OPERATION, MAINTENANCE, AND MONITORING MANUAL

Former Chicago Pneumatic
Tool Company
Remedial Action Facility
2322 Bleecker Street
Utica, New York 13501
NYSDEC Site No. 622003

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ACRONYMS AND ABBREVIATIONS

6 NYCRR Part 364	Part 364 of Title 6 of the New York State Compilation of Codes, Rules and Regulations
29 CFR 19190	Part 1910 of Title 29 of the Code of Federal Regulations
40 CFR 761	Part 761 of Title 40 of the Code of Federal Regulations
AAA	AAA Environmental, Inc. Project Prime Contractor
ASTM	American Society for Testing and Materials
BBL	Blasland, Bouck & Lee, Inc.
bgs	Below Ground Surface
CMP	Concrete Metal Pipe
CWA	Clean Water Act
cy	Cubic Yards
cis-1,2-DCE	cis-1,2-Dichloroethene
trans-1,2-DCE	trans-1,2-Dichloroethene
GAC	Granular Activated Carbon
GCL	Geosynethic Clay Liner
CMP	Concrete Metal Pipe
gpm	Gallons Per Minute
HELP	Hydrologic Evaluation of Landfill Performance
HDPE	High Density Polyethylene
MP	Material and Performance
NMPC	Niagara Mohawk Power Corporation
NYSDEC	New York State Department of Environmental Conservation
OMM	Operation, Maintenance, and Monitoring
OSHA	Occupational Safety and Health Administration
OVM	Organic Vapor Meter
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
ppb	Parts Per Billion
PPE	Personal Protection Equipment
ppm	Parts Per Million
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
RA	Remedial Action
RAF	Remedial Action Facility
RCP	Reinforced Concrete Pipe
SECOR	*SECOR International Incorporated*, Project Engineers
SPDES	State Pollutant Discharge Elimination System
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compounds
TAL	Target Analyte List
TCE	Trichloroethylene
TCL	Target Constituent List
TSCA	Toxic Substances Control Act
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VC	Vinyl Chloride
VOC	Volatile Organic Compound

REMEDIAL ACTION
FORMER CHICAGO PNEUMATIC TOOL COMPANY
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ASSOCIATED DOCUMENTS

Abbreviation:	Title:	Date:
Phase 1	Phase I Investigation (by Recra Research Inc.)	08/85
SI	Potential Hazardous Waste Site Inspection Report (Hazard Ranking Score) (by NUS Corp.)	09/86
QAPP	Summary of Site Activities and Qualities Assurance Project Plan	06/90
___________	Site Investigation Report	7/90
Work Plan	Remedial Investigation/Feasibility Study Work Plan	8/92 - 8/93
Order	Administrative Order on Consent Index No. B6-0491-96-04	10/93
RI	Remedial Investigation Report	10/94
IRM	Surface Water Interim Remedial Measures (Design)	10/94
IRM	Surface Water IRM	03/95
IRM-DWG	IRM Contract Drawing	04/95
IRM O&M	IRM Operation & Maintenance Manual	04/95
RI/FS	Health and Safety Plan - Addendum #1 Remedial Investigation/Feasibility Study	10/95
SRI/FS	Supplemental Remedial Investigation Report/Feasibility Study	12/95
ROD	Record of Decision - Site No. 622003	03/96
IRM	Storm Sewer Sediment Removal IRM	04/97
RD	Remedial Design Work Plan	11/97
RDS	Remedial Design Specifications	04/98
________	RDS-Appendix A - Minimum Requirements for Preparation of Plans	04/98

Abbreviation:	Title:	Date:
RDS-FSP	RDS-Appendix B - Remedial Action Field Sampling Plan	04/98
RDS-QAPP	RDS-Appendix C - Remedial Action Quality Assurance Project Plan	04/98
RDS-MP	RDS-Appendix D - Material and Performance Specification	04/98
________	RDS-Appendix E - SVE System Basis of Design	04/98
________	RDS-Appendix F - SVE Startup Procedures	04/98
RDS-AMP	RDS-Appendix G - Site-Specific Air Monitoring Plan	04/98
RDS CQAP	RDS-Appendix H - Construction Quality Assurance Plan	04/98
RDS-HASP	RDS Health and Safety Plan for Remedial Action Activities	06/98
————	As Built Drawings	12/99-5/01
OMM	Operation, Maintenance, & Monitoring Manual	12/99-4/01
FER	Final Engineering Report	01/00-5/01
————	FER-Appendix A - Construction Site Management Plan	01/00-5/01
————	FER-Appendix B - Site-Specific Health and Safety Plan	01/00-5/01
————	FER-Appendix C - Contract Submittals	01/00-5/01
————	FER-Appendix D - Permits and Certificates	01/00-5/01
————	FER-Appendix E - Analytical Data	01/00-5/01
————	FER-Appendix F - Data Verification	01/00-5/01
————	FER-Appendix G - Disposal Manifests and Weight Ship	01/00-5/01
————	FER-Appendix H - Soil Compaction Data	01/00-5/01
————	FER-Appendix I - Concrete Test Data	01/00-5/01
————	FER-Appendix J - Correspondence with NYSDEC	01/00-5/01
————	FER-Appendix K - Dust Monitoring Data	01/00-5/01
————	FER-Appendix L - Vapor Monitoring Data	01/00-5/01
————	SPDES Stormwater Action Plan	06/00
________	Work Plan - Reroute Roof Leader and Abandon Associated Stormwater Drain Pipe	08/00

1.0 INTRODUCTION

1.1 General

This manual sets forth guidance for individuals responsible for implementation of operation, maintenance, and monitoring (OMM) at the Remedial Action Facility (RAF), associated with the Remedial Action (RA), completed at the former Chicago Pneumatic Tool Company (CP) located in Utica, New York. This OMM and the Final Engineering Report (FER), which includes the RA Contract Submittals, and RA As-Built Drawings, provide an accounting of the completed RA and should be utilized simultaneously, as required, to address issues associated with the RAF. Reference is also given to the RA Remedial Design Specifications (RDS) and RA Contract Drawings, utilized to complete the RA. Additionally, a separate operation and maintenance (O&M) Manual was prepared for those components installed as part of the Surface Water Interim Remedial Measure (IRM).

The RA was implemented in accordance with the Administrative Order on Consent (Index No. B6-0491-96-04) entered into between Chicago Pneumatic Tool Company and the New York State Department of Environmental Conservation (NYSDEC), dated August 26, 1997. The NYSDEC set forth the selected remedy for addressing chemical constituents present in environmental media at the former Chicago Pneumatic Tool Company Inactive Hazardous Waste Site (Site No. 622003) in their Record of Decision (ROD), dated March 29, 1996. The RA was conducted by *SECOR International Incorporated (SECOR)* on behalf of Danaher Corporation (Danaher) and CP, and constructed by AAA Environmental, Inc. (AAA).

The RA was performed between May 1998 and December 1999. The RA included installation of a groundwater collection system that was connected to an existing treatment system, excavation of soil and sediment from identified areas of concern, and construction of an on-site containment cell and associated appurtenances. All effected soils and sediments associated with 14 identified Areas of Concern (AOCs) were excavated and placed in the on-site containment cell or exported off site. The leachate collection system was on-line and operating in Spring of 1999. Landscaping and other restoration activities were finalized in the Fall of 1999. Specific construction related information is presented in the FER, As-Built Drawings, as well as the RDS and Contract Drawings. These are referenced throughout this OMM manual when appropriate.

1.2 RAF Location and Description

The former CP site is located on the south side of Bleecker Street, Town of Frankfort, Herkimer County, New York, and encompasses 77 acres of property. The majority of the RAF is located in a fenced-in area (3.8 acres) in the back, southeastern portion of the property (See As-Built Drawing G1). Access to the RAF fenced area is made through two gates. Gate No. 1 (northwest side) is accessed along the west parking lot of the property, through a site security gate, and then south of the former foundry building. Gate No. 2 (northeast side) is accessed from the south end of the east parking lot. The RAF access gates No. 1 and No. 2, as well as the fence, bear “No Trespassing” signs and will remain secure at all times.

The RAF components requiring OMM are as follows:

- C The perimeter site components;
- C Groundwater collection trenches routed to an existing treatment system;
- C Containment cell;
- C Leachate collection manhole;
- C The RAF building;
- C The leachate storage system; and
- C Groundwater monitoring wells.

The majority of the RA components are secured within the RAF perimeter fence. The groundwater collection trenches and treatment system are located outside the RAF fence as are 5 of the 6 monitoring wells. The southern collection trench is located south of the main manufacturing building and is secured within the general site fence. The northern collection trench is located at the northern perimeter of the property, adjacent to Bleecker Street. The groundwater treatment system, consisting of an air stripper unit, is located in the southeast corner of the former manufacturing building. Note that operation of the air stripper is not provided in this RA OMM Manual. The air stripper and RA Pumping Manholes No. 1 and No. 2 were installed as part of the IRM in 1995. A separate O&M Manual (BBL, April 1995) was prepared at that time to address these components.

2.0 PERIMETER COMPONENTS

The RAF components, at the perimeter of the containment cell, that require regular OMM include:

- Perimeter and access roads;
- Ditches;
- Culverts;
- Perimeter fence; and
- Utilities; and
- Groundwater collection trenches.

As-Built Drawing G3 shows the locations of these RAF components which are discussed in the subsequent sections. A Site Inspection Report (Form A) is provided in Section 9.0 of this manual that can be used during OMM inspections to record the condition of the components addressed in the following sub-sections.

2.1 Perimeter and Access Roads

Site OMM will include visual inspection of the perimeter and access roads. The containment cell is encompassed by a 10-foot wide perimeter road. The perimeter road is identified in three sections (north, southeast, and southwest) and constructed to allow access to the containment cell for inspection and subsequent maintenance. Two 15-foot wide access roads emanate from the perimeter road, on the east and west sides. The roads are constructed of a 6-inch layer of crushed stone on a geotextile fabric overlying a soil fill.

Based on the visual inspection, additional maintenance to the roadways may be required. Roadway maintenance may include, but not be limited to, the additional replacement of crushed stone if settling or displacement is apparent. Material requirements can be obtained from the As-Built and Contract Drawings, RD Specifications, and/or Contract Submittals.

OMM access requirements will also include contracting a snow plowing service to provide access to the RAF building during the winter months. To facilitate this activity, provisions will be made to unlock Gate No. 1 for access.

2.2 Ditches

Generally, on either side of the perimeter road, there are drainage ditches designed to channel surface water and runoff. Ditches are designated as A, B, and C, and Area 6, on As-Built Drawing G3. An erosion control fabric was installed during construction along portions of Ditch B, Area 6, and Area 4. Medium-sized riprap was placed in certain locations along the ditches across the site. The riprap has been placed at culvert inlets and outlets and at the juncture of ditches, as well as along a major section of Area 14 ditch. The remaining areas are to be maintained with grasses.

The ditches will be visually inspected for excess debris that would hinder runoff. These ditches and inlet/outlet culverts will require periodic cleaning to maintain the originally-designed condition. Cleaning will be performed by hand or with use of equipment. Few utilities exist in these areas (see As-Built Drawings); however, utility clearance will be made prior to any invasive maintenance activities.

2.3 Culverts

Culverts have been installed at four locations along the containment cell ditches. The culverts are designated as CV-1, CV-2, CV-3, and CV-4 (see As-Built Drawing G3). The culverts are constructed of 18-inch HDPE pipe with riprap placed upstream and downstream to control erosion. During the scheduled inspection, all four culverts should be inspected. Any debris found must be removed to provide unobstructed flow. This task would most likely be performed in conjunction with the cleaning of the ditches. In addition, the downstream ditches, including Area 14 and adjacent Bleecker Street, should be inspected to insure that the flow of water is not obstructed.

2.4 Perimeter Fence

The containment cell, building, and the perimeter road are enclosed by an appropriate 8-foot high chainlink fence with two access gates: Gate No. 1 at the northwest end and Gate No. 2 at the northeast end. The fence is comprised of five sections of fencing, as shown on As-Built Drawing G3:

- The north fencing section (approximately 645 linear feet long) is newly constructed and follows along the edge of the north perimeter access road;

- The northeast section (approximately 230 linear feet long) is newly constructed. This section includes Gate No. 2 at the access road;

- The southeast section (approximately 355 linear feet long) follows the property boundary right-of-way (ROW) and is part of the original site fencing;

- The southwest section (approximately 490 linear feet long) is original site fencing and bounds a wooded area; and

- The northwest fence section (approximately 80 linear feet long) is newly constructed, and includes Gate No. 1 at the access road.

The chain link fence serves to secure the majority of the RAF components; therefore, inspections will be required on a regular basis. Any sign of damage should be noted and repairs made within a week, in accordance with the RDS set forth in Contract Specification Section MP-02711. Properly functioning gates and locks will be maintained, and two gates must remain locked when authorized personnel are not present at the RAF.

2.5 Utilities

Two utilities are contained within the secured RAF fenced area. Niagara Mohawk Power Corporation (NMPC) overhead high tension power lines are located along the south and east sides, and provide electrical service to the other site buildings. A separate service line was constructed for the RAF building, as noted on As-Built Drawing G1. An underground telephone line constructed by Bell Atlantic provides communication service to the building, and generally runs just inside the south and east perimeter fence. The approximate location of the telephone service line is shown on the As-Built Drawing G1. NMPC and Bell Atlantic may require periodic access into the secured RAF area for maintenance.

2.6 Groundwater Collection Trenches

As part of the RA, two groundwater collection trenches were constructed on site, as described in Section 8.0 of the FER. This involved connecting the collection trench pipes to the existing IRM system, constructed in 1995. The OMM of the groundwater collection components will require an interface with the O&M. The IRM O&M sets forth procedures for the two Pumping Manholes, and air stripper treatment system.

2.6.1 Construction

A northern and southern collection trench were constructed at key locations on site to collect and treat groundwater. A 6-inch perforated pipe encompassed by washed stone and geotextile fabric was installed and connected to the existing Pumping Manholes. The trenches were backfilled to existing grade and vegetation reestablished. The collection trenches were located and constructed, as indicated in Contract Drawings G-18, G-19, and G-20.

The northern collection trench extends approximately 120 feet in length. The 6-inch collection pipe extends along the entire length and surface as a cleanout (see As-Built Drawing G1). The cleanout is constructed with a bolt down surface casing cast in concrete. The downgradient end of the collection pipe penetrates Pumping Manhole No. 2.

The southern collection trench extends in length approximately 600 feet and contains the 6-inch perforated collection pipe. Three cleanouts were installed along the pipe’s length. At the east end of the trench, the pipe passes through a cutoff wall and changes to a solid 6-inch pipe. The solid pipe continues downgradient to Pumping Manhole No. 2 (see As-Built Drawing G1). The backfill is similar to that for the northern collection trench described above.

2.6.2 IRM

The IRM was constructed in 1995 to collect site surface water and treat for VOCs. The system incorporated three main components: a low-profile air stripper and two collection/pumping manholes. The location of these components are shown on As-Built Drawing G1.

Pumping Manhole No. 1 was constructed adjacent to the former oil skimmer pond (removed during the RA). Water was directed to the manhole where automatic level controls actuated a lead/lag pump system. The water is then pumped to the air stripper.

Pumping Manhole No. 2 was constructed at the northern extent of the site to collect effluent water from an existing clay pipe. The pump system is similar to that described above and also directs the water to the air stripper.

