OCCIDENTAL CHEMICAL CORPORATION
OLIN CORPORATION

POST CLOSURE OPERATION AND MAINTENANCE MANUAL

102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

September 9, 1995

FLUOR DANIEL, INC.
MARLTON, NEW JERSEY

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1.0 INTRODUCTION

The Post-Closure Operation and Maintenance Plan (O&M Plan) describes the major components of the program and provides maintenance/inspection schedules, checklists, and descriptions of specific tasks. Manufacturers literature, operating instructions, and spare parts lists will be incorporated in this O&M Plan after receipt from the vendors. A Final O&M Plan will be submitted to EPA and NYSDEC for their approval prior to completion of the RA.

The purpose of the O&M Plan is to provide a program to verify that the containment and monitoring systems are functioning as expected and designed, and to insure that the integrity of the remedial action is maintained over time. Each of the principal components are discussed by section below.

1.1 SITE DESCRIPTION

The Site covers approximately 22.1 acres and is located in Niagara Falls, Niagara County, New York. It consists of two separate properties owned, by OxyChem and Olin plus contiguous and related areas as defined in the September 1990 Record of Decision (ROD) as amended on June 9, 1995. The OxyChem/Olin property is bordered on the south by the Niagara River, on the north by Buffalo Avenue, on the west by Griffon Park, and on the east by privately owned land which is known as the Belden site. The Site as defined for the purpose of this remediation also includes the areas immediately adjacent to the east and to the west, and the adjoining river sediments.

The ROD components covered under this plan include O&M of following:

- cap with a combined compacted soil layer with a synthetic liner;
- slurry wall;
- recovery and treatment of aqueous phase liquids (APL);
- recovery and treatment of non-aqueous phase liquids (NAPL);
- monitoring of post-remedial action;
- restriction of access; and
- institutional controls.

1.2 SCOPE

After the final visual inspection of the RA at the site and submittal of the Remedial Action Report, the O&M Plan will be initiated. The post-closure care and monitoring will be performed for 30 years. At the end of 5 years, this program will be re-evaluated and modified, if necessary.

The manual specifically addresses the major components of the operations and maintenance program as follows:

i) APL collection;
ii) NAPL collection;
iii) loadout facility;
iv) cap subdrain collection;
v) soil and vegetative cover;
vi) run-on and run-off controls;
vii) groundwater level monitoring; and
viii) groundwater sampling and analysis.

During operations, inspections will be performed periodically according to schedule to ensure that erosion or weather related damage has not compromised the integrity of the cap, berms, channels, site features or containment systems.

Institutional controls on the property will also be established within the first year after remediation is complete. The controls will provide the basis for future land uses of the property.

This O&M Plan is consistent with maintenance program requirements per 40 CFR 264.310, to insure the continued integrity and effectiveness of the containment systems.

All provisions of the site Health and Safety Plan (HASP) that are applicable to the operations, maintenance, monitoring and sampling activities will be followed. This includes safety meetings pertinent to the specific activities conducted at a given time. OSHA training as per 29 CFR 1910.120 will be required for specific tasks as outlined in the HASP. Post-closure sampling procedures are presented below, and will serve as the Sampling and Testing Plan (SATP). Provisions of the site

Quality Assurance Project Plan Addendum (QAPP), Appendix E that are applicable to the operations, maintenance, monitoring and sampling activities will be followed.

Roles and responsibilities are presented below:

Project Manager

The Project Manager will have overall responsibility for the long-term O&M for the site and provide reports to the EPA and NYSDEC. The Project Manager will have the responsibility for and the decision-making authority to perform the following activities:

- Provide technical direction and oversight for the project;
- Solicit technical advice, as needed;
- Ensure availability of O&M resources to meet project objectives;
- Review technical work and, if needed, modify the technical program to ensure quality and completeness of the work;
- Perform those duties outlined in the Safety Health and Emergency Response Plan;
- Resolve potential conflicts; and
- Assign staff as needed.

Site Manager

The Site Manager will be dedicated full time to the project, will report to the Project Manager, and will be responsible for the following activities:

- Coordination of on-site O&M, sampling, monitoring and reporting activities, including all facets of scheduling and planning for work items;
- Procurement, with administration personnel, and supervision of subcontract services;
- Assignment of duties to the site project worker(s) and orientation of these worker(s) to the needs and requirements of the project;
- Performance of those duties outlined in the Safety Health and Emergency Response Plan; and
- Review of project-specific field procedures and internally prepared plans, drawings, and reports.

2.0 APL COLLECTION SYSTEM

An APL collection system (Figure 2-1) has been installed to create and maintain an inward gradient across the perimeter slurry wall. The inward gradient will be created and maintained by pumping APL from four (4) wet wells installed in the APL collection trench. Once the inward gradient is established, pumping rate will be adjusted to ensure that inward gradients, as determined from the difference between water levels in paired monitoring wells and piezometers, are maintained.

2.1 PROCESS AND FACILITIES DESCRIPTION

The APL collection system consists of an approximately 2300-foot long APL collection trench, four wet wells, loadout facility, and associated piping, pumps and controls.

The inward gradient across the perimeter slurry wall will be achieved and maintained by reducing the static groundwater level in the area contained by the perimeter slurry wall to approximately one-foot below, (562.6 feet MSL), the Niagara River elevation and the natural groundwater levels outside the perimeter slurry wall. The average river elevation is 563.6 feet above mean sea level (MSL). Fluctuations are temporary, based on local control of water, and are not significant for this program (Table 6, Milestone Report No.8).

The system components include:

- Collection trench,
- 4 wet wells & pumps,
- Forcemain,
- Two (2) 10,000 gallon APL storage tanks and transfer pump,
- Sump pump,
- Remote monitoring of loadout facility status at an OxyChem facility, and
- Controls/Instrumentation.

The location and construction details of APL collection system is shown on Drawings 594000-30K-01 through 594000-30K-08 and process information is provided on Drawings 594000-25J-01 and 594000-25J-02. The forcemain consists of 1.5 inch carrier pipe and 3.5 inch container pipe and associated valves and in-line cleanouts.

A loadout facility has been constructed on-site for storage of APL, until APL can be transported off-site for treatment and disposal.

