**Appendix I**

Operation, Maintenance and Monitoring Plan

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# Operation, Maintenance and Monitoring Plan

Dewey Loeffel Landfill Superfund Site
Nassau, New York

February 13, 2013

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Dewey Loeffel Landfill
Superfund Site
Nassau, New York

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## 1. Introduction

This Operation, Maintenance and Monitoring (OM&M) Plan has been prepared for the proposed treatment system at the Dewey Loeffel Landfill Superfund Site located in the Town of Nassau, Rensselaer County, New York (site). The work described herein is being completed pursuant to the Administrative Settlement Agreement and Order on Consent for a Removal Action (CERCLA Index No. 02-2012-2005) (Consent Order) executed by the United States Environmental Protection Agency (USEPA), General Electric Company (GE), and SI Group, Inc. (SI Group). (GE and SI Group are referred to herein as Respondents.)

This OM&M Plan has been prepared to provide the following:

- Procedures for routine OM&M of the groundwater extraction, landfill leachate collection and treatment systems, including, but not limited to, inspection and maintenance checklists, and schedules for inspection and maintenance activities;

- Plans for general maintenance of gravel drives, the fence surrounding the landfill, extraction wells and treatment building area, structures including the treatment building and any other enclosures which house parts of the groundwater extraction and landfill leachate collection systems, and snow removal and grass cutting as necessary to access all components of the groundwater extraction, landfill leachate collection and treatment systems;

- A plan for providing security measures to be taken to keep unauthorized personnel from entering restricted work areas;

- A schedule for operation of the groundwater extraction, landfill leachate collection, and treatment systems; and

- Plans and a schedule for monitoring of the treatment system in accordance with the revised Quality Assurance Project Plan (QAPP), which will be submitted to USEPA after the Design Report/Implementation Plan (DR/IP), as well as a schedule for submission of the results to USEPA.

Pursuant to Paragraph 63 of the Consent Order, within 30 days of the conclusion of the shakedown period discussed in the Start-Up Plan provided as Appendix H of the DR/IP, Respondents will submit to USEPA a Construction Completion Report. This report will include a final OM&M Plan for the groundwater extraction, landfill leachate collection, and treatment systems.

### 1.1 Location and Description

The Dewey Loeffel Landfill (landfill) is located along the south side at 350 Mead Road between Nassau-Averill Park Road and Central Nassau Road. A map showing the location of the landfill and surrounding area is presented on Figure 1. Key features are presented on Figure 2.

The capped area of the landfill is roughly triangular in shape and situated in a low-lying area between two wooded hills. The landfill is bound to the north by Mead Road, and to the south, west and east by undeveloped forested land. The rural area surrounding the landfill is sparsely populated and contains few residential properties and a bowhunter's club lodge.

Topography in the area generally slopes downward from east to west. Surface water at the landfill mostly drains to the west toward the Valatie Kill via Tributary T11A. The Valatie Kill flows in a southwesterly direction to Nassau Lake, located approximately three miles downstream. Surface water from a portion of the landfill flows to the south into a small unnamed tributary which discharges into Valley Stream and ultimately Nassau Lake.

The hydraulic gradient of groundwater in overburden soils in the vicinity of the landfill is generally to the west and/or southwest. The hydraulic gradient of groundwater in the bedrock is similar. However, based on the distribution of volatile organic compounds (VOCs) in a groundwater contaminant plume emanating from the landfill to the south, bedrock groundwater flows primarily to the south due to the influence of fractures within the bedrock.

### 1.2 History

As described in the Consent Order, from approximately 1952 to 1968, the landfill was owned and operated by several companies including the Loeffel Waste Oil and Removal Service Company (Loeffel Companies) as a waste disposal facility. During this time, the landfill consisted of two waste lagoons located in the western and central portions of the landfill, a 6-foot deep oil pit in the east central portion of the landfill, four 30,000 gallon aboveground storage tanks, and a drum disposal area located in the southeastern portion of the landfill.

Landfill disposal operations reportedly ceased in 1968 by order of the State of New York. Between 1970 and 1975, remedial actions undertaken by the Loeffel Companies included covering and grading the drum disposal area, oil pit and lagoons, and constructing a system of drainage ditches around the landfill. From 1974 to 1980, the Loeffel Companies reportedly also operated a waste oil transfer station utilizing the four 30,000 gallon aboveground storage tanks.

On September 23, 1980, GE entered into an agreement with the New York State Department of Environmental Conservation (NYSDEC) which required GE to perform field investigations, submit an engineering report which discussed the collected data, identify remedial alternatives, and recommend a remedial alternative. A remedy was subsequently selected by NYSDEC and involved the installation of soil-bentonite cutoff wall around the landfill, an overlying clay cap, and a landfill leachate collection system below the cap within the cutoff wall. The design of the remedy was performed by GE and approved by NYSDEC. The remedy was subsequently implemented by NYSDEC using funding provided by GE, Schenectady Chemicals, Inc. (now SI Group), and Bendix Corporation (now Honeywell International, Inc.). Beginning in 1983, NYSDEC and/or GE performed a variety of response actions at the site, some of which were performed in accordance with Records of Decision (RODs) issued by NYSDEC in January 2001 and January 2002. The response actions included, but were not limited to, the following:

- Installation and operation of a bedrock groundwater recovery well system involving three extraction wells located to the south of the landfill;
- Transportation of landfill leachate and groundwater for off-site treatment;
- Installation, operation, maintenance and monitoring of point-of-use treatment systems for five residential wells (located on four properties) to remove VOCs;
- Routine VOC monitoring of other residential wells located near the landfill; and
- Routine monitoring of many groundwater monitoring wells located outside the landfill's perimeter fence.

The current groundwater extraction system designed and constructed by NYSDEC is located along the approximate centerline of the VOC plume to the south of the landfill and includes three bedrock extraction wells (designated EW-1, EW-2 and EW-3, see Figure 2). Beginning in late March 2008 and through 2010, NYSDEC extracted groundwater from these three extraction wells on a seasonal basis, operating during the spring, summer, and fall months. Along with leachate from the landfill, extracted groundwater was transported for off-site treatment and disposal. NYSDEC transported landfill leachate for off-site treatment and disposal each year since 1991 with the exception of 1994. NYSDEC continued operation of the landfill leachate collection system through October 2011. Operation of the groundwater extraction system by NYSDEC did not resume after shutdown in the fall of 2010 until July 2011.

At the request of NYSDEC, USEPA proposed the site for inclusion on the National Priorities List (NPL) on March 4, 2010. The site was subsequently added to the NPL on March 10, 2011.

USEPA subsequently took over operation of the landfill leachate collection system and the groundwater extraction system to the south of the landfill on October 31, 2011. USEPA winterized the system, allowing groundwater extraction to continue during the winter months.

Pursuant to the Consent Order, GE and SI Group assumed responsibility from USEPA for continued operation and maintenance of the on-site leachate collection system and the off-site groundwater extraction system. The transition from USEPA to the Respondents occurred on August 1, 2012, and the first transportation of leachate and extracted groundwater by the Respondents occurred on August 2, 2012. The leachate and extracted groundwater will continue to be transported for off-site treatment and disposal until such time as an off-site treatment system is designed, constructed and approved for operation. Pursuant to the Consent Order, GE and SI Group will design and construct the treatment system to treat landfill leachate and extracted groundwater. Upon USEPA approval that the treatment system discharge meets the effluent discharge limits set under the Consent Order, routine transportation of leachate and extracted groundwater for off-site treatment will cease.

## 2. Site Facilities

Site facilities include the following:

- Gravel drive from Mead Road to the treatment building;
- Dirt and vegetated trails to the extraction wells, with gravel in select areas;
- Fencing with access gates around the landfill, extraction wells, and treatment building;
- Well vaults; and
- Electrical/control panels at the extraction wells and leachate storage tank at the landfill.

The monitoring and maintenance for the support facilities are discussed below. These facilities are grouped in categories by site access (e.g., gravel drive, dirt trails), site security (e.g., fencing), and site structures (e.g., treatment building) and utilities.

### 2.1 Site Access

A gravel drive, located to the west of the landfill, provides vehicular access to the treatment building from the south side of Mead Road. Connected to that gravel drive is a dirt trail that follows outside the western and southern landfill fence line. Connected to that dirt trail are a network of vegetated/dirt trails that provide access to the extraction wells located south of the landfill. As described below, the gravel drive and dirt trails will be monitored and maintained to allow ongoing site operations.

#### 2.1.1 Monitoring

The gravel drive to the treatment building and vegetated/dirt trails to the extraction wells will be monitored on a monthly basis using the Preventative Maintenance Checklist in Attachment A. Monitoring of the gravel drive and vegetated/dirt trails will be performed by walking the entire length from Mead Road to each of the extraction wells. The inspection will focus on looking for evidence of washout, settling, erosion and obstructions (e.g., debris, snow, downed trees/branches) that have the potential to prohibit safe vehicular access or would limit access to the extraction wells by personnel on foot.

### 2.1.2 Routine Maintenance

Maintenance of the gravel drive to the treatment building and vegetated/dirt trails to the extraction wells will be performed on an as-needed basis based on the results of the monitoring activities described above within a time frame sufficient to allow full-time operation of the treatment system. These maintenance activities may include the following:

- Placement and compaction of additional gravel;
- Minor trimming of vegetation along and within the gravel drive and/or vegetated/dirt trails;
- Clearing of downed trees/branches from the trails;
- Snow removal to the extent necessary to safely access the extractions wells, leachate collection tank, and treatment building; and
- Grass cutting to the extent necessary to maintain access to the extraction wells, leachate collection tank, and treatment building.

Snow removal will likely be completed by a local snow removal subcontractor to clear the gravel drive to the treatment building. Snow removal around the extraction wells will be completed by hand or by a mechanical means (e.g., snow blower, vehicle with plow) on an as-needed basis. Maintenance will be tracked on the log sheet in Attachment A.

## 2.2 Site Security

As shown on Figure 2, the landfill is surrounded by an 8-foot-high security fence topped with barbed wire. Vehicular and/or pedestrian access to the landfill is limited by three locked gates: two located along the northern fence line which provides access from Mead Road, and one located along the fence line at the southern tip of the landfill which exits onto the dirt/vegetated trail that follows outside the fence along the southwest edge of the landfill. The gates that provide access to the landfill are equipped with locking mechanisms (chains with padlocks).

Each of the three existing extraction wells (EW-1, EW-2 and EW-3) is surrounded by an 8-foot-high security fence topped with barbed wire, and the five new extraction wells (EW-4 through EW-8) will be similarly secured. Access to each well is through a double-swing gate with locking mechanisms (chains with padlocks).

The treatment building is also surrounded by an 8-foot-high security fence topped with barbed wire. Vehicular and/or pedestrian access to the treatment building is limited by double-swing gates with locking mechanisms (chains with padlocks).

During times when OM&M activities are not being performed, the gates that provide access to the landfill, extraction wells, and treatment building will remain locked. Only authorized personnel representing USEPA and the Respondents will be issued keys that allow access to the site.

#### 2.2.1 Monitoring

To confirm ongoing security at the site, fences, gates and locking mechanisms will be monitored on a monthly basis using the Preventative Maintenance Checklist in Attachment A. Monitoring of fencing around the landfill, extraction wells and treatment building will be completed by walking the entire perimeter of the fence to visually observe the overall integrity of the fencing and to determine if maintenance of the fencing is necessary. In addition, the gate structures will be observed for proper operation and security of the locking mechanisms.

#### 2.2.2 Routine Maintenance

Maintenance of the fencing and locking mechanisms will be performed on an as needed basis based on the results of the monitoring described above. Fencing in the area requiring maintenance will be repaired to a similar condition as the surrounding existing fencing. Inoperable or damaged locks and chains will be replaced as needed. Maintenance will be tracked on the log sheet in Attachment A.

### 2.3 Site Structures and Utilities

Several site structures and utilities are present at the site including the following:

- Well vaults;
- Treatment building; and
- Electrical/control panels at the extraction wells.

#### 2.3.1 Monitoring

To assess integrity and functionality, the site structures and utilities will be monitored as necessary for full-time operation of treatment system and on a monthly basis using the Preventative Maintenance

Checklist in Attachment A, which addresses the structures and utilities individually. This inspection will focus on observing for obvious signs of the following:

- Damaged and/or deteriorating construction materials;
- Vandalism or tampering;
- Significant leaks in the roofing/wall systems;
- Rodent or pest infestation;
- Overall security (e.g., inoperable doors, locks);
- Faded or damaged signage; and
- If applicable, evidence of leaking, damaged or corroded piping and valves.

Additionally, electrical components will be inspected for evidence of deterioration or corrosion of panels, conduits, wires and connections.

### 2.3.2 Routine Maintenance

Maintenance of the site facilities and utilities will be performed on an as needed basis based on the results of the monitoring described above within a time frame sufficient to allow full-time operation of treatment system. Simple repairs (e.g., patching holes, replacing signs) will be performed by operating personnel. More significant or specialized repairs to equipment (e.g., electrical) will be performed by qualified subcontractor personnel. Maintenance will be tracked on the log sheet in Attachment A.

## 3. Groundwater Extraction and Landfill Leachate Collection Systems

The groundwater extraction system consists of the following components that will be maintained within a time frame sufficient to allow full-time operation:

- Three existing bedrock extraction wells (EW-1, EW-2 and EW-3);
- Five new bedrock extraction wells (EW-4 through EW-8);
- Extraction well pumps; and
- Subsurface piping at well heads and associated fittings, valves and meters.

The existing extraction wells were installed within the approximate centerline of the VOC plume at distances of approximately 400 feet (EW-3), 800 feet (EW-2) and 1,200 feet (EW-1) south of the landfill. The flows from extraction well EW-2 averages approximately 2 gallons per minute (gpm) while the flow from extraction wells EW-1 and EW-3 average about 1 gpm. Each extraction well is equipped with well pump, power supply, and pump control and level control panels, which together supply power and control to groundwater pump operations. Pump operation is initiated and stopped when the pump on and off level set points are reached. Each well pump discharge line is connected via a pitless adaptor to the existing force main running towards the treatment building. The five new extraction wells are located closer to the landfill and similarly configured.

The existing leachate collection system consists of a network of three underground pipes beneath the western end of the landfill that gravity drain to an approximately 8,000-gallon underground storage tank (UST) in that same area. Landfill leachate will be pumped from the leachate collection tank to a 550 gallon leachate tank in the treatment building.

*Equipment*

*Extraction Well Pumps (P-101 to P-108)*

| | |
|---|---|
| Quantity: | 8 |
| Type: | Submersible well pump |
| Manufacturer: | Grundfos or equivalent |
| Model: | 10Redi-Flo3-260 or equivalent |
| Capacity: | 5 gpm at 340 feet total dynamic head (TDH) |
| Electrical: | 1 horsepower (hp), 230 volt, single phase |

*Leachate Collection Tank Pump (P-001) (located at the landfill)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Submersible well pump |
| Manufacturer: | Grundfos or equivalent |
| Model: | XGOWS0712BF or equivalent |
| Capacity: | 20 gpm at 35 feet TDH |
| Electrical: | 1/2 hp, 230 volt, single phase |

### 3.1 Monitoring of Groundwater Extraction and Landfill Leachate Collection Systems

Monitoring of the groundwater extraction and landfill leachate collection systems will be documented on a monthly basis using the Preventative Maintenance Checklist in Attachment A. Visible piping, valves and couplings will be inspected for evidence of corrosion, flaking and leakage. Visible wiring will be visually observed for cracking of the wire insulation and for evidence of corrosion. Additionally, operating parameters (e.g., extraction well pumping rates, flow totalizer readings) will be recorded.

Samples will be collected from the extraction wells and leachate collection tank. These samples will initially be analyzed for select field parameters (dissolved oxygen [DO] and pH), VOCs, select semi-volatile organic compounds (SVOCs) and polychlorinated biphenyls (PCBs) at the frequencies given in Table 1 of the Performance Monitoring Plan (see Appendix J of the DR/IP). The analytical parameters and frequencies of these samples may be adjusted in the future based on operational experience. Extraction well samples will be collected from the sample tap located in the vault near each well. Similarly, samples of leachate will be collected from the vault near the leachate collection tank at the landfill.