The air stripper is located in the south corner of the former manufacturing building (see As-Built Drawing G1). It receives the water from the two Pumping Manholes, removes VOCs and discharges the treated water to the Area 14 drainage at SPDES Outfall 03A.

The controls for the air stripper and pump, as well as an auto dialer, are affixed to the east wall adjacent to the air stripper. A system manual entitled Surface Water Interim Remedial Measure Operation and Maintenance Manual, dated April 1995, is also stationed at the air stripper. This manual is specific to the IRM and contains contingency elements, particularly the auto dialer system. The following are primary failure/action scenarios:

- Spills and Leaks Inside the Building - The air stripper and appurtenance are contained within a bermed area with a sump and a pump to control any spills or leaks;

- Power Failure - The auto dialer monitors the electrical service;

- Pump Failure - Should a pump discontinue to control the liquid level, a float switch will trigger an alarm, which will be called out by the auto dialer;

- Blower Failure - The air stripper is equipped with a low air pressure sensor, which would subsequently activate the auto dialer should the pressure drop;

- Fouling of the Air Stripper Trays - The maintenance of the air stripper is scheduled from subsequent monthly inspections, and are performed by the O&M Contractor on an as-needed basis;

- Blockage of the Force Mains - Should flow diminish or stop, the liquid level would rise and trigger a high level switch and, subsequently, activate the auto dialer;

- Plumbing Leaks Inside Manhole - Each manhole is equipped with a high level switch, which provides an alarm, should the liquid level in the manhole not be maintained, thereby activating the auto dialer; and

- SPDES Discharge Permit Limit Exceedance - As previously noted, the air stripper effluent is permitted under the SPDES. The effluent is sampled and analytically tested for constituents defined in the permit. Should an exceedance be encountered, the NYSDEC, Division of Water, would be contacted by the IRM O&M Contractor, followed by subsequent corrective actions.

2.6.3 Inspection

During scheduled site inspections, all cleanouts should be viewed to assure continued operation. The cleanouts should be inspected for damages from traffic, vandalism, and weather. Also, note any observed subsidence or heaving at the cleanouts, as well as along the covered trenches.

Small amounts of movement can be lightly graded, adding topsoil as required. Any large movements observed should be reported to the Engineer for assessment. Damaged cleanout should be repaired within a week to original design conditions. The collection trench inspection/repair information is recorded on Form A contained in Section 9.0 of this OMM Manual.

2.6.4 Cleanout

If the influent water flow appears to be obstructed, the collection pipe must be cleaned. Cleaning will be performed using a high pressure water injection line accessed through either the collection cleanout pipe or the downstream end of the pipe located in the pumping Manhole. A flexible hose with a high pressure, low flow nozzle should be placed in the downstream end of the pipe and advanced upstream using a reverse action spray nozzle. If this approach does not reach the entire length of collection pipe then access the appropriate cleanout and advance the high pressure hose downstream.

Should an obstruction persist, an engineer would evaluate and prescribe a corrective action. Worst case, the pipe would be excavated, then repaired or replaced.

3.0 CONTAINMENT CELL

The containment cell is constructed with a single liner, leachate collection system, and a lined cap. It is a triangular-shaped cell, covers approximately one acre with approximate perimeter of 1,000 feet at the toe of slope (see As-Built Drawing G3). From the toe, the cell slopes upward to an estimated height of 20 feet, and contains approximately 16,000 cubic yards of waste soil.

A Site Inspection Report (Form A) is provided in Section 9.0 which can be used to record the condition of the containment cell components. Containment cell features requiring OMM include the following:

C Surface cover system;

C Gas vents;

C Collection pipe and cleanout; and

C Perimeter trench drains.

3.1 Surface Cover System

The containment cell is constructed with three sides (north, southeast, and southwest) that have approximate slopes of 30 percent, as indicated on As-Built Drawing G3. The top flattens out to roughly 6 percent. The 30 percent slopes are over 100 feet long, and may be conducive to erosion. The possibility of erosion would likely be greatest around the perimeter toe of the slopes. As an erosion control measure, fabric placed along the lower portion of the containment cell. At Ditch A, erosion control fabric extends up the slope approximately 25 feet.

During the containment cell inspection, particular attention will be paid to its overall physical appearance. Adequate vegetative cover over the containment cell surface is essential to reduce sheet erosion and resulting loss of soil. If rivulet erosion is noted, OMM repairs will be performed to return the cover system to its original-design condition. If erosion is allowed to continue through the 6-inch topsoil layer, exposing the underlying protective soil layer. This material is granular in nature and will erode quickly (See Contract Submittal, MP-02222). Inspection should also include view for rodent or vermin control. As burrowing animals can cause subterranean damage, an aggressive approach must be enacted to retain the integrity of the containment cell cover system. Once the animals have been extricated, the cover system will be returned to its original-design condition, as described above.

Any signs of slope failure or mass earth movement will require immediate attention. Additionally, any subsidence (settling) or lifting (possible gas pocket) must be identified. If identified, a geotechnical engineer should be employed to ascertain the extent of the damage and subsequent repair plan. If subsidence or lifting is found to be substantial, where the integrity of the HDPE liner is in question, excavation would be considered by the Engineer. This would be performed initially by equipment and then by hand so as not to damage the HDPE liner. This liner would be inspected and repaired, if required, as outlined in Contract Specification Section MP-02234. The repair plan should include, but not be limited to, construction activities that would return the containment cell to its original design condition, as outlined in the As-Built and Contract Drawing and RD Specifications.

The inspection for slope erosion will require documenting damaged areas. The extent and magnitude of these damages will dictate the timeliness in which the repairs are to be made. Inspections should be conducted on a monthly basis. Inclement weather conditions, such as a heavy precipitation event, may warrant additional inspections.

General maintenance will include the placement of clay-laden topsoil (see RD Specifications and/or Contract Submittal Section MP-02212) in the eroded voids by hand or using appropriate mechanical equipment. The voids should be slightly overfilled then compacted then compacted to the original grade of the cap. Once the topsoil has been compacted and graded, the area will be seeded, and straw or hay will be applied, as noted in the RD specifications. If mechanical equipment is utilized too, it must have a ground pressure of 5 pounds per square inch (psi) or less so as not to damage the cover system. If erosion persists in a particular area, the Engineer may elect to use alternative erosion mitigation methods, such as riprap or fabric, to provide additional control.

Vegetation covering the containment cell should be cut at least twice a year, to facilitate visual inspection of the surface and to eliminate unwanted deep rooted trees and shrubs.

3.2 Gas Vents

The containment cell is equipped with two passive release gas vents. Vent No. 1 is a 6-inch diameter, Schedule 80 polyvinyl chloride (PVC) pipe which extends approximately 4 feet above the containment cell surface at its highest point (see As-Built Drawing G3). Vent No. 1 services the general waste material, which constitutes 85 percent of the containment cell mass. Vent No. 2 is a 4-inch pipe of the same construction as Vent No. 1. It is located on the west ridge of the containment cell and services the former soil vapor extraction (SVE) waste mass.

Visual inspection of the gas vents will be performed to ensure that the PVC piping has not been physically damaged. Damaged gas vents, could potentially become plugged and/or promote surface water infiltration into the containment cell. If damage occurs to a gas vent, the extent of the damage will be documented and subsequently repaired to its original design condition within one week. If any damage to the gas vents is identified the Engineer will be notified.

3.2.1 Sampling Protocol

As part of the scheduled inspection of the two containment cell gas vents, a vapor emission test will to be performed. The purpose of the test will be to evaluate whether volatile organic compounds, (VOCs) are being emitted at the vent openings, and to identify any health and safety issues for workers within the RAF, at the site, and off site.

Air monitoring will be conducted using a photoionization detector (PID). The PID measures quantitative concentrations of VOCs and other compounds. The PID should be certified for use in Class 1, Division 2, Group A, B, C, and D environments. Calibration, operation, and maintenance procedures are presented below.

PID Calibration

PID field instruments will be calibrated and operated to yield “total organic vapor” in parts per million (ppm) (v/v) as benzene. Operation, maintenance, and calibration shall be performed in accordance with the manufacturer’s instructions and documented on a PID calibration and maintenance log or the air monitoring logs (see Form A in Section 9).

1. Don (apply) personnel protective equipment (PPE).

2. Turn the FUNCTION switch of the PID to the BATTERY CHECK position. Check that the indicator is within or beyond the green battery arc. If the indicator is below the arc or the red LED is lit, the battery must be charged.

3. Turn the FUNCTION switch to the STANDBY position and rotate the ZERO POTENTIOMETER until the meter reads zero. Wait 15 to 20 seconds to confirm the adjustment. If unstable, readjust.

4. Check to see that the SPAN POTENTIOMETER is adjusted for the probe being used (e.g., 9.8 for 10.2 eV).

5. Set the FUNCTION switch to the desired ppm range (0-20, 0-200, or 0-2,000). A violet glow from the UV source should be visible at the sample inlet of the probe/sensor unit.

6. Listen for the fan operation to verify the fan function.

7. Connect one end of the sampling hose to the calibration canister regulator outlet and the other end to the sampling probe of the PID. Crack the regulator valve and take a reading after 5 to 10 seconds. Adjust the SPAN POTENTIOMETER to produce the concentration listed on the span gas cylinder. Record appropriate information on the field calibration log or the air monitoring log.

8. If so equipped, set the alarm at the desired visual or audible level.

9. Subsequent to obtaining a reading return the FUNCTION switch to the standby position.

Maintenance Procedures

1. At the end of each day or after 8 hours of monitoring with the PID, recharge the batteries for 12 hours.

2. Store the instrument in a protective case when not in use.

3. Keep records of operation, maintenance, calibration, problems, and repairs.

4. After use, the instrument should be inspected and observation noted in the field notebook.

5. A replacement instrument should be available on site or ready for overnight shipment, if necessary.

6. The PID should be sent back to the manufacturer for service, if necessary.

7. Record calibration information on the PID Calibration and Maintenance Log.

Equipment Cleaning

After each use, the readout should be wiped down with a clean cloth or paper towel. The UV light source window and ionization chamber should be cleaned in the following manner once a month:

1. With the PID off, disconnect the sensor/probe from the unit.

2. Remove the exhaust screw, grasp the end cap in one hand and the probe shell in the other, and pull apart.

3. Loosen the screws on the top of the end cap, and separate the end cap on ion chamber from the lamp and lamp housing.

4. Tilt the lamp housing with one hand over the opening so that the lamp slides out into your hand.

5. Clean the lamp with lens paper as per manufacturer's specifications..

6. Clean the ion chamber using methanol on a Q-tip® and then dry gently at 50 degrees Celsius (ºC) to 60ºC for 30 minutes.

7. Following cleaning, reassemble by first sliding the lamp back into the lamp housing. Place ion chamber on top of the housing, making sure the contacts are properly aligned.

8. Place the end cap on top of the ion chamber and replace the two screws, tighten the screws only enough to seal the o-ring.

9. Line up the pins on the base of the lamp housing with pins inside the probe shell and slide the housing assembly into the shell.

Air Monitoring Procedure

1. Calibrate PID meter (see PID Calibration).

2. Measure and record the background PID reading, while standing upwind of the area to be monitored.

3. Observe the breathing space reading as the vent (source) is approached from the downwind side.

4. Approach the vent from the downwind side while observing the meter. If, at any time while approaching a vent, the meter registers 5 ppm or higher, a PPE respirator should be used. Readings of this magnitude must be reported to the Engineer. If work is being performed at the RAF at the time, a contingency response plan must be initiated.

5. A final reading should be recorded with the PID tip inserted up into the vent. If it is windy, the vent should be covered so as not to affect the reading.

Vapor Emissions Response Plan

Should the 5 ppm action level (above site background) for VOCs be exceeded at the work area perimeter, then, in addition to stopping work, VOC monitoring will continue at the work perimeter area. If the VOC level decreases below the 5 ppm action level, then work activities may resume but more frequent intervals of monitoring, as directed by the Engineer, may be conducted. If the VOC level remains greater than 5 ppm but less than 25 ppm (above site background) at the work area perimeter, then work activities may resume, provided that:

- Proper PPE (Level C) is used;

- The VOC level 200 feet downwind of the work area perimeter or half the distance to the nearest residential or commercial structure, whichever is less, is less than 5 ppm (above site background); and

- Monitoring frequency is increased, as directed by the Engineer.

If the VOC level is greater 25 ppm (above site background) at the work area perimeter, additional downwind air monitoring as directed by the Engineer, will be implemented to determine whether vapor emission levels at the nearest structure and at the site perimeter is of concern. Levels of this magnitude are not expected.

3.3 Collection Pipe and Cleanout

The containment cell is equipped with a single 6-inch diameter HDPE collection pipe that runs continuously east to west through the cell, terminating at the leachate collection manhole (As-Built Drawing G3). At the eastern ridge of the cell, the upper end of the collection pipe surfaces as a cleanout pipe. During scheduled inspections, this cleanout pipe should be viewed and its physical condition determined. Any movement or physical damage must be noted, brought to the Engineer's attention, and repaired to its original-design conditions. The cleanout pipe is a secured entry into the containment cell; therefore, the inspection must evaluate if the cap and lock are sufficiently in place.

If the leachate flow appears to be obstructed, as determined by the Engineer, the collection pipe must be cleaned. Cleaning will be performed using a high pressure water injection line accessed through either the collection cleanout pipe or the downstream end of the pipe located in the leachate collection manhole. A flexible hose with a high pressure, low flow nozzle should be placed in the downstream end of the pipe and advanced upstream using a reverse action spray nozzle. All cleaning water must be collected, tested, and handled as leachate.

3.4 Perimeter Trench Drains

The containment cell is equipped with a 12-inch thick granular drainage layer located approximately 1.5 feet below its surface. The drainage layer provides a means for unaffected water, that has penetrated the surface, to be drained. Unaffected water from the drainage layer is directed into an enclosed, high permeability perimeter trench. This perimeter trench contains a 4-inch diameter collection pipe that exits into the cell perimeter ditch at four locations, as shown on As-Built Drawing G3. Two exit points are located along the north face (PD-1 at the west end and PD-2 at the east end); one along the southeast face (PD-3); and one along the southwest face (PD-4). The perimeter trench drains consist of a 4-inch pipe within a 6-inch HDPE protective casing, and are surrounded by riprap at the exit point into the perimeter ditch.

Each of these four drains will be regularly inspected to assess their operational condition. If operational condition of a drain is impaired by movement or physical damage, the problem must be noted and repairs made to return the drain to its original-design condition within one week. The drain pipe must remain clear and not be allowed to clog. Water allowed to back up could have a detrimental effect on the containment cell cover. Animals have been known to clog open-ended pipes; therefore, a screen is affixed to the opening and should be checked during scheduled inspections.

4.0 LEACHATE COLLECTION MANHOLE

The Leachate Collection Manhole (manhole) is located directly east of the containment cell and west of the RAF building (see As-Built Drawing G3). The purpose of the manhole is to safely collect leachate generated by the containment cell waste through gravity drainage and then pump the leachate to a storage tank within the RAF building. The manhole and associated influent and effluent pipes are of doubly containment construction. If a pipe or the manhole should acquire a leak, a secondary containment system is provided as a contingency.

The following subsections generally describe the construction and subsequent operation of the manhole and associated components. A Site Inspection Report (Form A) is provided in Section 9.0, which can be used to record the condition of these components.

