterly (March, June, September, and December) from September 2001 to June 2003, semi-annually (June and December) from December 2003 to June 2006, annually in June thereafter. Review after first 2 sampling rounds (December 2001) and after each 5 year interval (June 2006, June 2011, etc.). Same frequency as groundwater quality monitoring.

NIAGARA COUNTY REFUSE SITE

WATER LEVEL MEASUREMENT EQUIPMENT AND SUPPLY CHECKLIST

INSTRUMENTS:

- ☐ Electronic water level indicator

SUPPLIES:

- ☐ Foil
- ☐ Paper towels
- ☐ Decontamination Fluids
  - ☐ Deionized water
  - ☐ Non-phosphate soap
  - ☐ Tap water
  - ☐ 10% Nitric Acid (ultrapure)
  - ☐ Methanol (pesticide grade or better)
  - ☐ Hexane
- ☐ Trash bags
- ☐ Plastic spray bottles
- ☐ Scrub brush
- ☐ Abrasive pads (sponge type pads)
- ☐ Shallow tubs/buckets

PERSONAL PROTECTIVE EQUIPMENT:

- ☐ Nitrile gloves
- ☐ Tyveks
- ☐ Work gloves (cotton and chemical resistant)
- ☐ Safety glasses/or side shields on OSHA-approved prescription lenses
- ☐ Work boots
- ☐ First-aid kit
- ☐ Respirators

DOCUMENTATION:

- ☐ Well logs
- ☐ FP-3
- ☐ Previous well readings
- ☐ Site map
- ☐ O&M Manual

MISCELLANEOUS:

- ☐ Well cap keys and Site access keys
- ☐ Bolt cutters
- ☐ Knife
- ☐ Spare batteries for instruments
- ☐ Lock de-icer (winter)
- ☐ Pen/pencil/indelible marking pen
- ☐ Tool box
- ☐ Spare locks/keys

Completed by: ______________________

Date: ______________

FP-3A

5723 (17)

NIAGARA COUNTY REFUSE SITE

WATER LEVEL MEASUREMENT • COMPLETION CHECKLIST

BEFORE GOING TO SITE:

☐ Confirmed well numbers, location, and accessibility.
☐ Reviewed of project documents (i.e., QAPP, HSCP, and sampling procedures in the OM&M Manual).
☐ Checked historical well depths and water level measurements.
☐ Procured, inventoried, and inspected all equipment and supplies (complete FP-3A).
☐ Prepared and performed required maintenance on equipment.

AT SITE:

☐ Equipment decontaminated in accordance with the QAPP and FP-2.
☐ Well inspected (complete FP-3C).
☐ Initial well measurements logged on FP-3D.
☐ Well secured after measurements.
☐ Measurement dates, times, locations, and results have all been recorded on FP-3D.
☐ Water levels in wet wells and total flows from wet well pumps recorded on FP-3D.

AFTER LEAVING SITE:

☐ All equipment has been maintained and returned.
☐ Water elevation data is reduced and checked on FP-3D.
☐ Expendable stock supplies replaced.
☐ Access keys and well cap keys returned.
☐ Confirm all measurements taken with previous well readings.

Completed by: ______________________________ *Date:* ____________________

FP-3B

WELL INSPECTION SUMMARY

PROJECT NAME: *NIAGARA COUNTY REFUSE SITE*

INSPECTION CREW MEMBERS: ______________________________

DATE OF INSPECTION: |_|_|_|_|_|_|
(M M D D Y Y)

Well I.D. Number	*Lock*	*Surface Seal*	*Protective Casing*	*Riser*	*Comments*
EAST "A"					
EAST "B"					
EAST "C"					
EAST "D"					
NCR 3S					
NCR 4S					
NCR 5S					
NCR 13S					

Additional Comments: ______________________________

____

____

FP-3C

CRA 5723 (17)

WATER LEVEL RECORD

PROJECT NAME: *NIAGARA COUNTY REFUSE SITE*

LOCATION: Wheatfield, New York

DATE: |_|_|_|_|_|_| (M D D Y Y)

CREW MEMBERS: ____________________

Observation Well	Time of Measurement	Top of Casing Elevation A	Depth to Water B	Water Level Elevation A-B
		feet	feet	feet
EAST "A"				
EAST "B"				
EAST "C"				
EAST "D"				

WET WELLS

Wet Well	Time of Measurement	Total Flow	Water Level
WW A			
WW B			
WW C			
WW D			

Total System Flow	Time of Measurement

FP-3D

FP-4 PURGING PROCEDURE

Scope: This procedure describes the method for purging a monitoring well.

Purpose: The purpose of describing this procedure is to assure that wells are purged properly before groundwater samples are collected.

Equipment:

- ☐ Complete Form FP-4A.
- ☐ Copies of FP-2, FP-3C, FP-4, FP-5, and all associated forms.

Procedure:

☐ 1. Read the HSCP.

☐ 2. Complete "Before Going to Site" section of Form FP-4B.

☐ 3. Calibrate pH, conductivity, and turbidity meters according to manufacturer's instructions.

☐ 4. Use a new pair of disposable nitrile gloves at each well. Undertake additional glove changes as necessary. Wear Tyvek coveralls and safety glasses.

☐ 5. Locate and identify the monitoring well to be purged. See Table FP-4.1 for the list of wells that require purging. Unlock protective casing and remove the cap from the well.

☐ 6. Inspect the well as described in Form FP-3. Complete FP-3C.

☐ 7. Place plastic sheeting around well or use masonry trays or tubs to collect spillage.

☐ 8. Remove the free end of the air and water tubes (attached to the dedicated bladder pump) from inside the well. Attach the free end of the air tube to the air outlet on the pump control box and secure the tube with a pipe clamp or pressure fitting. Attach the compressor air hose to the compressor air outlet and the air inlet for the pump control box. Place the free end of the water hose into a large (5 gallon or larger) water jug and clamp it in place. Turn the stroke frequency and volume dials on the control box to zero.

FP-4 PURGING PROCEDURE

Procedure:

☐ 9. Ensure the generator motor exhaust outlet is upwind and facing away from the well. Ensure generator fuel tank is full. Plug the compressor into the generator and start the generator and air compressor.

☐ 10. Increase the stroke frequency and stroke volume of the bladder pump by turning the dials on the control box.

☐ 11. Check Table FP-4.1 to determine the volume of water required for one well volume and five well volumes.

☐ 12. Pump five well volumes from the well. After each well volume is removed, measure the temperature, pH, conductivity, and turbidity of the purge water according to meter manufacturer's instructions. Record the measurements on Form FP-4C.

☐ 13. When a water jug is almost full, transfer the water tube to an empty jug. Transfer the tube between pump strokes to avoid spilling well water on the ground. Fasten cap to full water jug.

☐ 14. If there is not enough water to purge five well volumes from the well, pump the well to dryness on three consecutive days prior to sampling.

☐ 15. Pour all purge water into an on-Site wet well.

☐ 16. Prepare for sampling (see FP-5).

TABLE FP-4.1

GROUNDWATER SAMPLING LOCATIONS
OPERATION, MAINTENANCE AND MONITORING MANUAL
NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Well No.	*Northing*	*Easting*	*Top of Casing (ft.)*	*Ground Elevation (ft.)*	*Bottom of Well (ft.)*	*Depth of Well (ft.)*	*Screen Length (ft.)*
NCR 3S	13820.31	9437.75			571.1	5.0	2
NCR 4S	12942.02	10223.86			570.8	5.0	2
NCR 5S	12175.27	9093.54			567.7	8.5	5
NCR 13S	9684.45	9768.97			568.4	5.8	2

FREQUENCY (See Form 1 - Appendix F)

Refer to Table FP-5.1.

NIAGARA COUNTY REFUSE SITE

GROUNDWATER PURGING AND SAMPLING EQUIPMENT AND SUPPLY CHECKLIST

EQUIPMENT:

☐ Generator
☐ Tubing (air and water discharge)
☐ Clamps
☐ Container(s) for purge water
☐ Air compressor and air hose with connectors
☐ Pump control box
☐ Compression fittings for tubing
☐ Small pipe clamps

SUPPLIES:

☐ Gasoline can/gas
☐ Polypropylene rope
☐ Aluminum foil
☐ Paper towels
☐ Meter calibration solution(s)
☐ Decontamination fluids:
  ☐ Deionized water, non-phosphate soap, tap water
  ☐ 10% Nitric acid (ultrapure)
  ☐ Methanol and hexane (pesticide grade or better)
☐ Sample jars (extra)
☐ Sample jar labels
☐ Cooler(s)/ice packs/packing materials
☐ Trash bags
☐ Plastic spray bottles
☐ Plastic basin or pan
☐ Polyethylene sheeting
☐ Scrub brush
☐ Abrasive pads (sponge type pads)
☐ Shallow tubs/buckets
☐ Calibrated container
☐ Watch

INSTRUMENTS:

☐ Water level indicator
☐ Thermometer *
☐ pH meter *
☐ Conductivity probe*
☐ Turbidity meter (Nephlometer)

* - or combination pH/cond/temp meter

PERSONAL PROTECTIVE EQUIPMENT:

☐ Tyveks (assorted sizes and types)
☐ Nitrile gloves
☐ Work boots
☐ Work gloves (cotton and chemical resistant)
☐ Safety glasses/or side shields on OSHA-approved prescription lenses
☐ First-aid kit

DOCUMENTATION

☐ Chain-of-Custody forms
☐ Well logs
☐ FP-3C, FP-4, and FP-5
☐ Courier manifests
☐ Previous well logs/ previous historical well data
☐ Site map
☐ OM&M Manual

MISCELLANEOUS:

☐ Well cap keys and Site access keys
☐ Bolt cutters
☐ Knife
☐ Spare batteries for instruments
☐ Lock de-icer (winter)

☐ Reinforced packing tape
☐ Custody seal tape
☐ Pen/pencil/indelible marking pen
☐ Tool box
☐ Spare locks/keys

Completed by: ______________________ *Date:* ______________

FP-4A

NIAGARA COUNTY REFUSE SITE

GROUNDWATER PURGING AND SAMPLING • COMPLETION CHECKLIST

BEFORE GOING TO SITE:

- ☐ Confirm well numbers, location, and accessibility.
- ☐ Review of project documents (i.e., QAPP, HSCP, and sampling procedures in the OM&M Manual), sampling QA/QC, and site-specific sampling requirements.
- ☐ Historical well data; depth, pH, performance and disposition of purge water.
- ☐ Site access notification and coordination.
- ☐ Coordinated with laboratory.
- ☐ Procured, inventoried, and inspected all equipment and supplies.
- ☐ Prepared, calibrated, and performed required maintenance on equipment.

AT SITE:

- ☐ Instruments calibrated daily.
- ☐ Sampling equipment decontaminated in accordance with the QAPP.
- ☐ Initial well measurements logged.
- ☐ Well volume calculated and specified volumes removed.
- ☐ Purged water collected.
- ☐ Specified samples and QA/QC samples taken per Quality Assurance Project Plan (QAPP).
- ☐ Samples properly labeled, preserved, and packed.
- ☐ Well was secured after completion of sampling.
- ☐ Sample dates, times, locations and sample numbers recorded in applicable log(s).
- ☐ Samples properly stored if not shipped/delivered to lab same day.
- ☐ Samples shipped with complete and accurate Chain-of-Custody record.

AFTER SAMPLING:

- ☐ All equipment has been maintained, decontaminated, and returned.
- ☐ Sampling information reduced and required sample keys and field data distributed.
- ☐ Chain-of-Custody records filed.
- ☐ Expendable stock supplies replaced.
- ☐ Access keys and well cap keys returned.
- ☐ Arranged disposal/treatment for purged water and decontamination fluids.
- ☐ Confirm all samples collected.

Completed by: ______________________________ *Date:* ____________________

FP-4B

5723 (17)

WELL PURGING INFORMATION

SITE/PROJECT NAME: Niagara County Refuse Site

DATE: ☐☐☐☐☐☐ (MM DD YY)

CREW MEMBERS: ______________________________

PURGING METHOD: Dedicated Bladder Pump

WELL NUMBER: ______________________________

ONE WELL VOLUME: ______________________ gallons

FIVE WELL VOLUMES: ______________________ gallons

(See Section 4.2.4.1 of the OM&M Manual and Table FP-4.1 to calculate well volumes based on current water levels.)

WELL VOLUME	1	2	3	4	5	TOT/AVG
VOLUME PURGED (total)						
pH						
TEMPERATURE						
CONDUCTIVITY						
TURBIDITY						
COLOR						
ODOR						
COMMENTS						

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE PROTOCOLS

DATE PRINT NAME SIGNATURE

FP-4C

CRA 5723 (17)

FP-5 GROUNDWATER SAMPLING PROCEDURE

Scope: This procedure describes the method for collecting groundwater samples.

Purpose: The purpose of describing this procedure is to ensure that groundwater samples collected are representative of Site groundwater.

Equipment:
☐ Same as for purging (see Form FP-4A).
☐ Copies of FP-1, and all forms required for purging (see FP-4).

Procedure:

☐ 1. Begin groundwater sampling immediately after purging is complete.

☐ 2. Read the QAPP to ensure the correct number of sample blanks is collected and the correct sample jars and preservatives are used.

☐ 3. Measure the flow rate with a calibrated container and a watch. Reduce flow by adjusting the stroke frequency and volume dials on the pump control box until the flow rate is approximately 100 mL/minute.

☐ 4. Collect samples directly into the sample jars from the discharge water tube. Collect sample over a bucket so that any overflow is collected. Fill sample jars in the following order:

- SW-846 8260 (volatile organic compounds);
- SW-846 8270 (semi-volatile organic compounds);
- SW-846 7470 (mercury); and
- SW-846 6010 (inorganics except mercury).

☐ 5. Collect samples for volatile organic compounds (VOCs) analysis (SW-846 8260) in 40 mL glass vials. Fill the vials until a meniscus (curve) is formed above the top of the vial and top with a teflon-lined cap. It is imperative that no air bubbles or headspace remain in the VOC vials. After the cap is secured, check for air bubbles by turning the vials upside down and tapping with a finger. Empty the vial and collect the sample again if any air bubbles are present.

Procedure:

☐ 6. Label sample containers with a unique sample identification number. Include the number 5723, the sampler's initials, the date, and the well number in the unique sample ID (e.g., 5723-MKS-06/20/00-NCR 3S). Write the sample date and time, the parameters to be analyzed, and the sampler's initials on every sample container. Record the sample ID and other pertinent information on Form FP-5A.

☐ 7. At the completion of sampling, turn the dials on the pump control box to zero, turn off the air compressor and generator, allow the air pressure to bleed out of the compressor, remove the air hose from the control box, and remove the air tube from the control box.

☐ 8. Carefully bend the pump tubing and suspend it back in the well so that it will not slide down.

☐ 9. Replace well cap and lock.

☐ 10. Decontaminate the sampling equipment as specified in Form FP-2.

☐ 11. Proceed to next well and begin purging (FP-4).

☐ 12. After all purging and sampling is complete, pour cleaning liquids (used tap water, soapy water, de-ionized water, nitric acid, hexane, and acetone), purge water, and overflow water from sampling into an on-Site wet well.

☐ 13. Pack and ship sample containers in accordance with FP-1.

☐ 14. Complete "At Site" and "After Sampling" sections of Form FP-4B.

☐ 15. Check box under "Purging/Sampling" column on Form 1 (Appendix F) beside the appropriate month.

TABLE FP-5.1

GROUNDWATER SAMPLING SUMMARY
OPERATION, MAINTENANCE AND MONITORING MANUAL
NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

LOCATIONS

NCR 3S
NCR 4S
NCR 5S
NCR 13S

FREQUENCY (See Form 1 - Appendix F)

Quarterly (March, June, September, and December) from September 2001 to June 2003; semi-annually (June and December) from December 2003 to June 2006; annually in June thereafter. Review after first 2 sampling rounds (December 2001) and after each 5 year interval (June 2006, June 2011, etc.). Same frequency as water level monitoring.