The mass of VOCs and select SVOCs removed from each extraction well and the landfill leachate will be calculated each month. Mass removal of PCBs will not be tracked given the very low, sporadic detections. These calculations will use the monthly recorded volume of leachate and extracted groundwater pumped to the treatment system along with available analytical data. All detections (including those flagged as estimated [i.e., below the practical quantitation limit but above the method detection limit]) will be employed in these calculations; for the purpose of these mass removal calculations, non-detects will be represented by the reporting limit, one-half of the reporting limit and/or zero.

### 3.2 Maintenance of Groundwater Extraction Wells and Landfill Leachate Collection Systems

Routine maintenance of the groundwater extraction and landfill leachate collection systems will be performed on an as needed basis based on the results of the monitoring described above. Simple repairs (e.g., piping, replacing gauges) will be performed by operating personnel. More significant or

specialized repairs to equipment (e.g., electrical) will be performed by qualified subcontractor personnel. Maintenance of the groundwater extraction wells and landfill leachate collection system may also include the pumps in each of the extraction wells and landfill leachate collection tank. Maintenance will be tracked on the log sheet in Attachment A.

## 4. Treatment System

The design of the treatment system is based on an average flow rate of 15 gpm and a maximum flow rate of 25 gpm. The treatment system consists of the following major components:

- One equalization tank for leachate;
- One equalization tank for groundwater and leachate combined;
- One aerobic fixed-film bioreactor primarily to destroy benzene, toluene, ethylbenzene, and xylenes (BTEX), vinyl chloride, and acetone;
- One clarifier settling tank to remove residual solids/biological carryover from the bioreactor;
- One bag filtration system to remove remaining solids carryover from the clarifier;
- One induced draft low-profile air stripper system to address remaining or residual strippable VOCs;
- Two liquid-phase granular activated carbon (GAC) adsorption units installed in series to address SVOCs, residual adsorbable VOCs, and low concentrations of PCBs;
- Three vapor-phase GAC vessels to address primarily VOCs (with the exception of vinyl chloride and methylene chloride) from the air stripper exhaust stream;
- Two vapor-phase potassium permanganate impregnated zeolite (PPZ) vessels for the destruction of vinyl chloride and methylene chloride from the air stripper exhaust prior to discharge;
- One backwash water supply tank required for backwashing GAC and/or air stripper cleaning, etc.; and
- A programmable logic controller (PLC)–based control system.

As shown on Figure 3, extracted groundwater will be pumped from the extraction wells to an equalization tank located in the treatment building. Landfill leachate will be first pumped from the leachate collection tank at the landfill to a leachate equalization tank in the treatment building, and will then be pumped into the main equalization tank. Groundwater and landfill leachate will then be pumped from the main equalization tank to an aerobic fixed-film bioreactor tank. The bioreactor will

consist of a submerged fixed-film growth media within a reactor tank, incorporating aeration and biological treatment. The bioreactor system will be designed primarily to destroy BTEX, vinyl chloride, and acetone, and is also expected to address other chlorinated VOCs and SVOCs to some extent. Inside of the bioreactor, biomass will attach to the growth media, with aerators and chemical feed systems to provide sufficient oxygen and nutrients for sustaining adequate biomass within the reactor. In the course of the biological process, biomass will slough off the growth media and exit the reactor tank. Effluent from the reactor tank, which will include this biomass and other solids that carryover from the bioreactor, will flow to a clarifier. Settled solids collected at the bottom of the clarifier will be periodically withdrawn for dewatering and off-site transportation and disposal.

The clarifier settling tank will overflow to a pump station tank, which will be equipped with transfer pumps leading to subsequent treatment processes and a recycle pump. A recycle stream will be directed back to the main equalization tank in order to maintain a consistent flow rate through the bioreactor/clarifier as well as provide additional bio-treatment to enhance removal of contaminants. Water will then be pumped through a bag filtration system (two bag filter units installed in parallel) for removal of suspended solids prior to being directed to an induced draft low-profile air stripper to address remaining or residual strippable VOCs. Vapor exhaust from the air stripper and the vented air from the bioreactor will pass through three vapor-phase GAC units for adsorption of VOCs followed by two vessels containing PPZ for destruction of methylene chloride and vinyl chloride in the vapor stream. Treated effluent from the air stripper will be either recycled back to the equalization tank based on tank level to maintain a continuous flow rate across the bioreactor, clarifier and air stripper, or directed through two liquid-phase GAC units in series to address SVOCs, residual adsorbable VOCs, and, if present, low concentrations of PCBs. Treated effluent will then flow to a backwash water storage tank. In order to maintain an adequate supply of treated water for backwashing purposes, all effluent will be directed through this tank. Treated effluent will be pumped for discharge to the Valatie Kill. USEPA provided Respondents with revised discharge limitations and monitoring requirements from NYSDEC on February 6, 2013, which are provided in Attachment B.

*Equipment*

*Leachate Tank (T-100) (located within the treatment building)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Flat bottom vertical tank with domed top |
| Manufacturer: | Snyder Industries or equivalent |
| Model: | 1800000N or equivalent |
| Capacity: | 550 gallons |
| Material of Construction: | HDPE |

*Leachate Feed Pump (P-100) (located at Leachate Tank T-100)*

| | |
|---|---|
| Quantity: | 1 |
| Manufacturer: | LMI or equivalent |
| Model: | SD8387P or equivalent |
| Capacity: | 115 GPH at 75 pounds per square inch (psi) |
| Electrical: | 60 Hertz (Hz), 230 volt, single phase |

*Equalization Tank (T-200)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Flat bottom vertical tank with domed top |
| Manufacturer: | Snyder Industries or equivalent |
| Model: | 1780200N or equivalent |
| Capacity: | 1,900 gallons |
| Material of Construction: | HDPE |

*Bioreactor Feed Pumps (P-200A/B)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Closed coupled centrifugal |
| Manufacturer: | Goulds or equivalent |
| Model: | 2ST2C4K4 or equivalent |
| Capacity: | 25 gpm at 33 feet TDH |
| Electrical: | 1/2 hp, 240 volt, three phase, 1750 revolutions per minute (rpm) |

*Fixed-Film Bioreactor (T-300)*

| | |
|---|---|
| Quantity: | 1 |
| Dimensions: | 10 feet diameter with 12 feet side water height |
| Continuous Design Flow Rate: | 15 gpm |
| Maximum Design Flow Rate: | 25 gpm |
| Design BOD (5 day) Loading: | 20 pounds per day |
| Media Volume: | 450 cubic feet of polypropylene packing |
| Material of Construction: | Epoxy-coated carbon steel |

*Bioreactor Blower (B-300)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Positive displacement |
| Manufacturer: | Dresser Industries or equivalent |
| Model: | URI-22 or equivalent |
| Capacity: | 36 cubic feet per minute (cfm) at 10 psi |
| Electrical: | 5 hp, 240 volt, single phase |

*Bioreactor Chemical Feed Pumps (P-300 and P-301)*

| | |
|---|---|
| Quantity: | 2 |
| Type: | Electronic metering pump |
| Manufacturer: | Pulsatron or equivalent |
| Model: | LE03 or equivalent |
| Capacity: | 0.50 GPH at 150 psi |
| Electrical: | 5 hp, 230 volt, single phase, 1750 rpm |

*Clarifier (T-400)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Sloped bottom with integrally molded drain outlet and domed top |
| Dimensions: | 10 feet diameter by 8 feet, 7 inches high |
| Capacity: | 4,000 gallons |
| Continuous Design Flow Rate: | 15 gpm |
| Maximum Design Flow Rate: | 25 gpm |
| Design Influent Solids: | 100 milligrams per liter (mg/L) |
| Estimated Sludge Production: | 75 gallons per day (3% solids) |
| Material of Construction: | HDPE |

*Sludge Pump (P-400)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Progressive cavity |
| Manufacturer: | Moyno or equivalent |
| Model: | 33152 or equivalent |
| Capacity: | 1.7 gpm at 30 psi |
| Electrical: | 5 hp, 230 volt, single phase, 1750 rpm |

*Pressure Filter Unit (PF-400 and PF-410A/B)*

| | |
|---|---|
| Quantity: | 3 |
| Manufacturer: | Rosedale |
| Model: | 8-30 |
| Capacity: | 25 gpm |
| Materials of Construction: | Stainless steel |

*Clarifier Pump Station Tank (T-410)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Flat bottom with domed top |
| Manufacturer: | Snyder Industries or equivalent |
| Model: | 8060000N |
| Capacity: | 550 gallons |
| Materials of Construction: | HDPE |

*Air Stripper Feed and Discharge Pumps (P-410A/B and P-500A/B)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Closed coupled centrifugal |
| Manufacturer: | Goulds or equivalent |
| Model: | 1ST1D4E4 or equivalent |
| Capacity: | 25 gpm at 58 feet TDH |
| Electrical: | 3/4 hp, 240 volt, three phase, 3500 rpm |

*Air Stripper Inlet Duct Heater*

| | |
|---|---|
| Manufacturer: | Indeeco or equivalent |
| Model: | QUZ or equivalent |
| Capacity: | 10 kW (kilowatt) |

*Recycle Pump (P-420)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Closed coupled centrifugal |
| Manufacturer: | Goulds or equivalent |
| Model: | 1ST2C4A4 or equivalent |
| Capacity: | 15 gpm at 33 feet TDH |
| Electrical: | 1/2 hp, 240 volt, single phase, 1750 rpm |

*Low-Profile Air Stripper (AS-500)*

| | |
|---|---|
| Quantity: | 1 |
| Manufacturer: | NEEP Systems or equivalent |
| Model: | ShallowTray Model 2600 or equivalent |
| Maximum Design Flow Rate: | 25 gpm |
| Number of Trays: | 5 |
| Materials of Construction: | 304L Stainless Steel |

*Air Stripper Blower (B-500)*

| | |
|---|---|
| Quantity: | 1 |
| Manufacturer: | New York Blower or equivalent |
| Model: | 2606A or equivalent |
| Flow Rate: | 600 cfm at 52 inches water column |
| Electrical: | 10 hp, 240 volt, single phase |

*Vapor-Phase Carbon Vessels (GAC-501 to GAC-503)*

| | |
|---|---|
| Quantity: | 3 |
| Manufacturer: | Tigg or equivalent |
| Model: | N-4000-PDB or equivalent |
| Design Flow Rate: | 600 cfm |
| Media Capacity: | 4,000 pounds of vapor-phase GAC |
| Materials of Construction: | Epoxy-coated carbon steel |

*Vapor-Phase PPZ Vessels (PPZ-504 and PPZ-505)*

| | |
|---|---|
| Quantity: | 2 |
| Manufacturer: | Siemens or equivalent |
| Model: | FB-2000 or equivalent |
| Design Flow Rate: | 600 cfm |
| Media Capacity: | 3,500 pounds of PPZ |
| Materials of Construction: | Epoxy-coated carbon steel |

*Liquid-Phase Carbon Vessels (GAC-601 and GAC-602)*

| | |
|---|---|
| Quantity: | 2 |
| Manufacturer: | Siemens or equivalent |
| Model: | PV-2000 or equivalent |
| Maximum Design Flow Rate: | 25 gpm |
| Media Capacity: | 2,000 pounds of liquid-phase GAC |
| Materials of Construction: | Epoxy-coated carbon steel |

*Backwash Tank (T-800)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Flat bottom with domed top |
| Manufacturer: | Snyder Industries or equivalent |
| Model: | 1831000N |
| Capacity: | 2,000 gallons |
| Materials of Construction: | HDPE |

*Backwash Pump (P-800)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Closed coupled centrifugal |
| Manufacturer: | Goulds or equivalent |
| Model: | 2ST1E4E4 or equivalent |
| Capacity: | 50 gpm at 58 feet TDH |
| Electrical: | 1-1/2 hp, 240 volt, single phase, 3500 rpm |

*Process Wash Vessel Feed Pump (P-810)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Closed coupled centrifugal |
| Manufacturer: | Davey or equivalent |
| Model: | HS12-40HT1 or equivalent |
| Capacity: | 12 gpm at 40 psi |
| Electrical: | 120 volt, single phase, 0.9 kW |

*Backwash Supply Tank Discharge Pumps (P-820A/B)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Closed coupled centrifugal |
| Manufacturer: | Goulds or equivalent |
| Model: | 1ST1D4E4 or equivalent |
| Capacity: | 25 gpm at 58 feet TDH |
| Electrical: | 3/4 hp, 240 volt, three phase, 3500 rpm |

*Process Sump Pump (P-900)*

| | |
|---|---|
| Quantity: | 1 |
| Type: | Submersible sump pump |
| Manufacturer: | Goulds or equivalent |
| Model: | WE0312M or equivalent |
| Capacity: | 10 gpm at 16 feet TDH |
| Electrical: | 1/3 hp, 230 volt, single phase, 1750 rpm |

*Process Wash Vessel*

| | |
|---|---|
| Manufacturer: | Eagle Group or equivalent |
| Model: | 314-16-1-18-R or equivalent |
| Materials of Construction: | 304 Stainless Steel |

## 5. Start-Up

The Start-Up Plan for the treatment system is provided in Appendix H of the DR/IP. The Start-Up Plan includes preliminary start-up activities along with a clean water system start-up to test the treatment system components.

Initial treatment system start-up will occur using groundwater from existing extraction wells EW-1, EW-2, and EW-3 and leachate from the existing leachate collection tank at the landfill. Prior to start-up and while the transition steps discussed in the Start-Up Plan are being completed, media and activated sludge from a local publically owned treatment works (POTW) and/or another source will be added to the bioreactor. Additionally, the discharge line from the treatment system will be rerouted to either of two frac tanks located outside the treatment building but inside a fenced area. Based on the current rates of leachate and groundwater removal, at least two frac tanks will be used and are sufficient to store approximately six days of leachate and groundwater removal.

The treatment system start-up will be initiated by placing controls in “Auto” mode at the operator interface in the control room of the new treatment building. Once in “Auto” mode, water should begin flowing from the equalization tank through the treatment system. The landfill leachate extraction system will be brought online first. The existing extraction wells will then be brought online one at a time, starting with EW-1 followed by EW-3 and then EW-2. At each step, proper operation of communication, instrumentation and interlocks systems will be verified prior to proceeding to the next extraction well.

Sampling of the treatment system will be conducted to demonstrate that the discharge meets the substantive requirements established pursuant to the Consent Order (see Attachment B). As specified in Paragraph 54 of the Consent Order, treated water discharged from the system will be containerized on-site in at least two frac tanks near the treatment building during this shakedown period. Treated water in the tanks will be sampled and analyzed for the parameters in the substantive requirements by methods described in the revised QAPP that will be submitted to USEPA after the DR/IP, and may, with USEPA prior approval, be discharged to surface water in batches if the sampling data for a tank show that the substantive requirements have been met. Alternatively, treated water may be transported for off-site disposal or recycled back into the treatment system until USEPA provides notice to Respondents of interim approval to discharge treated water directly to surface water. Sampling locations, methods and frequencies for process monitoring samples are provided in the Performance Monitoring Plan (see Appendix J of the DR/IP). Following this shakedown period, Respondents will present data to USEPA in a Construction Completion Report submitted pursuant to Paragraph 63 of the Consent Order.

As discussed in Appendix F of the DR/IP, additional hydrogeologic investigation activities are planned during installation of the five new extraction wells (EW-4 through EW-8). Thus, the new extraction wells will not be operational and connected to the treatment system until after initial start-up. Each new extraction will be started, one at a time on different days, and allowed to operate for 4 to 8 hours to collect additional information. During this period, proper operation of communication, instrumentation and interlocks systems will be verified. Additionally, the specific capacity of each new extraction well will be estimated. Prior to shutting down each well, a water sample will be collected for analysis of VOCs, SVOCs, and PCBs by methods described in the revised QAPP that will be submitted to USEPA after the DR/IP.

Based on the analytical results and specific capacity estimates, a start-up sequence will be established for the five new extraction wells. This process will be designed to avoid any upset to the treatment system operations. After a new extraction well is placed into operation, a minimum of one set of analytical results from the treatment system will be obtained before the next extraction well is placed into operation. After all of the new extraction wells are placed into operation, pump set points will be adjusted incrementally and sequentially based on treatment system data, extraction well data (flow rates and groundwater quality), and groundwater monitoring data (water level elevations and groundwater quality), the latter collected under the Groundwater Monitoring Plan (see Attachment B of Appendix J to the DR/IP).