4.1 Manhole

The manhole is constructed of a 2-inch thick, 50-inch inside diameter HDPE pipe. The manhole is approximately 10 feet deep, with a concrete base. This pipe is enclosed by a second 2-inch thick, 63-inch outside diameter HDPE pipe, providing an interstitial space for leak detection. The manhole was prefabricated by Ayer Sals Systems Division, Syracuse, New York, and delivered to the site. The entire manhole is capped with a pre-cast concrete cover that includes a 42-inch by 42-inch access door. At the surface, there is an electrical panel to control the pumps and instrumentation, as well as two bollards for protection. Details of the manhole are shown on As-Built Drawing M4.

Specifically, the manhole contains the following components:

- A six-inch HDPE leachate drainage influent pipe within a 10-inch HDPE containment pipe;
- Lead/lag pumping system (two pumps);
- Check valve and shut-off valve for each pump;
- Two-inch HDPE leachate conveyance effluent pipe within a 6-inch HDPE containment pipe;
- Float switch on the effluent containment pipe;
- Four mercury float switches;
- Electrical service appurtenance;
- Two manhole interstitial space access ports (one is fitted with a float switch); and
- Fixed access/egress ladder.

The interior of the manhole is considered to be a hazardous area (NEC Class 1, Division 1, Group D); therefore, proper confined space entry (see Section 4.6) and health and safety protocol must be followed when entering. Floating debris should be collected and discarded in an appropriate waste receptacle. Sediment can cause damage to the pumps; therefore, if over ½-inch of sediment is noted, the manhole should be cleaned out. Generally, a vac truck will be employed to remove the sediment, although it can be manually collected, as long as the aforementioned entry protocol is followed. All liquids and/or soils removed during cleaning must be analytically tested and disposed of accordingly.

During the scheduled inspection, the overall condition of the manhole and surrounding components should be reviewed. Any physical damage or displacement of any component, inside or at the surface, must be noted and brought to the Engineer's attention. Any floating debris or substantial sediments within the manhole should be removed.

4.2 Pumps and Plumbing

4.2.1 Pump Construction

The two pumps housed within the subgrade manhole are submersible, centrifugal, explosion-proof, sewage grinder type units. Each is rated at 2 horsepower (HP), 460 volts, 3-phase, 60 hertz, 3450 revolutions per minute (RPM), producing 40 gallons per minute (gpm) at 20 feet of total head. The pumps (Model No. G1LX200JD) are manufactured by Aurora Hydromatic Pump, Inc., and are installed with an electrical power cord, a sensor cord, service chain, and vertical plumbing. A manufacturer's service manual is included in the Contract Submittals (Section MP-15146) and should be consulted during pump maintenance. Pump testing will be discussed in a section to follow.

4.2.2 Plumbing

A 2-inch PVC pipe extends upward from each pump, passing through a check valve, an elbow, and a ball valve prior to joining the other pump at a tee (see As-built Drawing M4), which connects to the leachate storage tank by way of the conveyance pipe. The installed ball valve is a union connection, which will facilitate pump removal and plumbing repair. The integrity of the piping should be visually noted from the surface of the manhole during the scheduled inspections to insure that it is in proper functioning order and is not disturbed or leaking. As the plumbing is totally housed in the manhole, any leaks are contained. this will provide time to acquire material to conduct a permanent repair, as well as set up for proper entry protocol (see Section 4.6). If required, a vac truck can be employed to control the liquid level in the manhole.

4.2.3 Pump Changeover

The leachate transfer system is designed with an automatic lead/lag pumping system. Two identical submersible pumps (Pump No. 1 and Pump No. 2) are located in the manhole; either one can be activated as the lead pump. The system is designed so the one pump can manage the volume if leachate is generated. The lag pipe serves as a back-up and would be activated automatically in the event that the lead pump should fail. During the scheduled inspection, the active lead pump duty will be changed over to allow similar running times for both pumps. The control panel, located adjacent to the manhole, contains a three-position switch (HAND/OFF/AUTOMATIC [HOA]) for each pump, as well as a lead pump switch. The lead pump switch controls which pump is running under normal operations. A pump must be switched to automatic for the lead/lag system to function. The pump's automatic controls are reviewed in Section 4.2.5.

Once the manhole door has been opened, and the aforementioned components are inspected and found to be satisfactory, the control panel should be accessed. At this time, each pump should be tested by switching it from AUTOMATIC to the HAND position long enough to confirm operational status. Operational status should be confirmed visually and audibly, by noting if the green "on" light above the switch is illuminated and listening for the sound of the pump motor. Once operational status is confirmed, both pumps should be returned to the AUTOMATIC position. The lead pump selection switch is then changed, allowing the lead/lag operational roles to switch, therefore completing the changeover procedure. The two pump hour meters should be read and recorded on Form A (attached in Section 9.0) as part of the procedure.

4.2.4 Pump Change Out

If a problem is discovered during a scheduled pump inspection/changeover, or if a high leachate level alarm is received, then the operational status of the pumping system is in question. Once the manhole and control panel have been accessed and inspected, the active lead pump should be switched briefly from the AUTOMATIC to the HAND position. If the pump runs, the automated switching gear may be in question. If the pump does not operate, it should be repaired or replaced as soon as possible. In this event the lag pump would be set to operate as the lead pump. The lag pump should be switched temporarily to the HAND position to confirm operation, then switched to the AUTOMATIC mode.

In the event that both pumps are inoperable, and a high leachate level is observed, the manhole must be manually pumped out, either by a tank truck, or by externally pumping the leachate to the leachate tank. If this condition exists the Engineer should be notified immediately.

To change out a pump, the manhole must be accessed. The interior of the manhole is considered to be a hazardous area and proper protocol must be followed to enter a confined space. Although each pump is equipped with a hoisting chain, the manhole will have to be entered to perform the change out. The pump change out procedure is as follows:

1. Set up the work area. Place plastic sheeting on the ground to accept the pumps and tools.

2. Set up the confined space entry equipment as set forth in Section 4.6.

3. Pump out as much leachate from the manhole as possible using the installed pumps or any external unit.

4. Shut down the power to the pumps by accessing electrical panel "PP," located in the building (lockout, tagout, tryout).

5. Enter the manhole and plug the 6-inch influent pipe.

6. Examine the condition of the manhole and its components. These observations can be described to the attendant to record.

7. Close the 2-inch valve, isolating the pump being removed (see As-Built Drawing M4).

8. Disconnect the 2-inch union at the pump side of the valve. Note that leachate may momentarily spray when fitting is first loosened. The pump is now free with exception of the power cord, sensor cord, and lifting chain.

9. The manhole can now be exited, and the pump removed.

10. The pump should be removed from the manhole by use of the lifting chain. This can be done by hand or with the use of a winch.

11. Allow the pump to drain into the manhole. Generally, come leachate will remain in the pipe, due to the check valve, it must also be drained. The pump must be repositioned so that the open end of the pipe can be lowered, allowing the remaining leachate to drain into the manhole.

12. Once removed the pump should be placed on a plastic sheeting for maintenance. The manufacturer's manual, contained in the project Contract Submittals, should be consulted for maintenance information.

13. Once the pump has been changed or repaired, and installed back into the manhole, recheck that the fittings are tight, the valve is reopened, and the cords are fixed in a safe location.

14. The plug in the influent pipe should be removed as the entrant exits the manhole.

15. To test the newly installed pump, turn on the power and follow the procedures noted in Section 4.2.3.

16. Document the he pump change out and record the hour meter.

4.2.5 Pump Automatic Controls

The leachate collection manhole contains four mercury float switch level controls (Hydromatic Model 3900 by Aurora Pump), as shown on As-Built Drawings M1 and M4. The float switches are bulb-shaped in appearance and hang loose in the manhole. During normal operations, two float switches are used to turn on (Level Switch Low [LSL 100]) and turn off (Level Switch Low Low [LSLL 100]) the active lead pump when placed in the AUTOMATIC mode. If the lead pump is unable to control the leachate level, the manhole is equipped with an additional mercury float switch (Level Switch High [LSH 100]. This switch activates the lag pump, which will be activated as a backup contingency. The fourth mercury switch (Level Switch High High [LSHH 100]) operates the alarm circuit. If the leachate level in the manhole surpasses the lead pump switch, the LSHH 100 float switch will activate the "Manhole High Level" alarm that, in turn, activates the auto dialer.

Each year, the four mercury float switches should be inspected and tested. This involves a specific procedure for each float switch. The following reviews each switch, in order from the upper to the lower:

LSHH 100 Switch - Manhole High Level Alarm

C Physically turn the LSHH 100 mercury float switch up, indicating a manhole high liquid level.

C Confirm the illumination of the appropriately cabled red light on the manhole electrical panel.

C Allow the switch to hang down again, noting that the red light is turned off. This confirms that the mercury float switch is functional.

C Access the auto dialer. It should have recorded the manhole high level (Alarm A-5). Testing protocol for the auto dialer is discussed in Section 5.2.5.

LSH 100 Switch - Lag Pump On Switch

C The lag pump on switch, second from the top, is tested in conjunction with the LSL 100 and LSLL 100 switches.

C Access the manhole control panel to ensure that the lead and lag pumps are set to the automatic mode.

C Physically turn the mercury float switch second from the top up momentarily, indicating that the liquid has reached its upper working level. This would be performed immediately after testing the LSL 100 switch.

C With the lead pump running, the lag pump should start and continue to run even after the float switch is allowed to drop down.

LSL 100 Switch - Lead Pump On Switch

C The lead pump on float switch, third down from the top, is tested in conjunction with the LSH 100 and LSLL 100 switches.

C Access the manhole control panel to ensure that the lead and lag pumps are set to the automatic mode.

C Check the LSLL 100 switch to ensure that it is floating, indicating that there is enough liquid in the manhole to operate. If the liquid level is not sufficient enough, then the LSLL 100 switch will have to be manually turned upward to test the LSH 100 and LSL 100 controls.

C Briefly turn up the LSL 100 switch, third down from the top, which will start the lead pump, then immediately turn up the LSH 100 switch (as described above) to activate the lag pump.

C Also note that the individual green indicator lamp on the manhole control panel will illuminate, signifying that the switch gear is functional.

C The pump will run continue to lower the leachate level until the LSLL 100 switch, the lowest switch, turns down.

LSLL 100 Switch - All Pump Off Switch

- The off switch, the lowest switch, is tested in conjunction with the two on switches, LSH 100 and LSL 100, reviewed above. The off switch is configured to control both pumps.

- As previously discussed, the pumps will continue to run until the LSLL 100 switch goes from a floating position to a hanging down position.

- The pumps should shut off once the switch hangs down, indicating the lower working leachate level.

The mercury float switches and interior of the manhole should be kept clean of debris so as to not affect their operations.

If a mercury float switch is not operable or malfunctioning, it should be repaired within one week. If repair/replacement takes longer than a week, a site visit must be scheduled on a regular basis to ensure that the leachate is managed appropriately.

4.3 Electrical

Electrical power to the manhole is received through underground conduit from the building to the manhole control panel, then continuing underground to the manhole. A 480 volt, 3-phase, 20 amp service is installed. Wiring for the alarm sensors is fed back to the auto dialer through adjacent underground conduit.

4.3.1 Control Panel

The manhole control panel is located on the north side of the manhole. The panel has external operational lights, control switches, and hour meters. The operation of these features is discussed in the next section. Attached to the control panel is an overhead light, 110 volt a receptacle, and the 3-phase to single phase transformer. Internally, the control panel contains fuses, circuit breaker, relays, and a heater. A wiring schematic and layout is provided in the auto dialer manual included in the Contract Submittals Section MP-16900.

4.3.2 Pump Controls

The control panel contains functions necessary to operate and monitor the functioning for the two leachate pumps housed in the manhole. An upper "power on" light (white) indicates that there is power to the panel. Three pump control switches are located below the upper white light. The center switch is the "Lead Selector Switch," identifying which pump, Number 1 or Number 2, is actively being controlled by the lead float switch, as described in Section 4.2.5. The other would be the lag pump. A green light above the pump switch indicates that the pump is operating. The pump control switches to the left and right of the lead selector switch, have three positions (HAND/OFF/AUTOMATIC [HOA]). These switches function as follows:

- The HAND position allows the pump to operate manually without the automatic leachate level controls;

- OFF is used for the period when the pump is not in use or during system testing; and

- AUTOMATIC is the normal operating position for both pumps. The AUTOMATIC setting allows the mercury switch level controls to maintain the amount of leachate in the manhole.

The control panel also contains an hour meter for each pump. These readings are to be recorded during scheduled inspections and during the pump changeover or change out procedure. These procedures are detailed in Sections 4.2.3 and 4.2.4, respectively. The pump operation is also controlled by a fail safe system. This is a permissive relay contained in the manhole control panel, which is activated only by certain conditions at the tank. If the storage tank is full or liquid is in the dike containment, the permissive relay is activated, resulting in power being shut off to the pumps. Additional information on the permissive relay is provided in Section 6.3.

4.3.3 Alarm Features

The manhole control panel receives alarm signals from the three sensors within the manhole, as follows:

- "High Manhole Level" (LSHH 100) notes a high leachate level in the collection manhole, which, in turn, activates the alarm channel A-5 of the auto dialer;

- "Manhole Leak" (LSHH 200) alarm senses leachate in the interstitial space of the manhole, which, in turn, activates the alarm channel A-6 of the auto dialer; and

- "Pipe Leak" (LSHH 201) alarm indicates that leachate is in the manhole effluent containment pipe, which, in turn, activates the alarm channel A-7 of the auto dialer.

Each of these sensors are supported by a red light on the control panel, which is illuminated in an alarm situation. These alarm signals also activate the auto dialer (see Section 5.2.5) located in the building. A detailed description of these features and testing protocols for the high manhole level alarm has been outlined in Section 4.2.5, alarm features are discussed in the sections that follow.

4.4 Manhole Interstitial Space

The HDPE leachate collection manhole is encompassed by an HDPE secondary containment providing an approximately 3 inches of annular or interstitial space, as shown on As-Built Drawing M4. This space will collect and provide warning if the collection manhole should leak. The annular space is accessed through two ports located inside the manhole. These ports can be viewed through the access door at the surface and should be observed during the scheduled manhole inspection. One port is fitted with a leachate level detection device that will activate the light on the control panel, as well as the auto dialer, and provide a warning that the interstitial space contains leachate. The second port has a removable cap to allow observation and servicing.

The interstitial space monitoring device is a leachate level switch (float switch, manufactured by Flowline; see Contract Submittal MP-15146) that should be situated within a few inches (initially set at 3 inches) of the bottom of the manhole. Due to condensation and the inability to totally pump out the interstitial space volume, the probe cannot be placed on the bottom. If the leachate level in this space rises to the leachate level switch, the auto dialer will be activated. If activated, the system should be serviced within a week.

Upon opening the manhole for servicing, an overall visual inspection should be performed to evaluate if the remaining systems are operational. The observation port on the inside of the manhole is then opened. This procedure involves a person to be in the manhole and proper health and safety protocol must be followed (see Section 4.6). The depth of liquid in this interstitial space should be measured and recorded and a pump used to remove the leachate. The recovered liquid should be pumped into the manhole, and a sample be obtained for water quality analysis. The sample analysis will determine if the liquid is leachate or surface water infiltration. Commonly, the liquid is water, not leachate, from condensation. Sampling and analytical information are provided in Section 6.5. Generally, the leachate can be identified by the evidence of VOCs. If it is found to be leachate, the Engineer should be contacted and an investigation conducted to assess the probable source. Once the source of the leak is identified a corrective action should be implemented. The corrective action would be specifically described by the Engineer, which may require patching by extrusion welding, excavating the manhole to expose the outside for repair or, ultimately, total replacement.