PARAMETERS

Volatile Organic Compounds (Method SW-846 8260)

Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
2-Butanone
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Dibromochloromethane
Chloroethane
Chloroform
Chloromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethene (Total)
1,2-Dichloropropane
cis-1,3-Dichloropropane
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone
Methylene chloride
4-Methyl-2-pentanone
Styrene
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Vinyl chloride
Xylenes (Total)

Semi-Volatile Organic Compounds (Method SW-846 8270)

1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Phenol
2-Methylphenol
3&4-Methylphenol

Inorganics (all except mercury - Method SW-846 6010; mercury - Method SW-846 7470)

Aluminum
Antimony
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc

NIAGARA COUNTY REFUSE SITE

GROUNDWATER PURGING AND SAMPLING EQUIPMENT AND SUPPLY CHECKLIST

EQUIPMENT:

- ☐ Generator
- ☐ Tubing (air and water discharge)
- ☐ Clamps
- ☐ Container(s) for purge water
- ☐ Air compressor and air hose with connectors
- ☐ Pump control box
- ☐ Compression fittings for tubing
- ☐ Small pipe clamps

SUPPLIES:

- ☐ Gasoline can/gas
- ☐ Polypropylene rope
- ☐ Aluminum foil
- ☐ Paper towels
- ☐ Meter calibration solution(s)
- ☐ Decontamination fluids:
  - ☐ Deionized water, non-phosphate soap, tap water
  - ☐ 10% Nitric acid (ultrapure)
  - ☐ Methanol and hexane (pesticide grade or better)
- ☐ Sample jars (extra)
- ☐ Sample jar labels
- ☐ Cooler(s)/ice packs/packing materials
- ☐ Trash bags
- ☐ Plastic spray bottles
- ☐ Plastic basin or pan
- ☐ Polyethylene sheeting
- ☐ Scrub brush
- ☐ Abrasive pads (sponge type pads)
- ☐ Shallow tubs/buckets
- ☐ Calibrated container
- ☐ Watch

INSTRUMENTS:

- ☐ Water level indicator
- ☐ Thermometer *
- ☐ pH meter *
- ☐ Conductivity probe*
- ☐ Turbidity meter (Nephlometer)

* - or combination pH/cond/temp meter

PERSONAL PROTECTIVE EQUIPMENT:

- ☐ Tyveks (assorted sizes and types)
- ☐ Nitrile gloves
- ☐ Work boots
- ☐ Work gloves (cotton and chemical resistant)
- ☐ Safety glasses/or side shields on OSHA-approved prescription lenses
- ☐ First-aid kit

DOCUMENTATION

- ☐ Chain-of-Custody forms
- ☐ Well logs
- ☐ FP-3C, FP-4, and FP-5
- ☐ Courier manifests
- ☐ Previous well logs/ previous historical well data
- ☐ Site map
- ☐ OM&M Manual

MISCELLANEOUS:

- ☐ Well cap keys and Site access keys
- ☐ Bolt cutters
- ☐ Knife
- ☐ Spare batteries for instruments
- ☐ Lock de-icer (winter)
- ☐ Reinforced packing tape
- ☐ Custody seal tape
- ☐ Pen/pencil/indelible marking pen
- ☐ Tool box
- ☐ Spare locks/keys

Completed by: ______________________________ *Date:* ______________

GROUNDWATER SAMPLING • SAMPLE COLLECTION DATA SHEET

PROJECT NAME: *NIAGARA COUNTY REFUSE SITE*

SAMPLING CREW MEMBERS: ______________________

DATE OF SAMPLE COLLECTION: ☐☐☐☐☐☐ (M M D D Y Y)

Sample I.D. Number	*Well Number*	*Well Volume (Gallons)*	*Volume Purged (Gallons)*	*Sample Time*	*Sample Description*	*Analysis Required*	*Chain-of-Custody Number*	*Shipping Manifest Number*
	NCR 3S							
	NCR 4S							
	NCR 5S							
	NCR 13S							
	(MS/MSD) *							
	(Duplicate) *							
	(Rinse Blank) *							

Note: * QA/QC sample (see QAPP for explanation of how to collect and label these samples). Collect MS/MSD and duplicate from one of the four monitoring wells listed above. Create a unique sample ID for the blind duplicate using NCR 6S for the well number. Write the name of the well where the MS/MSD and duplicate were actually collected in the well number boxes under "MS/MSD" and "Duplicate" above.

Additional Comments: ______________________

____

____

FP-5A

ATTACHMENT FP-5

WELL LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-05)

PROJECT NAME: NCR SITE

PROJECT NO.: 2677

CLIENT: NCR PRP GROUP

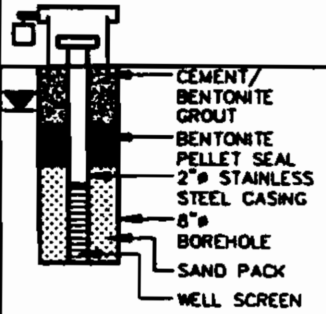
LOCATION: NORTHEAST CORNER OF INDUSTRIAL CELL

HOLE DESIGNATION: NCR-3S

DATE COMPLETED: AUGUST 02, 1990

DRILLING METHOD: 4 1/4" ID HSA

CRA SUPERVISOR: E. SUNDIN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	HNU (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	579.60 576.1	 				
	For complete stratigraphic description see NCR 3M	574.9					
2.5							
5.0	END OF HOLE @ 5.0 FT. BGS	571.1					
7.5			SCREEN DETAILS: Screened Interval: 3.0 to 5.0' BGS Length -2.0' Diameter -2.0" Slot # 10 Material -Stainless Steel Sand pack interval: 2.5 to 5.0' BGS Material -# 4 Sand				
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○ WATER FOUND ▽ STATIC WATER LEVEL ▼ (10/30/90)

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

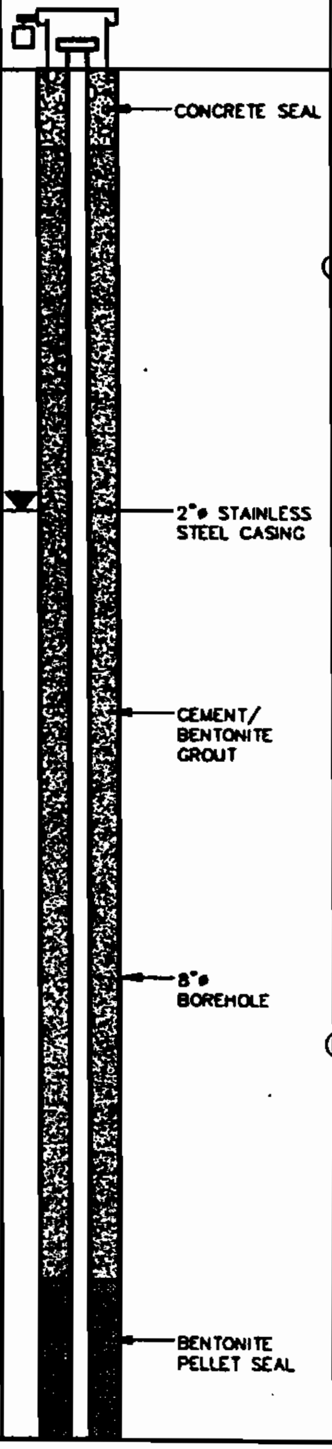
(L-06)

PROJECT NAME: NCR SITE
PROJECT NO.: 2677
CLIENT: NCR PRP GROUP
LOCATION: NORTHWEST CORNER OF INDUSTRIAL CELL

HOLE DESIGNATION: NCR-3M
(Page 1 of 2)
DATE COMPLETED: AUGUST 02, 1990
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: E. SUNDIN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	REFERENCE POINT (Top of Riser)	579.22
	GROUND SURFACE	576.1
	OL-SAND(TOPSOIL), sandy, dark brown, rootlets	
	SW-SAND, medium to fine grained, trace silt, loose, orange brown, moist	575.1
2.5		
	CH-CLAY, high plasticity, stratified bedding, gray brown, interstratified reds and oranges, moist	571.8
5.0		
	- red orange interstratified clay	
7.5	- gray sand in fissures	
10.0		
		564.8 ▼
12.5		
	- soft, massive, wet	
15.0		
	- mottled soft clay, gray brown and orange brown (16.0 to 22.0 ft. BGS)	
17.5		
20.0		
22.5		
	- grades from trace to little medium sand from 23.0 to 24.0 ft. BGS	
	ML-SILT(TILL) and sand, trace gravel, very dense, grades from silty clay to silty sand, brown to red brown, moist	552.1
25.0		
27.5		
	SW-SAND, fine to medium grained, trace gravel, dense, well graded, brown, moist	548.1
30.0		
	- 6" gray sand seam, medium grained, trace gravel, well graded	
32.5	- fine sand, trace gravel	
	- some gravel in 6" seam of coarse sand	

MONITOR INSTALLATION



SAMPLE

NUMBER	STATE	'N' VALUE	HNu (ppm)
1SS	☒	10	0.5
2SS	☒	9	0.5
3SS	☒	22	0
4SS	☒	59	0
5SS	☒	19	0
6SS	☒	16	0
7SS	☒	13	0
8SS	☒	3	0
9SS	☒	4	0
10SS	☒	0	0
11SS	☒	1	0
12SS	☒	9	0
13SS	☒	61	0
14SS	☒	97	0
15SS	☒	82	0
16SS	☒	32	0
17SS	☒	50	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○ WATER FOUND ▽ STATIC WATER LEVEL ▼ (10/30/90)

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-06)

PROJECT NAME: NCR SITE

PROJECT NO.: 2677

CLIENT: NCR PRP GROUP

LOCATION: NORTHWEST CORNER OF INDUSTRIAL CELL

HOLE DESIGNATION: NCR-3M (Page 2 of 2)

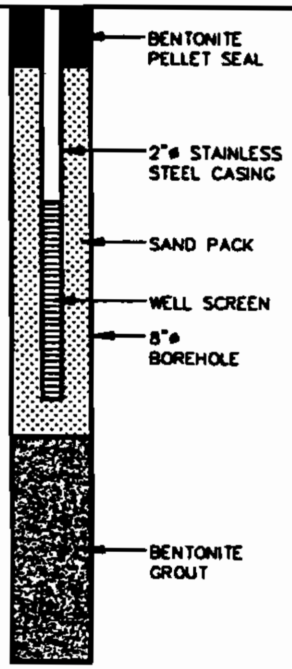
DATE COMPLETED: AUGUST 02, 1990

DRILLING METHOD: 4 1/4" ID HSA

CRA SUPERVISOR: E. SUNDIN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
35.0		
37.5		
40.0		
	SM-SAND and silt, fine grained, trace gravel very dense, brown, moist	
42.5		
45.0		
47.5	– finer matrix, trace clay	
	END OF HOLE ● 49.3 FT. BGS	526.8
50.0	NOTES: 1. Soil samples collected for chemical analysis from 4.0 to 6.0 ft. BGS and from 24.0 to 26.0 ft. BGS) 2. Monitoring wells installed at NCR-3 location as follows : NCR-3S – Shallow overburden NCR-3M – Deep overburden	
52.5		
55.0		
57.5		
60.0		
62.5		
65.0		

MONITOR INSTALLATION



SCREEN DETAILS:
Screened Interval:
37.5 to 42.5' BGS
Length –5.0'
Diameter –2.0"
Slot # 10
Material –Stainless Steel
Sand pack interval:
34.0 to 43.0' BGS
Material –# 4 Sand

SAMPLE			
NUMBER	STATE	'N' VALUE	HNu (ppm)
18SS	☒	64	0
19SS	☒	39	0
20SS	☒	35	0
21SS	☒	62	0
22SS	☒	92	0
23SS	☒	73	0
24SS	☒	>100	0
25SS	☒	>100	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

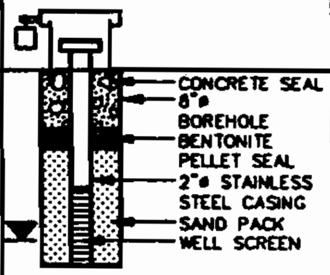
CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-07)

PROJECT NAME: NCR SITE
PROJECT NO.: 2677
CLIENT: NCR PRP GROUP
LOCATION: EAST OF LANDFILL

HOLE DESIGNATION: NCR-4S
DATE COMPLETED: AUGUST 23, 1990
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: E. SUNDIN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	"N" VALUE	HNU (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	577.88 575.8					
	For complete statigraphic description see NCR-4M						
2.5							
		571.4					
5.0	END OF HOLE @ 5.0 FT. BGS	570.8	SCREEN DETAILS: Screened Interval: 3.0 to 5.0' BGS Length -2.0' Diameter -2.0" Slot # 10 Material -Stainless Steel Sand pack interval: 2.0 to 5.0' BGS Material -# 4 Sand				
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○ WATER FOUND ▽ STATIC WATER LEVEL ▼ (10/30/90)

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

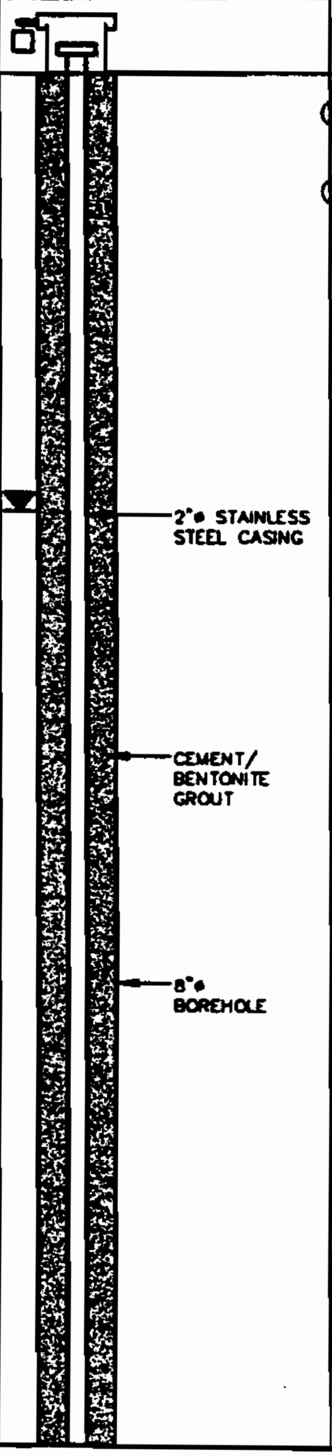
(L-08)

PROJECT NAME: NCR SITE
PROJECT NO.: 2677
CLIENT: NCR PRP GROUP
LOCATION: EAST OF LANDFILL

HOLE DESIGNATION: NCR-4M (Page 1 of 2)
DATE COMPLETED: AUGUST 22, 1990
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: E. SUNDIN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	577.97 575.9				
	OL-SAND and SILT(TOPSOIL), trace clay, black rootlets	575.4	1SS	☒	7	
2.5	SP-SAND, trace silt, loose, fine grained, orange-beige, orange staining grades to a gray sand with orange mottling, moist	572.9	2SS	☒	9	
5.0	CH-CLAY, stiff, laminated, horizontal bedding, dark brown and red-brown laminations high plasticity, very soft, very moist		3SS	☒	14	
7.5			4SS	☒	26	
			5SS	☒	11	
10.0		564.7	6SS	☒	3	
12.5			7SS	☒	4	
15.0			8SS	☒	2	
17.5	- gravel and coarse sand seam (6" thick), wet		9SS	☒	10	
20.0			ST	◣		
	SW-SAND(TILL), little gravel, little coarse sand, trace silt, loose, dark brown, slightly red, very moist	554.9	10SS	☒	3	
22.5			11SS	☒	7	
25.0			12SS	☒	6	
27.5			13SS	☒	16	
30.0	- little silt		14SS	☒	15	
			15SS	☒	35	
32.5			16SS	☒	22	

MONITOR INSTALLATION



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○ WATER FOUND ▽ STATIC WATER LEVEL ▼ (10/30/90)

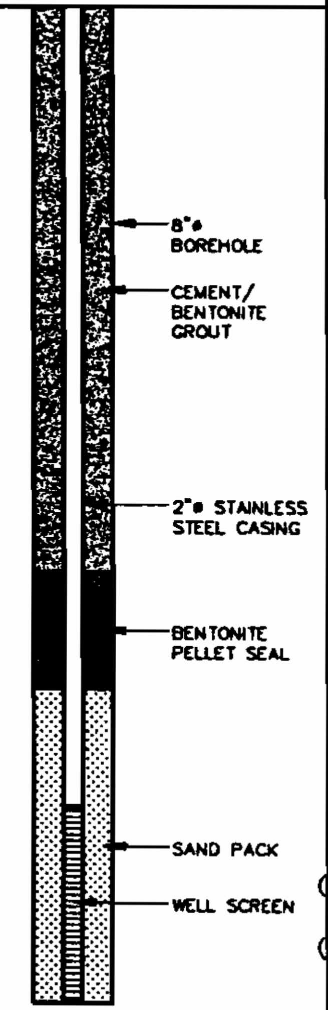
STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-08)

PROJECT NAME: NCR SITE
PROJECT NO.: 2677
CLIENT: NCR PRP GROUP
LOCATION: EAST OF LANDFILL

HOLE DESIGNATION: NCR-4M
(Page 2 of 2)
DATE COMPLETED: AUGUST 22, 1990
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: E. SUNDIN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
35.0	– extremely dense		17SS	☒	>100	
			18SS	—	>100	
37.5						
			19SS	☒	25	
40.0						
			20SS	☒	51	
42.5			21SS	☒	>100	
45.0			22SS	☒	>100	
47.5			23SS	☒	>100	
			24SS	☒	>100	
50.0						
			25SS	☒	85	
52.5			26SS	☒	>100	
55.0			27SS	☒	85	
	– trace silt					
			28SS	☒	>100	
57.5						
	END OF HOLE @ 58.1 FT. BGS	517.8				
60.0						
62.5						
65.0						



END OF HOLE @ 58.1 FT. BGS

NOTES:

1. Soil samples collected for chemical analysis from 1.0 to 3.0 ft. BGS and from 55.0 to 57.0 ft. BGS)
2. Monitoring wells installed at NCR-4 location as follows :
   - NCR-4S – Shallow overburden
   - NCR-4M – Deep overburden
3. Shelby tube samples attempted from 18.0 to 20.0 ft. BGS. No recovery.