2.2 OPERATION AND MAINTENANCE

APL will be recovered by the APL pumps located in each of four wet wells. The recovered APL will be pumped, via the forcemain, to the two 10,000 gallon APL storage tanks located at the loadout facility. A 5000-gallon tanker will load APL on a frequency sufficient to maintain the APL storage tanks at less than 80 percent capacity. The operator will transfer APL from the storage tanks to the 5000-gallon tanker truck by connecting a flexible hose to the discharge line of the APL transfer pump. When the level in the APL storage tanks is at only one percent, APL transfer pump P-206, will be automatically shut off. APL is then taken to the OxyChem Buffalo Avenue wastewater treatment facility. The volume of APL transferred is manually read from the flow totalizer, FQI-5. Upon completion of the transfer, the power to the APL pumps will be restored and APL recovery will continue.

In the event that the two 10,000 gallon APL storage tanks reach 80 percent capacity prior to the arrival of the transfer tanker, a remote message will also be sent to provide notification on the status of the APL storage tanks. The tanker will be sent immediately to the storage tanks to bring the quality below 80 percent capacity. Should the APL storage tanks become full, an automated cut off of the power supply to all the APL wet well pumps.

Individual APL pumps will be operated on automatic level control. Individual APL pumps will be turned off automatically if the water level in the wet well is below the low level probe in the well. When the water level rises above the high level probe, power to the APL pump will be restored automatically.

2.2.1 Startup Operation

Initially, groundwater levels within the encapsulated landfill area will be lowered to 562.6 feet to create an inward gradient. This will be achieved by pumping up to 20,000 gallons per day, 24 hours a day, 5 days a week. Inward gradients should first be created in about six months of operation. Approximately 20,000 gallons of APL will be transported to an off-site treatment facility on each working day during first six months. Once inward gradients are created, inward

gradients will be maintained by pumping APL as needed. The estimated pumping rate at the steady state groundwater levels is 400 gallons per day or 3,000 gallons per week.

Individual pump flow rates, flow totalizers, and APL levels in the wets wells will be recorded whenever water levels in the piezometers and the monitoring wells are recorded. Total flow and flow rate data in conjunction with the groundwater levels will be used to adjust individual pumping rate to minimize pump cycling and ensure that water level declines uniformly throughout the landfill.

2.2.2 Controls/Instrumentation Summary

APL storage tank @ 80 %	Message via a remote telephone dialer
APL storage tank @ 95 %	Cut off power to all 4 APL wet well pumps. Power needs to be restored manually after transferring APL from APL storage tanks to tanker trucks.
APL storage tank @ 1 %	Automatically shut off APL transfer pump
APL wet well water level below the low level probe	APL wet well pump will be automatically shut off
APL wet wells water level rises above the high level probe	APL wet well pumps will be automatically turned on to maintain water levels at a pre-set level

2.2.3 APL Transfer

A tanker truck will transfer APL from the loadout facility to the OxyChem Buffalo Avenue plant for treatment and discharge. The OxyChem Buffalo Avenue facility consists of an activated carbon treatment system that discharges to the City of Niagara Falls sanitary sewer system. OxyChem has obtained approval from the Waste Water Treatment Facility for addition of the treated APL from the 102nd Street Landfill Site. OxyChem will continue to monitor the effluent of the Buffalo Avenue facility per the city permit.

2.3 PREVENTATIVE MAINTENANCE AND PROBLEM IDENTIFICATION/CORRECTION

INSPECTION/CONCERN	ACTION
Piping Leakage - Perform periodic visual inspection of in-line cleanouts and exposed piping.	Contain and recover APL. Repair or replace leaking pipe.
Storage Tank Spill or Leakage - Perform visual inspection of tank and piping. Electronic measurement of tank levels.	Contain and recover APL. Repair or replace leaking or malfunctioning components.
Transfer Pump Failure - Visual inspection.	Repair or replace pump.
APL Wet Well Pump Failure - Visual inspection (monthly initially and quarterly thereafter). Electronic measurement of wet well APL levels and flow rates.	Ensure that power to the pump is not off. Try to run pump in manual mode. if not successful or not enough flow is produced, clean, repair or replace pump.
Frequent Pump Restarts - Visual inspection (monthly initially and quarterly thereafter). Flow rate and flow totalizer measurements.	Reduce pumping rate or increase distance between low and high level probes.
Wet Well Incrustation or Clogging - Visual inspection. Electronic measurement of wet well APL levels and flow rates, and piezometer and monitor well levels.	Affect repair or rehabilitation on wet well components.

An inventory of spare equipment will be maintained to complete timely repairs of system components.

Manufacturer's operation and maintenance manuals for equipment are presented in Appendix B.

3.0 NAPL COLLECTION SYSTEM

3.1 PROCESS AND FACILITIES DESCRIPTION

The purpose of the NAPL collection system is to recover NAPL through a well network and manage the NAPL for treatment/disposal. NAPL at the Site will be recovered using ten (10) dedicated extraction wells, and the recovered NAPL will be transported off-site for incineration at OxyChem's Buffalo Avenue incinerator facility or another permitted facility. After the extraction wells have been installed and are operational, and a representative amount of NAPL (approximately 50 gallons) has been recovered from the wells, it will be characterized to provide the required analytical data to meet the requirements of the RCRA permit (EPA I.D. No. NYD000824482) and New York State Part 373 (I.D. No. 90-86-0707), of the incinerator facility. After the characterization has been approved, full operation of the NAPL recovery system will commence.

The principal components include:

- 10 recovery wells
- 10 well pumps and probes
- Mobile gasoline-powered generator and AC-to-DC transformer
- Controls/Instrumentation
- Mobil NAPL collection drum (e.g. 55-gallon)

The location and construction details of the NAPL recovery system is shown on Drawings 594000-30K-01 through 594000-30K-06, 594000-25J-01, and 594000-25J-03.

3.2 OPERATION AND MAINTENANCE

3.2.1 Operation of NAPL Collection System

Upon completion of Remedial Construction activities at the Site, the NAPL recovery wells will be pumped individually monthly for three months to determine the amount of NAPL that can be pumped from each and the rate of recharge to the wells. This information will be used to finalize the pumping schedule for the wells. Based on results of the NAPL recovery tests

conducted at NR-05 (NAPL Recovery Well Testing Program, 1995), pumping frequencies of once a month for the first 3 months and then once every three to six months are anticipated.