The interstitial space float switch should be maintained and tested on a yearly basis. This involves entering the manhole and removing the float switch. Once removed, and cleaned, lift the float, this will activate the alarm, indicating that the unit is functional. The float switch can also be tested by adding water into the interstitial space. The alarm should activate with approximately 3 inches of water. The added water should be pumped out. If an alarm is not indicated, repair or replacement of the switch or controls within the panel will be required.

4.5 Conveyance Pipe Interstitial Space

As with the manhole, the influent and effluent piping is constructed such that leaks can be detected and contained. This type of construction is commonly known as double containment piping. It involves a conveyance pipe that handles the leachate transfer, and an outer or second pipe, which totally surrounds the conveyance pipe. The annulus area is identified as the interstitial space that contains and provides a means of leak detection.

The leachate is transferred from the leachate collection manhole to the leachate storage tank by means of a conveyance pipe, which consists of a 2-inch HDPE pipe within a 6-inch HDPE pipe. It has been constructed such that any leachate in the interstitial space will flow by gravity back to the manhole. The annular space is capped at the manhole and is equipped with a liquid level detection device. The liquid level detection device is similar to the float located in the manhole interstitial space reviewed in the previous section. If the conveyance pipe, which is under pressure from the pumps, should acquire a leak, it would be contained and acknowledged by this float switch. Subsequently, the panel light and auto dialer would be activated. The float switch and its circuits should be tested on a yearly basis.

Should a conveyance pipe interstitial space alarm be received, the site should be accessed as soon as possible. Once on site, an overview of the facility should be conducted to ensure that all systems are up and functioning. The manhole must be entered following the protocol provided in Section 4.6.

The float switch is attached to the bottom of the 6-inch containment pipe within the manhole, as well as a drain valve. This is used to first sample, then drain the containment pipe. If little or no liquid is observed, activation may be the result of condensation or a faulty switch. If liquid is present, a sample should be collected and analyzed to evaluate whether the liquid is leachate, water infiltration or condensation. Sampling and analytical information are provided in Section 6.5. Generally, the leachate can be identified by the presence of VOCs. If VOCs are present, the Engineer would supply recommendations to address further actions.

If a large amount of liquid is drained from the valve and/or is deemed leachate, the Engineer should be contacted. The contingency plan would include shutting off the pumps and the employment of a tank truck, portable pump, and hose to temporarily transfer leachate to the RAF tank or a portable pump and tank system until permanent repairs are made. The conveyance line may need to be exhumed to conduct repairs.

Similar to the manhole effluent line, the influent leachate line into the manhole is of double containment construction. It is also graded to allow flow, by gravity, into the manhole. Although the influent pipe is not under pressure, leaks can occur. As there is no alarm system for the influent line, it must be visually checked during scheduled inspections. If leachate is observed coming from the interstitial space, the Engineer should be contacted and the incident assessed.

4.6 Confined Space Entry

All inspectors or contractors involved in confined space entry activities or conducting activities near confined spaces, which may create a hazard inside the space, must meet the regulatory requirements outlined in 29 CFR 1910.146: Permit-Required Confined Spaces. This section contains the requirements and procedures for working in confined spaces. A confined space is defined as a space large enough and so configured that a person can bodily enter and perform assigned work, has limited means for entry or exit, and is not designed for continuous employee occupancy. Potentially contaminated confined spaces may pose additional hazards such as air contamination, flammable or explosive atmosphere, and oxygen deficiency. Confined space entry may pose the possibility of engulfment. Personnel must be properly trained in order to supervise and participate in confined space entry procedures or serve as standby attendants. The confined spaces for this project include but are not limited to the leachate collection manhole.

4.6.1 Duties of Personnel

Each confined space being entered shall have a minimum of one dedicated attendant and one other support person (who may have other duties) within sight or call for the entrants.

Duties of Entrants:

C Know the hazards that may be faced during entry, and confined space work. Hazards include, but are not limited to:

< Heat or cold exposure;
< Toxic or oxygen deficient atmospheres;
< Slips and falls; and
< Equipment operations.

C Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space. Be versed in non-verbal communication procedures, such as hand signals.

C Alert the attendant whenever:

  < The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or
  < The entrant detects a prohibitive condition.

C Exit from the permit space as quickly as possible whenever:

  < An order to evacuate is given by the attendant or the entry supervisor,
  < The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,
  < The entrant detects a prohibitive condition, or
  < An evacuation alarm is activated.

Duties of Attendants:

C Know the hazards that may be faced during entry, and confined space work. Hazards include, but are not limited to:

  < Heat or cold exposure;
  < Toxic or oxygen deficient atmospheres;
  < Slips and falls; and
  < Equipment operations.

C Be aware of possible behavioral effects of hazard exposure in authorized entrants. The behavioral effects include, but are not limited to:

  < Disorientation;
  < Slurring of speech;
  < Irritability;
  < Confusion; and
  < Reddened face.

C Continuously maintain an accurate count of authorized entrants in the permit space and accurately identify who is in the permit space by tagging the lifelines with the entrant's name, and recording the names of all entrants.

C Remain outside the permit space during entry operations or until relieved by another qualified attendant.

- Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space. Communication should include pre-determined hand signals to relay emergency information.

- Continuously monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit space immediately under any of the following conditions:

    - If the attendant detects a prohibitive condition;
    - If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
    - If the attendant detects a situation outside the space that could endanger the authorized entrants; or
    - If the attendant cannot effectively and safely perform all his duties.

- Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.

- Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:

    - Warn the unauthorized persons that they must stay away from the permit space;
    - Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and
    - Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.

- Perform non-entry rescues.

- Perform no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

Duties of Entry Supervisors:

- Know the hazards that may be faced during entry, and confined space work. Hazards include, but are not limited to:

    - Heat or cold exposure;
    - Toxic or oxygen deficient atmospheres;
    - Slips and falls; and
    - Equipment operations.

- Verify, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted, and that all procedures and equipment specified by the permit are in place before endorsing the permit and allow entry to begin.

- Terminate the entry and cancel the permit as required.

- Remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations.

- Determine that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

- Document on the entry permit any incidents or circumstances requiring review of the confined space entry program. Such incidents include:

  - Unauthorized entry;
  - The detection of a condition/hazard not authorized by the permit;
  - The occurrence of an injury or near-miss during entry;
  - A change in use of configuration of the space; or
  - Employee observations about the confined space entry.

- Prescribe procedures for coordination of entry when personnel from multiple employers will work simultaneously.

4.6.2 Protocol for Confined Space Entry

Isolation Requirements: The confined space must be isolated to prevent the introduction of contaminants during entry. Isolation must include disconnecting or installing slip blanks (plugs) into all lines leading to the space. When isolation is not practical or possible (as in sewer entry), entry conditions must be continuously monitored using real-time monitoring devices such as PID, LED, and other devices designed to detect contaminants that may be present in the space.

To prevent injury from physical hazards within the space, lockout, ragout, tryout, and return to service procedures must be implemented for potential sources of hazardous energy.

Atmospheric Hazard Control: Atmospheric hazards must be eliminated or controlled to meet the requirements specified in the table following this section. If necessary, the space shall be purged or inserted, then ventilated to the extent necessary. Ventilation equipment may be needed to maintain these conditions.

Testing Equipment: The monitoring devices to be used, at a minimum, are a combustible gas/oxygen (LED/O_2) hydrogen sulfide/carbon monoxide monitor for confined space and excavation entry, a Drager pump with a vinyl chloride-specific (vinyl chloride 0.5/a or 0.5b), and a PID. All monitoring equipment shall be maintained in such quantity and condition, per manufacturer recommendations, to adequately monitor and assess all confined space entries.

Testing Procedures: Procedures for inspecting, monitoring, and testing the confined space to verify that acceptable conditions exist prior to and throughout the entry operation are as follows:

- Permit-required confined spaces shall be tested initially prior to entry and then continuous testing with real-time direct reading instruments during entry activities. Priority for atmospheric hazard testing shall be: 1) oxygen; 2) combustible gases/vapors; and 3) toxic gases.

The following table provides action levels for specific parameters:

Airborne Contaminant Action Levels

Parameter	Reading	Action
Total Organic Vapors	0 ppm to # 1 ppm	Normal operations; continue breathing zone monitoring
	1 ppm to 10 ppm	Modified Level D operations; use colorimetric tube to screen for vinyl chloride
	> 25 ppm	Use colorimetric tubes to screen for trichloroethylene and 1,2-dichloroethylene
	10 ppm to 50 ppm	Upgrade to Level C if vinyl chloride action levels are not exceeded; increase monitoring frequency
	$ 50 ppm	Stop work and evacuate area; investigate cause of reading; evaluate need for upgrade to Level B PPE
Vinyl Chloride (Determined with Colorimetric Tube)	0 to 1 ppm	Normal operations
	$ 0.5 ppm	Implement personal sampling for vinyl chloride
	> 1 ppm	Stop work and evacuate area; investigate cause of reading; evaluate need for upgrade to Level B PPE
Trichloroethylene (Determined with Colorimetric Tube)	0 to 50 ppm	Normal operations
	> 25 ppm	Implement person sampling for trichloroethylene
	> 50 ppm	Stop work and evacuate area; investigate cause of reading; evaluate need for upgrade to Level B PPE
1,2-Dichloroethylene (Determined with Colorimetric Tube)	0 to 200 ppm	Normal operations
	> 100 ppm	Implement personal sampling for 1,2-dichloroethylene
	> 200 ppm	Stop work and evacuate area; investigate cause of reading; evaluate need for upgrade to Level B PPE
Total Dust	< 0.150 mg/m^3	Normal operations
	$ 0.150 mg/m^3	Implement dust suppression activities; monitor perimeter for off-site migration above 0.150 mg/m^3; upgrade to Level C PPE
Flammable Vapors (LED)	< 10% LED	Normal operations
	$ 10% LED	Stop work; ventilate area; investigate source of vapors
Oxygen during Confined Space/Excavation Entry	> 19.5%, < 23.5%	Acceptable condition; normal operations
	< 19.5%, > 23.5%	Stop work; ventilate area; investigate source of vapors
Carbon Monoxide	< 25 ppm	Normal operations
	$ 25 ppm	Stop work; ventilate area; investigate source
Hydrogen Sulfide	< 5 ppm	Normal operations
	$ 5 ppm	Stop work; ventilate area; investigate source

Notes:
ppm = Parts per million
mg/m^3 = milligrams per cubic meter
LED = Lower Explosive Limit
% = percent

Communications: If verbal communication or hand signals are not practical, provisions for continuous communication between entrants and attendants shall consist of powered communication equipment with the appropriate NEC rating.

Personal Protection Equipment:

- PPE selection will be based on expected contaminants and exposure levels in the space, as directed by 29 CFR 1910.132.

- Protective suits, boots, and gloves - including specifying the material of construction.

- Face, head, and foot protection.

- A chest or parachute harness with approved lifelines at least ½-inch in diameter and 2,000 pounds test. (NOTE: Wristlets may be used only when a harness presents a greater hazard to the employee and wristlets are the safest, most effective alternative).

- All lifelines shall be secured to a mechanical device or fixed point outside the confined space. Mechanical devices shall be used for all vertical entry permit spaces greater than 5 feet deep. Mechanical devices suitable for rescue/retrieval are limited to hand or motor operated winches and/or pulleys.

- Respiratory protection, per 29 CFR 1910.134.

Other Required Equipment: Lighting and electrical shall be of the appropriate National Electrical Code (NEC) rating. Rating should be Class I, Division I unless the space specifically meets other rating requirements.

Ingress and Egress Equipment: Protective barriers to be used to protect entrants from external pedestrian, vehicle, or equipment hazards.

A decontamination area will be constructed directly outside the confined space entry area. The decontamination area will be accessible only to 40-hour Occupational Safety and Health Administration (OSHA) trained personnel. The area is to be used for staging and cleaning of equipment and personnel as they leave the confined space area. The decontamination area is to be constructed, at a minimum, of polyethylene sheeting covering the ground, and set in a way (by frame or berm) so as to capture any water/leachate brought out of the space, or used as cleaning solution. Materials from the confined space are to be cleaned with a detergent solution, or discarded in an assigned container at the decontamination area.

Rescue Equipment: All lifelines must be attached to a mechanical device or a fixed point outside the space such that a rescue can begin as soon as the rescuer becomes aware that a rescue is necessary. A mechanical device must be available to retrieve personnel from vertical type permit spaces more than 5 feet deep.

4.6.3 Permit System

Before entry is authorized, the Entry Supervisor shall complete and sign a Confined Space Entry Permit (see Section 9.0, Form B for sample) to document that all pre-entry requirements have been met and that acceptable entry conditions exist. The entry permit must be completely executed and include all required information. The completed permit shall be posted at the primary entrance to the confined space. All Entry Permits are valid for a maximum of one work shift, and shall be canceled by the Entry Supervisor when the shift ends, confined space operations are complete, or whenever a prohibited condition arises in or near the space. All confined spaces shall be securely closed or barricaded whenever the entry permit is canceled.

4.6.4 Emergency Procedures

The Entry Supervisor shall arrange for outside rescue services which are available and have been informed of the hazards of the confined space to be entered.

The Entry Supervisor must verify that the emergency personnel have been informed of the potential hazards they may confront, and have had an opportunity to examine the space(s). The Entry Supervisor must also verify all necessary equipment is available, and MSDS for potential contaminants are provided to the facility treating any injured/exposed entrants.

4.6.5 Training

General: Prior to assignment to confined space entry work, all involved employees shall receive training in the hazards of confined spaces, work practices to control these hazards, and duties to be performed. Employee proficiency shall be established by testing and/or practical demonstration.

Requirements for Entrants/Attendants: Basic training requirements for entrants and attendants shall include 40-Hour OSHA (or equivalent) and 8-Hour Confined Space Entry (CSE) Entrant/Attendant training. Personnel assigned to attendant duties shall be trained in non-entry rescue procedures.

Requirements for Entry Supervisors: Basic training for entry supervisors and personnel conducting atmospheric testing shall include 8-Hour Confined Space Entry Supervisor Training (or equivalent), 8-Hour Supervisor Training, and 40-Hour OSHA Training.

Requirements for Emergency Rescue Personnel: Personnel assigned to provide emergency entry and rescue services shall be trained annually in the proper use of personnel protective and rescue equipment. Such training shall include a simulated rescue exercise at least once every 12 months. In addition, rescue personnel shall be trained in the hazards and proper work practices for handling blood or other potentially infectious materials.

5.0 BUILDING

5.1 Structure

The RAF building is constructed of all steel with dimensions of approximately 25 feet by 65 feet and approximately 15 feet high at the eaves, as indicated on As-Built Drawing S2. The final design and fabrication of the pre-engineered steel building was performed by CECO Building Systems (CECO) of Rocky Mount, North Carolina (see Contract Submittal Section MP-13600). The floor is slab-on-grade construction. The structural steel columns are based on concrete spread footings, as shown on As-Built Drawing S1.

The following subsections generally describe the construction and subsequent maintenance of the building and associated components. A Site Inspection Report (Form A), is provided in Section 9.0 which can be used to record the condition of these items.

There are three areas to the building:

1. The treatment enclosure;

2. The tank pad; and

3. The truck pad areas.

The treatment enclosure is insulated and has the interior finished in sheet metal. This area is entered through a man door or through a roll-up door. An electric heating unit with thermostatic control is provided, as well as two exterior vents. There are no windows.