SCREEN DETAILS:
Screened Interval:
53.0 to 58.0' BGS
Length –5.0'
Diameter –2.0"
Slot # 10
Material –Stainless Steel
Sand pack interval:
50.0 to 58.1' BGS
Material –# 4 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-09)

PROJECT NAME: NCR SITE

PROJECT NO.: 2677

CLIENT: NCR PRP GROUP

LOCATION: WEST OF LANDFILL

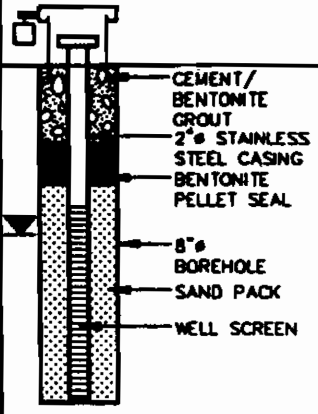
HOLE DESIGNATION: NCR-5S

DATE COMPLETED: JULY 30 , 1990

DRILLING METHOD: 4 1/4" ID HSA

CRA SUPERVISOR: E. SUNDIN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	579.34 576.2					
	For complete statigraphic description see NCR-5M						
2.5							
		571.9					
5.0							
7.5							
	END OF HOLE ● 8.6 FT. BGS	567.6					
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							



SCREEN DETAILS:

Screened Interval:
3.5 to 8.5' BGS
Length -5.0'
Diameter -2.0"
Slot # 10
Material -Stainless Steel
Sand pack interval:
3.0 to 8.6' BGS
Material -#4 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

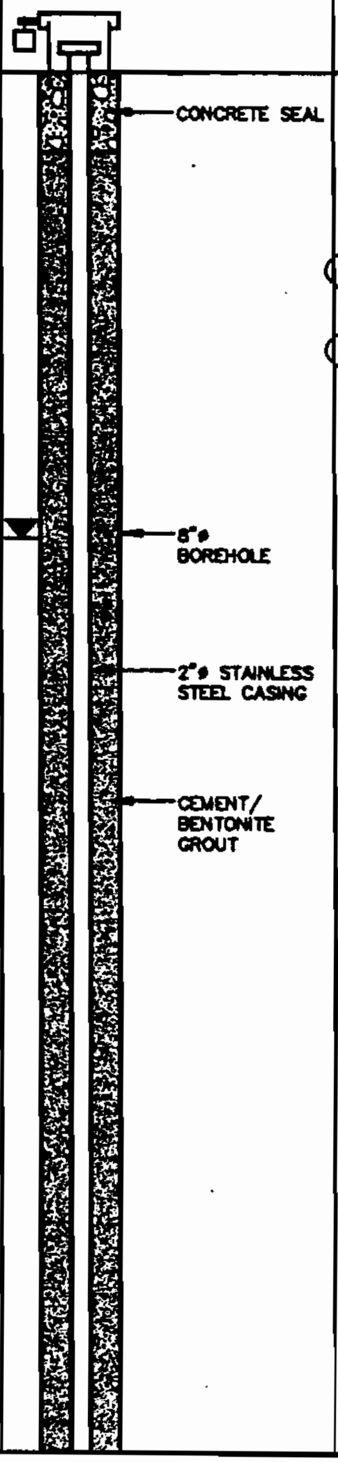
CHEMICAL ANALYSIS ○ WATER FOUND ▽ STATIC WATER LEVEL ▼ (10/30/90)

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-10)

PROJECT NAME: NCR SITE
PROJECT NO.: 2677
CLIENT: NCR PRP GROUP
LOCATION: WEST SIDE OF LANDFILL

HOLE DESIGNATION: NCR-5M (Page 1 of 2)
DATE COMPLETED: JULY 30, 1990
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: E. SUNDIN



DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	SAMPLE NUMBER	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	577.93 576.4			
	SM-SAND(FILL), some red-brown clay, little silt, trace gravel, medium dense, intermixed clay and sand (excavated from adjacent swale.)		1SS	12	0
2.5			2SS	21	0
5.0	– moist sand		(3SS)	23	0
7.5			(4SS)	45	0
	SM-SAND(TILL), fine to medium grained, some silt, little gravel, extremely dense, red-brown, moist	568.4	5SS	88	0
10.0			6SS	>100	0
		564.6 ▼			
12.5	– some rusty stains in fissures (0.5 pmm HNU reading at fissures)		7SS	>100	0.5
15.0			8SS	>100	0.8
			9SS	>100	0
17.5					
			10SS	>100	0
20.0					
			11SS	>100	1.3
22.5	SW-SAND, some interstratified clay, hard red-brown and gray mottled, moist to wet, sharp contacts with sand SW-SAND, medium grained, medium dense		12SS	53	0
25.0			13SS	46	0
27.5			14SS	43	0
	SM-SAND, fine grained, little silt, little gravel, clay inclusions, dense, red-brown, moist – laminar clay inclusions from porous bedding – no clay, 1" poorly graded medium sand seam, gray SW-SAND, medium grained, trace gravel, medium dense, grades from clean sand to gravelly sand, gray to tan and brown, wet	548.4	15SS	41	0
30.0			16SS	55	0
32.5			17SS	59	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○ WATER FOUND ▽ STATIC WATER LEVEL ▼ (10/30/90)

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

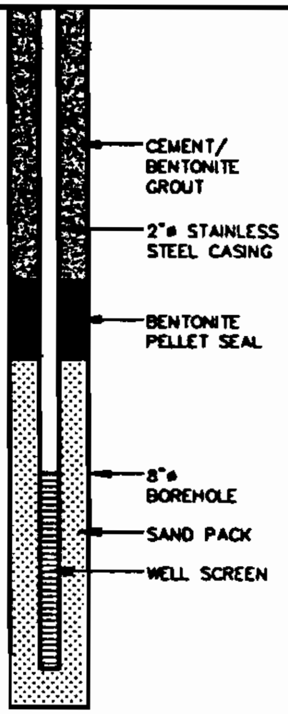
(L-10)

PROJECT NAME: NCR SITE
PROJECT NO.: 2677
CLIENT: NCR PRP GROUP
LOCATION: WEST SIDE OF LANDFILL

HOLE DESIGNATION: NCR-5M (Page 2 of 2)
DATE COMPLETED: JULY 30, 1990
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: E. SUNDIN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
35.0		
37.5		537.9
40.0	SM-SAND(TILL), fine to medium grained, some silt, little gravel, extremely dense, red-brown, moist	534.9
42.5	SW-SAND, medium to coarse grained, some gravel, extremely dense, gray, fine particles light tan and brown, wet - grades to clean medium sand - grades to fine sand with medium gravel	
45.0	- interstratified clean medium sands and silty fine sands - green-gray shale fragment (4" x 1/2")	
47.5	- grades finer and grayer	
50.0		525.9
52.5	END OF HOLE @ 50.5 FT. BGS NOTES: 1. Soil samples collected for chemical analysis from 5.4 to 7.0 ft. BGS and from 44.0 to 47.0 ft. BGS) 2. Monitoring wells installed at NCR-5 location as follows : NCR-5S - Shallow overburden NCR-5M - Deep overburden NCR-5D - Bedrock	
55.0		
57.5		
60.0		
62.5		
65.0		

MONITOR INSTALLATION



SCREEN DETAILS:
Screened Interval:
44.5 to 49.5' BGS
Length -5.0'
Diameter -2.0"
Slot # 10
Material -Stainless Steel
Sand pack interval:
41.5 to 50.5' BGS
Material -# 4 Sand

SAMPLE NUMBER	STATE	'N' VALUE	HNu (ppm)
18SS		>100	
19SS		>100	
20SS		>100	
21SS		>100	
22SS		>100	
23SS		>100	
24SS		0.1	
25SS		>100	
26SS		>100	

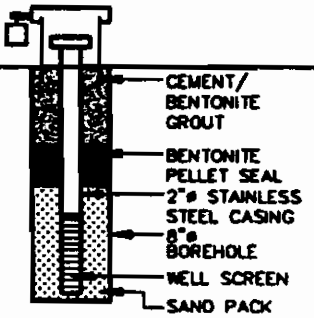
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-17)

PROJECT NAME: NCR SITE
HOLE DESIGNATION: NCR-13S
PROJECT NO.: 2677
DATE COMPLETED: AUGUST 08, 1990
CLIENT: NCR PRP GROUP
DRILLING METHOD: 4 1/4" ID HSA
LOCATION: SWALE IN SOUTHWEST CORNER OF LANDFILL
CRA SUPERVISOR: K. LYNCH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
	REFERENCE POINT (Top of Riser)	577.15					
	GROUND SURFACE	574.2					
	OL-SILT, some fine sand, trace red-brown clay, vegetation, firm, loose, dark brown, dry to moist	573.4		1SS	☒	8	
2.5	SW-SAND(ALLUVIAL), fine to medium grained, well graded, firm, some structure, brown and gray mottled, some rusty staining, moist to wet Some, except medium to coarse, wet	570.9		2SS	☒	7	
5.0	ML-SILT, some sand, firm, slightly plastic, gray with some brown, wet			3SS	☒	18	
	ML-SILT, some to little clay, trace fine sand, medium plasticity, hard to stiff, laminated, red-brown to brown, dry to moist.	568.2					
7.5	END OF HOLE @ 6.0 FT. BGS NOTES:		SCREEN DETAILS: Screened Interval: 3.8 to 5.8' BGS				
10.0	1. Soil samples collected for chemical analysis from 0.0 to 0.8 ft. BGS and from 2.5 to 3.5 ft. BGS 2. Monitoring well installed to 5.8 ft. BGS		Length -2.0' Diameter -2.0" Slot # 10 Material -Stainless Steel				
12.5			Sand pack interval: 3.0 to 6.0' BGS Material -# 4 sand				
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○ WATER FOUND ▽ STATIC WATER LEVEL ▼

FP-6 SURFACE WATER SAMPLING PROCEDURE

Scope: This procedure describes the method for collecting surface water samples.

Purpose: The purpose of describing this procedure is to ensure that surface water samples collected are representative of Site surface water conditions.

Equipment:
☐ Complete equipment list (Form FP-6A).
☐ Copies of FP-1 and FP-2.

Procedure:

☐ 1. Read the HSCP. Always perform stream sampling in a team of at least two people. Have a life vest and safety line beside the water at all times in case they are required.

☐ 2. Complete "Before Going to Site" section of Form FB-6B.

☐ 3. Calibrate pH, conductivity, and turbidity meters according to manufacturer's instructions.

☐ 4. Use a new pair of disposable nitrile gloves at each well. Undertake additional glove changes as necessary. Wear tyvek coveralls and safety glasses.

☐ 5. Find the monitoring location. See Table FP-6.1 for a list of surface water sampling locations.

☐ 6. Read the QAPP to ensure the correct number of QA samples are collected and the correct sample jars and preservatives are used.

☐ 7. Collect a sample in a pre-cleaned unpreserved bottle and measure the pH, temperature, conductivity, and turbidity of the water. Record all readings.

☐ 8. Attach a pre-cleaned sample jar to a telescoping rod. While standing on the shore, completely submerge the inverted jar 6 inches below the water surface in the middle of the stream and then tilt the opening of the bottle upstream to fill it. If the sample bottles contain preservatives, use pre-cleaned unpreserved bottles to collect the samples, then transfer the sample to the appropriate preserved bottle.

Procedure:

☐ 9. Fill sample jars in the following order:

- SW-846 8260 (volatile organic compounds);
- SW-846 8270 (semi-volatile organic compounds);
- SW-846 7470 (mercury); and
- SW-846 6010 (inorganics except mercury).

☐ 10. Collect samples for volatile organic compounds (VOCs) analysis (SW-846 8260) in 40 mL glass vials. Fill the vials until a meniscus (curve) is formed above the top of the vial and top with a teflon-lined cap. It is imperative that no air bubbles or headspace remain in the VOC vials. After the cap is secured, check for air bubbles by turning the vials upside down and tapping with a finger. Empty the vial and collect the sample again if any air bubbles are present.

☐ 11. Label sample containers with a unique sample identification number. Include the number 5723, the sampler's initials, the date, and the well number in the unique sample ID (e.g., 5723-MKS-05/20/008-NCR5S). Write the sample date and time, the parameters to be analyzed, and the sampler's initials on every sample container. Record the sample ID and other pertinent information on Form FP-6C.

☐ 12. Decontaminate sampling equipment as specified in Form FP-2.

☐ 13. Repeat Steps 5 through 12 until all required surface water samples are collected.

☐ 14. Pour cleaning liquids (used tap water, soapy water, de-ionized water, nitric acid, hexane, and acetone), purge water, and overflow water from sampling into an on-Site wet well.

☐ 15. Pack and ship sample containers in accordance with FP-1.

☐ 16. Complete "At Site" and "After Sampling" sections of Form FP-6B.

☐ 17. Check box under "Surface Water" column on Form 1 (Appendix F) beside the appropriate month.

TABLE FP-6.1

SURFACE WATER SAMPLING SUMMARY
OPERATION, MAINTENANCE AND MONITORING MANUAL
NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

LOCATIONS

SW-1
SW-2
SW-3

FREQUENCY (See Form 1 - Appendix F)

Annually starting in June 2002. Review after first 2 sampling rounds (June 2003).

PARAMETERS

Volatile Organic Compounds (Method SW-846 8260)

Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
2-Butanone
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Dibromochloromethane
Chloroethane
Chloroform
Chloromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethene (Total)
1,2-Dichloropropane
cis-1,3-Dichloropropane
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone
Methylene chloride
4-Methyl-2-pentanone
Styrene
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Vinyl chloride
Xylenes (Total)

Semi-Volatile Organic Compounds (Method SW-846 8270)

1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Phenol
2-Methylphenol
3&4-Methylphenol

Inorganics (all except mercury - Method SW-846 6010;
mercury - Method SW-846 7470)

Aluminum
Antimony
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc

NIAGARA COUNTY REFUSE SITE

SURFACE WATER SAMPLING EQUIPMENT AND SUPPLY CHECKLIST

INSTRUMENTS:

- ☐ Steel tape (100 ft)

SUPPLIES:

- ☐ Aluminum foil
- ☐ Paper towels
- ☐ pH buffer solution(s)
- ☐ Decontamination fluids:
  - ☐ Deionized water, non-phosphate soap, tap water
  - ☐ 10% Nitric acid (ultrapure)
  - ☐ Methanol and hexane (pesticide grade or better)
- ☐ Polyethylene sheeting
- ☐ Sample jars (extra)
- ☐ Sample jar labels
- ☐ Cooler(s)/ice packs/packing materials
- ☐ Trash bags
- ☐ Plastic spray bottles
- ☐ Plastic basin or pan
- ☐ Scrub brush
- ☐ Abrasive pads (sponge type pads)
- ☐ Shallow tubs/buckets

MISCELLANEOUS:

- ☐ Site access keys
- ☐ Knife
- ☐ Spare batteries for instruments
- ☐ Lock de-icer (winter)
- ☐ Duct tape
- ☐ Reinforced packing tape
- ☐ Custody seal tape
- ☐ Pen/pencil/indelible marking pen
- ☐ Tool box

EQUIPMENT:

- ☐ Sampling telescopic pole
- ☐ Thermometer
- ☐ pH meter
- ☐ Turbidity meter (Nephlometer)

PERSONAL PROTECTIVE EQUIPMENT:

- ☐ Waders/overboots
- ☐ Life vest
- ☐ Safety line
- ☐ Nitrile gloves
- ☐ Hardhat/liner
- ☐ Safety glasses/or side shields on OSHA-approved prescription lenses
- ☐ First-aid kit
- ☐ Check HSCP

DOCUMENTATION:

- ☐ Chain-of-Custody forms
- ☐ FP-6
- ☐ OM&M Manual
- ☐ Courier manifests
- ☐ Site map

Completed by: ______________________________ *Date:* ________________

FORM 6A

CRA 5723 (17)

NIAGARA COUNTY REFUSE SITE

SURFACE WATER SAMPLING
• COMPLETION CHECKLIST

BEFORE GOING TO SITE:

☐ Confirmed surface water sample locations and accessibility.
☐ Reviewed project documents (i.e., QAPP, HSCP, and sampling procedures in the OM&M Manual), sampling QA/QC, and Site-specific sampling requirements.
☐ Site access notification and coordination.
☐ Coordinated with laboratory.
☐ Procured, inventoried, and inspected all equipment and supplies.
☐ Prepared, calibrated, and performed required maintenance on equipment.