## 6. Normal System Operations

The system is designed to operate automatically without constant supervision and maintenance. The panel-mounted human-machine interface (HMI) will allow operators to connect to the PLC and will graphically display the status of the treatment system as well as log data and alarms. For the HMI, the operator can operate the equipment (i.e., turn on/off pumps, etc.) and change control and alarm set points. The PLC is also provided with a wireless modem that allows an off-site operator to remotely monitor the treatment system. The treatment system operator will visit the site at least weekly to monitor the system. The following activities must be completed during the monitoring:

- Monitor system operation;
- Check equipment and all related piping for leaks, repair if necessary;
- Change the filter bags, if necessary;
- Check the pressure drop across the liquid and vapor-phase GAC units and complete GAC change outs, if necessary based on analytical data;
- Inspect the air stripper trays through the view ports. If there is excessive build-up on the trays, schedule the air stripper for cleaning;
- Inspect the treatment building for general housekeeping issues and correct as necessary;
- Record any maintenance performed on the log sheet in Attachment A;
- Complete the Preventative Maintenance Checklist on a monthly basis; and
- Complete the checklists included with the revised Health and Safety Plan (HASP) and revised Preparedness, Prevention, and Contingency Plans (PPCP) that will be submitted to USEPA after the DR/IP.

### 6.1 Normal Start-Up Procedure

The system is designed to operate in automatic mode under the control of the PLC. To restart the system after a brief shutdown, open any valves that were closed for maintenance or cleaning and place all equipment in “Automatic”. The PLC will start the equipment as the necessary permissives are satisfied.

Should the system be shut down due to a power outage, the water in the sump of the air stripper must be pumped to the equalization tank and clean water added to the stripper sump prior to restart of the system. This procedure will also be used if the system is shut down on an emergency basis, and if

the system shuts down for an unknown reason and it cannot be confirmed that the blower timed out properly.

### 6.2 Treatment System Process Monitoring

During treatment system operation, the parameters listed in the Operations Log Sheet are monitored to assess the overall performance of the treatment system components. The monitoring will be conducted on a weekly basis during the first quarter of operation and then at least bi-weekly thereafter.

### 6.3 Treatment System Routine Maintenance

To promote proper operation of the system, maintenance described in this section will be conducted. Additional maintenance requirements are described in the equipment manufacturers' manuals that will be stored in the treatment building.

#### 6.3.1 Equalization Tank Routine Maintenance

Due to the nature of the extraction system design, sediment may build up in the equalization tank during normal operation. The tank will be checked monthly for sediment buildup, and cleaned as necessary. The frequency of tank cleaning will be determined by operational experience.

#### 6.3.2 Clarifier Routine Maintenance

Due to the nature of the bio-reactor operation, sludge will build up in the clarifier during normal operation. The clarifier will be checked weekly for sludge buildup, and sludge removed using the sludge pump and pressure filter as necessary. The frequency of clarifier sludge removal will be determined by operational experience.

#### 6.3.3 Filter Bag Change-Out

The pressure drop across the influent and effluent bag filters will increase as the bags collect solids. When indicated by the increased pressure drop, the filter in service will be replaced with a new filter bag in the housing. The frequency of filter bag changes will be determined by operational experience.

#### 6.3.4 Air Stripper Routine Maintenance

The low-profile air stripper is designed to operate with a minimal amount of maintenance. The following general maintenance will be performed on the air stripper at least annually:

- Clean blower motor housing;
- Lubricate blower fan and motor bearings, as necessary; and
- Clean air stripper aeration trays as described in Section 6.3.5.

### 6.3.5 Air Stripper Cleaning

During operation of the system, dissolved minerals (e.g., calcium) may precipitate out of the water onto the air stripper trays. These minerals form insoluble deposits that can foul the openings in each tray. Fouling may cause higher than normal operating air pressure within the air stripper unit. In order to prevent fouling of the aeration trays, the trays will be periodically pressure washed. Pressure washing of the air stripper aeration trays with water will be conducted as necessary to maintain normal operating air pressures within the air stripper. Clean-out ports located on the end of the air stripper trays provide access to the air stripper trays. Normal cleaning operations can be accomplished via the access ports; therefore, removal of the air stripper trays is typically not necessary.

#### *6.3.5.1 Equipment Required*

- Pressure washer capable of 2 gpm minimum flow at 900 psi max;
- Washer wand with spray nozzle and an adapter to connect the wand to the pressure washer hose end; and
- Treated water from the Backwash Supply Tank.

#### *6.3.5.2 Pressure Washing Procedure*

- Shut down the system.
- Stop and lock out the air stripper and the equalization tank pump.
- Make provisions for handling waste generated during cleaning. A wet/dry vacuum may be required.
- Remove the cleanout port covers.
- Turn on the water supply to the pressure washer. Then, turn on the pressure washer. Be sure to wear appropriate personal protective equipment (PPE), including, but not limited to, protective goggles or a face shield while spraying.

- Insert the wand all the way into the 8-inch-diameter cleanout port on the sump tank. Have the spray nozzle pointed up toward the bottom of the lower tray. Holding the wand tightly, pull the trigger to start the pressurized water flow. Expect the wand to kick back as flow starts.

- Move the wand side to side at a rate of about 1 inch per second. Be sure to cover the entire tray bottom area.

- Periodically stop the cleaning operation and inspect the cleaned area by shining a light into the unit. The area is clean when there are no deposits in or around the aeration holes.

- Check the water level in the sump tank and drain as necessary.

- When the bottom surface appears clean, move the wand to the top side of the same tray by inserting it in the next highest cleanout port. Continue spraying with the nozzle pointed down onto the top surface of the tray. Remove all visible deposits from the tray baffles and the walls of the unit.

- Repeat the procedure for the bottom and top of each tray.

- After the cleaning operation is finished, rinse the trays, baffles, and walls with the pressure sprayer. Work down from the upper tray to the sump tank. Make sure the surfaces are clean and the holes are not blocked by loosened debris.

- Remove the top cover, flip it over, and wash the bottom side. Inspect the spray nozzle for fouling.

- If the spray nozzle shows evidence of deposits, it should be removed and cleaned with a wire brush.

- Reinstall the top cover and all cleanout port covers.

- Pump all wash water collected in the air stripper sump to the equalization tank.

- Return the air stripper to operation.

If pressure washing is ineffective, the stripper trays may require a cleaning with a dilute acid solution.

*6.3.5.3 Equipment and Materials Required for Air Stripper Acid Washing*

- Portable pH meter;

- 1 gallon of hydrochloric acid; and

- 1 quart of sodium hydroxide.

*6.3.5.4 Air Stripper Acid Washing Procedures*

- Shut down the system and turn the air stripper control panel HAND/OFF/AUTO (HOA) switch and turn the switches for the air stripper blower, the air stripper inlet pump, and the air stripper sump pump to the OFF position.
- Close ball valve on air stripper sump pump discharge pipe.
- Close ball valve on air stripper water inlet piping.
- Open the ball valve on the crossover pipeline from the air stripper discharge pump to the air stripper inlet piping.
- Remove the rubber cap on the air stripper sump access portal, add 2 quarts of hydrochloric acid to the approximately 80 gallons of water remaining in the air stripper sump and replace the rubber cap on the portal. Be sure to wear appropriate PPE, including, but not limited to, protective goggles or face shield and protective gloves.
- Turn the air stripper sump discharge pump HOA switch to the HAND position and allow the acid/water mixture to circulate from the air stripper sump to the air stripper inlet piping, through the air stripper tray and back to the air stripper sump.
- Allow the acid/water mixture to circulate for 2 hours or until the trays of the air stripper are cleaned of hardness buildup, checking the pH of the mixture every 30 minutes and adding hydrochloric acid as needed to keep the pH below 4.0.
- After the cleaning is a complete, use small amount of sodium hydroxide to raise the pH of the acid/water solution circulating through the air stripper to a pH between 6.7 and 8.3.
- Pump all wash water collected in the air stripper sump to the equalization tank.
- Turn air stripper sump discharge pump HOA switch to the OFF position.
- Return valves to their normal positions.
- Turn air stripper control panel HOA switches to the AUTO position.
- Return the stripper to operation.

The frequency of acid washing of the air stripper will be determined by operational experience.

6.3.6 Liquid-Phase GAC System Change-Out

Change-outs of the lead liquid-phase GAC will be scheduled based on sampling results in addition to evaluation of loading based on these data in conjunction with isotherm estimates in order to minimize the generation of hazardous waste while still meeting substantive requirements. Liquid-phase GAC change-outs will be completed by vacuuming the spent carbon out of the vessel and replacing with fresh carbon.

6.3.7 Vapor-Phase GAC and PPZ Change-Outs

As shown on Figure 3, the vapor-phase treatment will include three GAC units in series followed by two PPZ units. To monitor operating efficiency, air samples will be collected from between the middle and the lag vapor-phase GAC units and at the discharge of the lead vapor-phase PPZ. Air samples will be collected using either a tedlar bag or summa canister and analyzed for VOCs. As presented in Table 1 of the Performance Monitoring Plan in Appendix J of the DR/IP, air samples will be collected on a monthly basis for the first year of operation. Thereafter, based on operational experience, the sampling schedule may be reduced. Change-outs of the lead vapor-phase GAC and PPZ will be scheduled based on sampling results in addition to evaluation of loading based on these data in conjunction with isotherm estimates in order to minimize the generation of hazardous waste while still meeting substantive requirements. Change-out of the vapor-phase GAC and PPZ will be completed by vacuuming the spent media out of the vessel and replacing with fresh media.

## 6.4 Waste Management

Spent PPE, disposable equipment and other debris (including bag filters and other solid hazardous waste) will be contained in a 55-gallon drums in the treatment building. Additional waste will include spent liquid-phase GAC, vapor-phase GAC and vapor-phase PPZ. These materials will be characterized as necessary for profile approval, and then transported off-site for disposal at a permitted facility in accordance with the Transportation and Disposal (T&D) Plan conditionally approved by USEPA.

Non-impacted materials (e.g., paper, cardboard, plastic, etc.) will be placed in a designated on-site recycling container for periodic removal to an off-site recycling facility. General non-impacted refuse (e.g., cups, packaging materials, etc.) that is not recyclable will be placed in a designated trash container for periodic removal to an off-site sanitary waste disposal facility.

## 7. Control Systems

The treatment system will be equipped with adequate instrumentation necessary for monitoring of key parameters. The function of major instrumentation is summarized below and described in further detail on Contract Drawings P2, P3, P4, and P5 provided in Attachment C.

- The extraction wells will be equipped with local pump control panels to control pump operation, flow meters to monitor extraction well flow, and level switches. All extraction well pump instrumentation will be in communication with and interlocked with the treatment system main control panel via buried control wiring. A similar configuration will be provided at the leachate collection tank at the landfill;

- The leachate tank in the treatment building will be equipped with level controls and switches to monitor for high or low level conditions and to control pump and actuated valve operation;

- The main equalization tank will be equipped with level controls and switches to monitor for high or low level conditions and to control pump and actuated valve operation;

- The fixed-film bioreactor feed line will be equipped with a flow meter to control feed pump operation and monitor flow conditions to the bioreactor;

- The fixed-film bioreactor will be equipped with instrumentation to monitor pH, DO, and temperature, along with a level switch to monitor for a high level condition;

- The clarifier will be equipped with a level switch to monitor for a high level condition;

- The clarifier pump station will be equipped with level controls and switches to monitor for high or low level conditions and to control pump operation;

- The air stripper feed line will be equipped with a pressure transmitter to monitor line pressure upstream of the bag filtration system and a flow meter to monitor flow conditions to the air stripper;

- The air stripper will be equipped with level transmitters and switches, pressure transmitters and switches, air flow meter, and temperature transmitter to detect critical alarm conditions associated with the air stripper system;

- The liquid-phase GAC system feed line will be equipped with a flow meter to monitor flow conditions and a pressure transmitter to monitor line pressure upstream of the GAC system; and

- Flow and pH meters will be mounted at the discharge line in the building for flow and effluent quality monitoring prior to discharge to surface water.

The instrumentation and process equipment located in the building and at the extraction wells will be hard-wired to a PLC mounted inside the building. The PLC will perform the following functions:

- Monitor various system parameters such as groundwater and air flow rates, tank levels, air stripper air inlet temperature, air stripper sump pressure, effluent pH, building temperature, bioreactor pH, bioreactor DO, and bioreactor temperature;

- Directly control equipment operations including actuated valves, pumps, and the air stripper;

- Initiate alarms and/or equipment shutdowns as detailed in the interlocks and control logic on Contract Drawing P5 provided in Attachment C; and

- Notify operating personnel of alarm and/or shutdown conditions as appropriate via wireless telemetry.

## 8. Sampling and Analysis

Treatment system effluent samples will be collected from the treatment system discharge pump. The sampling frequency and analytical parameters specified in the substantive requirements are presented in Table 1 of the Performance Monitoring Plan in Appendix J of the DR/IP. These include select field parameters (DO and pH), VOCs, select SVOCs, PCBs, select pesticides, select metals, and select water quality parameters. Additionally, the substantive requirements include quarterly whole effluent toxicity (WET) testing along with mercury and PCB minimization programs. Following the conclusion of the shakedown period and USEPA approval of routine discharge from the treatment system to the Valatie Kill, the treatment system discharge will be monitored as described in the Performance Monitoring Plan in Appendix J of the DR/IP.

Treatment system influent samples will initially be collected for the same analytical parameter as the effluent but at a reduced sampling frequency (see Table 1 of the Performance Monitoring Plan in Appendix J of the DR/IP). Additional samples will be collected from specific locations between key process components within the treatment system. These samples will initially be analyzed for select field parameters (DO and pH), VOCs, and select SVOCs at the frequency given in Table 1 of the Performance Monitoring Plan in Appendix J of the DR/IP. Water samples within the treatment system are anticipated to be collected from the sample taps at the locations shown on Figure 3 in the Performance Monitoring Plan in Appendix J of the DR/IP.

## 9. Reporting

Respondents do not propose to provide USEPA with daily oral or weekly written reports for the activities described in this OM&M Plan. However, in addition to providing the laboratory analytical results, the activities performed under this plan will be summarized in the Monthly Progress Reports that are submitted to USEPA pursuant to the Consent Order. Additionally, in accordance with Paragraph 57f of the Consent Order, Analytical Services Tracking System (ANSETS) forms will be submitted to USEPA for each sampling event; the complete analytical data packages will also be submitted to USEPA.