The treatment enclosure also houses the main electrical panels (PP and LP), the transformer, the telephone, and the auto dialer. This area has lighting and receptacles as well.

Adjacent to the treatment enclosure is the tank pad area. The tank pad area houses the 5,000-gallon steel leachate storage tank and a surrounding secondary containment dike tank. This area also houses the tank control panel that services all of the sensors affiliated with the leachate storage system. The tank pad area is enclosed on three sides and is equipped with overhead lighting and receptacles.

The truck pad area is open to the tank pad area. This area is also open to the access road on two sides, allowing for drive-through of the receiving tanker truck. The concrete floor is constructed with a sump to collect leachate transfer spills. This area shares overhead lighting with the truck pad area accessed by a switch located at the north wall near the opening.

During the scheduled facility inspection, the building should be reviewed for damages. Damages may occur due to weather-related events, possible vandalism, or misuse. If any substantial damages are noted, they should be scheduled for repair. Incidental maintenance, such as changing light bulbs and general cleaning, should be routinely conducted, as necessary.

5.2 Electrical

5.2.1 Electrical Service

Electrical power is provided by Niagara Mohawk Power Corporation (NMPC). There is a 200 amp, 480 volt, 3-phase service entering from the east side of the site, running overhead to a utility pole within the confines of the RAF. This service is provided only for the RAF building, and is separate from other site buildings (see As-Built Drawing E1). The transformers are mounted to the utility pole and, from there, the service is run through conduits underground to the building. Electrical power is run through a master switch and meter mounted outside on the south side of the building. Power is then supplied to the inside of the building.

The general condition of the electrical service should be observed during the scheduled site inspections. Any vandalism or weather-related damages should be reported and subsequently repaired.

5.2.2 Telephone Service

Telephone service to the building is provided by Bell Atlantic. This emanates from a junction box at the corner of Bleecker Street and Industrial Park Road. The telephone line is underground from this junction and is directed south, following on the inside of the fence at the east side of the site (see As-Built Drawing G1). The telephone line turns west and follows beneath the electrical lines, entering from the east side of the site, to the RAF utility pole. The telephone line resurfaces at this pole and then through a conduit underground into the building.

The telephone service is capable of handling 12 separate lines. This telephone service is provided only for the RAF and is separate from service provided to other site buildings. The RAF presently uses one line (315-724-3928). Similar to the electrical service, the condition of the telephone service should be observed during scheduled site inspections.

5.2.3 Panels and Transformers

Electrical power entering the building is routed to panelboard "PP." The panel services all 3-phase power needs, including the leachate pump, control pond, and unit heater panel board "PP" contains serviceable circuit breakers that protect the electrical components, as well as the transformer. The 25 KVA transformer takes power from this panel and converts it from 3-phase to single phase. The 100 amp service is then routed to panelboard "LP." The "LP" panelboard provides 20 amp circuit breakers to the remaining electrical needs, including power to lights, plugs, heaters, and instrumentation. This panel is designed to accommodate additional future power needs. Electrical information and diagrams are provided in the "E" series of the As-Built Drawings and should be consulted during servicing. Both panels are equipped with a key type locks.

5.2.4 Major Components

5.2.4.1 Unit Heater

Heat is provided to the treatment enclosure portion of the building only. The heater is a 3-phase, 18 amp, 480 volt, 15 KW horizontal overhead unit equipped with a disconnect switch manufactured by Berko (Model HUHAA-1548). The fan is automatically controlled and area temperature is adjusted by a thermostat located on the east wall. Consult the furnished manufacturer's manual contained in the Contract Submittal Section MP-15500 when servicing this unit heater.

5.2.4.2 Heat Tracing

The tank pad area is unheated; therefore, the leachate tank and external plumbing must be protected from freezing temperatures. Leachate temperature is thermostatically controlled by heat tape on piping and a heat pad on the tank. These heating units are manufactured by Thermon. Additional information can be found in the Contract Submittal Section MP-15051. The heating elements are also covered with insulation.

The condition of the heating units should be assessed during scheduled RAF inspections, particularly in the winter months. Observed deterioration or damages should be recorded and repaired. An inspection should be scheduled after a long period (one continuous week) of sub-zero weather to insure that all leachate handling systems are operational. The tank is equipped with a temperature sensor (see Section 6.4) that will trigger the auto dialer. The pipe must be manually checked by touch or use of a thermometer. Ultimately, the pipe flow can be checked by observing the flow totalizer and briefly turning the pump to the HAND position. If the pipe to the leachate tank should freeze and leachate flow is hindered, the auto dialer will be triggered from the high leachate level alarm in the manhole. Should this event occur, the tank or manhole should be pumped out by a tank truck, and the equipment repaired.

5.2.5 Auto Dialer

The auto dialer is a Sensaphone - Intelligent System for Automatic Control and Communication (ISACC), manufactured by Phonetic, Inc., and is located in the treatment enclosure area of the RAF building. It is capable of monitoring up to 16 inputs, providing eight outputs, and calling out an alarm message to a maximum of eight recipients' phone numbers. It is PC programmed, either locally or remotely and utilizes a Windows-based software package. ISACC communicates in voice or data transferred through a modem. A comprehensive outline of the auto dialer is provided in the manufacturer's manual included in the Contract Submittal Section MP-16900.

The ISACC monitors two major components of the RAF (see As-Built Drawing M1):

1. The leachate collection manhole; and

2. The leachate storage tank.

The manhole has the following sensors that trigger the auto dialer to call out an alarm:

- Manhole High Level, Alarm A-5: Indicates that the leachate level is high (approximately 63" above the base of the manhole);

- Manhole Leak, Alarm A-6: Indicates that the manhole interstitial space has liquid present; and

- Pipe Leak, Alarm A-7: Indicates that the conveyance piping containment pipe has liquid present.

The leachate storage tank has the following sensors connected to the auto dialer:

- Tank Level, Alarm A-1: Provides the level of leachate in the tank (this information is provided on an as-call basis, although it can be set as a contingency liquid level alarm, if required);

- Tank 90% Full, Alarm A-4: Alerts the receiver that the tank needs to be emptied (this can be adjusted to a different value);

- Tank Leak, Alarm A-3: Indicates that there is leachate in the secondary containment dike tank (triggers at approximately 5 inches of leachate) and, ultimately, shuts down the pump;

- Tank High, Alarm A-2: Indicates that the storage tank is full (at 92 inches with 4 inches remaining headspace) and, ultimately, shuts down the pumps; and

- Tank Low Temperature, Alarm A-7: Indicates that the leachate is approaching freezing temperature (this activated at or about 35 degrees Fahrenheit [ºF] and can be changed).

The auto dialer also handles other general information, such as:

- Inside Temperature, Alarm A-9: Monitors inside temperature of the treatment enclosure (a high and low alarm can be set);

- Outside Temperature, Alarm A-10: Monitors the outside temperature within the tank enclosure (a high and low alarm can be set); and

- Power Off, Alarm A-16: ISACC internally responds to a power outage.

The tank level indicator, noted above, provides an analog account of the depth of leachate in the tank. This ultrasonic level transmitter, located atop the tank, is manufactured by Flowline, Inc. (Model LU30), as well as its accompanying relay (Model LC52), located within the tank control panel, and triggers Alarm A-4. RD Specifications are contained in the auto dialer manual provided in the Contract Submittal Section MP-16900. The transmitter has been set up to provide depth, in inches, of leachate in the tank (0 to 96 inches). This value can be viewed by either directly connecting a PC to the auto dialer or through a remote PC with a modem. The value received, in inches, can easily be converted into gallons by using the following conversion table:

Tank Capacity Table

Liquid Level (inches)	Volume (gallons)	Liquid Level (inches)	Volume (gallons)	Liquid Level (inches)	Volume (gallons)
1	9	33	1,526	65	3,613
2	25	34	1,589	66	3,675
3	47	35	1,653	67	3,736
4	71	36	1,717	68	3,797
5	100	37	1,782	69	3,857
6	130	38	1,847	70	3,914
7	164	39	1,912	71	3,975
8	200	40	1,977	72	4,033
9	237	41	2,043	73	4,091
10	277	42	2,109	74	4,147
11	319	43	2,175	75	4,202
12	362	44	2,241	76	4,257
13	406	45	2,307	77	4,310
14	453	46	2,374	78	4,363
15	500	47	2,440	79	4,414
16	549	48	2,507	80	4,464
17	599	49	2,573	81	4,513
18	651	50	2,640	82	4,561
19	703	51	2,706	83	4,607
20	757	52	2,772	84	4,652
21	811	53	2,839	85	4,695
22	867	54	2,905	86	4,736
23	923	55	2,971	87	4,776
24	980	56	3,036	88	4,814
25	1,038	57	3,102	89	4,850
26	1,097	58	3,167	90	4,883
27	1,156	59	3,232	91	4,914
28	1,216	60	3,296	92	4,942
29	1,277	61	3,360	93	4,967
30	1,339	62	3,424	94	4,988
31	1,400	63	3,488	95	5,004
32	1,463	64	3,551	96	5,013

The ISACC auto dialer must be programmed to call out to pre-determined and ordered telephone numbers. The designated receivers should be versed in the ISACC operation in order to understand and answer alarm calls properly (see Form F in Section 9.0). Alarm received can be recorded on the Auto Dialer Alarm Incident and Testing Report (Form E), also included in Section 9.0. As-Built Drawing M1 provides a one-line diagram, which outlines the leachate control and monitoring system. The E Series Drawings indicate general location and routing of the circuits. Specific wiring of individual components and the auto dialer are located in the ISACC manual provided in the Contract Submittals.

Programming and testing of the ISACC unit is also covered in the aforementioned manual. Inspection and testing of the individual input sensor is discussed in the appropriate section (see Sections 4.2.5, 4.5, and 6.4), as well as maintenance and contingency considerations. This scheduled annual testing (see Section 8.1) would require two technicians and a laptop computer directly connected to ISACC. One person would trip each sensor while the other would note confirmation by ISACC and provide the result on Form E.

The ISACC unit is accessed by modem, generally on a weekly basis. As the ISACC system reads and records all functions every hour, this information should be downloaded and reviewed. This would indicate that ISACC is functional. Furthermore, the amount of leachate contained in the storage tank, as reviewed earlier, can be graphed and, with interpolation, a date can be calculated to predict when the tank is to be pumped out.

Should the auto dialer system indicate that it is not functioning properly, the system would have to be directly accessed as soon as possible. If necessary, the manufacturer, Phonetic, Inc, 901 Tryens Road, Astor, Pennsylvania 19014, (610) 558-2700, should be contacted for additional instructions. With four screws and easy plug-in connectors, the ISACC unit can be easily removed and shipped back to the manufacturer for repair, as needed. During the period of time that the auto dialer system is non-functional, the RAF must be inspected at least once a week, as well as completing Form E.

6.0 LEACHATE STORAGE SYSTEM

The manhole collects leachate from the containment cell. The leachate is then pumped from the manhole into a leachate storage tank located in the tank pad area to await final disposition. Primary components of the leachate storage system are:

C Leachate storage tank;

C Secondary containment dike tank;

C Control panel; and

C Alarm features and instrumentation.

When the tank is full, it is sampled and based on the analytical results disposed at an appropriate treatment facility. To date, the leachate quality has been acceptable for discharge to the Oneida County Department of Water Quality and Water Pollution Control via an on-site sanitary sewer (permit No. GW-050).

The following subsections generally described the construction and subsequent operation and maintenance of the leachate tank and associated components. A Site Inspection Report, (Form A), is provided in Section 9.0 which can be used to record the condition of these components.

6.1 Leachate Storage Tank and Secondary Containment

A 5,000-gallon aboveground leachate storage tank is located within the building, in the tank pad area (see As-Built Drawing M2). The storage tank is cylindrical design, single wall steel, constructed by Mohawk Metal Products Co., Inc., of Utica, New York. The tank has been mounted horizontally within a steel dike tank which provides secondary containment in the event of leakage. The dike tank capacity is 110% of the storage tank. The dike tank stands 4.5 feet tall and a stairway and landing are attached for access.

The storage tank is equipped with several fittings allowing access through the top and west end. The top of the tank has the following components:

C A 4-inch vent;

C An 18-inch manhole for cleaning and inspections;

C A liquid level transmitter;

C An influent pipe with a check valve and flow totalizer;

C A full tank float switch; and

C A temperature probe.

The west end of the tank has the following components:

- A 3-inch drain fitting, where leachate is transferred out; and

- A ½-inch sampling port.

During scheduled inspections, the storage tank and the secondary containment dike tank should be viewed for leaks, as well as any structural non-conformities. Any leaks emanating from the tank or affixed pipes are easily observed and will be contained in the contingency dike tank. It is not uncommon to find small quantities of water in the dike tank from condensation, blowing rain, or snow, as the west end of the tank pad area is open to the drive-through truck pad. The dike tank should not be allowed to collect more than 2 inches of water from these external sources. Excess water accumulation would lessen the capacity and cause adverse effects to the storage tank insulation. If the tank is allowed to collect water the tank leak alarm will be triggered and the auto dialer activated. The dike tank has drain plugs, located at the east and west end, that can be used to control the liquid. As a secondary contingency, draining or a leak in the dike tank will generally be collected in the adjacent trench drain (see As-Built Drawing S1). Section 6.8 describes leachate transfer as well as pumping liquid from the dike tank and trench drain sump.

If a slow leachate leak is suspected, then a sample should be collected and analyzed to initiate the contingency plan. Sampling and analytical information are provided in Section 6.5. Generally, the leachate can be identified by the evidence of VOCs. If VOCs are detected, inspection of the storage tank and its appurtenance will be conducted. This may involve removal of some or all of the insulation to identify the location of the leak and make permanent repairs. A major leak should activate the alarm system and would require accessing the leachate storage system as soon as possible. As part of a contingency plan, a tank truck should be employed to control the leachate as repairs are made.

The tank pad area is unheated; therefore, the storage tank and influent and effluent piping must be protected from freezing. The heating element controls and insulation for the components are described in Section 5.2.4.2. An internal inspection of the storage tank should be conducted once a year as well. This would involve accessing the 18-inch manhole atop the storage tank (see As-Built Drawing M2) to perform this inspection. This would be performed just after the tank has been pumped out to provide the best visibility. Any corrosion or scaling should be recorded, as well as sediment accumulation. Should substantial corrosion be observed, the tank would require entry (see Section 4.6) and repairs made to insure its longevity.

6.2 Influent/Effluent Piping and Components

The leachate storage tank influent conveyance pipe originates underground from the manhole. Section 4.5 reviews the construction of this leachate conveyance pipe, as well as the leak detection features. The 2-inch HDPE conveyance pipe is contained within a 6-inch HDPE containment pipe until it reaches over the dike tank. The conveyance pipe continues to direct the leachate through a flow totalizer meter and check valve prior to entering the top of the storage tank. The flow meter provides the total number of gallons of leachate pumped and can be read directly or from a remote unit located next to the control panel. Inside the storage tank, the pipe is extended to within a few inches of the bottom to facilitate leachate mixing.

The storage tank is equipped with a 3-inch effluent pipe for transferring the leachate into a tanker truck. This pipe has a valve and a male quick connect hose fitting to assist in the transferring process. Frost protection of the piping is covered in Section 5.2.4.2.