At each well the mobile collection system will be parked adjacent to the well and the oil/water interface probe installed in the NAPL recovery well will be used to determine the presence and thickness of the NAPL in the well. If NAPL level is above the pump intake, the submersible pump discharge line (0.25-inch ID tube) will be connected to the flexible double walled tube by means of a quick-connect adapter. The electrical leads from the submersible NAPL pump will be connected to the AC-to-DC transformer. The generator will be started and NAPL recovery will commence. To minimize the volume of the APL extracted along with the NAPL, the operator will watch the discharge to the NAPL collection tank, and when APL is detected in the discharge line, operator will manually turn the NAPL pump off. The oil/water interface probe will be used to verify that the NAPL level is below the pump intake. Then, the double walled discharge tubing and electrical power to the NAPL recovery pump will be disconnected at the wellhead and the mobile unit moved to the next well.

Actual recharge rates will vary with the locations for the extraction wells, though the extent is not known. Actual recharge rates must be confirmed after installation of the extraction wells to finalize the recovery schedule. Recharge rate of one (1) to ten (10) gallons per months for the first three months and zero (0) to five (5) gallons per quarter to six months is anticipated.

3.2.2 Mobile Collection System

The mobile extraction/collection unit will consist of a gasoline-powered generator, an AC-to-DC transformer, and a 55-gallon drum lined with a polyethylene drum liner plus the necessary valves and double walled flexible piping. The collection system will be mounted on a small skid or capable of being mounted on the flatbed of a pickup truck.

The flatbed or pickup truck will be stored, between pumping events, at the OxyChem's Buffalo Avenue Facility.

3.2.3 Characterization of NAPL Sample

A composite NAPL sample from the 10 recovery wells will be collected to provide a "representative" sample for analytical testing and characterization for submittal to agency for approval. The sample will be characterized pursuant to EPA RCRA Permit (EPA I.D. No. NYD000824482) and New York State Part 373 (I.D. No. 90-86-0707), which contain approval for OxyChem to incinerate NAPL from the 102nd Street Landfill Site. Laboratory analysis will be performed, as required by the permit.

3.3 PREVENTATIVE MAINTENANCE AND PROBLEM IDENTIFICATION/CORRECTION

INSPECTION/CONCERN	ACTION
Recovery wells will be monitored for encrustation or clogging of the screens during the NAPL recovery program.	Technique to further development the well or dislodge fines include use of jetting and surge block.
Leaking APL or NAPL at recovery well.	APL or NAPL will be contained and recovered. Transport to loadout facility.

An inventory of spare equipment will be maintained to complete timely repairs of system components.

Manufacturer's operation and maintenance manuals for equipment are presented in Appendix B.

4.0 CAP SUBDRAIN COLLECTION SYSTEM

4.1 PROCESS AND FACILITIES DESIGN

The drainage system will consist of a geonet overlying the geomembrane which is tied into a subsurface drainage collection piping system.

The geonet will act as a drainage layer to convey precipitation, which has percolated through the upper soil layers, quickly away from the geomembrane and into the collection piping system.

A geotextile, consisting of eight-ounce non-woven geotextile, will be placed immediately above the geonet and beneath the select soil cover. The geotextile will prevent the overlying soil cover from piping into the geonet and clogging the drainage system while allowing percolating water to pass into the geonet for conveyance to the water collection system.

4.2 OPERATION AND MAINTENANCE

The subsurface drainage collection piping system consists of four-inch diameter perforated HDPE pipe. The HDPE pipe will be embedded in shallow trenches and backfilled with crushed stone. The collection pipe system will be installed beneath the perimeter drainage swales and beneath the two internal swales that run north to south. The collection pipes beneath the drainage swales will be located above the geomembrane layer. The water collected by the geonet and conveyed to the piping is considered non-hazardous and will be discharged as surface runoff through the bulkhead via the drainage blanket which runs east-to-west, along the southern boundary of the Site. The water will exit the drainage blanket, along its entire length, into and through the riprap embankment of the bulkhead and ultimately into the Niagara River. The inspection frequency will be semi-annually.

5.0 EROSION CONTROL AND SURFACE FEATURES

This section describes the types and frequencies of inspection and maintenance activities for the various erosion control and surficial components of the remediated site. The results of periodic inspections and subsequent maintenance activities will be reported as described herein.

Specific schedules will be prepared for each activity, however most inspection and maintenance activities will be conducted either a semi-annual basis or an annual basis for the first two (2) years.

Erosion control maintenance will include routine vegetation management, subsidence repair, and run-on/run-off control.

5.1 SURFACE FEATURES

Surface features include the vegetative cover, topsoil and cap. This section covers the inspection and maintenance of these components of the remedial facilities. As-built drawings will be attached to this O&M Plan upon completion of construction to aid in these inspection and maintenance activities.

5.1.1 Vegetative Cover

A complete perennial grass cover of the cover and adjacent areas will be maintained. The vegetative cover will be visually inspected periodically for damage to the cover.

The surface will be mowed semi-annually. Mowing will reduce the vegetative cover to approximately 4 inches above the ground elevation. Inspection will be conducted semi-annually and after significant weather events. If the inspections reveal damage to the grass cover, the damaged area will be hydromulched, seeded or sodded. Water and fertilizer will be applied as necessary until the grass is re-established.

5.1.2 Surface Erosion

The cap surface will be inspected periodically for erosion and other surface damage. These inspections will occur after the cap is mowed and at other regularly schedule intervals. The cap

surface will also be inspected after significant flood events. Silt fences will be inspected and maintained as necessary.

Erosion will be repaired by using clean fill material and topsoil to restore the lines and grades of the eroded area. The repaired areas will then be hydromulched, seeded or sodded. Water and fertilizer will be applied as necessary until the grass cover is established. Use of erosion control mats or netting may be evaluated for specific areas based on the frequency and nature of any repairs.

5.1.3 Surface Settlement

General Settlement

The cap surface will be inspected visually semi-annually for signs of ponding or disruption of proper drainage patterns.