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**Table**

**TABLE 1**
**DEWEY LOEFFEL LANDFILL SUPERFUND SITE**
**NASSAU, NEW YORK**
**EQUIPMENT SCHEDULE**

| Equipment Tag | Manufacturer | Model Number |
|---|---|---|
| **Extraction Wells** | | |
| P-101--P-103 | GRUNDFOS | 10REDI-FLO3-260 |
| FIT-101--FIT-103 | BADGER | RECORDALL MODEL 55 WITH RTR FLOW TRANSMITTER |
| LSH-101--LSH-103 | GEMS | LS750 |
| **Leachate Collection Tank (Located at the Landfill)** | | |
| P-001 | GOULDS | XGOWS0712BF |
| FIT-001 | BADGER | RECORDALL MODEL 55 WITH RTR FLOW TRANSMITTER |
| **Main Treatment System** | | |
| T-100 | SNYDER INDUSTRIES | 1800000N |
| LSHH/LSLL-100 | GEMS | LS750 |
| LE/LT-100 | WIKA | LS10 |
| P-100 | LMI | SD8387P |
| FIT-100 | BADGER | 1" MAGNETOFLOW |
| MV-200 | HAYWARD | SERIES EMJ ELECTRIC ACTUATOR |
| T-200 | SNYDER INDUSTRIES | 1780200N |
| LSHH/LSLL-200 | GEMS | LS750 |
| LE/LT-200 | WIKA | LS10 |
| P-200A/B | GOULDS | 2ST2C4K4 |
| FIT-200 | BADGER | 1" MAGNETOFLOW |
| AE-300 | FOXBORO | 870ITPH |
| AE-310 | HACH | 5790000 |
| TT-300 | FOXBORO | RTT15-T1WCQNAF-L1 |
| T-300 | SEE CONTRACT DRAWING M7 | |
| FIT-300A/B/C | DWYER INSTRUMENTS | RMB-52 |
| PIT-300C | FOXBORO | IGP20-T22B21F-M1L1 |
| B-300 | DRESSER INDUSTRIES | PC-12-22 |
| P-300--P-301 | PULSAFEEDER PULSATRON | LE03 |
| T-400 | SEE CONTRACT DRAWING M8 | |
| LSHH/LSLL-410 | GEMS | LS750 |
| LE/LT-410 | WIKA | LS10 |
| P-400 | MOYNO | 33152 |
| PF-400 | ROSEDALE | 8-30 |
| T-410 | SNYDER INDUSTRIES | 8060000N |
| P-410A/B | GOULDS | 1ST1D4E4 |
| FIT-410 | BADGER | 1" MAGNETOFLOW |
| PIT-410 | FOXBORO | IGP10-T22D1F-M1L1 |
| PF-410A/B | ROSEDALE | 8-30 |
| MV-410 A/B/C/D | ASAHI | 3730020 |
| PIT-420 | FOXBORO | IGP10-T22D1F-M1L1 |
| P-420 | GOULDS | 1ST2C4A4 |
| DUCT HEATER | INDEECO | QUZ |
| TT-500 | FOXBORO | RTT15-T1WCQNAF-L1 |
| AS-500 | NEEP SYSTEMS | SHALLOWTRAY MODEL 2650 |
| FIT-500 | SIERRA | 620S-L06M1EN2V4DD0 |
| B-500 | NEW YORK BLOWER COMPANY | 2606A |
| PIT-510 | FOXBORO | IGP20-T22B21F-M1L1 |
| GAC-501--GAC-503 | TIGG | N-4000-PDB |
| PPZ-504--PPZ-505 | SIEMENS | FB-2000 |
| P-500 A/B | GOULDS | 1ST1D4E4 |
| FIT-510 | BADGER | 1" MAGNETOFLOW |
| PIT-520 | FOXBORO | IGP10-T22D1F-M1L1 |
| MV-500 | HAYWARD | SERIES EMJ ELECTRONIC ACTUATOR |
| MV-510 | HAYWARD | SERIES EMJ ELECTRONIC ACTUATOR |
| GAC-601--GAC-602 | SIEMENS | PV-2000 |
| FIT-800 | BADGER | 1" MAGNETOFLOW |
| P-800 | GOULDS | 2ST1E4E4 |
| T-800 | SNYDER INDUSTRIES | 1831000N |
| LSH/LSL-800 | GEMS | LS750 |
| LE/LT-800 | WIKA | LS10 |
| P-810 | DAVEY | HS12-40HT1 |
| P-820A/B | GOULDS | 1ST1D4E4 |
| FIT-900 | BADGER | 1" MAGNETOFLOW |
| AIT-900 | FOXBORO | 870ITPH |
| P-900 | GOULDS | WE0312M |
| PROCESS WASH VESSEL | EAGLE GROUP | 314-16-1-18-R |
| **Heating and Ventalation** | | |
| UH-1--UH-4, UH-6--UH-7 | CHROMALOX | LUH-07-21-34 |
| L-1/L-3 | RUSKIN | ELC6375DAX, 36"W X 36" W |
| EF-1 | GREENHECK | AWB 24A6B |
| UH-5 | CHROMALOX | LUH-04-21-34 |
| L-2 | RUSKIN | ELC6375DAX, 12"W X 18" H |
| EF-2 | GREENHECK | SE1-12-432-E-1 |

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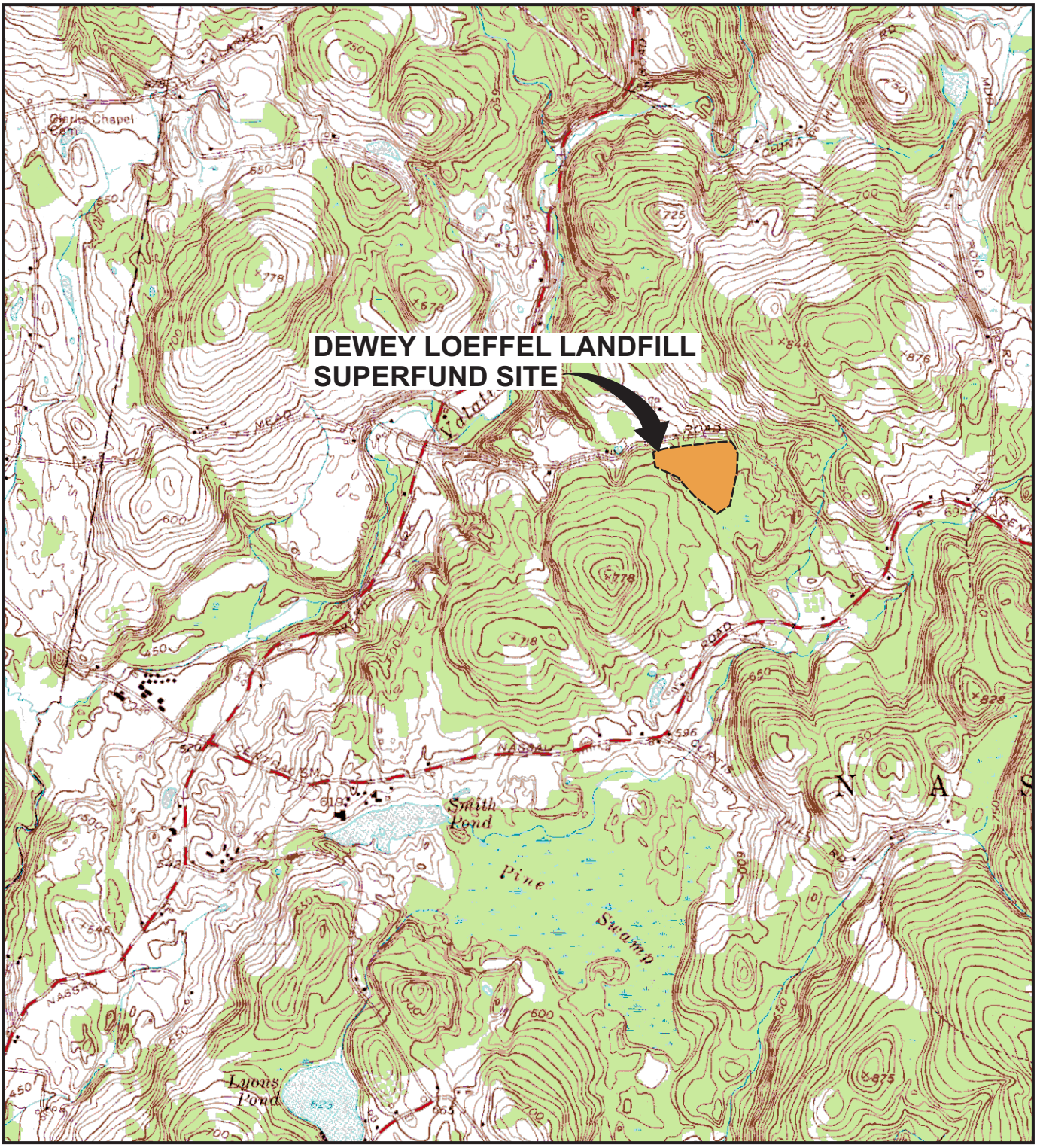
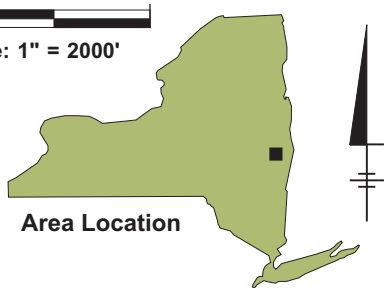
**Figures**




**REFERENCE:** BASE MAP USGS 7.5 MIN. QUAD., NASSAU, NY, 1953, PHOTOREVISED 1978.

2000' 0 2000'

**Approximate Scale: 1" = 2000'**




DEWEY LOEFFEL LANDFILL SUPERFUND SITE
NASSAU, NEW YORK

## SITE LOCATION MAP

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FIGURE
**1**

04/116/2012 SYRACUSE, NY-ENV/CAD-141, DJHOWES
B0031174/0000/00001/CDR/31174N01.CDR

EXISTING UNDERGROUND GROUNDWATER TRANSFER PIPELINE AND CONTROL LINES (TO BE TAKEN OUT OF SERVICE AFTER TREATMENT SYSTEM START-UP)

EXISTING DOUBLE-WALLED FRAC TANKS WITHIN POLE BARN

NEW UNDERGROUND ELECTRICAL AND INSTRUMENTATION LINES

EXISTING ELECTRICAL SERVICE COMPOUND (TO BE TAKEN OUT OF SERVICE)

NEW VALVE VAULT – TIE IN NEW 2"ø SDR 11 X 4"ø SDR 17 DUAL-CONTAINED HDPE FORCEMAINS INTO EXISTING 2" SDR 11 X 4" SDR 17 DUAL-CONTAINED FORCEMAIN

EXISTING SLURRY WALL

EXISTING LEACHATE UNDERGROUND STORAGE TANK

NEW 2"ø SDR 11 X 4"ø SDR 17 DUAL-CONTAINED FORCEMAIN AND LATERALS FOR NEW EXTRACTION WELLS EW-4 THROUGH EW-8

NEW 2"ø SDR 11 X 4"ø SDR 17 DUAL-CONTAINED HDPE FORCEMAINS

NEW ELECTRICAL SERVICE POLE, UTILITY TRANSFORMER, AND METER (TO BE INSTALLED BY NATIONAL GRID)

NEW TREATMENT BUILDING

NEW GRAVEL PAD AND DRIVE

NEW 3"ø SDR 11 HDPE DISCHARGE LINE

TO VALATIE KILL

ALLAN M. SMITH (REPUTED OWNER) L. 1267 P. 1025 TM 191-5-20

THE COUNTY OF RENSSELAER (REPUTED OWNER) L. 1372 P. 557 TM 191-5-16.1

TRI-VILLAGE BOWHUNTERS L. 1696 P. 85 TM 191-5-16.2

ISIDORO MARRA AND GAIL A. MARRA (REPUTED OWNERS) L. 1259 P. 753 TM 191-5-21

MEAD ROAD

WOODED AREA

BRUSH

TRAIL

100' 0 100' 200'
1"=100'

LEGEND

- PROPOSED UNDERGROUND PIPE
- PROPOSED UNDERGROUND ELECTRIC SERVICE
- PROPOSED CHAIN LINK FENCE
- PROPERTY LINES
- EXISTING ROADWAY
- EXISTING EXTRACTION WELL
- PROPOSED EXTRACTION WELL
- EXISTING MONITORING WELL

DEWEY LOEFFEL LANDFILL SUPERFUND SITE
NASSAU, NEW YORK

# SITE PLAN

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FIGURE 2

CITY:SYRACUSE-NY DIV/GROUP:ENVCAD DB:G.STEINBERGER LD:G.STEINBERGER PIC:P.FARR PM:D.SAUDA TM:S.BATTAGLIA LYR:ON=*;OFF=*REF*
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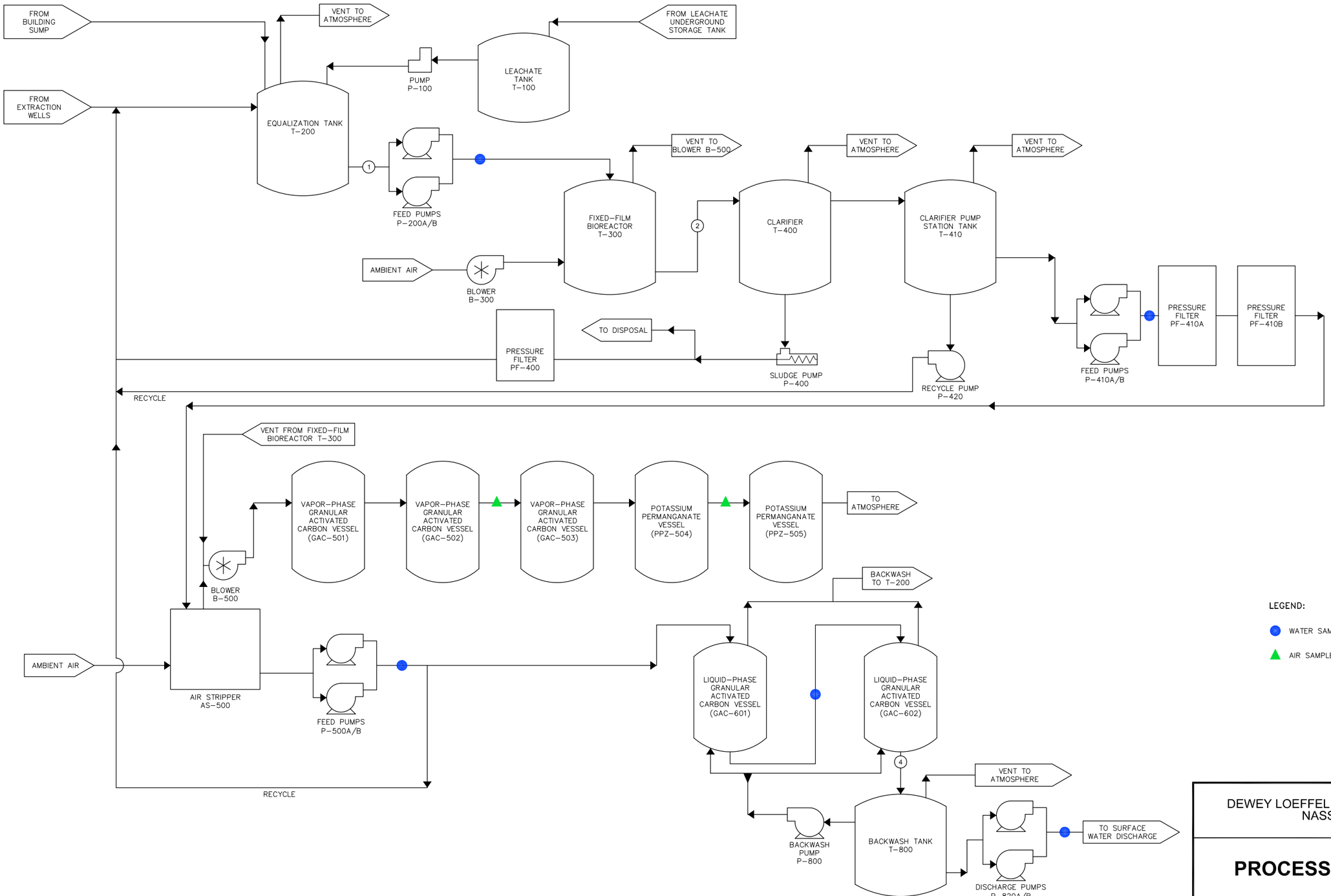