AT SITE:

☐ Instruments calibrated daily.
☐ Sampling equipment decontaminated in accordance with the QAPP.
☐ Temperature, pH, conductivity, and turbidity logged.
☐ Specified samples and QA/QC samples collected per QAPP.
☐ Samples properly labeled, preserved, and packed.
☐ Sample dates, times, locations, and sample numbers recorded in applicable log(s).
☐ Samples properly stored if not shipped/delivered to lab same day.
☐ Samples shipped with complete and accurate Chain-of-Custody record.

AFTER SAMPLING:

☐ All equipment has been maintained, decontaminated, and returned.
☐ Sampling information reduced and required sample keys and field data distributed.
☐ Chain-of-Custody records filed.
☐ Expendable stock supplies replaced.
☐ Access keys returned.
☐ Arranged disposal/treatment for decontamination fluids.
☐ Confirm all samples collected.

Completed by: ______________________________ *Date:* ____________________

FORM 6B

CRA 5723 (17)

SURFACE WATER SAMPLING • SAMPLE COLLECTION DATA SHEET

PROJECT NAME: *NIAGARA COUNTY REFUSE SITE*

SAMPLING CREW MEMBERS: ______________________

DATE OF SAMPLE COLLECTION: ☐☐☐☐☐☐ (M D D Y Y)

Sample I.D. Number	*Sample Location*	*Sample Description*	*Analysis Required*	*Chain-of-Custody Number*	*Shipping Manifest Number*	*Sample Time*	*Estimated Stream Width (ft.)*	*Estimated Stream Depth (ft.)*	*Estimated Stream Velocity (ft./sec.)*	*pH*	*Temp.*	*Cond.*	*Turb.*
	SW-1												
	SW-2												
	SW-3												
	(MS/MSD) *												
	(Duplicate) *												
	(Rinse Blank) *												

Note: * QA/QC sample (see QAPP for explanation of how to collect and label these samples). Collect MS/MSD and duplicate from one of the four sampling locations listed above. Create a unique sample ID for the blind duplicate using SW-4 for the name of the sample location. Write the name of the well where the MS/MSD and duplicate were actually collected in the well number boxes under "MS/MSD" and "Duplicate" above.

Precipitation in previous week? ☐ Yes ☐ No

Additional Comments: ______________________

FP-6C

FP-7 EFFLUENT SAMPLING PROCEDURE

Scope:	This procedure describes the method for collecting PCS effluent samples.
Purpose:	The purpose of describing this procedure is to ensure that effluent samples collected are representative of Site effluent conditions.
Equipment:	☐ Complete equipment list (Form FP-7A). ☐ Copies of FP-1 and FP-2.
Procedure:	☐ 1. Read the HSCP. ☐ 2. Complete "Before Going to Site" section of Form FB-7B. ☐ 3. Calibrate pH, conductivity, and turbidity meters according to manufacturer's instructions. ☐ 4. Use a new pair of disposable nitrile gloves. Undertake additional glove changes as necessary. Wear tyvek coveralls and safety glasses. ☐ 5. Find the monitoring location (Wet Well A). ☐ 6. Read the QAPP to ensure the correct sample jars and preservatives are used. ☐ 7. Collect samples from the sampling port in Wet Well A. Allow the effluent to discharge into a container for 10 seconds prior to sampling to ensure that a representative sample is collected. Empty the container into the wet well. ☐ 8. Collect a sample from the sample port in a pre-cleaned unpreserved bottle and measure the pH, temperature, conductivity, and turbidity of the water. Record all readings. ☐ 9. Collect a sufficient volume of effluent for chemical analysis. Collect all required QA/QC samples as discussed in the QAPP.

FP-7 EFFLUENT SAMPLING PROCEDURE

Procedure:

☐ 10. Fill sample jars in the following order:

- EPA 624 (volatile organic compounds);
- EPA 625 (semi-volatile organic compounds);
- EPA 420.2 (phenols);
- EPA 150 (pH);
- EPA 405.1 (BOD);
- EPA 160.2 (total suspended solids);
- EPA 365 (total phosphorus); and
- EPA 200 Series (inorganics).

☐ 11. Collect samples for volatile organic compounds (VOCs) analysis (SW-846 8260) in 40 mL glass vials. Fill the vials until a meniscus (curve) is formed above the top of the vial and top with a teflon-lined cap. It is imperative that no air bubbles or headspace remain in the VOC vials. After the cap is secured, check for air bubbles by turning the vials upside down and tapping with a finger. Empty the vial and collect the sample again if any air bubbles are present.

☐ 12. Label sample containers with a unique sample identification number. Include the number 5723, the sampler's initials, the date, and the well number in the unique sample ID (e.g., 5723-MKS-05/20/008-WWA). Write the sample date and time, the parameters to be analyzed, and the sampler's initials on every sample container. Record the sample ID and other pertinent information on Form FP-7C.

☐ 13. Decontaminate sampling equipment as specified in Form FP-2.

☐ 14. Pour cleaning liquids (used tap water, soapy water, de-ionized water, nitric acid, hexane, and acetone), purge water, and overflow water from sampling into an on-Site wet well.

☐ 15. Pack and ship sample containers in accordance with FP-1.

☐ 16. Complete "At Site" and "After Sampling" sections of Form FP-7B.

☐ 17. Check box under "Effluent" column on Form 1 (Appendix F) beside the appropriate month.

TABLE FP-7.1

PCS EFFLUENT SAMPLING SUMMARY
OPERATION, MAINTENANCE AND MONITORING MANUAL
NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

LOCATIONS

Effluent monitoring port at Site discharge point (Wet Well A)

FREQUENCY (See Form 1 - Appendix F)

Semi-annually in December and June starting in December 2001 (or as dictated by the current City of North Tonawanda discharge permit - see Appendix B).

PARAMETERS

Volatile Organic Compounds (Method EPA 624)

Benzene
2-Butanone
Chlorobenzene
1,1-Dichloroethane
1,2-Dichloroethene (Total)
Ethylbenzene
Methylene chloride
Styrene
Toluene
Xylenes (Total)

Semi-Volatile Organic Compounds (all except phenols - Method EPA 625; pheols - Method EPA 420.2)

1,4-Dichlorobenzene
Dibenzofuran
Phenols (4AAP)
2-Methylphenol
3&4-Methylphenol

Inorganics (Method EPA 200 Series)

Aluminum
Chromium
Iron
Lead
Magnesium
Manganese
Nickel
Sodium
Zinc

Wet Chemistry

pH - EPA 150
BOD - EPA 405.1
Total Suspended Solids - EPA 160.2
Phosphorus (Total) - EPA365

NIAGARA COUNTY REFUSE SITE

EFFLUENT SAMPLING EQUIPMENT AND SUPPLY CHECKLIST

EQUIPMENT:

☐ Thermometer
☐ pH meter
☐ Conductivity meter
☐ Turbidity meter (Nephlometer)

SUPPLIES:

☐ Aluminum foil
☐ Paper towels
☐ pH buffer solution(s)
☐ Decontamination fluids:
  ☐ Deionized water, non-phosphate soap, tap water
  ☐ 10% Nitric acid (ultrapure)
  ☐ Methanol and hexane (pesticide grade or better)
☐ Sample jars (extra)
☐ Sample jar labels
☐ Cooler(s)/ice packs/packing materials
☐ Trash bags
☐ Plastic spray bottles
☐ Plastic basin or pan
☐ Scrub brush
☐ Abrasive pads (sponge type pads)
☐ Shallow tubs/buckets

MISCELLANEOUS:

☐ Site access keys
☐ Knife
☐ Spare batteries for instruments
☐ Lock de-icer (winter)
☐ Duct tape
☐ Reinforced packing tape
☐ Custody seal tape
☐ Pen/pencil/indelible marking pen
☐ Tool box

PERSONAL PROTECTIVE EQUIPMENT:

☐ Nitrile gloves
☐ Hardhat/liner
☐ Safety line
☐ Safety glasses/or side shields on OSHA-approved prescription lenses
☐ First-aid kit
☐ Check HSCP

DOCUMENTATION:

☐ Chain-of-Custody forms
☐ FP-7
☐ OM&M Manual
☐ Courier manifests
☐ Site map

Completed by: ______________________________ *Date:* ______________

FORM 7A

NIAGARA COUNTY REFUSE SITE

EFFLUENT SAMPLING
• COMPLETION CHECKLIST

BEFORE GOING TO SITE:

- ☐ Confirmed effluent sample location and accessibility.
- ☐ Reviewed project documents (i.e., QAPP, HSCP, and sampling procedures in the OM&M Manual), sampling QA/QC, and Site-specific sampling requirements.
- ☐ Site access notification and coordination.
- ☐ Coordinated with laboratory.
- ☐ Procured, inventoried, and inspected all equipment and supplies.
- ☐ Prepared, calibrated, and performed required maintenance on equipment.

AT SITE:

- ☐ Instruments calibrated daily.
- ☐ Sampling equipment decontaminated in accordance with the QAPP.
- ☐ Temperature, pH, conductivity, and turbidity logged.
- ☐ Specified samples and QA/QC samples collected per QAPP.
- ☐ Samples properly labeled, preserved, and packed.
- ☐ Sample dates, times, locations, and sample numbers recorded in applicable log(s).
- ☐ Samples properly stored if not shipped/delivered to lab same day.
- ☐ Samples shipped with complete and accurate Chain-of-Custody record.

AFTER SAMPLING:

- ☐ All equipment has been maintained, decontaminated, and returned.
- ☐ Sampling information reduced and required sample keys and field data distributed.
- ☐ Chain-of-Custody records filed.
- ☐ Expendable stock supplies replaced.
- ☐ Access keys returned.
- ☐ Arranged disposal/treatment for decontamination fluids.
- ☐ Confirm all samples collected.

Completed by: ______________________________ *Date:* ____________________

FORM 7B

CRA 5723 (17)

EFFLUENT SAMPLING • SAMPLE COLLECTION DATA SHEET

PROJECT NAME: *NIAGARA COUNTY REFUSE SITE*

SAMPLE LOCATION: *WET WELL A*

SAMPLING CREW MEMBERS: ______________________

DATE OF SAMPLE COLLECTION: |_|_|_|_|_|_| (M M D D Y Y)

Sample Time	
Sample ID Number	
pH	
Temperature	
Conductivity	
Turbidity	
Instantaneous Flow Velocity	
Total Flow	
Sample Description	
Analysis Required	
Chain-of-Custody Number	
Shipping Manifest Number	

Additional Comments: ______________________

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FP-7C

APPENDIX D

QUALITY ASSURANCE PROJECT PLAN (QAPP)

TABLE OF CONTENTS

LIST OF TABLES
(Following Text)

1.0 INTRODUCTION

This appendix describes the Quality Assurance Project Plan (QAPP) for groundwater, surface water, and Perimeter Collection System (PCS) effluent sampling and analyses during Operation, Maintenance and Monitoring (OM&M) activities at the Niagara County Refuse (NCR) Site.

2.0 MONITORING PARAMETERS

The monitoring parameters for groundwater and surface water samples are listed in Table 2.1. The monitoring parameters for PCS effluent are listed in Table 2.2. Parameter survey levels, analytical methods, sample preservation requirements, holding times, and sample bottle types are also presented in Tables 2.1 and 2.2.

3.0 QA REQUIREMENTS

3.1 RINSE BLANKS

Aqueous rinse blanks will be prepared in the field by pouring deionized water through the sample collection equipment (i.e., bladder pump) into appropriate sample bottles. The sample analyses performed on the rinse blank will be the same as the analyses performed on the groundwater and surface water samples. Rinse blanks will not be collected for PCS effluent sampling. Rinse blanks will be shipped to the analytical laboratory with the groundwater samples. They will be labeled as rinse blanks; they will not be submitted "blind". Rinse blanks will be collected at a rate of one blank for every 4 groundwater or 4 surface water samples collected (one field blank if less than 4 samples) or at least one per day of sampling.

3.2 TRIP BLANKS

Trip blanks (provided by the analytical laboratory in sealed containers) are shipped to the laboratory with the groundwater samples. One set of trip blanks will be shipped with each sample shipment and will be stored and shipped in the same cooler as the volatile organic compound (VOC) samples.

3.3 FIELD DUPLICATES

Field duplicate samples will be collected by filling two sets of sample bottles at a well or surface water sampling location instead of one. The sample bottles will be filled in the order listed in FP-5 and FP-6 in Appendix C (i.e., all VOC bottles first, including field duplicates, followed by all semi-volatile organic compound or SVOC bottles, followed by metals). Field duplicates will be stored and shipped with the other samples. The duplicates will be submitted to the analytical laboratory "blind". Sample personnel will create a non-existent well or surface water sample location name for the sample and will not use the same sampling time as any of the other samples collected. Sampling personnel will record on the sample collection sheet the sample identification of the duplicate and the sample identification of the groundwater sample it duplicates. Field duplicates will be collected at a rate of one duplicate for every 4 groundwater or 4 surface water samples collected (one field duplicate if less than 4 samples) or at least one per day of sampling.

3.4 MATRIX SPIKES AND MATRIX SPIKE DUPLICATES

Matrix spike and matrix spike duplicate (MS/MSD) samples will be collected by filling three sets of sample bottles at a well or surface water sampling location instead of one. The sample bottles will be filled in the order listed in FP-5 and FP-6 in Appendix C (i.e., all VOC bottles first, including field duplicates, followed by all SVOC bottles, followed by metals). MS/MSD samples will be stored and shipped with the other samples. The MS/MSD samples will be labeled as MS/MSD samples; they will not be submitted "blind". MS/MSD samples will be collected at a rate of one MS/MSD for every 4 groundwater or 4 surface water samples collected (one MS/MSD if less than 4 samples) or at least one per day of sampling.

3.5 FIELD SPLITS

Any additional duplicate (split) samples requested by the Environmental Protection Agency (EPA) or New York State Department of Environmental Conservation (DEC) will be collected and submitted to EPA or DEC for analysis.

4.0 CHAIN-OF-CUSTODY RECORDS

Chain-of-custody records will be used. Complete and sign the chain-of-custody prior to shipping, retain the sampler's copies, place the remaining copies in a sealable plastic bag, place the bag in the cooler on top of the packed samples, and seal the cooler.

TABLE D.2.1

SITE SPECIFIC PARAMETERS, GROUNDWATER AND SURFACE WATER
OM&M MANUAL - QA/QC REQUIREMENTS
NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Parameter	*Quantitation Limit (ug/L)*	*Analytical Method Reference*	*Sample Storage*	*Sample Preservation*	*Maximum Holding Time* [(1)]	*Sample Container*
VOCs						
Acetone	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Benzene	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Bromodichloromethane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Bromoform	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Bromomethane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
2-Butanone	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Carbon disulfide	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Carbon tetrachloride	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Chlorobenzene	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Chloroethane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Chloroform	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Chloromethane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Dibromochloromethane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
1,1-Dichloroethane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
1,2-Dichloroethane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
1,1-Dichloroethene	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
1,2-Dichloroethene (total)	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
1,2-Dichloropropane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
cis-1,3-Dichloropropane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
trans-1,3-Dichloropropane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Ethylbenzene	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
2-Hexanone	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Methylene chloride	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
4-Methyl-2-pentanone	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Styrene	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
1,1,2,2-Tetrachloroethane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Tetrachloroethene	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Toluene	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
1,1,1-Trichloroethane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
1,1,2-Trichloroethane	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Trichloroethene	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Vinyl chloride	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
Xylenes (total)	5	SW-846 8260	Cool, 4°C	HCl to pH < 2	14 Days	(2)
SVOCs						
1,2-Dichlorobenzene	10	SW-846 8270	Cool, 4°C	$Na_2S_2O_3$ (0.008%)^	*	(3)
1,3-Dichlorobenzene	10	SW-846 8270	Cool, 4°C	$Na_2S_2O_3$ (0.008%)^	*	(3)
1,4-Dichlorobenzene	10	SW-846 8270	Cool, 4°C	$Na_2S_2O_3$ (0.008%)^	*	(3)
Phenol	10	SW-846 8270	Cool, 4°C	$Na_2S_2O_3$ (0.008%)^	*	(3)
2-Methylphenol	10	SW-846 8270	Cool, 4°C	$Na_2S_2O_3$ (0.008%)^	*	(3)
3&4-Methylphenol	10	SW-846 8270	Cool, 4°C	$Na_2S_2O_3$ (0.008%)^	*	(3)

TABLE D.2.1

SITE SPECIFIC PARAMETERS, GROUNDWATER AND SURFACE WATER
OM&M MANUAL - QA/QC REQUIREMENTS
NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Parameter	*Quantitation Limit (ug/L)*	*Analytical Method Reference*	*Sample Storage*	*Sample Preservation*	*Maximum Holding Time* [(1)]	*Sample Container*
Metals						
Aluminum	200	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Antimony	60	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Barium	200	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Berylium	5	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Cadmium	5	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Calcium	5000	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Chromium	10	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Cobalt	50	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Copper	25	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Iron	100	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Lead	3	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Magnesium	5000	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Manganese	15	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Mercury	0.2	SW-846 7470	Cool, 4°C	HNO_3 to pH<2	28 Days	(4)
Nickel	40	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Potassium	5000	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Selenium	5	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Silver	10	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Sodium	5000	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Thallium	10	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Vanadium	50	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Zinc	20	SW-846 6010	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)