Repairs will be made by placing and lightly compacting additional topsoil on the settled area to eliminate ponding and restore efficient drainage. The repaired area will be hydromulched, seeded or sodded. Water and fertilizer will be applied as necessary until the grass cover is established.

Localized Settlement

Localized settlement is defined as deep depressions, greater than 2 feet, developing in small areas of 100 square feet or less. The cap surface will be inspected visually semi-annually for localized settlement. Repairs will be made using the same methods described as for general settlement.

5.2 STORMWATER RUNOFF SYSTEM

The components of the stormwater runoff system include the run-on and run-off ditches, level spreaders, and riprap. This section covers the inspection and maintenance of these facilities.

The stormwater run-off system will be visually inspected semi-annually for operation, sedimentation and obstacles to flow.

Use of alternate erosion control measures may be evaluated based on the frequency and nature of any repairs to the system. Debris which could obstruct the flow through the drainage system will be removed. Damaged components will be replaced or repaired as necessary.

5.3 PREVENTATIVE MAINTENANCE AND PROBLEM IDENTIFICATION/CORRECTION

INSPECTION CONCERN	ACTION
Erosion - Washed out vegetation, topsoil, sand or clay typically on steep slopes. Immediate action should be taken to prevent exposure of underlying soils.	Recover washed out topsoil or materials and restore eroded area. Backfill with soil to match the original cover. Seed with grass mix to match existing conditions. On slopes, cover area with erosion control mat or netting. For areas with severe erosion, placement of riprap or modification channel alignment and/or gradients may be necessary.
Bare Areas - Potential for erosion. Inspect for potential exposure of underlying materials.	Loosen and till topsoil. Reseed and cover with mat or netting.
Depressions or Puddles - Settlement of original cover. May provide undesirable collection point for water.	Till topsoil and grade. Add additional topsoil if necessary. Check final elevation to ensure adequate drainage. F and reseed. Follow remaining actions for bare areas.
Slope Instability - Potential damage to cover system.	Reconstruct cover, flatten slopes, or add/modify toe berm along base of slope.
Bushes or Trees - Potential penetration through cover if left unattended.	Remove bushes, trees and tall weeds including roots. Reseed as required.

INSPECTION CONCERN	ACTION
Vegetation - Maintenance of effective cover.	Mowing twice per year and fertilization annually. Supplemental soil conditioning as needed.
Dead/Dying Vegetation - Potential for erosion. Check for signs of leaching or any unusual surface features.	Till topsoil, reseed and cover with mat or netting.

5.4 ACCESS ROAD

The access road will be visually inspected periodically for potholes, low areas, standing water and other deficiencies to the road surface and drainage.

Snow will be removed from the road, and the road will be sanded and salted, as needed to allow safe operations during winter. Flexible, high visibility markers will be installed on both side of the road, approximately every 25 feet, to delineate the road for snow removal.

5.5 FENCING

Inspections of the fence will be performed periodically. The Inspector will monitor the perimeter of the fence and visually inspect for defects in the fence or gates. If any items of concern are observed, action will be taken to repair or replace portions of the fence or gate.

6.0 GROUNDWATER

6.1 GENERAL DESCRIPTION

A post-closure program for groundwater monitoring has been specified in the Final Engineering Report and will be implemented at the Site subsequent to completion of remedial activities. The program consists of the following tasks:

- Groundwater monitor well installation,
- Groundwater elevation monitoring, and
- Groundwater sampling and testing.

The objective of the post-closure groundwater monitoring program is to satisfy requirements of the ROD and provide performance monitoring of the remedial containment system and demonstrate effectiveness of the remedial system.

The primary objectives are:

- Determine the effectiveness of the containment system by collecting groundwater samples from post-closure monitoring wells and analyzing them for Site Specific Indicators (SSI) as presented in Table 6-1.

- Determine the effectiveness of the groundwater gradient control/APL collection system by monitoring groundwater elevations in the post-closure monitoring wells and piezometers.

6.2 WATER QUALITY

Eight post-closure monitoring wells in the shallow (alluvium) aquifer (two on east, 2 on west, two on north side, and two in the bulk head in the south side), and three bedrock monitoring wells (one on north side and two on south side) have been located outside the slurry wall to monitor water quality outside the perimeter slurry wall. Water quality data will be evaluated to provide a reliable indicator of remedial system effectiveness and determine in additional measures will be necessary.

Two existing off-site monitoring wells, OW14-79 and OW15-79, will also be included in the monitoring network. These wells will provide upgradient groundwater quality data throughout the monitoring period. The frequency of sampling and monitoring will be quarterly for the first two years and semi-annually for another eight years and every five years thereafter. Sampling and purging procedures are presented in Appendix F.

6.3 WATER LEVEL MONITORING

Eight piezometers in the landfill (two on east, two on west, two on north side, and two on south side) have been located inside the slurry wall to compare water level elevations inside and outside (in the monitoring wells) the perimeter slurry wall. After completion of the remedial action construction, water levels in the post-closure monitor wells and piezometers will be recorded on a monthly basis for two years. After two years, water levels will be recorded on a quarterly basis.

Water level measurements procedures are presented in Appendix F.

6.4 MONITORING WELL SAMPLING

A groundwater sampling and monitoring program will be conducted at the Site to provide post-remedial performance monitoring of the containment system. This section outlines the field work to be performed at the Site. Post-closure monitoring wells will be sampled on the frequency described in Section 6.2.

6.4.1 Well Purge Procedures

All monitoring wells will be purged by pumping prior to sampling. Purge water will be containerized and transported to the site loadout facility. Evacuation of a minimum of one well volume, and preferably three volumes will be completed prior to collection of the sample. Purging procedures are presented in Appendix F.

6.4.2 Sampling Procedures

A positive-displacement bailer will be used for collection of samples due to the inclusion of volatile organic compounds in the SSI list. Sample withdrawal methods are described in Appendix F.

6.5 TESTING

All the groundwater samples collected shall be analyzed for Site Specific Indicators (SSI) as presented in Table 6-1. Testing shall be performed by a laboratory participating in the Contract Laboratory Program (CLP).