DEWEY LOEFFEL LANDFILL SUPERFUND SITE
NASSAU, NEW YORK

# PROCESS FLOW DIAGRAM

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FIGURE
3

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**Attachments**

**Attachment A**

Log Sheets and Checklists

**DEWEY LOEFFEL LANDFILL SUPERFUND SITE**
**NASSAU, NEW YORK**
**PREVENTATIVE MAINTENANCE CHECKLIST**

| | Yes | No | Comments |
|---|---|---|---|
| Gravel Drive and Trails | | | |
| 1. Is there evidence of washout, settling, erosion, or obstructions on the gravel drive or trails? If yes, describe. | | | |
| 2. Is there evidence of erosion or obstructions which prohibit access to the extraction wells? If yes, describe. | | | |
| 3. Is any maintenance of the treatment building gravel drive or trails to extraction wells required? If yes, describe. | | | |
| Security Fences | | | |
| 1. Are there any compromised areas of the chain link fence? If yes, describe location(s). | | | |
| 2. Are gates operating properly? If no, describe. | | | |
| 3. Is barbed wire present and intact? If no, describe location(s). | | | |
| 4. Are locking mechanisms present and functional? If no, replace as necessary? | | | |
| 5. Is any maintenance necessary? If yes, describe. | | | |
| Treatment Building | | | |
| 1. Is there evidence of deterioration of the building materials? If yes, describe. | | | |
| 2. Are there significant leaks in the roofing/wall system? If yes, describe. | | | |
| 3. Are locking mechanisms functional and effective? If no, describe. | | | |
| 4. Is there any evidence of vandalism? If yes, describe. | | | |
| 5. Is there evidence of rodent/pest infestation? If yes, describe. | | | |
| 6. Is there any evidence of leakage or damages/corroded piping and valves on the interior of the treatment building? If yes, describe. | | | |
| 7. Is there evidence of cracked wire insulation or corrosion/rust on any electrical connections/wiring? If yes, describe. | | | |
| 8. Is signage present and legible? If no, describe. | | | |
| 9. Is any maintenance necessary? If yes, describe. | | | |

| | | | |
|---|---|---|---|
| **Well Vaults** | | | |
| 1. Is there evidence of vandalism/tampering? If yes, describe. | | | |
| 2. Is there evidence of deterioration of the concrete top (e.g. spalling concrete) and the metal door? If yes, describe. | | | |
| 3. Are locking mechanisms functional and effective on any of the extraction well vaults? If no, describe. | | | |
| 4. Is signage present and legible? If no, describe. | | | |
| 5. Is any maintenance necessary? If yes, describe. | | | |
| **Groundwater Extraction System** | | | |
| 1. Is there evidence of leaking and/or deterioration at any of the extraction wells? If yes, describe. | | | |
| 2. Is there any evidence of vandalism at any of the extraction well compounds? If yes, describe. | | | |
| 3. Is there evidence of corrosion, flaking, and leakage on any visible piping, valves, and couplings? If yes, describe. | | | |
| 4. Is there evidence of cracked wire insulation or corrosion/rust on any visible electrical connections/wiring? If yes, describe. | | | |
| 5. Is there evidence of leaking and/or deterioration on any of the extraction well pumps? If yes, describe. | | | |
| 6. Are the extraction well pumps operating properly? If no, describe. | | | |
| 7. Is any maintenance of the groundwater extraction system required? If yes, describe. | | | |
| **Leachate Collection System** | | | |
| 1. Is there evidence of leaking and/or deterioration at the vault? If yes, describe. | | | |
| 2. Is there any evidence of corrosion, flaking, and/or leakage on any visible piping, valves and/or couplings? If yes, describe. | | | |
| 3. Is there evidence of cracked wire insulation or corrosion/rust on any electrical connections/wiring? If yes, describe. | | | |
| 4. Is any maintenance necessary? If yes, describe. | | | |

| Treatment System | | | |
|---|---|---|---|
| 1. Is there evidence of leaking at the tanks, piping, valves, and couplings? If yes, describe. | | | |
| 2. Is there sediment buildup in the equalization tank? If yes, describe. | | | |
| 3. Are all motorized control valves operational? If no, describe. | | | |
| 4. Are all pumps and blowers operational? If no, describe. | | | |
| 5. Is the air stripper unit operational? If no describe. | | | |
| 6. Is the duct heater operational? If no, describe. | | | |
| 7. Are the exhaust fan/louvers operational? If no, describe. | | | |
| 8. Are the heaters operational? If no, describe. | | | |
| General (performed annually) | | | |
| 1. Check calibration of all pressure transmitters. | | | |
| 2. Check calibration of all flow transmitters. | | | |
| 3. Check calibration of all temperature transmitters. | | | |
| 4. Check calibration of all level transmitters | | | |
| General Comments: | | | |
| | | | |

Date: _____

Operator: _____ (Print)

_____ (Sign)

**MAINTENANCE LOG SHEET**

Dewey Loeffel Landfill Superfund Site
Nassau, New York

Date: _____

Operator: _____

Use this form to document maintenance performed at the site or on any system components. Also indicate who performed the work (operator, subcontractor, etc.).

| **Date** | **Description of Work Done** |
|---|---|
| _____ | _____ |
| | _____ |
| | _____ |
| | _____ |
| | _____ |
| _____ | _____ |
| | _____ |
| | _____ |
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| _____ | _____ |
| | _____ |
| | _____ |
| | _____ |
| | _____ |

**DEWEY LOFFEL LANDFILL SUPERFUND SITE**
**NASSAU, NEW YORK**
**OPERATIONS LOG SHEET**

| Parameter | Units | Equipment Tag | Date<br>Time<br>Operator Initials | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extraction Wells | | | | | | | | | | | | |
| Running | - | P-101 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Running | - | P-102 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Running | - | P-103 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Running | - | P-104 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Running | - | P-105 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Running | - | P-106 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Running | - | P-107 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Running | - | P-108 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Totalized Flow | gallons | FIT-101 | | | | | | | | | | |
| Totalized Flow | gallons | FIT-102 | | | | | | | | | | |
| Totalized Flow | gallons | FIT-103 | | | | | | | | | | |
| Totalized Flow | gallons | FIT-104 | | | | | | | | | | |
| Totalized Flow | gallons | FIT-105 | | | | | | | | | | |
| Totalized Flow | gallons | FIT-106 | | | | | | | | | | |
| Totalized Flow | gallons | FIT-107 | | | | | | | | | | |
| Totalized Flow | gallons | FIT-108 | | | | | | | | | | |
| Leachate Underground Storage Tank (on landfill) | | | | | | | | | | | | |
| Pump Running | - | P-001 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Totalized Flow | gallons | FIT-001 | | | | | | | | | | |
| Leachate Tank (in treatment building) | | | | | | | | | | | | |
| Pump Running | - | P-100 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Totalized Flow | gallons | FIT-100 | | | | | | | | | | |
| Level | feet | LE/LT-100 | | | | | | | | | | |
| Equalization Tank | | | | | | | | | | | | |
| Pump Running | - | P-200A/B | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Level | feet | LE/LT-200 | | | | | | | | | | |
| Discharge Pressure | psi | PI-200A/B | | | | | | | | | | |
| Totalized Flow | gallons | FIT-200 | | | | | | | | | | |
| Fixed-Film Bioreactor | | | | | | | | | | | | |
| Blower Running | - | B-300 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Nutrients Needed | - | P-300--P-301 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| pH | SU | AE-300 | | | | | | | | | | |
| Dissolved Oxygen | mg/L | AE-310 | | | | | | | | | | |
| Temperature | °C | TT-300 | | | | | | | | | | |
| Air Flow Rate | cfm | FIT-300A/B/C | | | | | | | | | | |
| Air Pressure | psi | PIT-300C | | | | | | | | | | |

**DEWEY LOFFEL LANDFILL SUPERFUND SITE**
**NASSAU, NEW YORK**
**OPERATIONS LOG SHEET**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clarifier | | | | | | | | | | | | |
| Pump Running | - | P-400 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Discharge Pressure | psi | PI-400 | | | | | | | | | | |
| Clarifier Pump Station | | | | | | | | | | | | |
| Pump Running | - | P-410A/B | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Pump Running | - | P-420 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Level | feet | LE/LT-410 | | | | | | | | | | |
| Totalized Flow | gallons | FIT-410 | | | | | | | | | | |
| Bag Filter Housings | | | | | | | | | | | | |
| Changed Bags | - | PF-410A/B | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Inlet Pressure | psi | PIT-410 | | | | | | | | | | |
| Outlet Pressure | psi | PIT-420 | | | | | | | | | | |
| Air Stripper | | | | | | | | | | | | |
| Blower Running | - | B-500 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Pump Running | - | P-500A/B | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Inlet Air Temperature | °C | T-500 | | | | | | | | | | |
| Totalized Flow | gallons | FIT-510 | | | | | | | | | | |
| Vapor-Phase GAC and PPZ | | | | | | | | | | | | |
| Air Flow | cfm | FIT-500 | | | | | | | | | | |
| Inlet Pressure | psi | PIT-510 | | | | | | | | | | |
| Discharge Pressure | psi | PI-505 | | | | | | | | | | |
| Liquid-Phase GAC | | | | | | | | | | | | |
| Discharge Pressure | psi | PIT-520 | | | | | | | | | | |
| Discharge Pressure | psi | PI-800 | | | | | | | | | | |
| Backwash Supply Tank | | | | | | | | | | | | |
| Pump Running | - | P-800 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Pump Running | - | P-810 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Totalized Flow | gallons | FIT-800 | | | | | | | | | | |
| Level | feet | LE/LT-800 | | | | | | | | | | |
| System Effluent | | | | | | | | | | | | |
| Pump Running | - | P-820A/B | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| Discharge Pressure | psi | PI-820A/B | | | | | | | | | | |
| Totalized Flow | gallons | FIT-900 | | | | | | | | | | |
| pH | SU | AIT-900 | | | | | | | | | | |
| Building Sump | | | | | | | | | | | | |
| Pump Running | - | P-900 | | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No | Yes/No |
| General Comments | | | | | | | | | | | | |
| | | | | | | | | | | | | |

**Attachment B**

Effluent Limitations and Monitoring Requirements

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning **March 1, 2013** and lasting until **February 28, 2018** the discharges from the treatment facility to **Valatie Kill**, water index number H-204-2-7 , Class C(T), shall be limited and monitored by the operator as specified below:

| Outfall Number and Parameter | Discharge Limitations | | Units | Minimum Monitoring Requirements | |
|---|---|---|---|---|---|
| | Monthly Avg. | Daily Max | | Measurement Frequency | Sample Type |
| **Outfall 002**- Treated Groundwater Remediation Discharge to the Valatie Kill | | | | | |
| Flow | Monitor | 36,000 | GPD | Continuous | Meter |
| pH (range) | 6.5 to 8.5 | | SU | Weekly | Grab |
| Solids, Total Suspended | Monitor | 20 | mg/l | One/2 weeks | Composite |
| Solids, Total Dissolved | Monitor | 2700 | mg/l | One/2 weeks | Composite |
| Dissolved Oxygen | Monitor | 5.0 minimum | mg/l | Weekly | Grab |
| BOD5 | Monitor | 30 | mg/l | One/2 weeks | Composite |
| Ammonia, as NH3 | Monitor | 8.1 | mg/l | One/2 weeks | Composite |
| Oil & Grease | Monitor | 15 | mg/l | One/2 weeks | Grab |
| Aluminum, Total | 2000 | 4000 | ug/l | One/2 weeks | Composite |
| Arsenic, Total | 50 | 100 | ug/l | One/2 weeks | Composite |
| Cobalt, Total | Monitor | 27 | ug/l | One/2 weeks | Composite |
| Copper, Total | Monitor | 86 | ug/l | One/2 weeks | Composite |
| Iron, Total | 2000 | 4000 | ug/l | One/2 weeks | Composite |
| Lead, Total | Monitor | 51 | ug/l | One/2 weeks | Composite |
| Manganese, Total | 1000 | 2000 | ug/l | One/2 weeks | Composite |
| Mercury, Total (7) | Monitor | 50 | **ng/l** | Quarterly | Grab |
| Phosphorus, Total | Monitor | 1000 | ug/l | One/2 weeks | Composite |
| Selenium, Total | Monitor | 25 | ug/l | One/2 weeks | Composite |
| Silver, Total | Monitor | 22 | ug/l | One/2 weeks | Composite |
| Thallium, Total | Monitor | 43 | ug/l | One/2 weeks | Composite |
| Vanadium, Total | Monitor | 76 | ug/l | One/2 weeks | Composite |

| | | | | | |
|---|---|---|---|---|---|
| Zinc, Total | Monitor | 400 | ug/l | One/2 weeks | Composite |
| Acetone | Monitor | 280 | ug/l | Weekly | Grab |
| Benzene | Monitor | 5.0 | ug/l | Weekly | Grab |
| Bis(2-Ethylhexyl)phthalate | Monitor | 5.0 | ug/l | Weekly | Grab |
| 2-Butanone | Monitor | 280 | ug/l | Weekly | Grab |
| Chlorobenzene | Monitor | 10 | ug/l | Weekly | Grab |
| Chloroethane | Monitor | 10 | ug/l | Weekly | Grab |
| Chloroform | Monitor | 50 | ug/l | Weekly | Grab |
| Chloromethane | Monitor | 10 | ug/l | Weekly | Grab |
| 2-Chlorophenol | Monitor | Monitor | ug/l | Weekly | Grab |
| Sum of o, m, & p-Dichlorobenzene | Monitor | 27 | ug/l | Weekly | Grab |
| 1,1 Dichloroethane | Monitor | 10 | ug/l | Weekly | Grab |
| 1,2 Dichloroethane | Monitor | 10 | ug/l | Weekly | Grab |
| 1,1 Dichloroethene | Monitor | 10 | ug/l | Weekly | Grab |
| cis 1,2 Dichloroethene | Monitor | 10 | ug/l | Weekly | Grab |
| trans 1,2 Dichloroethene | Monitor | 10 | ug/l | Weekly | Grab |
| 2,4-Dimethylphenol | Monitor | 10 | ug/l | Weekly | Grab |
| Ethylbenzene | Monitor | 5.0 | ug/l | Weekly | Grab |
| Isopropylbenzene | Monitor | 14 | ug/l | Weekly | Grab |
| Methylene Chloride | Monitor | 10 | ug/l | Weekly | Grab |
| 4-Methyl-2-pentanone | Monitor | 140 | ug/l | Weekly | Grab |
| 2-Methylphenol | Monitor | 10 | ug/l | Weekly | Grab |
| Sum of 3- & 4-Methylphenol | Monitor | 10 | ug/l | Weekly | Grab |
| Pentachlorophenol | Monitor | Monitor | ug/l | Weekly | Grab |
| Phenol | Monitor | 10 | ug/l | Weekly | Grab |
| Phenols, Total Chlorinated (9) | Monitor | 5.4 | ug/l | Weekly | Grab |
| Phenols, Total Unchlorinated (10) | Monitor | 27 | ug/l | Weekly | Grab |
| 1,1,2,2 Tetrachloroethane | Monitor | 50 | ug/l | Weekly | Grab |

| | | | | | |
|---|---|---|---|---|---|
| Tetrachloroethene | 5.4 | 10 | ug/l | Weekly | Grab |
| Toluene | Monitor | 5.0 | ug/l | Weekly | Grab |
| 1,2,4 Trichlorobenzene | Monitor | 10 | ug/l | Weekly | Grab |
| 1,1,1 Trichloroethane | Monitor | 10 | ug/l | Weekly | Grab |
| 1,1,2 Trichloroethane | Monitor | 10 | ug/l | Weekly | Grab |
| Trichloroethylene | Monitor | 10 | ug/l | Weekly | Grab |
| Trichlorofluoromethane | Monitor | 10 | ug/l | Weekly | Grab |
| Vinyl Chloride | Monitor | 10 | ug/l | Weekly | Grab |
| Sum of o, m, & p-Xylene | Monitor | 15 | ug/l | Weekly | Grab |
| Aroclor 1221 (7) | Monitor | 200 | ng/l | One/2 weeks | Composite |
| Aroclor 1242 (7) | Monitor | 200 | ng/l | One/2 weeks | Composite |
| Aroclor 1248 (7) | Monitor | 200 | ng/l | One/2 weeks | Composite |
| Aroclor 1254 (7) | Monitor | 200 | ng/l | One/2 weeks | Composite |
| Aroclor 1260 (7) | Monitor | 200 | ng/l | One/2 weeks | Composite |
| beta-BHC | Monitor | 38 | ng/l | One/2 weeks | Composite |
| delta-BHC | Monitor | 43 | ng/l | One/2 weeks | Composite |
| alpha-Chlordane | Monitor | 50 | ng/l | One/2 weeks | Composite |
| gamma-Chlordane | Monitor | 50 | ng/l | One/2 weeks | Composite |
| 4-4' - DDE | Monitor | 10 | ng/l | One/2 weeks | Composite |
| Dieldrin | Monitor | 5.0 | ng/l | One/2 weeks | Composite |
| Endosulfan II | Monitor | 49 | ng/l | One/2 weeks | Composite |
| Endosulfan Sulfate | Monitor | 200 | ng/l | One/2 weeks | Composite |
| Heptachlor | Monitor | 10 | ng/l | One/2 weeks | Composite |
| Methoxychlor | Monitor | 400 | ng/l | One/2 weeks | Composite |
| WET - Acute Invertebrate | | 0.3 | TUa | Quarterly | see footnote@ |
| WET - Acute Vertebrate | | 0.3 | TUa | Quarterly | see footnote@ |
| WET - Chronic Invertebrate | | 5.4 | TUc | Quarterly | see footnote@ |
| WET - Chronic Vertebrate | | 5.4 | TUc | Quarterly | see footnote@ |

**@ - Whole Effluent Toxicity (WET) Testing for Outfall 002**:

Testing Requirements - WET testing shall consist of **Chronic only**. WET testing shall be performed in accordance with 40 CFR Part 136 and TOGS 1.3.2 unless prior written approval has been obtained from the Department. The test species shall be *Ceriodaphnia dubia* (water flea - invertebrate) and *Pimephales promelas* (fathead minnow - vertebrate). Receiving water collected upstream from the discharge should be used for dilution. All tests conducted should be static-renewal (two 24 hr composite samples with one renewal for Acute tests and three 24 hr composite samples with two renewals for Chronic tests). The appropriate dilution series bracketing the IWC and including one exposure group of 100% effluent should be used to generate a definitive test endpoint, otherwise an immediate rerun of the test is required. WET testing shall be coordinated with the monitoring of chemical and physical parameters limited by this authorization so that the resulting analyses are also representative of the sample used for WET testing. The ratio of critical receiving water flow to discharge flow (i.e. dilution ratio) is 2.7:1 for acute, and 5.4:1 for chronic.