Notes:

(1) - Holding times are from date of collection.
(2) - Two 40-mL teflon lined septum vials.
(3) - Two 1-liter amber glass bottles.
(4) - One 1-liter plastic bottle.
* - 7 days to extraction, 40 days from extraction to analysis.
^ - preserving agent is only required if sample is expected to contain free or combined chlorine

TABLE D.2.2

SITE SPECIFIC PARAMETERS, PCS EFFLUENT
OM&M MANUAL - QA/QC REQUIREMENTS
NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Parameter	*Quantitation Limit (ug/L)*	*Analytical Method Reference*	*Sample Storage*	*Sample Preservation*	*Maximum Holding Time* (1)	*Container*
VOCs						
Benzene	5	EPA 624	Cool, 4°C	4 Drops HCl	14 Days	(2)
2-Butanone	5	EPA 624	Cool, 4°C	4 Drops HCl	14 Days	(2)
Chlorobenzene	5	EPA 624	Cool, 4°C	4 Drops HCl	14 Days	(2)
1,1-Dichloroethane	5	EPA 624	Cool, 4°C	4 Drops HCl	14 Days	(2)
1,2-Dichloroethene (total)	5	EPA 624	Cool, 4°C	4 Drops HCl	14 Days	(2)
Ethylbenzene	5	EPA 624	Cool, 4°C	4 Drops HCl	14 Days	(2)
Methylene chloride	5	EPA 624	Cool, 4°C	4 Drops HCl	14 Days	(2)
Styrene	5	EPA 624	Cool, 4°C	4 Drops HCl	14 Days	(2)
Toluene	5	EPA 624	Cool, 4°C	4 Drops HCl	14 Days	(2)
Xylenes (total)	5	EPA 624	Cool, 4°C	4 Drops HCl	14 Days	(2)
SVOCs						
1,4-Dichlorobenzene	10	EPA 625	Cool, 4°C	$Na_2S_2O_3$ (0.008%)^	*	(3)
Dibenzofuran	10	EPA 625	Cool, 4°C	$Na_2S_2O_3$ (0.008%)^	*	(3)
2-Methylphenol	10	EPA 625	Cool, 4°C	$Na_2S_2O_3$ (0.008%)^	*	(3)
3&4-Methylphenol	10	EPA 625	Cool, 4°C	$Na_2S_2O_3$ (0.008%)^	*	(3)
Phenols	10	EPA 420.2	Cool, 4°C	H_2SO_4 to pH<2	28 Days	(6)
Metals						
Aluminum	200	EPA 200 Series	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Chromium	10	EPA 200 Series	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Iron	100	EPA 200 Series	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Lead	3	EPA 200 Series	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Magnesium	5000	EPA 200 Series	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Manganese	15	EPA 200 Series	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Nickel	40	EPA 200 Series	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
Sodium	5000	EPA 200 Series	Cool, 4°C	HNO_3 to pH<2	6 Months	(4)
General Chemistry						
pH	-	EPA 150	Cool, 4°C	None	Immediately	(5)
BOD	10 mg/L	EPA 405.1	Cool, 4°C	None	48 hours	(6)
Total suspended solids	10 mg/L	EPA 160.2	Cool, 4°C	None	7 Days	(7)
Phosphorus (total)	100	EPA 365	Cool, 4°C	H_2SO_4 to pH<2	28 Days	(8)

Notes:
(1) - Holding times are from date of collection.
(2) - Two 40-mL teflon lined septum walls.
(3) - Two 1-liter amber bottles.
(4) - One 1-liter plastic bottle.
(5) - One 60-mL plastic bottle.
(6) - One 1-liter glass bottle.
(7) - One 500-mL plastic bottle.
(8) - One 125-mL plastic bottle.
* 7 days for extraction; 40 days from extraction to analysis.
^ - Preserving agent is only required if sample is expected to contain free or combined chlorine.

HEALTH AND SAFETY PLAN FOR REMEDIAL ACTION ACTIVITIES

Conestoga-Rovers & Associates
2055 Niagara Falls Boulevard
Niagara Falls, New York 14304

JUNE 2000
REF. NO. 5723 (17)

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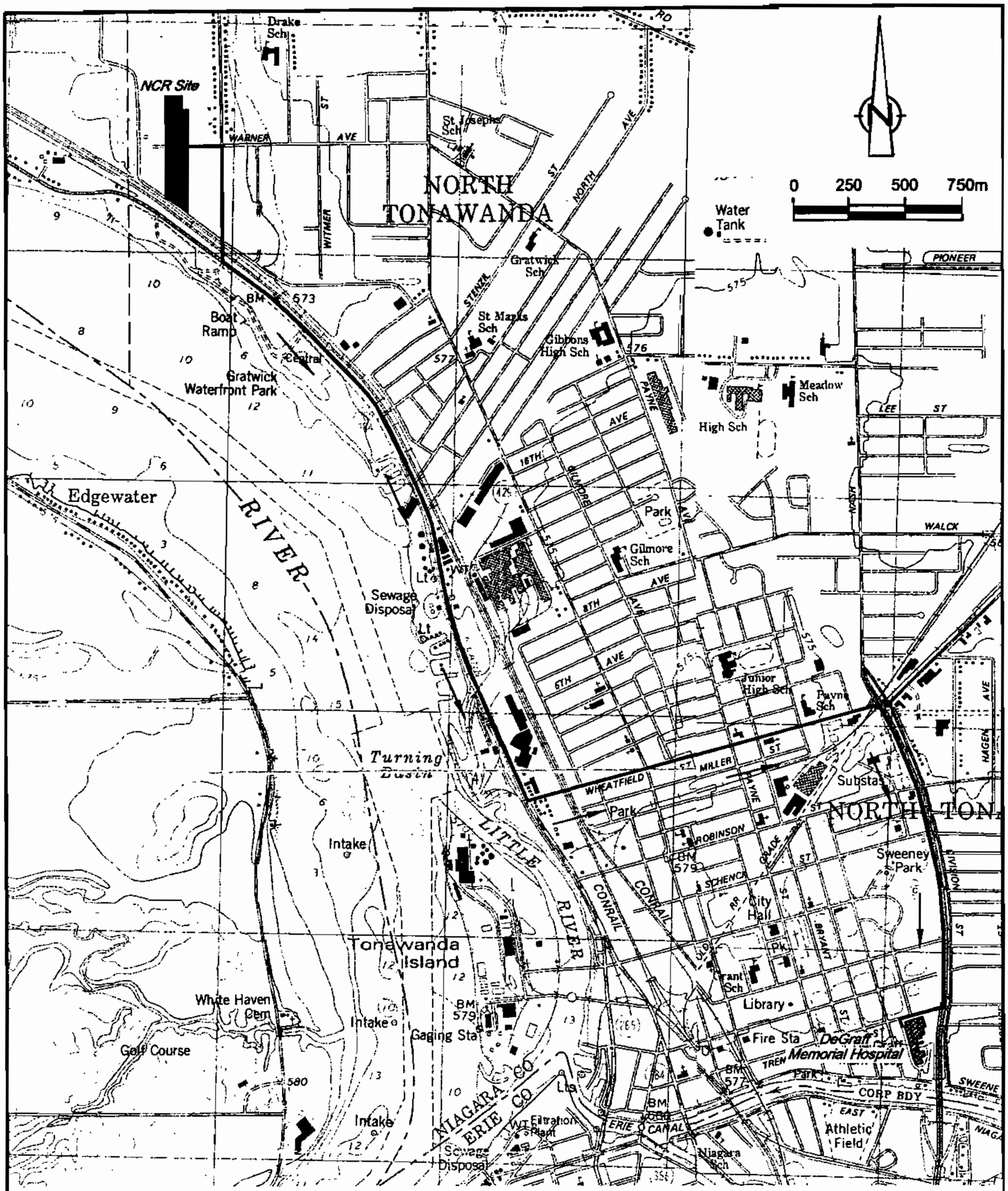

figure E.14.1

EMERGENCY HOSPITAL ROUTE
HEALTH & SAFETY CONTINGENCY PLAN
NIAGARA COUNTY REFUSE SITE
Wheatfield, New York

CRA

1.0 INTRODUCTION

The Health and Safety Plan (HASP) presented herein describes the health and safety procedures and emergency response guidelines to be implemented during the Operation, Maintenance and Monitoring (OM&M) activities at the Niagara County Refuse (NCR) Site located in the Town of Wheatfield, Niagara County, New York. The Site location is shown on Figure 2.1 in the OM&M Manual. The Site layout is presented on Figure 2.2 in the same manual.

The scope of work to be completed during the OM&M activities includes the following:

i) mobilization and demobilization of labor, materials and equipment to and from the Site;
ii) inspections of the Site including security fencing and the landfill cap;
iii) maintenance of the leachate collection system;
iv) groundwater monitoring activities;
v) grass cutting activities; and
vi) decontamination activities.

During a portion of these activities, personnel may come in contact with soils, sediments, leachate and groundwater, which may contain hazardous substances. This HASP has been developed to minimize direct contact by Site personnel with material potentially having chemical presence by ensuring:

i) that Site personnel are not adversely exposed to the compounds of concern;
ii) that public health and the environment are not adversely impacted by materials with elevated chemical presence which may potentially migrate off-Site during work activities at the Site;
iii) compliance with applicable governmental and non-governmental (American Conference of Governmental Industrial Hygienists [ACGIH]) regulations and guidelines. In particular, the amended rules of the Occupational Safety and Health Administration (OSHA) for Part 1926 (Title 29 Code of Federal Regulations [CFR] Part 1926.65) will be implemented for all Site work; and
iv) initiation of proper emergency response procedures to minimize the potential for any adverse impact to Site workers, the general public, or the environment.

For the purpose of this HASP, activities performed on Site involving contact with materials with potentially elevated chemical presence will be considered contaminated operations requiring personal protective equipment (PPE). A detailed description of the PPE required is presented in Section 6.1.

The applicability of this HASP extends to all personnel who will be on Site, including OM&M personnel, State and Federal Agency personnel, contractors, subcontractors, and visitors to the Site.

All OM&M activities at the Site will be conducted in accordance with the provisions of this Site-specific HASP. A copy of this HASP and employer-specific Standard Operating Procedures (SOPs) will be maintained on Site whenever activities are in progress.

1.1 PROJECT ORGANIZATION

The OM&M activities will be organized as follows. The OM&M Contractor will direct the project and selected contractors. Subcontractors may assist with project activities, as necessary.

The OM&M Contractor will provide an individual working on Site who will direct the day-to-day activities. This individual will also serve as the Health and Safety Officer (HSO) who will be responsible for ensuring compliance with the Site-specific HASP.

2.0 SITE CHARACTERIZATION AND POTENTIALLY HAZARDOUS COMPOUNDS

The Site is located along the eastern border of the Town of Wheatfield, Niagara County, New York, and the western border of the City of North Tonawanda and comprises an area of approximately 65 acres. The southern edge of the Site lies approximately 500 feet north of the Tonawanda Channel of the Niagara River, which is on the north side of Grand Island.

Site access is restricted to authorized vehicular traffic by secured fence gates.

In 1969, the NCR Disposal District, formerly the Niagara County Solid Waste Disposal Agency, commenced refuse disposal operations at the Site. Solid waste was hauled to the Site by either municipal or privately operated collection companies. Refuse reported to have been disposed at the Site includes solid household, yard, institutional, commercial, industrial, demolition and construction, and agricultural waste, sewage treatment plant sludges, street sweepings, and tires. A list of the industrial waste materials reported to have been disposed at the NCR Site is presented in Table E.2.1. The Site was operated by NCR Disposal District until October 1976 at which time it was officially closed. The Town of Wheatfield acquired ownership of the Site on June 30, 1977.

Previous Site investigations have detected the presence of chemicals. Table E.2.2 presents a list of maximum concentration of Site specific compounds of concern in soil and groundwater that have been identified to be present at the Site. The exposure routes and regulatory exposure levels for the chemical compounds of concern are presented in Table E.2.3.

3.0 BASIS FOR DESIGN

Regulations set forth by OSHA in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926) form the basis of this HASP. Emphasis is placed on Sections 1926.65 (Hazardous Waste Operations and Emergency Response), 1910 Subpart I (Personal Protective Equipment), and 1910 Subpart Z (Toxic and Hazardous Substances). In addition, current Threshold Limit Values (TLVs) formulated by the ACGIH have been considered in the development of the selection of PPE. Some of the specifications within this section are in addition to the OSHA regulations, and reflect the positions of the United States Environmental Protection Agency (EPA), the National Institute for Occupational Safety and Health (NIOSH), and the United States Coast Guard (USCG) regarding safe operating procedures at hazardous waste sites.

The health and safety of the public and Site personnel and the protection of the environment will take precedence over cost and schedule considerations for all project work.

4.0 RESPONSIBILITIES AND ADMINISTRATION

The HSO shall be responsible for all decisions regarding operations and work stoppage due to health and safety considerations. The HSO will have prior experience in working at hazardous waste sites.

The on-Site HSO responsibilities include:

i) supervision and enforcement of safety equipment usage, including the required use of extra equipment if appropriate;

ii) supervision and inspection of equipment cleaning;

iii) supervision of decontamination activities;

iv) conduct the on-Site personnel safety indoctrination session for potential hazards, personal hygiene principles, confined space entry procedures, all other SOPs, safety equipment usage, emergency procedures, and location of first aid kits and identification of personnel trained in first aid and cardiopulmonary resuscitation (CPR);

v) maintain Exclusion Zone (EZ) and Contaminant Reduction Zone (CRZ) work areas;

vi) review and modify the HASP as more information becomes available or conditions warrant;

vii) issue confined space entry and hot work permits as required;

viii) authority to suspend work activity due to unsafe working conditions;

ix) coordination of emergency procedures;

x) be responsible for performing air monitoring;

xi) ensure that all on-Site personnel have obtained the required medical examination prior to arrival at the Site, have met the OSHA training requirements, and have been fit tested for the respiratory equipment they may use;

xii) maintain the on-Site Hazard Communication Program including copies of Material Safety Data Sheets (MSDSs);

xiii) administer the accident prevention program; and

xiv) provide instruction to Site personnel regarding operating, procedures, hazards, and safeguards of tools and equipment when necessary to perform their job.

5.0 WORKER TRAINING AND EDUCATION

Prior to commencing Site activities, a Health and Safety/Site Indoctrination Session will be presented. Attendance is mandatory for all personnel who will be or who are expected to be involved with project activities.

The training program will stress the importance that each attendee understands the basic principles of personnel protection and safety, be able to perform their assigned job tasks in a safe and environmentally responsible manner, and be prepared to respond in an appropriate manner to any emergency which may arise. A brief history of the Site will be included and the various components of the project HASP will be presented followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel not successfully completing this training program will not be permitted to enter or work in potentially contaminated areas of the Site. Personnel successfully completing this training program shall sign an acknowledgement form, a copy of which is presented in Attachment E.1. In addition, contractors will be required to conduct daily "tailgate" safety meetings will take place each day prior to beginning the day's work. All Site personnel will attend these safety meetings. The safety meetings will be documented with written sign-in sheets containing a list of topics discussed. Attachment E.2 presents the form that will be used for this purpose.

This training will be given in addition to the basic training required under OSHA and is not intended to meet the requirements of 29 CFR 1926.65. Prior to working in or entering an EZ environment (as defined in Section 6.0), all personnel will be required to provide documentation to the HSO indicating successful completion of the training requirements of 29 CFR 1926.65. Contractors or subcontractors will provide these certificates to the OM&M Project Manager.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

This section of the HASP describes the requirements for PPE and the specific levels of protection required for each work task to be conducted at the Site during project activities. Basic PPE in all Site areas will consist of hard hats, safety glasses, and steel toe boots/shoes.

6.1 PROTECTION LEVELS

Personnel will wear protective equipment when project activities involve potential exposure to chemicals from vapors, gases, or particulates that may be generated on Site or when direct contact with potentially hazardous substances may occur. Chemical resistant clothing protects the skin from contact with skin-destructive and absorbable chemicals. Respirators protect lungs, the gastrointestinal tract, and if a full-face respirator is worn, the eyes, against airborne toxicants. Respiratory protection levels will be based on the real-time air monitoring results and the action levels that are presented in Section 6.5.

Protection levels are selected based upon the following:

i) measured concentrations of the Site chemicals and expected concentrations in the ambient atmosphere compared to allowable exposure levels (Table 2.1);

ii) potential for exposure to chemicals in air, splashes of liquids, or other contact due to the nature of work tasks; and

iii) Site chemical toxicity, route of exposure, and chemical matrix.

The specific protection levels to be employed at the Site for each work task are listed in Table E.6.1. All project activities conducted at the Site will require the use of one of the following levels of PPE.