6.6 DATA REVIEW AND REPORTING

Analytical data will be collected according to the frequencies described above. A database will be established during this period of monitoring to serve as a comparison on the effectiveness of the containment systems. A summary of results will be reported to the Agencies every year with a recommendation, such as sampling and monitoring requirements for the next year.

7.0 GENERAL SAMPLING PROCEDURES

Procedures for decontamination, documentation, chain-of-custody, packing and shipping is presented in previously approved site documents:

- Milestone Report #9, Appendix C, Quality Assurance Plan for the Site Specific Indicators, 102nd Street Landfill Site (July, 1986).
- Site Specific Quality Assurance Requirements (SSQAR) (Task 3), 102nd Street Landfill Site (May 23, 1985).
- Remedial Action Quality Assurance Project Plan, Triangular Area North of Buffalo Avenue (February 19, 1993).
- Remedial Action Quality Assurance Project Plan Addendum (September 1995) (see Appendix E).

8.0 RESPONSE PLANNING

In the event of a spill or problem with in a containment system component, the Site Manager or Inspection personnel will immediately activate the O&M Response Plan as follows:

(1) Implement spill control and countermeasures as contained in the HASP.
(2) Determine scope and magnitude of situation.
(3) Affect containment measures as appropriate, according to the HASP.
(4) Notify OxyChem and Olin Project Emergency Coordinators. The emergency team personnel and contact numbers are presented in Appendix D.

9.0 SCHEDULE AND REPORTING

A summary of all scheduled operations and maintenance activities is presented in Table 9-1. In general, most inspections will occur in the spring and fall of each year.

A bound overview summary report will be prepared for each calendar year for submittal to the Agencies.

Table 6-1
Groundwater Sampling and Analysis Summary

Sample Matrix	Laboratory Parameters	Field Samples/Type	Laboratory QA		Purpose
			MSD	MS	
Water Samples	organic SSIs (A) & methods (listed below)	10 grab	2	2	Post-Closure groundwater quality monitoring quarterly program

(A): Site Specific Indicator Parameters

Parameter	Survey Level (ug/l)	Analytical Method
Benzene	5	EPA 624 (modified)
Monochlorobenze	5	"
2-Monochlorotoluene	5	"
1,2-Dichlorobenzene	10	EPA 625 (modified)
1,4-Dichlorobenzene	10	"
1,2,4-Trichlorobenzene	10	"
1,2,3-Trichlorobenzene	10	"
1,2,3,4-Tetrachlorobenzene	10	"
1,2,4,5-Tetrachlorobenzene	10	"
alpha-Hexachlorocyclhexane	10	"
beta-Hexachlorocyclhexane	10	"
gamma-Hexachlorocyclhexane	10	"
delta-Hexachlorocyclhexane	10	"
2,5-Dichloroaniline	10	"
Phenol	10	"
2-Chlorophenol	10	"
4-Chlorophenol	10	"
2,4-Dichlorophenol	10	"
2,5-Dichlorophenol	10	"
2,4,5-Dichlorophenol	50	"

Note [for all samples/analyses except (a)]: Containers = Glass; Holding Times = 7 days extraction, 30 days analysis; Preservation = Cool 4 degrees C (a) Holding Time 30 days

General Parameters	per SSQAR	per SSQAR
Arsenic	50	EPA 206.2

Note: Containers = Plastic; Holding Times = 30 days extraction; Preservation = HNO3 to pH<2, filter on-site

Table 9-1

Operation and Maintenance Activities Summary

ACTIVITY	SCHEDULE
Vegetative Cover Inspection/Mowing	Semi-annually in spring and fall
Surface Erosion Inspection and Repair	Semi-annually in spring and fall and after major weather events
Surface Settlement Inspection and Repair	Semi-annually in spring and fall
Cap Surface Drainage Inspection and Repair	Semi-annually in spring and fall
Cap Surface Spot Elevation Monitoring	Annually
Stormwater Run-off System Inspection and Maintenance	Semi-annually in spring and fall
Stormwater Run-off Systems Elevation Monitoring	Semi-annually in spring and fall
Access Road Inspection and Repair	Semi-annually in spring and fall
Sediment Basin and Trap Inspection and Maintenance	Semi-annually in spring and fall
Fence Inspection and Repair	Periodically
APL Collection System Inspection and Maintenance	Semi-annually
NAPL Collection System Inspection and Maintenance	semi-annually
Groundwater Sampling and Testing	Quarterly
Submittal of Regularly Scheduled Summary Reports	Annual