Monitoring Period - WET testing shall be performed at the specified sample frequency **for the duration of the discharge authorization.** .

Reporting - Toxicity Units shall be calculated and reported as follows: TUa = (100)/(48 hr LC50) or (100)/(48 hr EC50) (note that Acute data is generated by both Acute and Chronic testing) and TUc = (100)/(NOEC) when Chronic testing has been performed or TUc = (TUa) x (10) when only Acute testing has been performed and is used to predict Chronic test results, where the 48 hr LC50 or 48 hr EC50 and NOEC are expressed in % effluent. This must be done for both species and using the Most Sensitive Endpoint (MSE) or the lowest NOEC and corresponding highest TUc. Report a TUa of 0.3 if there is no statistically significant toxicity in 100% effluent as compared to control.

The complete test report including all corresponding results, statistical analyses, reference toxicity data, daily average flow at the time of sampling and other appropriate supporting documentation, shall be submitted within 60 days following the end of each test period to the Toxicity Testing Unit. A summary page of the test results for the invertebrate and vertebrate species indicating TUa, 48 hr LC50 or 48 hr EC50 for Acute tests and/or TUc, NOEC, IC25, and most sensitive endpoints for Chronic tests, should also be included at the beginning of the test report.

WET Testing Exceedances - If a limit is exceeded then the Department may require the authorized discharger to conduct additional WET testing including Acute and/or Chronic tests. Additionally, the authorized discharger may be required to perform a Toxicity Reduction Evaluation (TRE) in accordance with Department guidance. If such additional testing or performance of a TRE is necessary, the authorized discharger shall be notified in writing by the Department. The written notification shall include the reason(s) why such testing or a TRE is required.

Additional Conditions:

(1) Discharge is not authorized until such time as an engineering submission showing the method of treatment is approved by the Department. The discharge rate may not exceed the effective or design treatment system capacity. All monitoring data, engineering submissions and modification requests must be submitted to:

Mike Komoroske, Section Chief
NYSDEC, 625 Broadway, Albany, New York 12233-7016
518-402- 9802

With a copy sent to:
Andrea Dzierwa, Regional Water Engineer
NYSDEC, 1150 N. Westcott Road, Schenectady, NY 12306-2014
518-357-2045

(2) Only site generated wastewater is authorized for treatment and discharge.

(3) Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.

(4) Both concentration (mg/l, µg/l or ng/l) and mass loadings (lbs/day) must be reported to the Department for all parameters except flow and pH. Should the laboratory results show non-detect for any of the listed parameters, the mass loadings for those parameters are not required to be reported.

(5) Any use of corrosion/scale inhibitors, biocidal-type compounds, or other water treatment chemicals used in the treatment process must be approved by the department prior to use.

(6) This discharge and administration of this discharge must comply with the substantive requirements of 6NYCRR Part 750.

(7) The mercury minimization program and PCB minimization program requirements specified below must be complied with.

(8) For the purposes of this authorization, a composite sample shall be composed of a minimum of eight grab samples at a constant sample volume collected at least fifteen minutes apart.

(9) Sum all detected chlorinated phenolic compounds.

(10) Sum all detected unchlorinated phenolic compounds.

(11) Sufficiently sensitive analytical methods, as defined by USEPA, must be used for monitoring purposes.

# MERCURY MINIMIZATION PROGRAM

1. **General** - The authorized discharger shall develop, implement, and maintain a Mercury Minimization Program (MMP) for those outfalls which have mercury effluent limits. The MMP is required because the 50 ng/L effluent limit exceeds the statewide water quality based effluent limit (WQBEL) of 0.70 nanograms/liter (ng/L) for Total Mercury. The goal of the MMP is to reduce mercury effluent levels in pursuit of the WQBEL. Note – the mercury-related requirements in this authorization conform to the mercury Multiple Discharge Variance specified in NYSDEC policy *DOW 1.3.10*.

2. **MMP Elements** - The MMP shall be documented in narrative form and shall include any necessary drawings or maps. Other related documents already prepared for the facility may be used as part of the MMP and may be incorporated by reference. As a minimum, the MMP shall include an on-going program consisting of: periodic monitoring; an acceptable control strategy which will become enforceable under this authorization; and, submission of periodic status reports.

A. Monitoring - The authorized discharger shall conduct periodic monitoring designed to quantify and, over time, track the reduction of mercury. Wastewater treatment plant influents and effluents, and other outfalls shall be monitored in accordance with the minimum frequency specified on the mercury limits page. Additionally, key locations in the wastewater and/or stormwater collection systems, and known or potential mercury sources, including raw materials, shall be monitored at the above frequency during the first year of the MMP. Monitoring of key locations and known/potential sources may be reduced during subsequent years if downstream outfalls have maintained mercury levels less than 50 ng/l during the previous year. Additional monitoring must be completed as may be required elsewhere in this authorization or upon Department request. Monitoring shall be coordinated so that the results can be effectively compared between internal locations and final outfalls.

All authorization-related wastewater and stormwater mercury compliance point (outfall) monitoring shall be performed using EPA Method 1631. Use of EPA Method 1669 during sample collection is recommended. Unless otherwise specified, all samples should be grabs. Monitoring at influent and other locations tributary to compliance points may be performed using either EPA Methods 1631 or 245.7. Monitoring of raw materials, equipment, treatment residuals, and other non-wastewater/non-stormwater substances may be performed using other methods as appropriate.

B. Control Strategy - An acceptable control strategy is required for reducing mercury discharges via cost-effective measures, which may include, but is not limited to: source identification; replacement of mercury-containing equipment, materials, and products with mercury-free alternatives where environmentally preferable; more stringent control of tributary waste streams; remediation; and/or installation of new or improved treatment facilities. Required monitoring shall also be used, and supplemented as appropriate, to determine the most effective way to operate the wastewater treatment system(s) to ensure effective removal of mercury while maintaining compliance with other requirements.

C. Annual Status Report - An annual status report shall be submitted to the Regional Water Engineer and to the DER summarizing: (a) all MMP monitoring results for the previous year; (b) a list of known and potential mercury sources; (c) all action undertaken pursuant to the strategy during the previous year; (d) actions planned for the upcoming year; and, (e) progress toward the goal. The annual status reports are due on January 31 for the prior calendar year, and the first such report is due on January 31 in the year following USEPA approval to start discharge from the treatment system to surface water. A file shall be maintained containing all MMP documentation which shall be available for review by NYSDEC representatives. Copies shall be provided upon request.

3. **MMP Modification** - The MMP shall be modified whenever: (a)changes at the facility or within the collection system increase the potential for mercury discharges; (b) actual discharges exceed 50 ng/L; (c) a letter from the Department identifies inadequacies in the MMP; or (d) pursuant to modification of this authorization.

# PCB MINIMIZATION PROGRAM

1. **General** - The authorized discharger shall develop, implement, and maintain a Polychlorinated Biphenyl Minimization Program (PCBMP) for those outfalls which have effluent limits for PCBs (including Aroclors). The PCBMP is required because the 200 nanograms/liter (ng/L) effluent limit per PCB Aroclor exceeds the water quality based effluent limit (WQBEL) of 0.001 ng/L for Total PCBs. The goal of the PCBMP is to reduce PCB effluent levels in pursuit of the WQBEL. The basis for the 200 ng/L per Aroclor limit is the EPA Method 608 analytical Minimum Level for Aroclors.

2. **PCBMP Elements** - The PCBMP shall be documented in narrative form and shall include any necessary drawings or maps. Other related documents already prepared for the facility may be used as part of the PCBMP and may be incorporated by reference. As a minimum, the PCBMP shall include an on-going program consisting of: periodic monitoring; an acceptable control strategy which will become enforceable under this authorization; and, submission of periodic status reports.

   A. Monitoring - The authorized discharger shall conduct periodic monitoring designed to quantify and, over time, track the reduction of PCBs. Wastewater treatment plant influents and effluents, and other outfalls shall be monitored using a congener specific analysis method* at a minimum frequency of quarterly. Key locations in the wastewater and/or stormwater collection systems, and known or potential PCB sources, including raw materials as appropriate, shall be monitored using a congener specific analysis method* at a minimum frequency of semi-annually.

   Effluent limit compliance monitoring shall be performed at the frequency specified on the effluent limits page(s) using Method 608. Effluent results from congener analysis required under this PCBMP shall not be used for determining compliance with the 200 ng/L Aroclor limits. Additional monitoring must be completed as may be required elsewhere or upon Department request. Monitoring shall be coordinated so that the results can be effectively: compared between locations; compared between analytical methods; used to identify PCB sources; and, used to gauge the effectiveness of PCB reduction and control efforts.

   * The authorized discharger shall use a congener specific analysis method to measure and quantify Total PCBs at the locations noted above. The congener specific analysis method must achieve a Total PCB reporting limit no greater than 9 ng/L. For methods more sensitive than this specification, the reporting of Total PCB concentrations below 9 ng/L is not required. Sample volumes greater than one liter may be necessary to achieve this limit. Current methodologies approved by the Department for congener specific PCB analyses are as follows:

   (1) **Method 1668C** - Method 1668, Revision C: Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS. EPA-820-R-10-005, Office of Water, U.S. Environmental Protection Agency, Washington, D.C. (2010).

   (2) **mGBM** - "The Modified Green Bay Mass Balance Method" as detailed in the following publication: Palmer P.M., Wilson L.R., Casey A.C. and Wagner R.E. (2011) - Occurrence of PCBs in raw and finished drinking water at seven public water systems along the Hudson River. Environ. Monit. Assess. 175 (1-4), pp. 487-499.

   The authorized discharger may request, and the Department may optionally approve, alternate methods for congener specific PCB analyses provided all of the following conditions are met: (a) the method can achieve a Total PCB reporting limit of 9 ng/L or less; (b) the analysis method must allow for quantification of all 209 congeners to arrive at a Total PCB concentration; (c) co-elutions among the 209 congeners will be allowed, but the summation of only targeted or toxic congeners does not constitute an analysis for Total PCB; and (d) the accuracy and precision of the alternate method must be demonstrated to be equivalent or superior to Method 1668C and/or mGBM.

   B. Control Strategy - An acceptable control strategy is required for reducing PCB discharges via cost-effective measures, which may include, but are not limited to, source identification, more stringent control of tributary waste streams, remediation, and/or installation of new or improved treatment facilities.

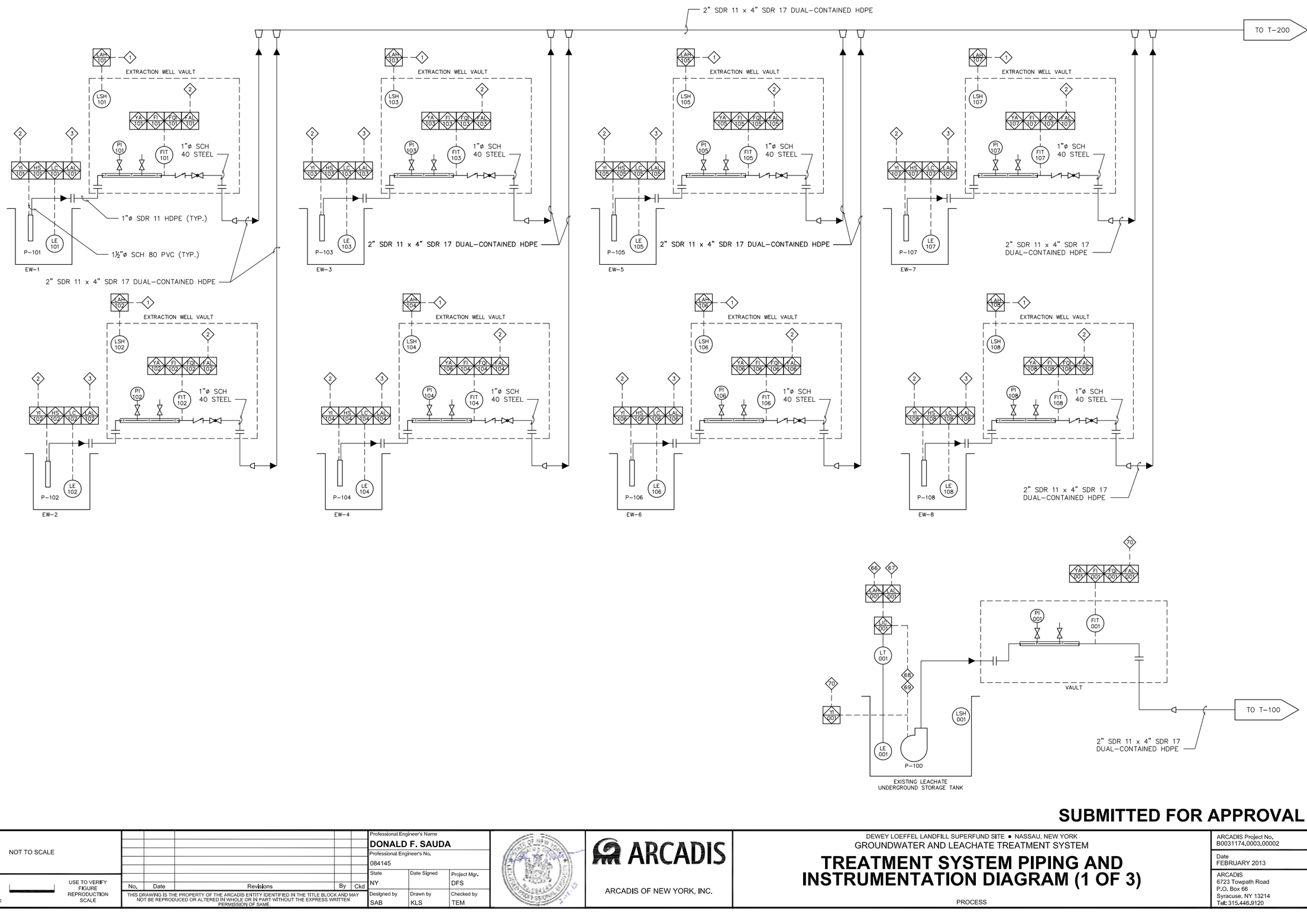
Required monitoring shall also be used, and supplemented if appropriate, to determine the most effective way to operate the wastewater treatment system(s) to ensure effective removal of PCBs while maintaining compliance with other requirements.

C. Annual Status Report - An annual status report shall be submitted to the Regional Water Engineer and to the Bureau of Water Permits summarizing: (a) all PCBMP monitoring results for the previous year; (b) a list of known and potential PCB sources; (c) all action undertaken pursuant to the strategy during the previous year; (d) actions planned for the upcoming year; and, (e) progress toward the goal. The annual status reports are due on January 31 for the prior calendar year, and the first such report is due on January 31 in the year following USEPA approval to start discharge from the treatment system to surface water. A file shall be maintained containing all PCBMP documentation which shall be available for review by NYSDEC representatives. Copies shall be provided upon request.

3. **PCBMP Modification** - The PCBMP shall be modified whenever: (a)changes at the facility or within the collection system(s) increase the potential for PCB discharges; (b) new information is discovered concerning the source, nature, or extent of any PCB source(s) and/or discharges from the facility; (c) actual discharges contain detectable Aroclors as measured with EPA Method 608; (d) a letter from the Department identifies inadequacies in the PCBMP; or (e) pursuant to a modification of this authorization.