6.3 Control Panel

The leachate storage system includes an electrical control panel located along the east wall of the tank pad area. The control panel displays three operation lights, three control buttons, and an alarm horn. An illuminated white light indicates that the control panel has power. Two red lights indicate a full tank and presence of liquid in the containment tank.

The control panel is equipped with an audible alarm system. This includes the alarm horn, horn reset button, horn test button, and a fault reset button. Due to the fact that all of the sensors are passed through the auto dialer and the RAF is not permanently staffed, the horn has been disconnected. In addition, the fault reset button is no longer necessary, as the liquid sensors automatically reset.

Internally, the control panel directs information regarding the leachate storage tank to the auto dialer. The storage tank is equipped with a leachate level indicator that provides analog information to the auto dialer through a controller in the control panel.

A permissive control relay is a fail safe system that overrides the pump operation. If the tank is full or if liquid is detected in the dike tank, the relay will shut down the power to the pumping system; preventing additional leachate from being pumped. Although the relay is located in the manhole control panel, actuation emanates from the storage tank sensors. A wiring schematic and layout is provided in the auto dialer manual located in Contract Submittal Section MP-16900.

6.4 Alarm Features and Instrumentation

The leachate storage tank and its secondary containment tank are equipped with four sensors, as indicated on As-Built Drawing M1:

- "Tank Low Temperature" (TSL 302) this sensor monitors the leachate temperature and activates the auto dialer (Channel A-8) when the temperature drops below a set value (set at 35ºF);
- "Tank Leak" (LSH 301), this is the dike tank liquid level sensor, which is set to activate the auto dialer (Channel A-3) if the leachate rises approximately 5 inches in this containment tank;
- "Tank High Level" (LSHH 300) is a leachate storage tank 100% full sensor, which activates the auto dialer (Channel A-2); and
- "Tank 90% Full" (LSH 300) works through LI 300 controller and transistor sensor LT 300 to provide a leachate storage tank 90% full alarm through the auto dialer (Channel A-4).

The temperature sensor, located within the storage tank, activates the auto dialer as the leachate approaches freezing (35 degrees Fahrenheit [ºF]) the temperature setting is adjustable: temperature sensor activation of the autodialer may indicate that the heating blankets are not functioning (see

Section 5.2.4.2). If the leachate is allowed to freeze, the storage tank may fail. The sensor is tested by placing the end into ice, which should set off the auto dialer, or by exposing the sensor to the atmosphere if freezing temperatures below 35ºF exist.

The secondary containment dike tank has a leachate level sensor (float switch) that will trigger an alarm if the liquid level rises approximately 5 inches from the bottom. The dike tank's liquid level sensor is most vulnerable since it is exposed; in the open dike The sensor should be visually checked on a monthly basis, particularly in the winter. This sensor will act as a fail safe system if the leachate tank alarms should fail and leachate overflows. This is a float type sensor and is tested by lifting the float. Lifting the float will illuminate the red "Tank Leak" light on the control panel and activate the auto dialer. It will also shut down power to the pumps through the permissive relay (see Section 6.3).

The tank 100% full sensor is a separate float switch unit providing a fail safe system should the liquid level transmitter fail. It is tested by lifting the float and observing the illuminated (red) 100% tank full light on the control panel. This also triggers the auto dialer and will shut down the pumps through the permissive relay (see Section 6.3).

The leachate storage tank leachate level transmitter has the ability to send an alarm at any preset depth. The transmitter is currently set at 90% full; initiating an alarm to the auto dialer. When activated the receiver will prepare to transfer the collected leachate.

The leachate level transmitter also has means of sensing the leachate level in the tanks (see Section 5.2.5); and provides actual leachate volume, in gallons, converted from the inches provided by auto dialer readout.

The leachate level transmitter is located atop the storage tank and senses the leachate level by means of SONAR. It is physically tested by removing the transmitter and placing a solid object, (e.g., a sheet of cardboard), 4 inches in front of the sensor, indicating a full tank situation. The transmitter will record a 100% full (96 inches) on the analog readout (laptop computer attached to the auto dialer) as well as trigger the 90% full alarm. Testing of the four alarm sensors should be performed yearly.

The auto dialer has the capability to send an alarm (Channel A-1) at any required depth of leachate. The auto dialer can be programmed at any time from a computer locally or through a modem. Additional information on the transmitter and auto dialer can be found in the Contract Submittal Section MP-16900.

6.5 Sampling Protocol

The leachate that drains from the containment cell is collected in a manhole, then pumped to the leachate storage tank located within the RAF building. Once the storage tank approaches maximum capacity, or at a preset frequency (by volume or date), as defined by the Engineer, the collected leachate will be removed. A representative sample should be obtained and analyzed to provide disposal/discharge characterization.

The leachate storage tank is equipped with a sampling port located a third of the way up from the bottom (see As-Built Drawing M2). This provides easy access to the ½-inch ball valve from the stairway located at the west end of the tank. Because the influent pipe is submerged a few inches from the tank bottom, the pumping action occasionally mixes the stored leachate; therefore, a good representative sample can be obtained in this fashion. As a contingency, the 18-inch manhole at the top of the tank can be accessed to collect samples.

The leachate sampling protocol, including a review of sampling materials, procedures, and analytical parameter reference list, is provided below.

Materials

The following materials, or equivalent should be available during effluent water sampling:

- Appropriate health and safety personnel protective equipment (PPE);
- Buckets to collect any effluent water overrun;
- Appropriate water sample containers obtained from the analytical laboratory;
- Appropriate transport containers (coolers) with ice;
- Appropriate labeling, packing, and shipping materials;
- Field book or log sheets;
- Chain of custody;
- Indelible ink pens; and
- Keys to manhole and access gate.

Procedures

The procedures for sampling effluent water are as follows:

1. Review materials check list to ensure the appropriate equipment has been acquired.
2. Identify the site in the log book/log sheets, along with the date, arrival time, and weather conditions. Identify the personnel and equipment utilized or other pertinent data in log book or log sheets.
3. Label the lab samples and sample containers with the date, time, sample matrix, sample type, analysis required, and preservative added. Cover the sample label with clear packing tape to secure label to the container.
4. Apply PPE, as required.

5. Locate the effluent water sampling port.

6. Place the bucket under the sampling port to collect any effluent water overrun.

7. Obtain the effluent water sample needed for analysis directly from the sample port in the appropriate container, minimize headspace, and tightly replace the caps.

8. Secure sample containers with packing material and store on ice at 4 degrees Celsius (ºC) in an insulated cooler.

9. Return any overrun effluent water contained in the bucket to the leachate collection manhole.

10. Complete the associated chain of custody and transport to the approved laboratory. Form C, Leachate Bulk Sampling and Transfer (see Section 9.0) contains a list of the analytical requirements and should receive initial data recordings.

6.6 Analytical Laboratory Requirements

Once the leachate samples have been collected, they are to be delivered to a laboratory certified to perform the required analytical tests. The sample bottle and cooler, which are generally provided by the laboratory, must be turned over to the laboratory with a completed chain-of-custody form. Also, it is imperative that the samples are kept cool (4ºC) and the holding time is not exceeded. A list of required analytical tests for the RAF leachate and their specific parameters are provided below.

Parameter Reference List

Parameter	Reference	Sample Container	Sample Volume	Preservation	Holding Time
VOCs	USEPA 624	Two 40-ml glass vials with Teflon-lined septum cap	80 ml	No headspace; cool 4ºC	7 Days
SVOCs	USEPA 625	1-Liter amber glass	1 Liter	No headspace; cool 4ºC	7 Days
Selected Metals	USEPA 200.7	500-ml plastic	500 ml	HNO_3 to pH <3	180 Days
PCBs/Pesticides	USEPA 608	1-Liter amber glass with Teflon cap	1 Liter	Cool 4ºC	1 Day
Oil & Grease	USEPA 1664	1-Liter amber glass	1 Liter	H_2SO_4 cool 4ºC	26 Days
TSS	USEPA 160.2	Plastic	250 ml	None	None

Notes:
VOCs = Volatile Organic Compounds.
PCBs = Polychlorinated Biphenyls.
SVOCs = Semivolatile Organic Compounds.
HCL = Hydrochloric Acid.
HNO_3 = Nitric Acid.
TSS = Total Suspended Solids.
H_2SO_4 = Hydrogen Sulfide

6.7 Historic Analytical Results

To date, the leachate quality has been acceptable for discharge to the Oneida County Department of Water Quality and Water Pollution Control via an on-site sanitary sewer. The current acceptance criteria for discharge to the sanitary sewer, as set forth in Permit No. GW-050, are as follows:

Sanitary Sewer Compliance Levels

Analytical Requirements		Compliance Levels
TTO:	VOC - USEPA Method 624	*
	SVOC - USEPA Method 625	*
	Pesticides - USEPA Method 608	2.0 mg/L (ppm)
Metals:	Cadmium - USEPA Method 200.7	1.0 mg/L (ppm)
	Chromium - USEPA Method 200.7	5.0 mg/L (ppm)
	Copper - USEPA Method 200.7	3.0 mg/L (ppm)
	Lead - USEPA Method 200.7	5.0 mg/L (ppm)
	Nickel - USEPA Method 200.7	2.0 mg/L (ppm)
	Zinc - USEPA Method 200.7	4.0 mg/L (ppm)
PCBs:	Per Aroclor - USEPA Method 608	0.065 ug/L (ppb)
Oil and Grease:	USEPA Method 1664	100 mg/L (ppm)

Notes:

* TTO = Total Toxic Organics; the sum of methods of 624, 625, and 608 (pesticides only).
VOCs = Volatile Organic Compounds.
SVOCs = Semivolatile Organic Compounds.
PCBs = Polychlorinated Biphenyls.
mg/L = Milligrams per liter (mg/L).
ppm = Parts per million.
ug/L = Micrograms per liter (ug/L).
ppb = Parts per billion.

A summary of the batch test results are provided in the table below. Leachate sampling and analysis are further reviewed in the FER, Section 6.0.

Analytical Results Summary

	Batch Number	1	2	3	4
	Sample Identification	**EW-11**	**EW-12**	**EW-13**	**EW-14**
	Sampling Date	**12/29/98**	**2/8/99**	**3/1/99**	**4/13/99**
	Approximate Volume of Leachate	**3,000 gal**	**3,000 gal**	**3,000 gal**	**2,000 gal**
TTO:	VOCs - USEPA Method 624 SVOCs - USEPA Method 625 Pesticides - USEPA Method 608	0.003	0.042	0.031	0.012
Metals:	Cadmium - USEPA Method 200.7	<0.005	<0.005	<0.005	<0.005
	Chromium - USEPA Method 200.7	<0.01	<0.01	<0.01	<0.01
	Copper - USEPA Method 200.7	<0.01	<0.01	<0.01	<0.01
	Lead - USEPA Method 200.7	<0.003	<0.003	<0.003	<0.003
	Nickel - USEPA Method 200.7	<0.02	<0.02	<0.02	<0.02
	Zinc - USEPA Method 200.7	<0.01	<0.01	<0.01	<0.01
PCBs:	Per Aroclor - USEPA Method 608	<0.05	<0.05	<0.05	<0.05
Oil and Grease:	USEPA Method 1664	ND	ND	ND	0.7
TSS:	USEPA Method 160.2	6	<4	<4	<4

Notes:

All results reported in milligrams per liter (mg/L), equivalent to parts per million (ppm), except PCBs, which are micrograms per liter (ug/L), equivalent to parts per billion (ppb).
TTO = Total Toxic Organics (VOCs, SVOCs, and Pesticides).
VOCs = Volatile Organic Compounds.
SVOCs = Semivolatile Organic Compounds.
PCBs = Polychlorinated Biphenyls.
TSS = Total Suspended Solids.
ND = Non-detect.

The historical results demonstrate that the leachate is acceptable for continued disposal to the local wastewater treatment plant, Oneida County Department of Water Quality and Water Pollution Control, Oneida County Sewer District. This required a discharge permit, executed by the Commissioner, which is renewed annually.

If a sampling event should indicate a leachate in excess of a particular compliance level, the leachate would be resampled and tested for the exceeded compound. Should this concur with the first result, the Engineer would be required to make alternative arrangements for disposal.

As a contingency, other wastewater treatment plants would be contacted for acceptance. As an example, Industrial Oil Tank Services, Oriskany, New York, has the facilities to handle high concentrations of water pollutants.

6.8 Leachate Transfer

The RAF building is equipped with a drive-through (open on two sides) leachate transfer area. It allows for a tanker truck to be positioned adjacent to the leachate storage tank. The truck pad area has been constructed with a concrete floor that slopes to a sump located in the center. The tanker truck must contain an outboard transfer pump, as one is not available at the RAF. The leachate storage tank is fitted with a 3-inch transfer pipe that includes a gate valve and a male hose quick connect. As a contingency, the 18-inch manhole can be accessed to transfer leachate, if necessary.

The transfer procedures begin when the analytical leachate batch results are received from the laboratory. The facility accepting the leachate must be contacted and provided the quantity and quality of the leachate to be transported. Upon acceptance, a tanker truck can be scheduled to transfer the leachate.

Prior to leachate transfer, the dike tank and truck pad sump must be inspected for excess liquids. In case of a spill during the transferring process, these containment volumes must be available to receive leachate. The dike tank alarm system will be activated if greater than 5 inches of leachate accumulate. The truck pad sump will likely have some amounts of water contained, primarily in the form of precipitation entering the north and south openings of the leachate transfer area. This sump must be pumped out prior to transferring leachate. Collected precipitation water, which has not come in contact with leachate, can be pumped outside or it may be easier to just draw it up into the truck prior to hooking to the leachate storage tank.

If, during the transfer process, a minor release of leachate occurs, it must be reported to the Engineer for evaluation and follow-up procedures, as well as contacting the NYSDEC Region 6 Spill Response Division (Spill Hotline 1-800-457-7362), which initiates the contingency plan.

The on-site person(s) would apply PPE. The following PPE supplies should be kept on site at all times and stored in the RAF enclosed area:

- Eye Protection;
- Ear Protection;
- Rubber Gloves;
- Tyvek Suit;
- Rubber Boots; and
- First Aid Kit.

The on-site person(s) should make all attempts to contain and collect the leachate spill. The following contingency spill material and equipment should be kept on site at all times and be stored in the RAF enclosed area:

- Absorbent booms;

- Absorbent pads;
- Speedy Dry;
- Waste Container;
- Sample Jars; and
- Water.

The spill and subsequent activities are to be documented and attached to Form A. The NYSDEC may require a spill report to be filed.

7.0 GROUNDWATER MONITORING

A groundwater monitoring well network was established during the RA. Previously existing monitoring wells MW-1, MW-2D, MW-4, MW-5, MW-6D, MW-7, MW-7D, MW-8, MW-9, MW-9D, MW-10, MW-10D, MW-11, MW-12, MW-13, MW-13D, MW-15, MW-15D, and MW-16S were decommissioned between July 31, 1998, and August 4, 1998. Details of the monitoring well decommissioning and installation are provided in the Final Engineering Report, Section 5.0. New RA monitoring wells (MW-13A, MW-17, and MW-18) were installed on January 20, 1999. These changes were made to accommodate remediation activities and refine the monitoring well locations to meet the RA monitoring objectives.