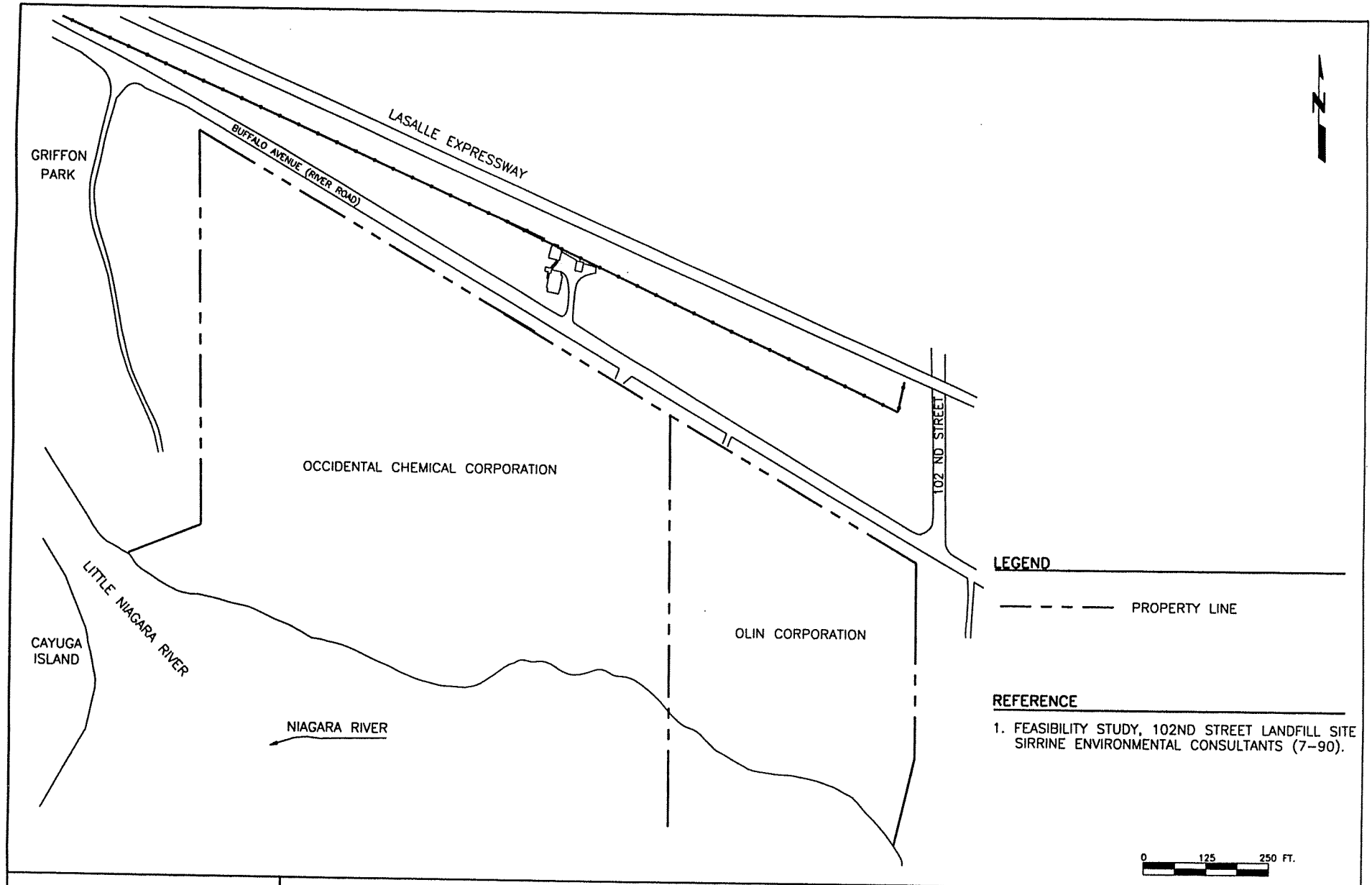
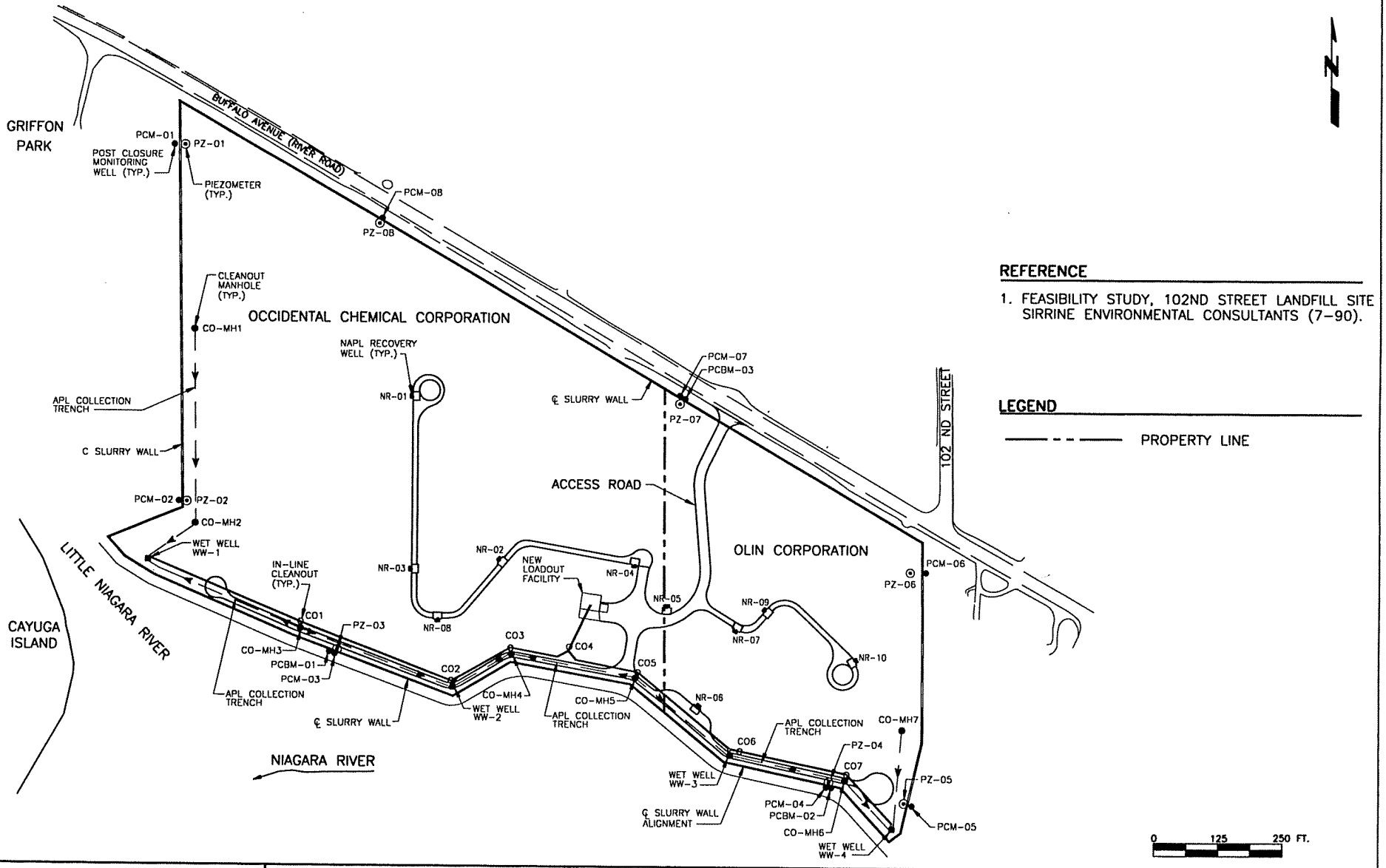


FIGURE 1-1	GENERAL SITE MAP	DATE: 9-6-95	OXYCHEM/OLIN
FLUOR DANIEL		REV:	REMEDIAL ACTION
		PROJ No: 23594000	102ND STREET LANDFILL SITE