Level B (Not Expected to be Worn):

i) supplied air respirator (NIOSH approved). Respirators may be positive pressure-demand, self-contained breathing apparatus (SCBA) or positive pressure-demand airline respirator (with escape bottle for Immediately Dangerous to Life and Health [IDLH] or potential for IDLH atmosphere);

ii) polycoated Tyvek® or Saranex® coveralls;

iii) steel toe work boots and disposable boot covers or rubber boots;

iv) disposable nitrile inner gloves;
v) outer nitrile work gloves;
vi) hearing protection as necessary; and
vii) hard hat.

<u>Level C:</u>

i) Tyvek® coveralls (polycoated Tyvek® when handling or working with liquids [e.g., decontamination]);
ii) steel toe work boots and disposable boot covers or rubber boots;
iii) disposable nitrile inner gloves;
iv) outer nitrile inner gloves;
v) half-face or full-face air purifying respirator (APR), equipped with cartridges for organic vapors;
vi) hearing protection as necessary; and
vii) hard hat.

<u>Modified Level D:</u>

i) Tyvek® coveralls (polycoated Tyvek® when handling or working with liquids);
ii) steel toe work boots;
iii) disposable nitrile inner gloves;
iv) outer nitrile work gloves;
v) safety glasses;
vi) splash shields as necessary;
vii) hearing protection as necessary; and
viii) hard hat.

<u>Level D:</u>

i) standard work uniform or coveralls;
ii) steel toe work boots;
iii) gloves as necessary;
iv) safety glasses;
v) splash shield as needed;

vi) hearing protection as necessary; and
vii) hard hat.

PPE will be maintained in a clean sanitary condition and ready for use. Disposable coveralls shall be discarded when torn and as an employee leaves the EZ. Hard hats shall be thoroughly cleaned after leaving the EZ. Respirators shall be cleaned after each day's use and cartridges discarded. A sufficient quantity of potable water shall be supplied for washing, cleaning PPE, and drinking. A potable water supply for washing and cleaning PPE will be maintained adjacent to the decontamination area described in Section 9.0. Fresh potable water for drinking will be supplied on a daily basis and be maintained at a location removed from the active work area.

6.2 REASSESSMENT OF PROTECTION LEVELS

Protection levels provided by PPE selection shall be upgraded or downgraded based upon a change in Site conditions or the review of the results of air monitoring.

When a significant change occurs, the hazards shall be reassessed. Some indicators of the need for reassessment are:

i) commencement of a new work phase;
ii) change in job tasks during a work phase;
iii) change of season/weather;
iv) when temperature extremes or individual medical considerations limit the effectiveness of PPE;
v) chemicals other than those expected to be encountered are identified;
vi) change in ambient levels of chemicals; and
vii) change in work scope which effects the degree of contact with areas of potentially elevated chemical presence.

All proposed changes to protection levels and PPE requirements will be reviewed and approved prior to their implementation by the HSO.

6.3 DURATION OF WORK TASKS

The duration of project activities involving the usage of PPE will be established by the HSO or his designee based upon ambient temperature and weather conditions, the capacity of personnel to work in the designated level of PPE (heat stress and cold stress, see Section 12.3 - Environmental Control), and limitations of the protective equipment (i.e., ensemble permeation rates, life expectancy of air-purifying respirator cartridges, etc.). As a minimum, rest breaks will be observed at the following intervals:

i) 15 minutes midway between shift startup and lunch;

ii) ½-hour for lunch; and

iii) 15 minutes in the afternoon, between lunch and shift end.

All rest breaks will be taken in a clean area (e.g., support zone) after full decontamination and PPE removal. Additional rest breaks will be observed, based upon the OM&M Contractor's guidelines for the heat stress monitoring.

6.4 LIMITATIONS OF PROTECTIVE CLOTHING

PPE ensembles designated for use during project activities have been selected to provide protection against chemicals at known or anticipated concentrations in the soil and groundwater. However, no protective garment, glove, or boot is chemical-proof, nor will it afford protection against all chemical types. Permeation of a given chemical through PPE is a complex process governed by the chemical concentrations, environmental conditions, physical condition of the protection garment, and the resistance of a garment to a specific chemical; chemical permeation may continue even after the source of the chemical has been removed from the garment.

In order to obtain optimum usage from PPE, the following procedures are to be followed by all Site personnel using PPE:

i) when using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift;

ii) inspect all clothing, gloves, and boots both prior to and during use for:

    a) imperfect seams,

    b) non-uniform coatings,

        - c) tears,
        - d) poorly functioning closures; and
    - iii) inspect reusable garments, boots, and gloves both prior to and during use for:
        - a) visible signs of chemical permeation,
        - b) swelling,
        - c) discoloration,
        - d) stiffness,
        - e) brittleness,
        - f) cracks,
        - g) any sign of puncture, and
        - h) any sign of abrasion.

Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above will be discarded. PPE used in areas known or suspected to exhibit elevated concentrations of chemicals will not be reused.

Additional PPE usage guidelines are as follows:

- i) ankles/wrists will be secured tightly with the use of duct tape;
- ii) prescription eyewear used on Site shall be safety glasses equipped with side shields when full-face respirators are not required. Contact lenses shall not be used;
- iii) all EZ workers will have received training in the usage of air purifying respirators;
- iv) steel toe leather footwear shall be covered with neoprene overboots prior to entering the EZ and immediately upon entering the CRZ; and
- v) safety footwear and hard hats are to be worn by Site personnel at all times.

EZ personnel also carry certain responsibilities for their own health and safety, and are required to observe the following safe work practices:

- i) familiarize themselves with this HASP;
- ii) use the "buddy system" when working in a contaminated operation;

iii) use the safety equipment in accordance with training received, labeling instructions, and common sense;

iv) maintain safety equipment in good condition and proper working order;

v) refrain from activities that would create additional hazards (i.e., smoking, eating, etc., in restricted areas, leaning against dirty, contaminated surfaces);

vi) smoking, eating, and drinking will be prohibited except in designated areas. These designated areas may change during the duration of the project to maintain adequate separation from the active work area(s). Designation of these areas will be the responsibility of the HSO; and

vii) soiled disposable outerwear shall be removed and placed into a covered container prior to washing hands and face, eating, using lavatory facilities, or leaving the Site.

6.5 RESPIRATORY PROTECTION PROGRAM

Prior to arriving at the Site, all on-Site personnel will have received training in the use of, and have been fit tested for the air purifying respirator that they may need to wear. All on-Site personnel will be required to comply with their employer specific written respiratory protection program developed in accordance with OSHA 29 CFR 1910.134.

Respiratory protection should not be necessary for most routine OM&M activities however, it may be required during some of the project activities. This is to ensure worker protection from volatile organic compounds (VOCs). A photoionization detector (PID) will be available to determine if organic vapors are present. A background reading will be established prior to commencing work activities at each active work area. In addition, Site personnel will be monitored for potential exposure to vinyl chloride and other selected chemical compounds of concern. The results of the personnel monitoring program will be reviewed to ensure that the proper respiratory protection procedures are being implemented.

Realtime instrument action levels for organic vapors to determine the level of respiratory protection necessary during OM&M activities are based on the concentration of the Site chemicals measured within the breathing zone. They are also based on the premise that vinyl chloride is not present. The action levels and appropriate respiratory protection for these Site activities are as follows:

Sustained Organic Vapor Reading Above Background Within Worker Breathing Zone in Parts Per Million (ppm)	*Action Taken*
0 or Background	Half- or Full-Face Respirator Available
1 - 10	Wear Half- or Full-Face Respirator
10 - 50	Wear Full-Face Respirator
>50	Must Wear Supplied Air Respirator/Implement Additional Engineering Controls

All efforts will be made to implement additional engineering controls to minimize the need to wear a supplied air respirator. If the ambient concentrations of organic vapors are due to identifiable substances, the level of respiratory protection may be altered by the HSO.

The appropriate air purifying respirator cartridge to be used at the Site is one that will provide protection against organic vapors. The cartridge used must be of the same manufacturer as the respiratory face piece.

6.6 SITE CONTROL

Designated work areas will be set up as appropriate during OM&M activities, as required. The purpose of these procedures is to limit access to areas with potentially elevated chemical presence, and prevent the migration of potentially hazardous materials into adjacent clean areas. These areas are described in the following:

i) The Exclusion Zone (EZ) is the area immediately surrounding the active work area. Sufficient area will be provided for efficient movement of personnel and equipment as well as chemical control. Boundaries are modifiable depending on operational requirements. The HSO will be responsible for maintaining the boundaries of this area. Personnel entering this area are required to wear the PPE as defined previously. A wind direction indication device (i.e., flagging, windsock, etc.) will be mounted in the area of any EZ during Site activities.

   All personnel (including visitors) entering the EZ or CRZ using respiratory protection must have successfully passed a respirator fit test in accordance with OSHA 29 CFR 1910.134. Documentation of fit testing is the responsibility of each employer.

In the event that unauthorized personnel enter the EZ, work will stop. Work will not resume until the unauthorized personnel have been removed from the EZ or have been moved to an acceptable on-Site area. A log of all visitors to the Site, including those entering the EZ, will be maintained.

ii) The Contaminant Reduction Zone (CRZ) will provide a location for removal of PPE which has contacted material with elevated chemical presence and final removal and decontamination of personnel and equipment. Supplemental safety equipment, such as fire extinguishers, portable eyewash, and extra quantities of PPE may be stored in this area. The order in which safety equipment is to be donned is as follows:

a) tyvek® suit;
b) rubber boot;
c) gloves;
d) respirator (if required); and
e) hard hat.

The following order applies when removing safety equipment:

a) wash off boots and outer gloves prior to removal;
b) tyvek® suit;
c) hard hat;
d) respirator; and
e) inner gloves.

iii) The Support Zone (SZ) is situated in clean areas where there is a minimal risk of encountering hazardous materials or conditions. PPE beyond standard construction safety equipment is therefore not required.

7.0 ACTIVITY HAZARD/RISK ANALYSIS

This section identifies the general hazards associated with specific project activities and presents the documented or potential health and safety hazards that exist at the Site. Every effort will be made to reduce or eliminate these hazards. Those which cannot be eliminated must be guarded against by use of engineering controls and/or PPE. Table E.7.1 presents the anticipated hazards/risks and hazard controls.

In addition to the chemical hazards presented in Section 2.0 of this HASP, physical hazards including uneven terrain, steep slopes, slippery surfaces, electrical hazards, potential confined spaces, the use of heavy equipment, the use of decontamination equipment, and potential heat and cold stress exist at the Site. It will be the responsibility of all personnel to identify the physical hazards posed by the various Site project activities they are involved with and implement preventative and corrective action.

7.1 CHEMICAL EXPOSURE

Preventing exposure to toxic chemicals is a primary concern. Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage at the point of contact or can act systematically, causing a toxic effect at a part of the body distant from the point of initial contact.

Chemical exposures are generally divided into two categories: acute and chronic. Symptoms resulting from acute exposures usually occur during or shortly after exposure to a sufficiently high concentration of a chemical. The concentration required to produce such effects varies widely from chemical to chemical. The term "chronic exposure" generally refers to exposures to "low" concentrations of a contaminant over a long period of time. The "low" concentrations required to produce symptoms of chronic exposure depend upon the chemical, the duration of each exposure, and the number of exposures. For a given chemical, the symptoms of an acute exposure may be completely different from those resulting from chronic exposure.

For either chronic or acute exposure, the toxic effect may be temporary and reversible, or may be permanent (disability or death). Some chemicals may cause obvious symptoms such as burning, coughing, nausea, tearing eyes, or rashes. Other chemicals may cause health damage without any such warning signs (this is a particular concern for chronic exposures to low concentrations). Health effects such as cancer or respiratory disease may not become manifest for several years or decades after exposure. In addition, some toxic chemicals may be colorless and/or odorless, may dull the sense of smell, or may not produce any immediate or obvious physiological sensations. Thus, a worker's senses or feelings cannot be relied upon in all cases to warn of potential toxic exposure.

The effects of exposure not only depend on the chemical, its concentration, route of entry, and duration of exposure, but may also be influenced by personal factors such as the individual's smoking habits, alcohol consumption, medication use, nutrition, age, and sex.

An important exposure route of concern at the Site is inhalation. The lungs are extremely vulnerable to chemical agents. Even substances that do not directly affect the lungs may pass through lung tissue into the bloodstream, where they are transported to other vulnerable areas of the body. Some toxic chemicals present in the atmosphere may not be detected by human senses (i.e., they may be colorless, odorless, and their toxic effects may not produce any immediate symptoms). Respiratory protection is therefore extremely important if there is a possibility that the work site atmosphere may contain such hazardous substances. Chemicals also can enter the respiratory tract through punctured eardrums. Where this is a hazard, individuals with punctured eardrums should be medically evaluated specifically to determine if such a condition would place them at an unacceptable risk and preclude their working at the task in question.

Direct contact of the skin and eyes by hazardous substances is another important route of exposure. Some chemicals directly injure the skin. Some pass through the skin into the bloodstream where they are transported to vulnerable organs. Skin absorption is enhanced by abrasions, cuts, heat, and moisture. The eye is particularly vulnerable because airborne chemicals can dissolve in its moist surface and be carried to the rest of the body through the bloodstream (capillaries are very close to the surface of the eye). Wearing protective equipment, not using contact lenses in chemical atmospheres (since they may trap chemicals against the eye surface), keeping hands away from the face, and minimizing contact with liquid and solid chemicals can help protect against skin and eye contact.

Although ingestion should be the least significant route of exposure at the Site, it is important to be aware of how this type of exposure can occur. Deliberate ingestion of chemicals is unlikely, however, personal habits such as chewing gum or tobacco, drinking, eating, smoking cigarettes, and applying cosmetics at the Site may provide a route of entry for chemicals.

The last primary route of chemical exposure is injection, whereby chemicals are introduced into the body through puncture wounds (i.e., by stepping or tripping and falling onto contaminated sharp objects). Wearing safety shoes, avoiding physical hazards, and taking common sense precautions are important protective measures against injection.

8.0 AIR MONITORING

During the progress of project activities, monitoring of organic vapors will be taken by the HSO. Additionally, oxygen and combustible gas levels will need to be taken if personnel enter into any confined space.

The following air monitoring instrumentation will be used for this purpose:

i) a PID detector; and

ii) a combination oxygen/combustible gas instrument.

All monitoring equipment will be calibrated on a daily basis in accordance with the manufacturer's guidelines, and such calibrations will be recorded in the Site daily log book. Results of all daily air monitoring also will be recorded in the Site daily log book.

Air monitoring will be conducted initially in the breathing zone of workers in the EZ or as deemed necessary by the HSO based on Site-specific conditions. Background measurements immediately upwind of the EZ will be taken before activities commence. Respiratory action levels for organic vapors are discussed in Section 6.5.

Work activities will be stopped upon identifying sustained elevated levels of organic vapors (greater than 50 ppm) within the Work Zone. The HSO will determine the cause of the sustained elevated levels of organic vapors and alternate work methods or engineering controls will be implemented to rectify the release of elevated concentrations of organic vapors, or upgrade levels of PPE as required.

The OM&M Contractor will implement a personnel air monitoring program, in accordance with 29 CFR 1926.65 (h) for workers having the highest potential for exposure to chemicals present on Site. Samples would be collected during the startup of activities, at locations were personnel would face potential exposure, to verify the adequacy of personal protection and to document the actual exposure level to vinyl chloride and other selected chemicals of concern. Appropriate NIOSH procedures and methods will be followed and all samples should to be sent to an American Industrial Hygiene Association (AIHA) accredited laboratory. Results of the air sampling program will be provided to personnel who wore the sampling equipment.

Monitoring for oxygen and combustible gas levels should be continuous during any confined space entry work.

9.0 DECONTAMINATION PROCEDURES

In general, everything that enters the EZ at the Site must either be decontaminated or properly discarded upon exit from the EZ. All personnel, including any State and local officials, must enter and exit the EZ through the decontamination area. Prior to demobilization, potentially contaminated equipment will be decontaminated and inspected by the HSO before it is moved into the clean zone.

The type of decontamination solution to be used is dependent on the type of chemical hazards. The decontamination solution for this Site is Liquinox (soap) for equipment and for any reusable PPE. The Material Safety Data Sheet (MSDS) for Liquinox and any other chemical containing products used on Site will be maintained by the OM&M Contractor.

9.1 EQUIPMENT DECONTAMINATION PROCEDURES

All equipment must be decontaminated within the CRZ or on the decontamination pad by a pressure washer upon exit from the EZ. Decontamination procedures should include: knocking soil/mud from machines; water rinsing using a solution of water and Liquinox; scraping and brushing to remove remaining soils and a final water rinse. Personnel shall wear the appropriate PPE when decontaminating equipment. Runoff will be collected and processed through the treatment facility. Following decontamination and prior to equipment removal from the Site, the HSO shall be responsible for ensuring that the equipment has been properly cleaned. This inspection shall be included in the Site log book.

9.2 PERSONNEL DECONTAMINATION PROCEDURES

Personnel decontamination will be completed in accordance with Niagara County's or their selected contractor or subcontractor SOP for personnel decontamination.