**Attachment C**

Piping and Instrumentation Diagrams




**SUBMITTED FOR APPROVAL**

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XREFS: 31174X00
IMAGES: ARMSTRONG.jpg SAUDA.jpg

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| No. | Date | Revisions | By | Ckd |
|---|---|---|---|---|



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|---|---|---|
| Professional Engineer's Name: DONALD F. SAUDA | | |
| Professional Engineer's No.: 084145 | | |
| State: NY | Date Signed: | Project Mgr.: DFS |
| Designed by: SAB | Drawn by: KLS | Checked by: TEM |

ARCADIS OF NEW YORK, INC.

DEWEY LOEFFEL LANDFILL SUPERFUND SITE • NASSAU, NEW YORK
GROUNDWATER AND LEACHATE TREATMENT SYSTEM

# TREATMENT SYSTEM PIPING AND INSTRUMENTATION DIAGRAM (1 OF 3)

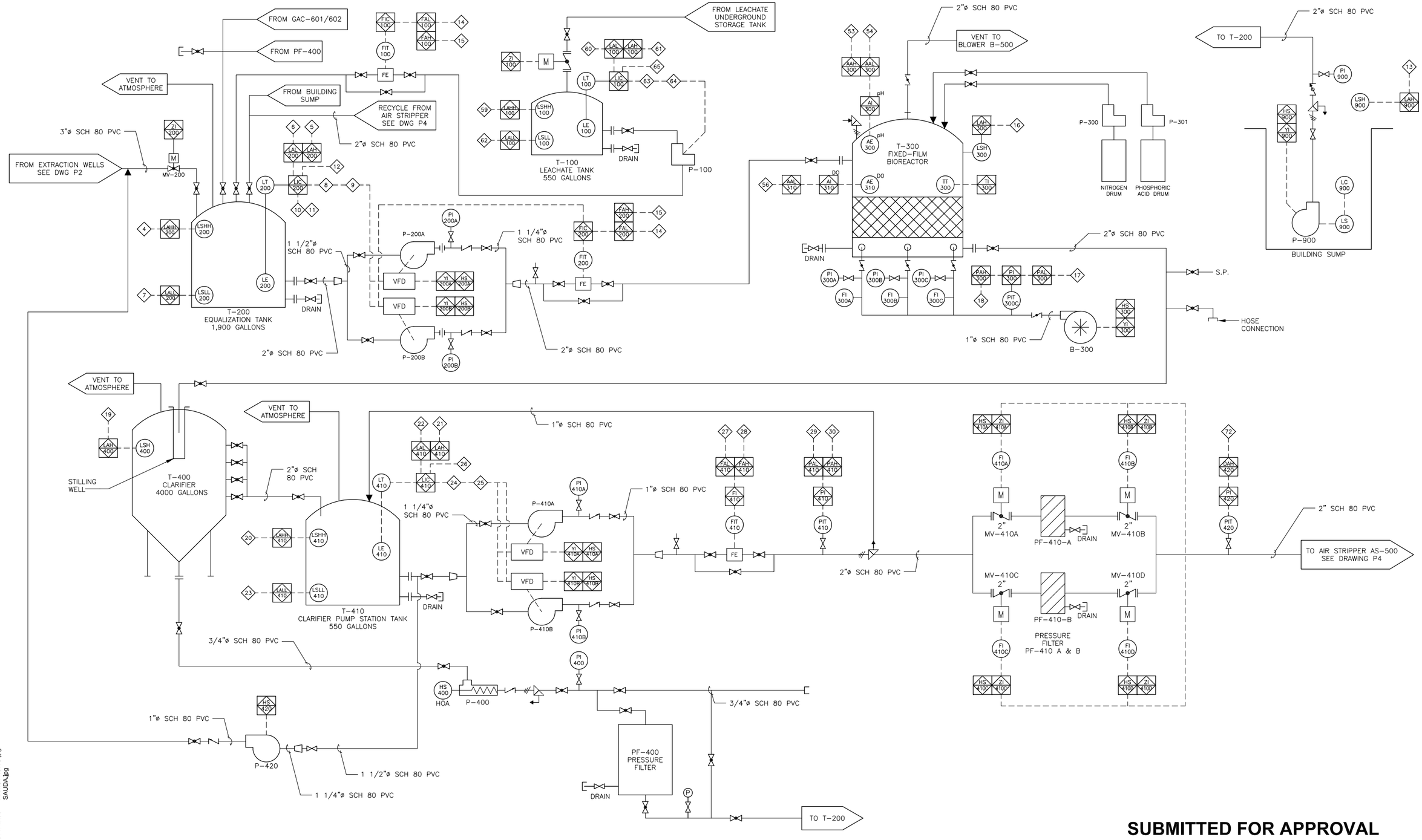
PROCESS

ARCADIS Project No.
B0031174.0003.00002

Date
FEBRUARY 2013

ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214
Tel: 315.446.9120

**P2**




**SUBMITTED FOR APPROVAL**

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XREFS: 31174X00
IMAGES: ARMSTRONG.jpg SAUDA.jpg

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THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

| No. | Date | Revisions | By | Ckd |
|---|---|---|---|---|



Professional Engineer's Name: **DONALD F. SAUDA**
Professional Engineer's No.: 084145
State: NY | Date Signed: | Project Mgr.: DFS
Designed by: SAB | Drawn by: KLS | Checked by: TEM

ARCADIS OF NEW YORK, INC.

DEWEY LOEFFEL LANDFILL SUPERFUND SITE • NASSAU, NEW YORK
GROUNDWATER AND LEACHATE TREATMENT SYSTEM

# TREATMENT SYSTEM PIPING AND INSTRUMENTATION DIAGRAM (2 OF 3)

PROCESS

ARCADIS Project No. B0031174.0003.00002
Date FEBRUARY 2013

ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214
Tel: 315.446.9120

**P3**

VENT FROM FIXED-FILM BIOREACTOR T-300

VI 500

HS 500 YI 500

40 PAH 510 PIT 510

PIT 510

6"ø SCH 80 PVC

6"ø HOSE

TO ATMOSPHERE

PI 505

S.P.

FRESH AIR INLET

DUCT HEATER

6"ø SCH 80 PVC

B-500

6"ø SCH 80 PVC

S.P.

31 TAH 500 TI 500 TT 500

32 TAL 500

FIT 500 FI 500

FAL 500 FAH 500

38 39

GAC-501
VAPOR-PHASE GRANULAR ACTIVATED CARBON VESSEL

PI 501 S.P.

GAC-502
VAPOR-PHASE GRANULAR ACTIVATED CARBON VESSEL

PI 502 S.P.

GAC-503
VAPOR-PHASE GRANULAR ACTIVATED CARBON VESSEL

PI 503 S.P.

PPZ-504
VAPOR-PHASE POTASSIUM PERMANGANATE VESSEL

PI 504 S.P.

PPZ-505
VAPOR-PHASE POTASSIUM PERMANGANATE VESSEL

33 PAL 500 PSH 500

34 PAH 500 PSL 500

LSH 500 LAH 500 35

LT 500 LI 500 36 37

AS-500
LOW-PROFILE AIR STRIPPER

VFD

PI 500A

P-500A

YI 500A HS 500A

VFD

PI 500B

P-500B

YI 500B HS 500B

DRAIN

FROM PF-410A/410B SEE DRAWING P3

2"ø SCH 80 PVC

1 1/4"ø SCH 80 PVC

2"ø SCH 80 PVC

1"ø SCH 80 PVC

FAH 510 42

FAL 510 41

FI 510

FIT 510

FM

FAH 520 44

FAL 520 43

PI 520

PIT 520

RECYCLE TO T-200 SEE DRAWING P3

2"ø SCH 80 PVC

MV-500 M ZI 500

2"ø SCH 80 PVC

MV-510 M ZI 510

TO T-200 SEE DRAWING P3

PI 601A

GAC 601
LIQUID-PHASE GRANULAR ACTIVATED CARBON VESSEL

PI 601B S.P.

NC

PI 602A

GAC 602
LIQUID-PHASE GRANULAR ACTIVATED CARBON VESSEL

PI 602B S.P.

73 AL 800 AH 800 74

LT 800 LIC 800 76 77

75

VENT TO ATMOSPHERE

1 1/4"ø SCH 80 PVC

LSH 800 LAHH 800 45

LSL 800 LALL 800 46

HS 810

P-810

HOSE CONNECTION

1"ø SCH 80 PVC

DRAIN TO SUMP

LE 800

T-800
BACKWASH SUPPLY HOLDING TANK
2,000 GALLONS

DRAIN

PROCESS WASH VESSEL

2"ø SCH 80 PVC

FI 800 FQI 800

FIT 800

FE

PI 800

YI 800 HS 800

P-800

1 1/4"ø SCH 80 PVC

VFD

PI 820A

P-820A

YI 820A HS 820A

VFD

PI 820B

P-820B

YI 820B HS 820B

FAH 900 FAL 900

FI 900 FQI 900

FIT 900

FE

PH AI 900 AIT 900 AE

AAH 900 51

AAL 900 52

3"ø SCH 80 PVC

DISCHARGE TO SURFACE WATER

3"ø SDR 11 HDPE

TAH 900 47

TT 900 TAL 900 48

UNAUTHORIZED BUILDING ENTRY

ZS 900 ZA 900 49

LOSS OF POWER

JS 900 JA 900 50

**SUBMITTED FOR APPROVAL**

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USE TO VERIFY FIGURE REPRODUCTION SCALE

| No. | Date | Revisions | By | Ckd |
|---|---|---|---|---|



Professional Engineer's Name: **DONALD F. SAUDA**
Professional Engineer's No.: 084145
State: NY | Date Signed: | Project Mgr.: DFS
Designed by: SAB | Drawn by: KLS | Checked by: TEM

ARCADIS OF NEW YORK, INC.

DEWEY LOEFFEL LANDFILL SUPERFUND SITE • NASSAU, NEW YORK
GROUNDWATER AND LEACHATE TREATMENT SYSTEM

# TREATMENT SYSTEM PIPING AND INSTRUMENTATION DIAGRAM (3 OF 3)

PROCESS

ARCADIS Project No.: B0031174.0003.00002
Date: FEBRUARY 2013

ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214
Tel: 315.446.9120

P4

## EQUIPMENT LEGEND:

- HEAT–TRACED PROCESS PIPING
- PROCESS PIPING
- INSTRUMENTATION SIGNAL
- SKID MOUNTED EQUIPMENT
- SAMPLE TAP
- PRESSURE GAUGE (PI 100)
- VACUUM GAUGE (VI 100)
- MOTOR CONTROLLED BALL VALVE (M)
- BALL VALVE
- CHECK VALVE
- UNION
- REDUCER
- BUTTERFLY VALVE
- HOSE CONNECTION
- BOOSTER PUMP
- PRESSURE RELIEF VALVE
- FLANGE
- LOCAL, FIELD MOUNT
- MAIN PLC CONTROLLER (LAH 100)
- MAIN PLC INTERLOCK (1)
- CENTRIFUGAL PUMP
- BLOWER
- METERING PUMP
- SUBMERSIBLE WELL PUMP
- PROGRESSIVE CAVITY PUMP
- VACUUM RELIEF VALVE

## ABBREVIATIONS:

| | |
|---|---|
| A | AIR |
| AAH | ANALYSIS ALARM HIGH |
| AAL | ANALYSIS ALARM LOW |
| AE | ANALYSIS ELEMENT |
| AIT | ANALYSIS INDICATING TRANSMITTER |
| AS | AIR STRIPPER |
| BF | BAG FILTER |
| ø | DIAMETER |
| DC | DOUBLE–CONTAINED |
| EW | EXTRACTION WELL |
| FAH | FLOW ALARM HIGH |
| FAL | FLOW ALARM LOW |
| FE | FLOW ELEMENT |
| FI | FLOW INDICATOR |
| FIT | FLOW INDICATING TRANSMITTER |
| FM | FLOW METER |
| FO | FAIL OPEN |
| FP | FLOOR PENETRATION |
| FQI | TOTALIZED FLOW INDICATOR |
| GAC | GRANULAR ACTIVATED CARBON |
| GA | GAUGE |
| HDPE | HIGH DENSITY POLYETHYLENE |
| HOA | HAND–OFF–AUTO |
| HP | HORSEPOWER |
| HS | HAND SWITCH |
| INS | INSULATED |
| KI | PUMP RUN TIME INDICATOR |
| KW | KILOWATT |
| LAH | LEVEL ALARM HIGH |
| LAHH | LEVEL ALARM HIGH–HIGH |
| LAL | LEVEL ALARM LOW |
| LALL | LEVEL ALARM LOW–LOW |
| LE | LEVEL ELEMENT |
| LI | LEVEL INDICATOR |
| LIC | LEVEL INDICATING CONTROLLER |
| LSH | LEVEL SWITCH HIGH |
| LSL | LEVEL SWITCH LOW |
| LT | LEVEL TRANSMITTER |
| MV | MOTORIZED VALVE |
| NC | NORMALLY CLOSED |
| NO | NORMALLY OPEN |
| PAH | PRESSURE ALARM HIGH |
| PAL | PRESSURE ALARM LOW |
| PF | PRESSURE FILTER |
| PT | PRESSURE TRANSMITTER |
| PI | PRESSURE INDICATOR |
| PLC | PROGRAMMABLE LOGIC CONTROLLER |
| PPZ | POTASSIUM PERMANANATE ZEOLITE |
| PSL | PRESSURE SWITCH LOW |
| PSH | PRESSURE SWITCH HIGH |
| PVC | POLYVINYL CHLORIDE |
| SCH | SCHEDULE |
| SDR | STANDARD DIMENSION RATIO |
| TAL | TEMPERATURE ALARM LOW |
| TI | TEMPERATURE INDICATOR |
| TT | TEMPERATURE INDICATING TRANSMITTER |
| TYP | TYPICAL |
| UG | UNDERGROUND |
| VFD | VARIABLE FREQUENCY DRIVE |
| W | WATER |
| YI | RUN INDICATION |
| ZI | POSITION INDICATOR |