CAD: GENLSITE.DWG



REFERENCE

1. FEASIBILITY STUDY, 102ND STREET LANDFILL SITE SIRRINE ENVIRONMENTAL CONSULTANTS (7-90).

LEGEND

PROPERTY LINE

FIGURE 2-1	SITE PLAN	DATE: 9-7-95	OXYCHEM/OLIN
FLUOR DANIEL		REV:	REMEDIAL ACTION
		PROJ No: 23594000	102ND STREET LANDFILL SITE

CAD: OMPLAN21.DWG

APPENDIX A

Vendor's Manuals

APPENDIX B

PFDs and P&IDs

APPENDIX C

Equipment Details

APPENDIX D

Contact List

RESPONSE PLAN NOTIFICATION LIST

RESPONSE TEAM MEMBER	RESPONSIBILITY	COMPANY	TELEPHONE NUMBER
A. Weston	Project Coordinator	OxyChem	(716) 286-3607
L. Wood	Alt. Project Coordinator	OxyChem	(716) 286-3102
D. Cummings	Project Coordinator	Olin	(615) 336-4549
R. McCaleb	Alt. Project Coordinator	Olin	(615) 336-4073
T. Slowe	Health and Safety Officer	OxyChem	(716) 278-7576
Main Gate	Call in List	OxyChem	(716) 278-7794

APPENDIX E

Remedial Action Quality Assurance Project Plan Addendum
to Triangular Area North of Buffalo Avenue,
September 1995.

OCCIDENTAL CHEMICAL CORPORATION

OLIN CORPORATION

REMEDIAL ACTION QUALITY ASSURANCE PROJECT PLAN ADDENDUM TO TRIANGULAR AREA NORTH OF BUFFALO AVENUE

102nd STREET LANDFILL SITE

NIAGARA FALLS, NEW YORK

SEPTEMBER 9, 1995

FLUOR DANIEL, INC.

MARLTON, NEW JERSEY

NOTE

Replacement pages 1, 2, 3, 4, and 14 are attached together with replacement Table 3-1, Table 3-2, Figure 1.1.1 and Figure 2.0.1. Table 4-1 was deleted, the information was incorporated into Table 3-1 and Table 3-2. Page 23 includes changes for Section 7.1 only, the remainder of Section 7.0 and the QAPP will remain as referenced in approved procedures.

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is for the site-wide remedial action (RA) activities for the 102nd Street Landfill Site (Site). It identifies the organization, objectives, functional activities and specific Quality Assurance (QA) and Quality Control (QC) activities undertaken to ensure the validity of the analytical data generated by the field program. The purpose of the plan is to provide mechanisms so that the technical data generated for this site are accurate and representative. This plan is intended to be used as a supplement to the existing approved Quality Assurance Plan (QAP) (Milestone Report #9, Appendix C, Quality Assurance Plan for the Site Specific Indicators 102nd Street Landfill Site, July, 1986).

Specific work procedures are outlined in the Sampling and Testing Plan (SATP), Triangular Area (February, 1993). The approved QAP (July, 1986), combined with this QAPP, the SATP for embayment sediment area and the SATP component of the Post-Closure Operation and Maintenance Plan, provide an effective data acquisition and control program.

1.1 CORRESPONDING DOCUMENTS AND REFERENCES

This quality assurance or quality control plan was completed in accordance with the most current revision of the following documents:

- Region II - CERCLA Quality Assurance Manual, United States Environmental Protection Agency (EPA), Washington, DC. Revision 1, October 1989.
- Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, QAMS-005/80, December 29, 1980.
- EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, EPA QA/R-5, Draft January 29, 1992.
- Guidance for Preparation of Combined Work/Quality Assurance Project Plans for Water Monitoring, OWRS-1, May 1984.

- SW-846 document, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," (3rd ed., 9/86).

- Sample Bottle Repository - Statement of Work (SBR-SOW).

- National Functional Guidelines for Organic Data Review, Draft, June, 1991, EPA Contract Laboratory Program.

- Laboratory Data Validation, Functional Guidelines for Evaluating Inorganic Analyses, July, 1988, Sample Management Office, Viar & Company.

The QAPP is to be read and used in conjunction with other current reports and publications, specifically the following:

- Milestone Report #9, Appendix C, Quality Assurance Plan for the Site Specific Indicators, 102nd Street Landfill Site (July, 1986) (Milestone Report #9 QAP).
- Site Specific Quality Assurance Requirements (SSQAR) (Task 3), 102nd Street Landfill Site (May 23, 1985).
- Remedial Action Quality Assurance Project Plan, Triangular Area North of Buffalo Avenue (February 19, 1993) (Triangular Area QAPP).
- Remedial Action Sampling and Testing Plan (SATP) Addendum, Embayment Sediment Area (August 1995).
- Remedial Action Health and Safety Plan (HASP) Revision, (August 1995).
- Post-Closure Operation and Maintenance Plan, (August 1995).

1.2 PROJECT BACKGROUND

The selected Remedial Action for the Site, located in Niagara Falls, New York was presented in the Record of Decision (ROD) issued on September 26, 1990 and as amended on June 9, 1995. The ROD identified ten major components of the selected remedial alternatives:

- capping the site with a combined compacted soil layer with a synthetic liner;
- consolidation of perimeter soils under the cap;

- construction of slurry wall;
- recovery and treatment of aqueous phase liquids (APL);
- recovery and treatment of non-aqueous phase liquids (NAPL);
- dredging and containment of sediments;
- relocation of storm sewer;
- monitoring of post-remedial action;
- restriction of access; and
- institutional controls.

This document addresses components of the selected remedy where environmental data collection is planned.

1.3 SITE DESCRIPTION

The Site covers approximately 22.1 acres and is located in Niagara Falls, Niagara County, New York. It consists of two separate properties owned, respectively, by OxyChem and Olin plus contiguous and related areas as defined in the ROD. The OxyChem/Olin property is bordered on the south by the Niagara River, on the north by Buffalo Avenue, on the west by Griffon Park, and on the east by privately owned land which is known as the Belden site. The Site as defined for the purpose of this remediation also includes the areas immediately adjacent to the east and to the west, and the adjoining river sediments. Figure 1.1.1 presents the general site map.