10.0 GENERAL SAFETY AND PERSONAL HYGIENE

1. Eating at the Site is prohibited except in specifically designated areas. Designation of eating areas will be the responsibility of the HSO. The location of these areas may change during the duration of the project to maintain adequate separation from the active work area(s).
2. Smoking at the Site is prohibited except in specifically designated areas.
3. Individuals getting wet to the skin with effluent from the washing operation must wash the affected area immediately. If clothes in contact with skin are wet, then these must be changed.
4. Hands must be washed with soap and water before eating, drinking, smoking, and before using toilets.
5. All disposable coveralls and soiled gloves will be placed in covered containers at the end of every shift or sooner, if deemed necessary by the HSO. Wastes will be stored until proper disposal arrangements have been made.
6. Personnel working on Site will not be permitted to wear facial hair that interferes with the mask-to-face seal on air-purifying respirators.

11.0 MEDICAL SURVEILLANCE

In accordance with the requirements detailed in 29 CFR 1926.65 and 29 CFR 1910.134, all Site personnel who will come in contact with materials with potentially elevated chemical presence will have received, within 1 year prior to starting field activities, medical surveillance by a licensed physician or physician's group.

Medical records for all on-Site personnel will be maintained by their respective employers. The medical records will detail the tests that were taken and will include a copy of the consulting physician's statement regarding the tests and the employee's suitability for work.

The medical records will be available to the employee or his/her designated representative upon written request, as outlined in 29 CFR 1910.1020.

Contractors or subcontractors will provide certifications to the OM&M Project Manager that their personnel involved in Site activities will have all necessary medical examinations and will have obtained medical certification prior to commencing work which requires respiratory protection or potential exposure to hazardous materials. Personnel not obtaining medical certification will not perform work within the CRZ and EZ.

Interim medical surveillance will be completed if an individual exhibits poor health or high stress responses due to any Site activity or when accidental exposure to elevated concentrations of chemicals occur.

12.0 ENVIRONMENTAL CONTROL PROGRAM

This section of the HASP outlines measures to be implemented at the Site to prevent hazards associated with environmental conditions.

12.1 WEATHER MONITORING

The HSO will be responsible for checking weather forecasts for the next day and week of work to provide advance notification of any severe weather conditions. Severe weather conditions (e.g., heavy rains) may cause unsafe conditions at the site and in some situations work may have to be stopped.

12.2 RAIN AND SNOW

Excessive amounts of precipitation may cause potential safety hazards for all work tasks. The hazards would be most commonly associated with slipping, tripping, or falling due to slippery surfaces and further hazards are detailed by work task (Table E.7.1). Severe weather conditions may result in work stoppage and the implementation of further emergency measures.

12.3 TEMPERATURE

The OM&M activities are expected to be conducted year round. Low and high temperatures may be experienced which require measures to be implemented to prevent health and safety hazards from occurring. Potential hazards arising from temperature extremes are heat stress and cold exposure.

The potential hazard due to worker heat stress is particularly important if high protection levels of PPE are in use (e.g., respirators). It is the responsibility of the HSO to determine which measures are appropriate to implement to prevent heat stress; these will depend largely on daily Site conditions. The HSO will implement the appropriate heat stress monitoring and prevention requirements as specified by their employer-specific heat stress SOP.

Exposure to cold is similar to heat stress in that the HSO must determine the appropriate preventative measures to implement. Some of the measures which may be implemented include: more frequent breaks, additional clothing, and partial enclosure of work areas. The HSO will implement the appropriate cold exposure prevention and monitoring measures as specified by their employer-specific cold stress SOP.

12.4 WIND

High winds may be encountered at the Site and these can cause hazards that may affect Site personnel health and safety. Preventative measures that will be implemented if necessary are as follows:

i) restricted Site activity;
ii) battening down light equipment or building materials;
iii) partially enclosing work areas; and
iv) reduction or stoppage of work activities.

13.0 CONFINED SPACE ENTRY PROCEDURE

A confined space is defined as follows:

i) large enough and so configured that an individual can bodily enter and perform assigned work;
ii) limited or restricted means for entry or exit; and
iii) not designed for continuous occupancy.

A confined space provides the potential for unusually high concentrations of contaminants, explosive atmospheres, oxygen deficient atmospheres, limited visibility, and restricted movement. This section establishes requirements for safe entry into, continued work in, and safe exit from confined spaces. Access to the internal platform for regular inspection activities is generally not considered as confined space entry (see memorandum in Attachment E3). Additional information regarding confined space entry can be found in 29 CFR 1926.21, 29 CFR 1910.146, and NIOSH-106. Entry into a confined space will only be undertaken after remote methods have been tried and found not to be successful. If confined space entry is required, such work will only be undertaken following the guidelines presented in the OM&M Contractor's SOP for this work, which shall include a written lock and tag procedure.

14.0 EMERGENCY RESPONSE AND CONTINGENCY PLAN

It is essential that Site personnel be prepared in the event of an emergency. Emergencies can take many forms; illnesses or injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather. The following sections outline the general procedures for emergencies. Emergency information should be posted as appropriate.

14.1 EMERGENCY CONTACTS

Fire:	911
Police:	911
Ambulance:	911
Hospital:	DeGraff Memorial Hospital 445 Tremont Street North Tonawanda, New York Telephone: 716-690-2111

Directions to the Hospital: From the Site, travel south on River Road to Wheatfield Street. Turn left and proceed to the Twin City Memorial Highway, Route 425 South. Turn right and proceed four blocks to Tremont Street. Turn right. The hospital is on the left. A map with the route to the hospital is presented on Figure E.14.1.

14.2 ADDITIONAL EMERGENCY NUMBERS

National Response Center (NRC):	800-424-8802
Agency for Toxic Substances and Disease Registry:	404-488-4100
Chemtrec:	400-424-9300
Poison Control Center:	716-878-7654
Niagara County Health Department:	716-284-3124
EPA Project Manager (Mike Negrelli):	212-637-4278
City of North Tonawanda (Dale Marshall):	716-695-8565
Town of Wheatfield (Timothy Demler):	716-438-3471

Utilities:

Underground Locates:	716-893-1133
Niagara Mohawk - Trouble:	716-285-9311
New York Telephone - Repair Service:	716-282-9061
National Fuel Gas Emergency:	716-283-6915
New York State Power Authority (NYSPA):	716-285-3211

14.3 EMERGENCY EQUIPMENT AVAILABLE ON SITE

The following emergency equipment will be required at the Site:

i) OSHA approved first-aid kit;
ii) one 20-pound ABC-type dry chemical fire extinguisher;
iii) a cellular phone; and
iv) a portable emergency eyewash.

14.4 MEDICAL EMERGENCIES

Any person who becomes ill or injured in the EZ must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed as much as possible without causing further harm to the patient. First aid should be administered while awaiting an ambulance or paramedics. Any person transporting an injured/exposed person to a clinic or hospital for treatment should take directions to the hospital and a copy of the compounds of concern to which they may have been exposed.

14.5 FIRE OR EXPLOSION

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, OM&M personnel will advise the fire commander of the location, nature, and identification of the hazardous materials on Site.

If it is safe to do so, OM&M personnel may :

i) use fire fighting equipment available on Site; or

ii) remove or isolate flammable or other hazardous materials which may contribute to the fire.

14.6 SPILLS OR LEAKS

In the event of a spill or leak, OM&M personnel will:

i) report minor off-Site spills and releases to the Project Managers;

ii) report major off-Site spills and releases to the NRC and DEC (emergency management);

iii) locate the source of the spillage and stop the flow if it can be done safely; and

iv) begin containment and recovery of the spilled materials.

TABLE E.2.1

CHARACTERIZATION OF INDUSTRIAL WASTE REPORTED TO HAVE BEEN DISPOSED AT THE SITE NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Empty containers
Abrasive grain
Scrap resins
Heat treatment salts
Plating tank sludge
Clay, fly ash
Thiazole polymer blends
Iron catalyst salts
Accelerator sewer pumps
PVC floor sweepings, skins
Emulsion berries
Off-grade polyvinyl alcohol
Oil and grease drippings
Phenolic resin
Graphite
Lime sludge
Brine sludge (with mercury)
Hypo mud
Fumed silica
Zircon, Zirconia sludge
Paper bags, (metal dusts)
Flint pebbles
Flint drums
Steel drums
Bricks
Rags
Paper
Wood
Trash/rubbish

Notes:

a) The above table indicates the characterization of the suspected wastes that have been disposed at the Site from available records and may not be exhaustive and representative of the conditions at the Site.
b) Over 100 generators disposed their wastes at the Site.
c) Over 12,000 tons have been classified as hazardous (source: "Community Right To Know", prepared by DEC, April 1, 1985).
d) Total estimated wastes disposed at Site - 0.75 to 1 million tons.
e) Approximate waste composition by weight based on 1972 quantities:

Household	38%
Industrial	33%
Commerical	27%
Institutional	1%
Other	1%

Source: "Operating Plan for Site", prepared by "Krehbiel-Guay-Rugg-Hall", October 5, 1973.
Source: "Remedial Action Master Plan", prepared by Camp Dresser McKee Inc. and others, January 5, 1983.

TABLE E.2.2

MAXIMUM CONCENTRATION OF SITE SPECIFIC COMPOUNDS OF CONCERN IN SOIL AND GROUNDWATER NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Compound	*Maximum Soil Concentration*	Maximum On-Site Groundwater Concentration(1)
Volatile Organic Compounds		
Acetone	100J ug/kg	2.4 ug/L
Benzene	3J ug/kg	38 ug/L
Methylene chloride	73 ug/kg	620 ug/L
Styrene	39J ug/kg	25 ug/L
Trichoroethylene	32 ug/kg	22 ug/L
Vinyl chloride	240 ug/kg	ND
Semi-Volatile Organic Compounds		
Benzo(a)anthracene	210J ug/kg	ND
Benzo(a)pyrene	250J ug/kg	ND
bis-2-Ethylhexylphthalate	3,900 ug/kg	0.3 ug/L
Dibenzofuran	ND	4.1 ug/L
1,4-Dichlorobenzene	ND	10 ug/L
4-Methylphenol	68J ug/kg	1.300 ug/L
Naphthalene	43J ug/kg	1.2 ug/L
Phenanthrene	180J ug/kg	ND
Phenol	4,300 ug/kg	81, 000 ug/L
Pesticides		
Aldrin	2 ug/kg	ND
delta-BHC	5.4 ug/kg	ND
4,4'-DDE	28 ug/kg	ND
4,4'-DDT	77 ug/kg	ND
Dieldrin	2.4 ug/kg	ND
Heptachlor epoxide	3.1 ug/kg	ND
Inorganics		
Aluminum	27,800 mg/kg	22,000 ug/L
Antimony	20 mg/kg	ND
Arsenic	28 mg/kg	6.3 ug/L
Barium	280 mg/kg	430 ug/L
Beryllium	1.3 mg/kg	ND
Cadmium	2.1 mg/kg	5.6 ug/L
Cobalt	18 mg/kg	29 ug/L
Copper	39 mg/kg	75 ug/L
Iron	69,000 mg/kg	430,000 ug/L
Lead	250J mg/kg	210 ug/L
Manganese	1,300 mg/kg	8,000 ug/L
Mercury	1.1 mg/kg	0.16 ug/L
Nickel	35 mg/kg	700 ug/L
Vanadium	49 mg/kg	43 ug/L
Zinc	310 mg/kg	25,000 ug/L

Notes:

(1)	Maximum of composite from wells East A, East B, and East C and composite from test pits TP-2 and TP-24A.
J	Estimated value.
ND	Compound not detected.

TABLE E.2.3

EXPOSURE ROUTES AND EXPOSURE LEVELS FOR THE CHEMICAL COMPOUNDS OF CONCERN NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Chemical Compound	*Ionization Potential*	*Exposure Routes*	*Acceptable Exposure Levels in Air*
Benzene	9.2	Inhalation, Ingestion Skin Absorption, Human Carcinogen	0.5 ppm (1) 1 ppm (2) 5 ppm (4) 500 ppm (3)
Trichloroethene	9.5	Inhalation, Ingestion	50 ppm (1) 100 ppm (2) 1000 ppm (3) 300 ppm (5)
Methylene chloride	11.3	Inhalation, Ingetion Animal Carcinogen	50 ppm (1) 25 ppm (2) 2300 ppm (3)
Vinyl chloride	10	Inhalation, Ingestion Human Carcinogen	5 ppm (1) 1 ppm (2)
Styrene	8.5	Inhalation, Ingestion	20 ppm (1) 100 ppm (2) 700 ppm (3) 600 ppm (5)
Acetone	9.7	Inhalation, Ingestion	50 ppm (1) 1000 ppm (2) 2500 ppm (3)
Aldrin	NA	Inhalation, Ingestion Skin Absorption, Animal Carcinogen	0.25 mg/m^3 (1) 0.25 mg/m^3 (2) 25 mg/m^3 (3)
Benzo(a)Anthracene	NA	Inhalation, Ingestion	NE
Delta BHC	NA	Inhalation, Ingestion	NE
4,4-DDE	NA	Inhalation, Ingestion	NE
4,4-DDT	NA	Inhalation, Ingestion Skin Absorbtion	1 mg/m^3 (1)
Dibenzofuran	NA	Inhalation, Ingestion	NE
1,4-Dichlorobenzene	9	Inhalation, Ingestion Animal Carcinogen	60 mg/m^3 (1) 450 mg/m^3 (2) 150 mg/m^3 (3)
Dieldrin	NA	Inhalation, Ingestion Skin Absorbtion	0.25 mg/m^3 (1) 0.25 mg/m^3 (2) 50 mg/m^3 (3)

TABLE E.2.3

EXPOSURE ROUTES AND EXPOSURE LEVELS FOR THE CHEMICAL COMPOUNDS OF CONCERN NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Chemical Compound	*Ionization Potential*	*Exposure Routes*	*Acceptable Exposure Levels in Air*
Heptachlor Epoxide	NA	Inhalation, Ingestion, Skin Absorption Animal Carcinogen	0.05 mg/m^3 (1) 0.5 mg/m^3 (2) 35 mg/m^3 (3)
4 Methyl phenol	8.5	Inhalation, Ingestion, Skin Absorption	22 mg/m^3 (1) 22 mg/m^3 (2) 250 mg/m^3 (3)
Naphthalene	NA	Inhalation, Ingestion	52 mg/m^3 (1) 50 mg/m^3 (2) 250 mg/m^3 (3)
Phenanthrene	NA	Inhalation, Ingestion	NE
Phenol	8.7	Inhalation, Ingestion, Skin Absorption	19 mg/m^3 (1) 19 mg/m^3 (2) 250 mg/m^3 (3)
Bis(2-Ethylhexyl)Phthalate	NA	Inhalation, Ingestion	NE
Benzo (a) Pyrene	NA	Inhalation, Ingestion Suspected Human Carcinogen	0.2 mg/m^3 (2)
Manganese	NA	Inhalation, Ingestion	0.2 mg/m^3 (1) 5 mg/m^3 (4) 500 mg/m^3 (3)
Antimony	NA	Inhalation, Ingestion	0.5 mg/m^3 (1) 0.5 mg/m^3 (2) 50 mg/m^3 (3)
Lead	NA	Inhalation, Ingestion Animal Carcinogen	0.05 mg/m^3 (1) 0.05 mg/m^3 (2) 100 mg/m^3 (3)
Arsenic	NA	Inhalation, Ingestion Human Carcinogen	0.01 mg/m^3 (1) 0.01 mg/m^3 (2) 10 mg/m^3 (3)
Cadmium	NA	Inhalation, Ingestion Suspected Human Carcinogen	0.01 mg/m^3 (1) 0.005 mg/m^3 (2) 9 mg/m^3 (3)
Aluminum	NA	Inhalation, Ingestion	10 mg/m^3 (1) 15 mg/m^3 (2)
Nickel	NA	Inhalation, Ingestion	1 mg/m^3 (1) 1 mg/m^3 (2) 10 mg/m^3 (3)

TABLE E.2.3

EXPOSURE ROUTES AND EXPOSURE LEVELS FOR THE CHEMICAL COMPOUNDS OF CONCERN NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Chemical Compound	*Ionization Potential*	*Exposure Routes*	*Acceptable Exposure Levels in Air*
Barium	NA	Inhalation, Ingestion	NE
Beryllium	NA	Inhalation, Ingestion	0.5 mg/m^3 (1) 0.5 mg/m^3 (2) 50 mg/m^3 (3)
Cobalt	NA	Inhalation, Ingestion Animal Carcinogen	0.02 mg/m^3 (1) 0.1 mg/m^3 (2) 20 mg/m^3 (3)
Copper	NA	Inhalation, Ingestion	1 mg/m^3 (1) 1 mg/m^3 (2) 100 mg/m^3 (3)
Vanadium	NA	Inhalation, Ingestion	NE
Zinc	NA	Inhalation, Ingestion	NE
Mercury	NA	Inhalation, Ingestion Skin Absorption	0.025 mg/m^3 (1) 0.1 mg/m^3 (4) 10 mg/m^3 (3)
Iron	NA	Inhalation, Ingestion	NE

Notes:

(1)	1999-2000 Values, American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs).
(2)	Federal Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL).
(3)	Immediately Dangerous to Life and Health (IDLH).
(4)	Federal OSHA 15 minute ceiling standard.
(5)	Federal OSHA 5 minute exposure limit.
mg/m^3	Milligrams per Cubic Meter.
NA	Not Applicable
NE	Not Established
ppm	Parts Per Million.