7.1 Monitoring Well Locations

A total of six site monitoring wells, designated as: MW-3, MW-6R, MW-13A, MW-14, MW-17, and MW-18 were selected to provide groundwater quality data for site-specific RA areas. The locations of these wells are shown on As-Built Drawing G1. The monitoring well network is designed to intersect and monitor the overburden water table. Monitoring well installation logs are provided in Section 7.7. The RA monitoring well network consists of the following:

- MW-3, located hydraulically downgradient of RA Areas 4, 5, 6, 13, 14 and the southern groundwater collection trench, as well as the RAF;
- MW-6R, located hydraulically downgradient at the eastern portion of the site;
- MW-13A, located hydraulically side gradient (east) of RA Areas 5, 7, 8, 13, and 14, as well as the RAF;
- MW-14, located at the southeast corner of the site hydraulically upgradient of all areas and the RAF;
- MW-17, located hydraulically downgradient of the northern groundwater collection trench; and
- MW-18, located hydraulically downgradient of the RA Areas 6, 7, 8, 9, and 10, as well as side gradient (west) of the RAF.

7.2 Monitoring Schedule

A groundwater monitoring schedule was set forth in the RA FSP. The first sampling round was conducted in March 1999, subsequent to completion of major construction components and the newly installed wells were clean and functional. Three additional rounds of sampling, on a 6-month interval, over a period of 18 months is planned. Subsequent sampling events are proposed to be performed once a year, pending the results of the initial rounds.

For the first four groundwater sampling rounds, samples from the six designated monitoring wells, will be submitted to the laboratory for analysis of VOCs, PCBs, and metals as listed in Section 7.5. Based on the laboratory analytical results for the initial four sampling rounds, the analytical parameter list for subsequent groundwater monitoring events may be modified to include only the parameters that were detected at concentrations above the New York State Groundwater Quality Standards. The groundwater monitoring frequency is anticipated to continue on an annual basis. This would be based on observed diminishing concentrations of chemical constituents detected in the groundwater, as well as approval of the NYSDEC. Groundwater field measurements will be obtained from each well at the time of sampling, including pH, conductivity, dissolved oxygen, and temperature using the procedures outlined in the following sections.

The initial sampling was conducted in March 1999; therefore, the proposed sampling schedule is as follows:

1. Initial Sampling - March 1999;

2. Round 2 - September 1999;

3. Round 3 - March 2000;

4. Round 4 - September 2000;

5. Round 5 - September 2001 (modification to required sampling parameters); and

6. September of each following year, as required.

Upon receipt of the analytical results, all constituents should be compared to the New York State Groundwater Quality Standard for compliance. Should a non-compliance be determined, the following contingency plan should be considered. First, the operation logs for the groundwater collection system should be reviewed to insure that the pumps were running. A confirmation sample should be taken as soon as possible and retested for all constituents that were in exceedance. If these results are acceptable, all information would be reported, as described in Section 8.2, and returned to the scheduled sampling program.

Should exceedance of constituents persist in well samples, additional contingencies would be considered by the Engineer. The actual constituent and its quality would require review to develop a specific action, as well as concurrence of a work plan with the NYSDEC.

7.3 Groundwater Level Measurement

As part of the groundwater monitoring program, groundwater levels will be obtained to the nearest 0.01 foot from monitoring wells MW-3, MW-6R, MW-13A, MW-14, MW-17, and MW-18. Measurement will be obtained from a marked and surveyed reference point at the top of the inner PVC pipe. The water levels will be taken consecutively, on the same day, prior to sampling or other activities. A review of materials and procedures follows.

Materials

The following materials, as required, shall be available during water level monitoring:

- Level D health and safety PPE;
- Water level indicator;
- A 6-foot ruler graduated in hundredths of a foot;
- Soapy (Alconox) wash water;
- De-ionized water;
- Paper towels;
- Water level logs (Form C, sample attached);
- Indelible ink pens;
- Site map with well locations; and
- Keys to the well locks.

Procedures

The procedures for obtaining a water level from the site wells are as follows:

1. Review material check list above to ensure the appropriate equipment has been acquired.
2. Locate and access the well by unlocking it, opening the cover, and removing the inner cap.
3. Note the condition of the well and document any damage or changes.
4. Don (apply) appropriate PPE;

5. Lower the clean probe into the 2-inch PVC well, ensuring first that it is clean. Once the water level indicator lights up and/or beeps, hold the cord with one hand. Move the cord slightly up and down, holding it so that the thumb of the hand holding the cord is at the reference point just as the meter comes on. A ruler, graduated in 0.01-foot increments, can be used to correctly obtain the reading. Record the depth to top of water on the Water Level Field Log, (Form C).

6. Lower the probe to the bottom of the well and obtain a total well depth measurement. Record the total well depth measurement on Form C.

7. Reel the probe up to within a few feet. Wash the probe with a soapy Alconox wash, then rinse it with tap water.

8. Note the presence of light non-aqueous phase liquid (LNAPL) within the well, if any.

9. Close and secure the well. Make or schedule any necessary repairs, as necessary.

10. Once depth to groundwater measurements have been recorded from the six wells have been read, reduce the values to elevations. These data should be compared to historic groundwater elevation data for continuity. If an unreasonable level is noted, the well may need to be reread and/or the Engineer notified.

7.4 Groundwater Sampling Procedure

This protocol describes the procedures to be used to collect groundwater samples by bailer method. During precipitation events, groundwater sampling will be discontinued until precipitation ceases. The water levels will be taken prior (maximum 24 hours) to sampling or other activities. A review of materials and procedures follows.

<u>Materials</u>

The following materials, as required, shall be available during groundwater sampling:

C Water level indicator;

C Photoionization detector (PID);

C Appropriate health and safety PPE;

C Plastic sheeting (for each sampling location);

C Reusable, dedicated or disposable bailers;

C Polypropylene rope;

C Buckets to measure purge water;

C Conductivity/temperature meter;

- pH meter;
- Dissolved oxygen (DO) meter;
- Appropriate water sample containers;
- Appropriate blanks (trip blank supplied by the laboratory);
- Appropriate transport containers (coolers) with ice;
- Appropriate labeling, packing, and shipping materials;
- Non-phosphate (Alconox) wash water;
- Tap water;
- Paper towels;
- Groundwater sampling logs (Form D, sample attached);
- Chain-of-custody forms;
- Indelible ink pens;
- Site map with well locations;
- Keys to the well locks.

As part of the quality assurance, the field equipment noted above must be chosen to provide an acceptable precision and accuracy. The following table indicates the required range for specific parameters:

Field Measurement/Quality Control

Field Parameter	Precision[1]	Accuracy
Water Temperature	± 1ºC	± 1ºC Instrument Capability
pH	± 1 pH S.U.	± pH S.U. (Instrument Capability)
Conductivity	± 1 mS/cm	± 5% Standard
Dissolved Oxygen	± 0.02 mg/L	± 5%
Turbidity	± 1.0 NTU	± 2% Standard
Water Level	± 0.01 foot	± 0.01 foot

Notes:

[1] Precision units presented in applicable significant figures.
S.U. = Standard units.
mS/cm = milliSiemens per centimeter.
mg/L = milligrams per liter.
NTU = Nephelometric Turbidity Units.

Procedures

The procedures to sample monitoring wells will be as follows:

1. Review materials check list above to ensure that the appropriate equipment has been acquired. Make arrangements with the selected laboratory for appropriate sampling containers and documents.

2. Identify site and well sampled on sampling log sheets, along with date, time, and weather conditions. Identify the personnel and equipment utilized and other pertinent data requested on the logs. A Groundwater Sampling Log, (Form D) is provided in Section 9.0.

3. Label the sample containers. Cover the sample label with clear packaging tape to secure the label to the container.

4. Place plastic sheeting adjacent to the well to use as a clean work area.

5. Establish the background reading with the PID and record the reading on the field log.

6. Unlock and open the well cover while standing upwind of the well. Remove the well cap and place it on the plastic sheeting. Insert the PID probe in the breathing zone above the well casing and record the reading.

7. Set the sampling bailer and meter on plastic sheeting.

8. Prior to sampling, groundwater elevations will be measured at each monitoring well and the presence of light non-aqueous phase leachate (LNAPL) (if any; this has not been detected in the past) within the well will be evaluated. Obtain a water level depth, as reviewed in Section 7.3.

9. Don (apply) PPE.

10. As a minimum, three well volumes will be purged using a bailer. Purge water will be placed, temporarily, into a 5-gallon bucket. Attempt not to stir up the bottom sediments with the bailer. Collected purge water can be emptied into the leachate manhole as long as it does not contain appreciable sediments.

11. Measure the water level occasionally to ensure that the well is not drawn down too far and to judge the recovery rate. If the recharge rate of the well is very low, purging should be interrupted so as not to cause excessive drawdown within the well. However, a steady bailing rate should be maintained to the extent practicable. Sampling should commence as soon as the volume in the well has recovered sufficiently to permit collection of samples.

12. During purging of the well, monitor the field indicator parameters (turbidity, temperature, specific conductance, pH, etc.) every well volume (or as appropriate). The well is considered stabilized and ready for sample collection once all of the field indicator parameter values remain within 10% for three consecutive readings. If the parameters have stabilized, but the turbidity is not in the range of the 50-NTU goal, the bailing rate should be decreased.

13. Measure and record DO as well as the other parameters noted above. These may be taken in a clean container such as a glass beaker.

14. Collect VOCs (minimize air space) first, followed by PCBs. Metals shall be collected 24 hours after final purge; care shall be taken so as not to disturb any sediments during collection.

15. After the appropriate purge volume of groundwater in the well has been removed, obtain the groundwater samples needed for analysis; pour directly from the sampling device into the appropriate container (allow no air space) and tightly screw on the caps.

16. Secure with packing material and store at 4 degrees Celsius (ºC) on wet ice in an insulated transport container provided by the laboratory.

17. After all sampling containers have been filled, remove an additional volume of groundwater. Check the calibration of the meters and then measure and record on the field log physical appearance, pH, DO, temperature, turbidity, and conductivity.

18. If using a dedicated bailer, replace the dedicated bailer in the well and replace the well cap and lock the well.

19. Record the time that sampling procedures were completed on the field logs.

20. Place all disposable sampling materials (plastic sheeting, disposable bailers, and health and safety equipment) in appropriately labeled containers. Wash all reusable equipment with soapy water and rinse. Repeat the procedures above until all wells are sampled.

21. Complete the procedures for packaging, shipping, and handling with associated chain-of-custody. Make appropriate arrangements with the laboratory for exchange of samples and the constituents to be tested for.

7.5 Analytical Laboratory Requirements

Once the groundwater samples have been collected, they are delivered to a laboratory certified under the Environmental Laboratory Approval Program (ELAP) for Contract Laboratory Protocol (CLP) to perform the required analytical tests. The sample bottles and cooler, provided by the laboratory, must be turned over to the laboratory with a completed chain-of-custody form. The sample should be kept cool (4ºC) and the holding times not exceeded. A list of required analytical tests for the RAF groundwater and their specific parameters is provided below.

Parameter Reference List

Parameter	Reference	Sample Container	Sample Volume	Preservation	Maximum Holding Time from VTSR
VOCs of Concern	USEPA SW-846 Method 8260	Two 40-ml glass vials with Teflon-lined septum cap	80 ml	No headspace, cool 4ºC	7 Days
Metals of Concern	USEPA SW-846 6000/7000 Series Methods	One 1-liter plastic	1 Liter	Cool 4ºC	Extract within 180 days. Analyze extract within 180 days from extraction.
PCBs[1]	USEPA SW-846 Method 8082	One 1-liter amber glass with Teflon-lined cap	1 Liter	Cool 4ºC	Extract within 5 days. Analyze within 40 days following start of extraction.

Notes:

VTSR = Verifiable time of sample receipt.
Sampler must ensure that samples are delivered to the laboratory within 24 to 48 hours of collection.
VOCs of Concern include: 1,2-Dichloroethene (cis and tans), trichloroethylene, and vinyl chloride.
Selected Metals include: Chromium, Copper, Lead, and Zinc.

The Quality Assurance Project Plan (QAPP), addressed in the RDS, provided laboratory reporting limits for individual constituents. The following list identifies parameter, methods, and reporting limits for groundwater samples.

Groundwater Parameters, Methods, and Reporting Limits

Constituent	Reporting Limit (ppb)
VOCs of Concern (USEPA SW-846 Method 8260)	
cis-1,2-Dichloroethene	5
trans-1,2-Dichloroethene	5
Trichloroethylene	5
Vinyl Chloride	2
Metals of Concern (USEPA SW-846 6000 Series Methods)	
Chromium	10
Copper	25

Constituent	Reporting Limit (ppb)
Lead	5
Zinc	20
PCBs (USEPA SW-846 Method 8082)	
Aroclor 1016	0.09
Aroclor 1221	0.09
Aroclor 1232	0.09
Aroclor 1242	0.09
Aroclor 1248	0.09
Aroclor 1254	0.09
Aroclor 1260	0.09

Notes:

Reporting limits for VOCs of Concern are based on USEPA SW-846 Method 8260 CRQLs. Specific quantification limits are highly matrix dependent. The quantitation limits shown are provided for guidance and may not always be achievable.

USEPA SW-846 6000/7000 Series Methods will be used for analysis for metals of concern. Reporting limits presented are based on RCRA TCL CRQLs. CRQLs shown for Metals of Concern are provided for guidance and may not always be achievable.

Reporting limits of PCBs are based on TOGS Series (1.1.1). Quantitation limits shown for total PCBs are equal to those for each individual Aroclor listed. The quantitation limits shown are provided for guidance and may not always be achievable.

ppb = Parts per billion.

7.6 Historic Analytical Results

The initial round of groundwater sampling has been conducted as part of the RA monitoring plan. The following table presents the results of the March 1999 sampling round:

Analytical Groundwater Quality Data

Constituent	MW-3	MW-6R	MW-13A	MW-14	MW-17	MW-18	MW-18 (Dup)
VOCs							
cis-1,2-Dichloroethene	<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	<5	<5	<5	<5	<5	<5	<5

Constituent	MW-3	MW-6R	MW-13A	MW-14	MW-17	MW-18	MW-18 (Dup)
Metals							
Chromium	4.4	19.9	7.8 B	20.4	4	60.1	15
Copper	16.8	45	47.8	47.9	16 B	109	41.6
Lead	5.5	7.4	9.2	7.9	2.4 B	35.6	5.4
Zinc	15.1	49.5	38.1	36	14.6 B	172	36.3
PCBs							
Aroclor 1016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1221	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1232	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1242	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1248	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1254	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1260	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:

All results reported in micrograms per liter (ug/L), equivalent to parts per billion (ppb).
B = Analyte found in method blank; indicates potential laboratory contamination.
Dup = duplicate sample.

7.7 Groundwater Monitoring Well Logs

The site groundwater is monitored by six wells (MW-3, MW-6R, MW-13A, MW-14, MW-17, and MW-18), as part of the RA. Boring and well installation logs are included as part of this section. Actual monitoring well locations are shown on As-Built Drawing G1, which are based on an assumed coordinate system.

8.0 OMM REPORTS

The previous sections elaborate on the components of the RAF and the OMM needs. The frequency of inspections, sampling and testing are summarized in this section. Section 9.0 contains specific forms to assist in for the OMM program.