The FS divided the Site into three operable units. The remedy for each operable unit is addressed in the RAWP. The three operable units (OU) are:

OU-1: Landfill residuals, perimeter soils, shallow groundwater, and NAPL;

OU-2: Sediments in the Niagara River within 300 feet of the shore; and

OU-3: The portion of the 100th Street Storm Sewer that crosses the site.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The management structure outlined in this section provides for direct and constant operational responsibility, clear lines of authority, and the integration of QA activities. The various QA functions are explained below and are also depicted on Figure 2.0.1.

2.1 PROJECT MANAGER

The Project Managers (PMs) for the Remedial Action and are responsible for the review and implementation of the QAPP developed for this site during the RA. The Site Manager will be responsible for these activities during the Post-Closure Operation and Maintenance phase. This includes overall management of project operations including:

1. Review and approval of sampling procedures including approval of monitoring site locations, data quality objectives, chemical analysis parameters, schedules, and manpower allocations.
2. Providing that corrective action, as detailed in the QAPP, is undertaken when quality audit results indicate the need for such actions.
3. Incorporating Quality Assurance Managers' comments in all project related work.
4. Preparing Progress Reports with the assistance of support personnel.
5. Verifying the completeness of field notebooks, remediation contractor's logs, chain-of-custody records, sample labels, and all other field related documentation.
6. Overseeing field personnel and contractor personnel.
7. Maintaining project files.
8. Coordinating data reduction, validation, evaluation and reporting efforts.

4.0 SAMPLING PROCEDURES

The procedures for collecting samples and for performing all related field activities are described in the SATP and summarized in the following sections.

4.1 SAMPLING

4.1.1 Soil Sampling

Soil sampling is required to characterize soils used for fill or cover above the liner or outside of the perimeter slurry wall. The analytical methodology will include Toxicity Characteristic Leaching Procedure (TCLP) method 1311 and physical tests used for OxyChem fill characterization.

4.1.2 Sediment Sampling

Sediment sampling is required to verify the vertical extent of excavation of embayment area, prior to excavation. Sampling will be conducted to determine SSI concentrations at 24 to 30 inches in depth prior to sediment excavation to verify that the removal of sediment will achieve the desired objectives. Samples will be taken and analyzed in accordance with the SATP and supporting documentation. All sampling locations will be marked in the field and identified by a specific location number.

4.1.3 Water Sampling

Water sampling will be required during the RA water management program. The Construction Management Plan outlines monitoring, sampling and analytical requirements for water handled during the dewatering of the embayment for excavation activities. Monitoring will be conducted prior to release to the Niagara River or treatment off-site.

7.0 ANALYTICAL PROCEDURES

7.1 OVERVIEW

Sediments - Organic SSIs will be analyzed using the High Boiler Method described in Milestone Report #9, Appendix C, Quality Assurance Plan for the Site Specific Indicators, 102nd Street Landfill (July 1986); with the exceptions that monochlorotoluenes and dichlorobenzenes will be analyzed using EPA SW-846 Method 8260.

Soils - The analytical methodology for fill soils will include Toxicity Characteristic Leaching Procedure (TCLP) method 1311 and physical tests used for OxyChem fill characterization.

Waters - Organic SSIs will be analyzed using the EPA methods 624 (modified) and 625 (Modified), Arsenic will be analyzed using EPA method 206.2 and general parameters per the SSQAR;

The remaining sections of the QAPP, including the remainder of page 23, will remain consistent with approved procedures referenced in the Milestone Report #9 QAP and Triangular Area QAPP.

APPENDIX F

Groundwater Monitoring, Purging and Sampling Procedures

Measurements Procedures

(1) Make sure water level measuring equipment is in good operating condition.

(2) Clean all equipment entering the well.

(3) Remove well caps, note location, time of day, and date in site monitoring data form.

(4) Lower electric water level measuring device or equivalent into the well until water surface is encountered.

(5) Measure the distance from the water surface to the reference measuring point on the well casing or protective barrier post and record on data form. Note location of reference point.

(6) Measure total depth of well and record data.

(7) Remove all down hole equipment, replace casing cap and secure well.

(8) Rinse all down hole equipment and store for transport to the next well.

(9) Note any physical changes such as erosion or cracks in the well construction materials or variation in total depth of well.

(10) Decontaminate equipment as outlined in QAPP.

Well Purge Procedures

All monitoring wells will be purged by pumping prior to sampling. Purge water will be containerized and transported to the site loadout facility. Evacuation of a minimum of one well volume, and preferably three volumes will be completed prior to collection of the sample. Purging procedures are presented in Appendix F.

(1) Repeat step 1 through 10 as described in water level measurement procedures above.

(2) Calculate the Volume of water in the well and the volume to be purged. The volume in gallons per linear foot for typical well sizes are as follows:

2 inches v = 0.1632 gal/ft

The calculation is as follows:

Well volume = (h)(v)

Where:

h = height of water column (ft)
v = gallons per linear foot value (0.1632 gal/ft)

(3) Select purging and sampling equipment.

(4) Assemble pump, hoses and safety cable, and lower the pump into the well.

(5) Attach power supply, and purge well until specified volume of water has been evacuated (or until field parameters, such as temperature, pH, conductivity, etc. has stabilized).

(6) Collect and dispose of purge water as specified in the O&M Plan.

Sampling Procedures

A positive-displacement bailer will be used for collection of samples due to the inclusion of volatile organic compounds in the SSI list. Sample withdrawal methods are as follows:

(1) Attach a line to the bailer.

(2) Lower bailer slowly into the well, taking care not to shake the casing sides or to splash the bailer into the water. Stop lowering at a point adjacent to the screen.

(3) Allow bailer to fill and slowly retrieve the bailer, avoiding contact with the casing.

(4) Remove the cap from the sampling container(s).

(5) Begin pouring slowly from the bailer.

(6) Preserve samples as required.

(7) Cap container(s).

(8) Complete sample documentation in field logbook and data sheets as described in Sections 6.2 and 6.3 of the O&M Plan.

(9) Replace the well cap.

(10) Package samples and complete necessary paperwork as referenced in Sections 7.4 and 7.5 of the O&M Plan.

(11) Ship to contracted laboratory.