TABLE E.6.1

SPECIFIC PERSONAL PROTECTION LEVELS
NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Work Task	*Maximum Protection Level*[(1)]	*Alternate Protection Level*[(2)]
Mobilization and Demobilization of Labor, Materials, and Equipment to and from the Site.	Modified D	D
Inspection of the Site including Security Fencing and the Landfill Cap.	D	D
Maintenance of Leachate Collection System.	Level C	Modified D
Groundwater Monitoring Activities.	Level C	Modified D
Grass Cutting Activities.	D	D
Decontamination Activities.	Level C	Modified D

Notes:

Specific requirements for protection levels are detailed in Section 6.1.

(1) Level C: To be worn when the criterion for using air purifying respirators (APRs) are met and a lesser level of skin protection is needed.

Modified D: To be worn when dermal protection is required, however, no respiratory hazards are present. It provides minimal protection against chemical hazards.

(2) Alternate protection levels will be used if monitoring indicates that conditions are appropriate or the HSO determines that there is a reduced potential of exposure.

TABLE E.7.1

ANTICIPATED HAZARDS/RISKS AND APPROPRIATE PRECAUTIONS NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Activity	*Anticipated Hazards/Risk*	*Appropriate Precautions*
1. Mobilization and Demobilization Activities, Inspection of the Site, including Security Fencing and the Landfill Cap and Grass Cutting.	• slip/trip/fall hazards • potential back injuries from lifting heavy objects • potential heat or cold stress • severe weather • electrical hazards from power source • moving or backing vehicles • cuts to hands from working with sharp objects or fencing materials	• Modified D or Level D personal protection • practice safe lifting techniques • participate in on-Site training programs • practice good personal hygiene principles • use a spotter around moving or backing equipment • work activities will be reduced or suspended during severe weather conditions • ground fault circuit interrupters (GFCIs) should be used to reduce the hazard of electrical shock. Do not stand in water when handling equipment. Electrical equipment will be approved. • keep first aid supplies readily available • wear leather gloves when working with sharp objects

TABLE E.7.1

ANTICIPATED HAZARDS/RISKS AND APPROPRIATE PRECAUTIONS
NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Activity	*Anticipated Hazards/Risk*	*Appropriate Precautions*
2. Maintenance of Leachate Collection System, Groundwater Monitoring Activities and Decontamination Activities	• slip/trip/fall hazards • potential back injuries from lifting heavy objects • potential heat or cold stress • severe weather • electrical hazards from power sources • moving or backing vehicles and equipment • personnel injuries from sharp objects, falling debris, or pinch points • direct contact with potentially contaminated soils, sediment, leachate and groundwater • hazards presented by the use of heavy equipment • overhead and underground hazards (i.e., electrical lines, gas, or water lines) • potential burns from hot equipment • hazards presented by the use of specialized equipment (e.g., decontamination equipment) • hazards presented by entry into a confined space (i.e., oxygen deficient, working in small tight areas, and falling overhead objects) • reduced field of vision from wearing full-face respirators	• Level C, Modified D, and Level D based on realtime air monitoring or establishing protection levels (see Table E.6.1) • practice safe lifting techniques • participate in all on-Site training programs • be trained with all appropriate equipment SOPs • wear leather gloves when working with sharp objects • practice good personal hygiene principles • take proper precautions in unsafe areas • use the "Buddy System" • perform an underground utilities location search • only essential personnel allowed in work areas • if performing confined space entry work, follow the approved program, and ensure that workers have participated in a training program • use a spotter around moving or backing equipment • identify all high temperature objects or equipment

TABLE E.7.1

ANTICIPATED HAZARDS/RISKS AND APPROPRIATE PRECAUTIONS NIAGARA COUNTY REFUSE SITE, WHEATFIELD, NEW YORK

Activity	*Anticipated Hazards/Risk*	*Appropriate Precautions*
		• work activities will be reduced or suspended during severe weather conditions • GFCIs should be used to reduce the hazard of electrical shock. Do not stand in water when handling equipment. Electrical equipment will be approved. • keep first aid supplies readily available.

ATTACHMENT E1

TRAINING ACKNOWLEDGMENT FORM

TRAINING ACKNOWLEDGMENT FORM

Please Print:

NAME: ____________________

ADDRESS: ____________________

SOCIAL SECURITY NUMBER: ____________________

EMPLOYER: ____________________

JOB SITE:
Niagara County Refuse Site
Wheatfield, New York

Please place an X in and write your initials below the appropriate box(es).

☐ I have attended and understood the mandatory Site-specific initiation session for the above referenced job site. This program referenced the following topics:

i) known potential hazards on-Site;

ii) level of personal protection equipment required;

iii) emergency procedures for the Site; and

iv) the basics of the Site-specific Health and Safety Contingency Plan.

☐ I further confirm that I have the required 40 hours of training to comply with 29 CFR 1910.120, have a respirator for which I have been fit tested and have been thoroughly trained on the standard operating procedures of equipment I will be operating or procedures (e.g., confined space) which I will be participating in. Personnel not meeting these requirements will not be allowed to participate in water sampling and/or handling activities, confined space entry, collection drain system and/or forcemain system cleaning or repair, cap repair (beneath the liner), and/or liner repair.

____________________ (Date)

____________________ (Signature)

FORM 19

TRAINING ACKNOWLEDGEMENT FORM

I have read and understand the HASP and/or I have attended the mandatory Site-specific initiation session and understand the information presented in the HASP. I fully understand the known potential hazards present on Site, the required levels of PPE to complete my work, and the emergency procedures for the Site. I further confirm that I have the required training to participate in the OM&M activities that I will be involved with. I agree to work in accordance with the guidelines presented in the HASP and I understand that failure to do so could result in removal from the Site.

Date	*Printed Name*	*Signature*	*Company*

ATTACHMENT E2

DAILY SAFETY MEETING LOG

DAILY SAFETY MEETING LOG

PROJECT: ____________________ LOCATION: ____________________

DATE/TIME: ____________________

1. Safety Issues or Topics Discussed:

2. Work Summary and Physical/Chemical Hazards of Concern:

3. Protective Equipment/Procedures:

4. Emergency Procedure:

5. Signatures of Attendees:

ATTACHMENT E3

CONFINED SPACE MEMORANDUM

CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive
Waterloo, Ontario, Canada N2V 1C2

TELEPHONE: (519) 884-0510 (Colby Office)
(519) 725-3313 (Bathurst Office)
FACSIMILE: (519) 884-0525

MEMORANDUM

TO: Jim Cowe – Parsons Engineering Science, Inc.
REF. NO.: 5723
FROM: Rick Hoekstra/crh/12
DATE: October 8, 1999
RE: **Wet Well Confined Space Entry**

A conference call was convened on September 23, 1999 to discuss the status of the wet well chambers with respect to confined space entry requirements. The purpose of the conference call was for Parsons and CRA to clarify the confined space issues raised by the site safety audit performed by Parsons on August 31, 1999 and to reach a consensus for presentation to Niagara County. The participants on the conference call were as follows: Jim Kyles / Jim Cowe / Brian Powell (Parsons) and Rick Hoekstra / Craig Gebhardt (CRA).

The wet well chambers are all constructed with platforms installed to a depth of 3'-10" below the top of the chambers. The chambers are all considered confined spaces in their totality, however the intended purpose of the platforms were to allow access to these chambers to the depth of the platforms for routine monitoring and minor maintenance activities without requiring confined space permitting. The discussion focused on whether the wet well spaces above the platforms met the definition of a confined space in accordance with OSHA Regulations (29 CFR Part 1910.146). The OSHA definition of a "confined space" means that: (1) the space is large enough and so configured that a worker can bodily enter and perform assigned work; (2) the space has limited or restricted means for entry/exit; and (3) the space is not designed for continuous worker occupancy. The wet wells meet the definition of a confined space for conditions 1 and 3, but the definition of limited means of entry/exit (condition 2) can be interpretative. There are ladder rungs down to the platform, which provide entry/exit that should not be limiting to workers.

Thereafter, the conference call proceeded to discuss how to present the results/consensus of the call to Niagara County. It was acknowledged by all that our interpretation of potentially not being a confined space because of failing the definition for limited entry/exit may not be how an OSHA field inspector would judge these chambers sometime in the future. During the conference call, it was mentioned that photographic documentation could be taken to the regional OSHA office to request their interpretation of whether activities conducted on the platform would be considered confined space entry work. During the next construction meeting (September 27th), Mr. Richard Pope requested that the regional OSHA office be approached via telephone first.

On Monday, October 4, 1999, Craig Gebhardt (CRA) placed a telephone call to the regional office of the Occupational Safety and Health Administration within the Department of Labor in Buffalo, New York. Craig spoke with the officer on duty (Ms. Kim Mielonen, a Safety Compliance Specialist) and verbally described the intended design of the wet well chambers, particularly focusing on the platform elevation being less than 4 feet below the top of each chamber and the use of ladder rungs on the chamber walls to provide worker entry/exit. It was the opinion of the OSHA Safety Compliance Specialist that a chamber constructed to these design criteria would not meet the definition of a confined space, when the platform is in place. It was also indicated that written confirmation of this interpretation could be acquired if visual documentation of the completed wet well chambers was provided to the regional OSHA office, either through submission of construction drawings or photographic evidence or following a site visit by the OSHA Safety Compliance Specialist.

Therefore, the constructed wet well chambers appear to meet CRA's intended design with respect to access to the platforms for routine monitoring and minor maintenance activities without requiring confined space permitting. The designation that access above the platforms does not require a confined space permit does not preclude implementation of the proper entrance procedures, including air monitoring/ventilation and lockout/tagout as necessary, in accordance with the final Operation and Maintenance (O&M) Plan. The designation of the worker space above the platform in each wet well chamber as non-confined space entry does not affect the general status of the entire chamber as a confined space when access below the platform is required for major maintenance work. The chambers should be labeled as confined spaces and properly locked to ensure entry by only properly authorized and trained personnel and the final O&M plan should clarify that non-confined space access is allowed above the platform only.

APPENDIX F

STANDARD FORMS

LIST OF STANDARD FORMS

FORM 1	MONTHLY INSPECTION LOG
FORM 2	MAINTENANCE RECORD LOG
FORM 3	ANNUAL OPERATION MAINTENANCE AND MONITORING REPORT

MONTHLY INSPECTION LOG

PROJECT NAME: Niagara County Refuse Site

LOCATION: Wheatfield, New York

DATE: __ __ __ (MM DD YY)

INSPECTOR(S): ____________________

	Item	Inspect For	Action Required	Comments
1.	**Perimeter Collection System/Off-Site Forcemain**			
☐	Manholes	- cover on securely		
☐		- condition of cover		
☐		- condition of inside of manhole		
☐		- flow conditions		
☐	Wet Wells	- cover on securely		
☐		- condition of cover		
☐		- condition of inside of wet well		
2.	**Landfill Cap**			
☐	Vegetated Soil Cover	- erosion		
☐		- bare areas		
☐		- washouts		
☐		- leachate seeps		
☐		- length of vegetation		
☐		- dead/dying vegetation		

FORM 1

MONTHLY INSPECTION LOG

PROJECT NAME: Niagara County Refuse Site

LOCATION: Wheatfield, New York

DATE: ☐☐☐☐☐☐ (MM DD YY)

INSPECTOR(S): ______________________________

	Item	*Inspect For*	*Action Required*	*Comments*
2.	**Landfill Cap (continued)**			
☐	Access Roads	- bare areas, dead/dying veg.	______	______
☐		- erosion	______	______
☐		- potholes or puddles	______	______
☐		- obstruction	______	______
3.	**Wetlands (Area "F")**	- dead/dying vegetation	______	______
		- change in water budget	______	______
		- general condition of wetlands	______	______
4.	**Other Site Systems**			
☐	Perimeter Fence	- integrity of fence	______	______
☐		- integrity of gates	______	______
☐		- integrity of locks	______	______
☐		- placement and condition of signs	______	______

FORM 1

MONTHLY INSPECTION LOG

PROJECT NAME: Niagara County Refuse Site

LOCATION: Wheatfield, New York

DATE: ☐☐☐☐☐☐ (MM DD YY)

INSPECTOR(S): ______________________

	Item	*Inspect For*	*Action Required*	*Comments*
4.	**Other Site Systems (continued)**			
☐	Drainage Ditches/ Swale Outlets	- sediment build-up	____________	____________
☐		- erosion	____________	____________
☐		- condition of erosion protection	____________	____________
☐		- flow obstructions	____________	____________
☐		- dead/dying vegetation	____________	____________
☐		- cable concrete/gabion mats and riprap	____________	____________
☐	Culverts	- sediment build-up	____________	____________
☐		- erosion	____________	____________
☐		- condition of erosion protection	____________	____________
☐		- flow obstructions	____________	____________
☐	Gas Vents	- intact /damage	____________	____________
☐	Wells	- locks secure	____________	____________

FORM 1

MAINTENANCE RECORD LOG

PROJECT NAME: Niagara County Refuse Site LOCATION: Wheatfield, New York

CREW MEMBERS: ____________________________

1. Date: ☐☐☐☐☐☐ (MM DD YY)

   Time: ☐☐☐☐ (HH mm)

   Scheduled/Unscheduled: ____________________

   Type of Maintenance Performed: ____________________

2. Company Performing Maintenance

   Name: ____________________

   Address: ____________________

   ____

   Contact Name: ____________________

3. Methods Used:

   ____

   ____

   ____

   ____

   ____

   Description of Material Removed:

   ____

   ____

   ____

   ____

   ____

   Problems/Comments:

   ____

   ____

   ____

DATE	INSPECTOR	INSPECTOR'S SIGNATURE

FORM 2

ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT

NIAGARA COUNTY REFUSE SITE
WHEATFIELD, NEW YORK

YEAR: ____________

MONITORING

	Water Levels (Form FP-3)	*Purging/ Sampling (Forms FP-4 & FP-5)*	*Surface Water (Form FP-6)*	*PCS Effluent (Form FP-7)*		*Water Levels (Form FP-3)*	*Purging/ Sampling (Forms FP-4 & FP-5)*	*NAPL Checks (Form FP-6)*	*PCS Effluent (Form FP-7)*
January	☐	☐	☐	☐	July	☐	☐	☐	☐
February	☐	☐	☐	☐	August	☐	☐	☐	☐
March	☐	☐	☐	☐	September	☐	☐	☐	☐
April	☐	☐	☐	☐	October	☐	☐	☐	☐
May	☐	☐	☐	☐	November	☐	☐	☐	☐
June	☐	☐	☐	☐	December	☐	☐	☐	☐

Note: Completed monitoring forms and sample analyses are available for inspection at control building upon written request.

OPERATION

PERIMETER COLLECTION SYSTEM (PCS)

	Flow for Previous Year (gallons)	*Flow for Current Year (gallons)*
WW-1		
WW-2		
WW-3		
WW-4		
Total		

Were pumps off for periods longer than 24 hours?

	YES	NO
WW A	☐	☐
WW B	☐	☐
WW C	☐	☐
WW D	☐	☐

If pumps were off for periods longer than 24 hours, explain why.

____

____

____

____

____

FORM 3

ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT

NIAGARA COUNTY REFUSE SITE
WHEATFIELD, NEW YORK

INSPECTION AND MAINTENANCE

Scheduled inspections performed?

	YES	NO		YES	NO
January	☐	☐	July	☐	☐
February	☐	☐	August	☐	☐
March	☐	☐	September	☐	☐
April	☐	☐	October	☐	☐
May	☐	☐	November	☐	☐
June	☐	☐	December	☐	☐

Was maintenance required?

	YES	NO		YES	NO
January	☐	☐	July	☐	☐
February	☐	☐	August	☐	☐
March	☐	☐	September	☐	☐
April	☐	☐	October	☐	☐
May	☐	☐	November	☐	☐
June	☐	☐	December	☐	☐

What maintenance was required?

Maintenance Required	Date Scheduled	Date Performed

Attach additional sheets as necessary.

Describe any maintenance activity that required an activity specific work plan and health and safety plan.

____

____

____

____

____

____

FORM 3

ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT

NIAGARA COUNTY REFUSE SITE

WHEATFIELD, NEW YORK

SYSTEM IMPROVEMENTS

What RA system modifications were made in the past year?

What improvements could be made to the RA system to reduce future maintenance requirements?

ADDITIONAL COMMENTS

Form Completed By:

NAME SIGNATURE DATE

FORM 3

ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT

NIAGARA COUNTY REFUSE SITE

WHEATFIELD, NEW YORK

Send completed copies of this form to the following for review:

After review is complete, send a copy to the following:

FORM 3