8.1 Schedule of RAF Inspections

The RAF should be visited, at a minimum, on a monthly basis for inspection. The inspection program would continue at this frequency until results provide indications that a change in the schedule is appropriate. These visits may include additional items, as well as a record of observations. A list identifying monitoring, sampling, and component testing, as well as general inspection frequencies, follows:

RAF Inspection, Sampling, and Testing Frequency

Category	Area of Inspection	Frequency
1	General Site	Every 6 Months
2	Perimeter Components	Monthly
3	Containment Cell	Monthly
3a	Gas Vent Sampling	Every 6 Months
4	Manhole	Monthly
4a	Pump Changeover	Monthly
4b	Pump Control Test	Annually
5	Building	Monthly
5a	Auto Dialer and Controls	Annually
6	Leachate Storage System	Monthly
6a	Leachate Sampling and Transfer	As Required
6b	Leachate Tank Internal Inspection	Annually
7	Groundwater Monitoring	Every 6 Months

8.2 NYSDEC Reports

A report shall be prepared that will provide a summary of operation, maintenance and monitoring performed at the RAF covering one year. This annual report will supply all pertinent collected data to NYSDEC for review. The annual report will summarize each of the aforementioned categories and provide copies of the forms used (see Section 9.0), as well as laboratory analysis.

Should reportable problems, malfunction and/or anomalies occur at the site, the NYSDEC should be contacted within 48 hours to concur on repairs and/or site work.

9.0 INSPECTION, SAMPLING, AND SUMMARY FORMS

As part of the operation, maintenance, and monitoring certain data must be collected and retained. Forms specifically prepared for the RAF have been included. The following forms are attached:

Form	Title	No. of Pages
A	Site Inspection Report	2
B	Confined Space Entry Permit	2
C	Water Level Field Log	1
D	Groundwater Sampling Log	1
E	Auto Dialer Alarm Incident and Testing Report	1
F	Receiving Auto Dialer Alarms	2

OPERATION, MAINTENANCE AND MONITORING

FORMER CHICAGO PNEUMATIC TOOL COMPANY
2322 BLEECKER STREET
UTICA, NEW YORK
NYSDEC SITE NO. 622003

Site Inspection Report (Form A)

Inspector: ____________________ Company: ______________________ Date: ____________

Category	Inspected	Condition/Work Required	T
1 General Site			
A	General Site Access		
B	General Site Drainage	(i.e., ditches, culvert, SPDES)	
2 Cell Perimeter Components			
A	Perimeter and Access Roads		
B	Ditches		
C	Culverts		
D	Perimeter Fence	Locks ____ , Gates ____	
E	Utilities	Phone and Electric, Lock ____	
F	Collection Trenches	N ______ , S ______	
3 Containment Cell			
A	Surface Cover System	(i.e., vegetation, burrows, erosion, movement)	
B	Gas Vents (2)	6" Vent 1 ____ 4" Vent 2 ____	
B1	PID Readings	(Y or N) Background _____, @ Vent 1 _____, Vent 2 @ _____	
C	Collection Pipe Cleanout	Lock ____	
D	Perimeter Drains (4)		
4 Leachate Collection Manhole			
A	Structure	External ____ , Internal ____	
B	Pumps and Plumbing	Pump 1 Hours ___________ , Pump 2 Hours ___________	
B1	Lead Pump Changeover	(Y or N) From Pump No. ____ to Pump No. ____ , Lead	
B2	Test Automatic Pump Controls	LSH ____ , LSL ____ , LSLL ____ , LSHH _____	
C	Electrical Components	Test Pumps (Y or N), Lock ____	
D	Manhole Interstitial Space		

OPERATION, MAINTENANCE AND MONITORING

FORMER CHICAGO PNEUMATIC TOOL COMPANY
2322 BLEECKER STREET
UTICA, NEW YORK
NYSDEC SITE NO. 622003

Site Inspection Report (Form A Cont.)

Date ___________________

Category	Inspected	Condition/Work Required	T
E	Conveyance Pipe		
F	Influent Pipe	Containment Pipe ______	
G	Confined Space Entry	(Y or N) (see Form B)	
5 Building			
A	Structure	Lock _____, Vent _____, Heater _____	
B	Electrical and Telephone		
C	Auto Dialer and Controls	Test Functions (Y or N) (see Form E and F)	
6 Leachate Storage System			
A	Tank (External)	Internal (Y or N)	
A1	Flow Totalizer	Reading = __________00 gal.	
B	Secondary Containment	Liquid (Y or N)	
B1	Drain Liquid	(Y or N)	
C	Piping Components		
D	Electrical Components	Lock ____	
E	Leachate Sampling	(Y or N)	
7 Groundwater Monitoring Wells			
A	Condition	Locks ____	
B	Water Levels	(Y or N) (see Form C)	
C	Groundwater Sampling	(Y or N) (see Form D)	

Additional Comments:

____

____

____

____

OPERATION, MAINTENANCE AND MONITORING

FORMER CHICAGO PNEUMATIC TOOL COMPANY
2322 BLEECKER STREET
UTICA , NEW YORK
NYSDEC SITE NO. 622003

Confined Space Entry Permit (Form B)
(Post Outside Space)

TO BE COMPLETED BY PROJECT MANAGER

DATE: ______________________________

LOCATION OF WORK (Manhole): ______________________________

HAZARDS IN THIS CONFINED SPACE: ______________________________

DESCRIPTION OF WORK: ______________________________

HAZARDS CREATED BY WORK TO BE DONE: ______________________________

OBSERVER: ______________________ ENTRY LEADER: ______________

EMPLOYEES ASSIGNED: ______________________________

ENTRY DATE: __________ ENTRY TIME: __________ EXIT TIME: __________

OUTSIDE CONTRACTORS WORKING IN AREA: ______________________________

1. Have all employees who will enter this space or act as standby received the following approvals and training: (CIRCLE ANSWER)

   Yes *No* a. Medical clearance within the past year.
   Yes *No* b. Training in confined space entry.
   Yes *No* c. Job emergency procedures have been reviewed with all employees involved.
   Yes *No* d. Completed rescue drill for this type of confined space.

2. Equipment identified by checks (T) in boxes will be available at entrance for emergencies.
   Equipment identified by (X) in boxes will be used by personnel in space.

   ☐ ☐ 1. 30-min. SCBA
   ☐ ☐ 2. 15-min. SCBA
   ☐ ☐ 3. Other Respirator __________
   ☐ ☐ 4. 2-Way Radios
   ☐ ☐ 5. Tether - Life Lines
   ☐ ☐ 6. Harness - Safety Belt
   ☐ ☐ 7. Wristlets
   ☐ ☐ 8. Fall Device for Tether
   ☐ ☐ 9. Rolling Body Board (Creeper)
   ☐ ☐ 10. Ladder
   ☐ ☐ 11. Ladder Extensions
   ☐ ☐ 12. Barricades for All Openings
   ☐ ☐ 13. Tripod or Other Lifting Device
   ☐ ☐ 14. Opening Device for Covers
   ☐ ☐ 15. Device to Lock Covers Open
   ☐ ☐ 16. Fresh Air Blower and Hose
   ☐ ☐ 17. LEL-O_2 Monitor-Alarm
   ☐ ☐ 18. Toxic Gas Colorimetric Tubes
   ☐ ☐ 19. Toxic Gas Air Monitor
   ☐ ☐ 20. Hard Hats
   ☐ ☐ 21. Safety Shoes
   ☐ ☐ 22. Safety Glasses
   ☐ ☐ 23. Full Face Shields
   ☐ ☐ 24. Chemical Protective Arm Covers
   ☐ ☐ 25. Full Chemical Protective Suit
   ☐ ☐ 26. Chemical Protective Gloves
   ☐ ☐ 27. Chemical Protective Boots
   ☐ ☐ 28. Emergency Lights/Flashlights
   ☐ ☐ 29. Fire Extinguisher
   ☐ ☐ 30. Pre-Entry H&S Briefing
   ☐ ☐ 31. Stand-By Employee(s)

3. All lines that could discharge contaminants into the space have been/will be blanked off or line disconnected and pumping means locked out and tagged. *Yes* ____ *No* ____ *N/A* ____

FORMER CHICAGO PNEUMATIC TOOL COMPANY
2322 BLEECKER STREET
UTICA, NEW YORK
NYSDEC SITE NO. 622003

Confined Space Entry Permit (Form B Cont.)
(Post Outside Space)

---

4. Space has been/will be cleaned of any toxic residue or atmosphere by ________________________________.
   Yes _____ *No* _____ *N/A* _____

5. Moving machinery has been/will be locked out and immobilized. *Yes* _____ *No* _____ *N/A* _____

6. Entry and exit to the space are provided by
   Yes _____ *No* _____ *N/A* _____

7. Will work to be done in the space introduce contaminants to the space? *Yes* _____ *No* _____ *N/A* _____

8. What is the capacity of blowers to be used in cubic feet per minute? ________________________________.

9. Have all affected departments been notified of service interruption? *Yes* _____ *No* _____ *N/A*
10. Atmospheric gas tests will be done by ________________________________
    Readings:
    Oxygen ______________ Flammability % ____________________ Toxic Gas ____________________
    (Not <20% or >22%) (LEL <10%) (< ________ ppm)

11. Will a continuous monitoring device be used? *Yes* _____ *No* _____ *Type* ______________________

12. Calibration date of meters used in Items 10 and 11:
    a. ____________________ b. ____________________ c. ______________________
13. Emergency communications means: 2-Way ☐ Telephone ☐ Other ☐

14. Additional Comments: ____

____

I have inspected the space to enter and the safety equipment that will be used, and approve employees' entry into the confined space.

Signed: ________________________________
Project Manager

____
Site Health and Safety Officer

Approved: ________________________________
Corporate Health and Safety

OPERATION, MAINTENANCE AND MONITORING MANUAL

FORMER CHICAGO PNEUMATIC TOOL COMPANY
2322 BLEECKER STREET
UTICA, NEW YORK
NYSDEC SITE NO. 622003

Water Level Field Log (Form C)

Project No.: ____________________ **Date:** ____________________

Company: ____________________ **Technician:** ____________________

Well No.	Well Depth (ft.)[1]	Well (TOR) Elevation (ft.)[2]	Water Depth (ft.)[1]	Water Elevation (ft.)[2]	Water Column (ft.)	Time	Comments
MW-3	_____ 10.46	474.55					
MW-6R	_____ 7.45	462.46					
MW-13A	_____ 10.92	469.23					
MW-14	_____ 13.00	478.45					
MW-17	_____ 11.25	466.02					
MW-18	_____ 11.73	475.96					

Notes:

[1] Depth measurements are taken in hundredths of a foot from the Top of Riser (TOR), which is a reference point at the highest part on the inner 2-inch PVC riser pipe.

[2] Elevations are referenced to sea level, as set by the National Geodetic Vertical Datum (NGVD) of 1988.

General Comments: ____________________

FORMER CHICAGO PNEUMATIC TOOL COMPANY
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UTICA, NEW YORK
NYSDEC SITE NO. 622003

Groundwater Sampling Log (Form D)

Technician: ______________________ **Well Number**: __________________

Company: _______________________ **Date**: __________________________

AIR MONITORING

PID Model: _____________ Background: ___________ ppm At Well _________ ppm

WELL PURGING

Purge Volume

TD = Total Depth of Well (from Form C)

WL = Water Level Depth (from Form C)

VOL = Number of Well Volumes to Be Purged (3-9)

Purge Method

Bailer Type: Reusable _____ Disposable _____ Dedicated _____

Actual Volume Generated

___________ Gallons

Purge Volume Calculation: (_______ - ________) x ________ x ________ = _________ Gallons
(for 2" diameter well) TD (ft.) WL (ft.) Vol/ft. #VOLS Calculated Purge Vol.

FIELD PARAMETER MEASUREMENT

Time	Vol. No.	Temp (ºC)	Conductivity (mS/cm)	Water Depth (ft.)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	pH (NA)	Observations

WELL SAMPLING

Sample ID: _______________________ **Receiving Lab (Chain of Cusody)**: _________________________________

General Notes: ____

____

____

____

____

FORMER CHICAGO PNEUMATIC TOOL COMPANY
2322 BLEECKER STREET
UTICA, NEW YORK
NYSDEC SITE NO. 622003

Auto Dialer Alarm Incident and Testing Report (Form E)

Alarm Call Received By: ____________________ System Tested By: ______________________

Date Received: ____________________________ Date Tested: ___________________________

Time Received: ___________________________ Time Test Started: ______________________

Company: ________________________________ Time Test Ended: _______________________

Alarm No.	Function	Alarm Rec'd	Tested NG	Tested OK
1	Tank Level (@ 80%)			
2	Tank High Level			
3	Tank Leak			
4	Tank 90% Full			
5	High Manhole Level			
6	Manhole Leak			
7	Pipe Leak			
8	Tank Low Temperature			
9	Inside Temperature			
10	Outside Temperature			
11-15	Not In Use			
16	Power Off			

Reason for Alarm: ____

____

Action Taken: ____

____

____

Comments: ____

____

____

Receiving Auto Dialer Alarms (Form F)

ISACC Alarm Dialout - Voice Mode

When dialing to a standard telephone, ISACC recites an alarm message in voice-synthesized English to identify the input in alarm using its internally resident vocabulary. To acknowledge the alarm, you must use a touch-tone telephone to enter the acknowledgment code at the end of the alarm call.

Example: An alarm occurs on Input 2 and meets the recognition time. ISACC begins the dialout sequence. Phone 1 is programmed as voice. When the phone is answered, ISACC will identify itself by reciting its programmed phone number. It will then state the input providing the alarm. This message is repeated two times. ISACC will then request the touch-tone acknowledgment code **555**. When the touch-tones are received, ISACC will respond by saying "*OK*" and then disconnect the line. *Note*: The alarm is acknowledged but not cleared. The condition will continue to exist until some action is taken to correct the situation. Below is a scenario of what ISACC will say in the example above:

> "*Hello; this is telephone number 1-315-724-3928. Number 2 exists.*
>
> *Hello; this is telephone number 1-315-724-3928. Number 2 exists.*
>
> *Hello; this is telephone number 1-315-724-3928. Number 2 exists.*
>
> *Indicate you have received warning message.*"

You have 15 seconds to enter the acknowledgment code: **555** on the touch-tone phone. When the touch-tones are received, ISACC will respond by saying: "*OK. Have a good day.*"

The alarm has been acknowledged and the unit will then disconnect from the telephone line and stops the dialout sequence.

If the touch-tone code is not received, ISACC will respond by saying: "*Have a good day*."

If the alarm is not acknowledged, ISACC will continue by calling the next phone number. You may call the unit back using a touch-tone telephone, PC, or terminal to acknowledge the alarm. An alarm cannot be acknowledged using a pulse (rotary) phone.

Consult Contract Submittal MP-16900 for the manufactures manual.

Receiving Auto Dialer Alarms (Form F Cont.)

FORMER CHICAGO PNEUMATIC TOOL COMPANY
2322 BLEECKER STREET
UTICA, NEW YORK
NYSDEC SITE NO. 622003

The following list provides the input alarm number and a description:

Alarm Input Number	Description
1	Tank Level (@ 80%)
2	Tank High Level
3	Tank Leak
4	Tank 90% Full
5	Manhole High Level
6	Manhole Leak
7	Pipe Leak
8	Tank Low Temperature
9	Inside Temperature
10	Outside Temperature
11-15	Not in Use
16	Power Off

The following list is the order and personnel, which was programmed on ________ , for ISACC to contact:

Order No.	Telephone Number	Personnel
1	______________	___________________
2	______________	___________________
3	______________	___________________
4	______________	___________________
5	______________	___________________
6	______________	___________________
7	______________	___________________
8	______________	___________________

If an alarm is received, Form E should be initiated.