## CONTROL SYSTEM INTERLOCKS

| INTERLOCK # | DESCRIPTION |
|---|---|
| 1 | IF HIGH LEVEL AT EXTRACTION WELL VAULT (LAH–1XX), SIGNAL ALARM AT MAIN CONTROL PANEL (MCP) AND TURN OFF ALL EXTRACTION WELLS. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 2 | IF PUMP RUN SIGNAL DETECTED (YI–1XX) AT EXTRACTION WELLS AND RESPECTIVE FLOW RATE IS 0 AFTER 5 MINUTES, SIGNAL ALARM AT MCP (FAL–1XX) AND TURN OFF ALL EXTRACTION WELLS. |
| 3 | IF LOW LEVEL IN EXTRACTION WELL (LAL–1XX), SIGNAL ALARM AT MCP AND TURN OFF EXTRACTION WELL PUMP. |
| 4 | IF HIGH–HIGH LEVEL ALARM SWITCH ACTIVATED AT T–200 (LAHH–200), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B, P–400, P–410A/B, P–420, P–500A/B, AND P–800 TURN OFF ALL EXTRACTION WELL PUMPS, TURN OFF BUILDING SUMP PUMP P–900, AND CLOSE MV–200 AND MV–500. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 5 | IF HIGH LEVEL ALARM AT T–200 (LAH–200), SIGNAL ALARM AT MCP AND TURN OFF ALL EXTRACTION WELL PUMPS, TURN OFF PUMPS P–400 AND P–800, AND CLOSE MV–200. |
| 6 | IF LOW LEVEL ALARM AT T–200 (LAL–200), SIGNAL ALARM AT MCP, TURN OFF PUMPS P–200A /B AND P–800, TURN OFF ALL EXTRACTION WELL PUMPS, TURN OFF BUILDING SUMP PUMP P–900, AND CLOSE MV–200. |
| 7 | IF LOW–LOW LEVEL ALARM SWITCH ACTIVATED AT T–200 (LALL–200), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B AND P–800, TURN OFF ALL EXTRACTION WELL PUMPS, AND CLOSE MV–200. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 8 | IF HIGH LEVEL SETPOINT #1 AT T–200, TURN ON LEAD PUMP (P–200A OR B) – LEAD/LAG PUMPS SHALL BE ALTERNATING. |
| 9 | IF LOW LEVEL SETPOINT #1 AT T–200, TURN OFF PUMPS P–200A/B. |
| 10 | IF HIGH LEVEL SETPOINT #2 AT T–200, OPEN MV–510 AND CLOSE MV–500. |
| 11 | IF LOW LEVEL SETPOINT #2 AT T–200, OPEN MV–500 AND CLOSE MV–510. |
| 12 | IF T–200 LEVEL TRANSMITTER SIGNAL (LT–200) IS DETECTED OUT OF ACCEPTABLE RANGE, SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B, TURN OFF EXTRACTION WELL PUMPS, AND CLOSE MV–200. |
| 13 | IF HIGH LEVEL ALARM (LAH–900) AT BUILDING SUMP, SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B, P–400, P–410A/B, P–420, P–500A/B, AND P–800, TURN OFF ALL EXTRACTION WELL PUMPS, AND CLOSE MV–200. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 14 | IF LOW FLOW ALARM AT T–200 DISCHARGE (FAL–200), SIGNAL ALARM AT MCP, TURN OFF PUMPS P–200A/B, TURN OFF ALL EXTRACTION WELL PUMPS, AND CLOSE MV–200. |
| 15 | IF HIGH FLOW ALARM AT T–200 DISCHARGE (FAH–200), SIGNAL ALARM AT MCP, TURN OFF PUMPS P–200A/B, TURN OFF ALL EXTRACTION WELL PUMPS, AND CLOSE MV–200. |
| 16 | IF HIGH LEVEL ALARM SWITCH ACTIVATED AT T–300 (LAH–300), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 17 | IF LOW BLOWER DISCHARGE PRESSURE (PAL–300) AT T–300, SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B. |
| 18 | IF HIGH BLOWER DISCHARGE PRESSURE (PAH–300) AT T–300, SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B. |
| 19 | IF HIGH LEVEL ALARM SWITCH ACTIVATED AT T–400 (LAH–400), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 20 | IF HIGH–HIGH LEVEL ALARM SWITCH ACTIVATED AT T–410 (LAHH–410), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B, P–400, P–410A/B, P–420, P–500A/B, AND P–800 TURN OFF ALL EXTRACTION WELL PUMPS, TURN OFF BUILDING SUMP PUMP P–900, AND CLOSE MV–200 AND MV–500. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 21 | IF HIGH LEVEL ALARM AT T–410 (LAH–410), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B. |
| 22 | IF LOW LEVEL ALARM AT T–400 (LAL–400), SIGNAL ALARM AT MCP, TURN OFF PUMPS P–200A/B AND P–410A/B. |
| 23 | IF LOW–LOW LEVEL ALARM SWITCH ACTIVATED AT T–400 (LALL–400), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B, P–410A/B AND P–420. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 24 | IF HIGH LEVEL SETPOINT #1 AT T–410, TURN ON LEAD PUMP (P–410A OR B) – LEAD/LAG PUMPS SHALL BE ALTERNATING. |
| 25 | IF LOW LEVEL SETPOINT #1 AT T–410, TURN OFF PUMPS P–410A/B. |
| 26 | IF T–410 LEVEL TRANSMITTER SIGNAL (LT–410) IS DETECTED OUT OF ACCEPTABLE RANGE, SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B AND P–410A/B. |
| 27 | IF LOW FLOW ALARM AT T–410 DISCHARGE (FAL–410), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410A/B. |
| 28 | IF HIGH FLOW ALARM AT T–410 DISCHARGE (FAH–410), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410A/B |
| 29 | IF LOW PRESSURE ALARM AT T–410 EFFLUENT (PAL–410), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410A/B. |
| 30 | IF HIGH PRESSURE ALARM AT T–410 EFFLUENT, (PAH–410), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410A/B. |
| 31 | IF HIGH TEMPERATURE ALARM (TAH–500) AT AIR STRIPPER INLET DUCT, SIGNAL ALARM AT MCP AND TURN OFF P–410A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 32 | IF LOW TEMPERATURE ALARM (TAL–500) AT AIR STRIPPER INLET DUCT, SIGNAL ALARM AT MCP AND TURN OFF P–410A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 33 | IF HIGH PRESSURE ALARM ACROSS AIR STRIPPER SYSTEM (PAH–500), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410 A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 34 | IF LOW PRESSURE ALARM ACROSS AIR STRIPPER SYSTEM (PAL–500), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410 A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 35 | IF HIGH AIR STRIPPER SUMP SWITCH ALARM (LAH–500), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410 A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 36 | IF AIR STRIPPER SUMP HIGH LEVEL SETPOINT #1 ACTIVATED, TURN ON LEAD AIR STRIPPER DISCHARGE PUMP P–500A/B.– LEAD/LAG PUMPS SHALL BE ALTERNATING. |
| 37 | IF AIR STRIPPER SUMP LOW LEVEL SETPOINT #1 ACTIVATED, TURN OFF AIR STRIPPER DISCHARGE PUMPS P–500A/B. |
| 38 | IF LOW BLOWER AIR FLOW ALARM AT AIR STRIPPER (FAL–500), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 39 | IF HIGH BLOWER AIR FLOW ALARM AT AIR STRIPPER (FAH–500), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 40 | IF HIGH BLOWER DISCHARGE PRESSURE ALARM AT AIR STRIPPER (PAH–510), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 41 | IF LOW FLOW ALARM AT AIR STRIPPER DISCHARGE (FAL–510), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–500A/B AND P–410A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 42 | IF HIGH FLOW ALARM AT AIR STRIPPER DISCHARGE (FAH–510), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–500A/B AND P–410A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 43 | IF LOW PRESSURE ALARM AT P–500A/B DISCHARGE (PAL–520), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410A/B AND P–500A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 44 | IF HIGH PRESSURE ALARM AT P–500A/B DISCHARGE (PAH–520), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–410A/B AND P–500A/B AND TURN OFF BLOWERS B–300 AND B–500 AFTER 10 MINUTE DELAY. |
| 45 | IF HIGH LEVEL ALARM SWITCH ACTIVATED AT T–800 (LAHH–800), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–500A/B AND P–410A/B. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |

## CONTROL SYSTEM INTERLOCKS

| INTERLOCK # | DESCRIPTION |
|---|---|
| 46 | IF LOW LEVEL ALARM SWITCH ACTIVATED AT T–800 (LAL–400), SIGNAL ALARM AT MCP AND TURN OFF PUMP P–800. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 47 | IF HIGH BUILDING TEMPERATURE ALARM (TAH–900), SIGNAL ALARM AT MCP. |
| 48 | IF LOW BUILDING TEMPERATURE ALARM (TAH–900), SIGNAL ALARM AT MCP AND TURN OFF ALL EXTRACTION WELL PUMPS AND CLOSE MV–200. |
| 49 | IF UNAUTHORIZED BUILDING ENTRY ALARM ACTIVATED, SIGNAL ALARM AT MCP. |
| 50 | IF LOSS OF SYSTEM POWER DETECTED, SIGNAL ALARM AT MCP AND CLOSE MV–200. |
| 51 | HIGH pH ALARM AT DISCHARGE, SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–500A/B, AND P–410A/B. |
| 52 | LOW pH ALARM AT DISCHARGE, SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–500A/B, AND P–410A/B. |
| 53 | HIGH pH ALARM AT T–300 (AAH–300), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B. |
| 54 | LOW pH ALARM AT T–300 (AAL–300), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B. |
| 55 | HIGH DISSOLVED O2 ALARM AT T–300 (AAH–310), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B. |
| 56 | LOW DISSOLVED O2 ALARM AT T–300 (AAL–310), SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–200A/B. |
| 57 | HIGH TEMPERATURE ALARM AT T–300 (TAH–300), SIGNAL ALARM AT MCP. |
| 58 | LOW TEMPERATURE ALARM AT T–300 (TAL–300), SIGNAL ALARM AT MCP. |
| 59 | IF HIGH–HIGH LEVEL ALARM SWITCH ACTIVATED AT T–100 (LAHH–100), SIGNAL ALARM AT MCP, TURN OFF P–001 AND CLOSE MV–100. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 60 | IF HIGH LEVEL ALARM AT T–100 (LAH–100), SIGNAL ALARM AT MCP, TURN OFF P–001 AND CLOSE MV–100. |
| 61 | IF LOW LEVEL ALARM AT T–100 (LAL–100), SIGNAL ALARM AT MCP, TURN OFF BUILDING SUMP PUMP P–900, TURN OFF P–001 AND CLOSE MV–100. |
| 62 | IF LOW–LOW LEVEL ALARM SWITCH ACTIVATED AT T–100 (LALL–100), SIGNAL ALARM AT MCP, TURN OFF BUILDING SUMP PUMP P–900, TURN OFF P–001 AND CLOSE MV–100. ALL LEVEL SWITCHES SHALL BE WIRED NORMALLY CLOSED SO THAT LOSS OF SIGNAL WILL CONSTITUTE ALARM. |
| 63 | IF HIGH LEVEL SETPOINT AT T–100, TURN ON P–100. |
| 64 | IF LOW LEVEL SETPOINT AT T–100, TURN OFF P–100. |
| 65 | IF T–100 LEVEL TRANSMITTER SIGNAL (LT–100) IS DETECTED OUT OF ACCEPTABLE RANGE, SIGNAL ALARM AT MCP, TURN OFF P–001 AND CLOSE MV–100. |
| 66 | IF HIGH LEVEL ALARM AT LEACHATE UNDERGROUND STORAGE TANK (LAH–001), SIGNAL ALARM AT MCP AND TURN OFF P–001. |
| 67 | IF LOW LEVEL ALARM AT LEACHATE UNDERGROUND STORAGE TANK (LAL–001), SIGNAL ALARM AT MCP AND TURN OFF P–001. |
| 68 | IF HIGH LEVEL SETPOINT AT LEACHATE UNDERGROUND STORAGE TANK, TURN ON P–001. |
| 69 | IF LOW LEVEL SETPOINT AT LEACHATE UNDERGROUND STORAGE TANK, TURN OFF P–001. |
| 70 | IF PUMP RUN SIGNAL DETECTED (YI–001) AND FLOW RATE IS 0 AFTER 5 MINUTES, SIGNAL ALARM AT MCP (FAL–1XX) AND TURN OFF P–001. |
| 71 | IF LEVEL TRANSMITTER SIGNAL (LT–001) IS DETECTED OUT OF ACCEPTABLE RANGE, SIGNAL ALARM AT MCP AND TURN OFF P–001. |
| 72 | IF HIGH DIFFERENTIAL PRESSURE ALARM ACROSS PF–410A/B (DAH–420), SWITCH FROM LEAD VESSEL TO LAG VESSEL. |
| 73 | IF HIGH LEVEL ALARM AT T–800 (LAH–800), SIGNAL ALARM AT MCP, TURN OFF P–500A/B AND CLOSE MV–510. |
| 74 | IF LOW LEVEL ALARM AT T–800 (LAL–800), SIGNAL ALARM AT MCP, TURN OFF PUMPS P–500A/B AND P–820A/B AND CLOSE MV–510. |
| 75 | IF T–800 LEVEL TRANSMITTER SIGNAL (LT–800) IS DETECTED OUT OF ACCEPTABLE RANGE, SIGNAL ALARM AT MCP AND TURN OFF PUMPS P–500A/B AND P–820A/B. |
| 76 | IF HIGH LEVEL SETPOINT #1 AT T–800, TURN ON LEAD PUMP (P–820A OR B) – LEAD/LAG PUMPS SHALL BE ALTERNATING. |
| 77 | IF LOW LEVEL SETPOINT #1 AT T–800, TURN OFF PUMPS P–820A/B. |

## CONTROL LOGIC

| PUMP | DESCRIPTION |
|---|---|
| EXTRACTION WELL PUMPS | WELL PUMP OPERATION IS CONTROLLED BY THE LOCAL WELL PUMP CONTROL PANEL. PUMP OPERATION IS INITIATED WHEN THE PUMP ON LEVEL SETPOINT IS REACHED. PUMP OPERATION IS STOPPED WHEN THE PUMP OFF LEVEL SETPOINT IS REACHED. |
| P–001 | LEACHATE COLLECTION SUMP PUMP OPERATION IS CONTROLLED BY THE LOCAL CONTROL PANEL. PUMP OPERATION IS INITIATED WHEN THE PUMP ON LEVEL SETPOINT IS REACHED. PUMP OPERATION IS STOPPED WHEN THE PUMP OFF LEVEL SETPOINT IS REACHED. |
| P–100 | PUMP OPERATION SHALL BE CONTROLLED BASED ON LEVEL SETPOINT. PUMP OPERATION IS INITIATED WHEN THE PUMP ON LEVEL SETPOINT IS REACHED. PUMP OPERATION IS STOPPED WHEN THE PUMP OFF LEVEL SETPOINT IS REACHED. PUMP PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |
| P–200A/B | TRANSFER PUMP OPERATION SHALL BE ALTERNATING LEAD/LAG. LAG PUMP SHALL NOT TURN ON AUTOMATICALLY. PUMP OPERATION SHALL BE CONTROLLED BY VFD BASED ON FLOW SETPOINT. PUMP PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |
| MV–200 | MOTORIZED VALVE MV–200 SHALL BE EITHER 100% OPEN OR CLOSED. PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. IN THE EVENT OF A POWER LOSS, MV–200 SHALL BE CLOSED WITH POWER FROM UPS BACK–UP BATTERY. |
| B–300 | BLOWER OPERATION SHALL BE CONSTANT AND NOT DEPENDENT UPON ANY SETPOINTS. BLOWER PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |
| P–400 | TRANSFER PUMP OPERATION SHALL BE MANUALLY INITIATED AND TURNED OFF BY OPERATOR. PUMP PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |
| P–410A/B | TRANSFER PUMP OPERATION SHALL BE ALTERNATING LEAD/LAG. LAG PUMP SHALL NOT TURN ON AUTOMATICALLY. PUMP OPERATION SHALL BE CONTROLLED BY VFD BASED ON CONSTANT TANK T–410 LEVEL SETPOINT. PUMP PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |
| P–420 | RECYCLE PUMP OPERATION SHALL BE CONSTANT AND NOT DEPENDENT UPON ANY SETPOINTS. PUMP PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |
| P–900 | SUMP PUMP OPERATION SHALL BE AUTOMATIC BASED ON LOCAL SUMP LEVEL SWITCH POSITION. PUMP PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |
| B–500 | BLOWER OPERATION SHALL BE CONSTANT AND NOT DEPENDENT UPON ANY SETPOINTS. BLOWER PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |
| P–500A/B | TRANSFER PUMP OPERATION SHALL BE ALTERNATING LEAD/LAG. LAG PUMP SHALL NOT TURN ON AUTOMATICALLY. PUMP OPERATION SHALL BE CONTROLLED BY VFD BASED ON CONSTANT AS–500 SUMP LEVEL SETPOINT. PUMP PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |
| MV–500 | MOTORIZED VALVE MV–500 SHALL BE EITHER 100% OPEN OR CLOSED. PERMISSIVE CONIDTIONS ARE IDENTIFIED IN THE INTERLOCK LIST. IN THE EVENT OF A POWER LOSS, MV–200 SHALL BE CLOSED WITH POWER FROM UPS BACK–UP BATTERY. |
| MV–510 | MOTORIZED VALVE MV–510 SHALL BE EITHER 100% OPEN OR CLOSED. PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. IN THE EVENT OF A POWER LOSS, MV–200 SHALL BE CLOSED WITH POWER FROM UPS BACK–UP BATTERY. |
| P–800 | TRANSFER PUMP OPERATION SHALL BE MANUALL INITIATED BY OPERATOR . PUMP PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |
| P–820A/B | TRANSFER PUMP OPERATION SHALL BE ALTERNATING LEAD/LAG. LAG PUMP SHALL NOT TURN ON AUTOMATICALLY. PUMP OPERATION SHALL BE CONTROLLED BY VFD BASED ON FLOW SETPOINT. PUMP PERMISSIVE CONDITIONS ARE IDENTIFIED IN THE INTERLOCK LIST. |

**SUBMITTED FOR APPROVAL**


CITY:SYRACUSE-NY DIV/GROUP:ENV/CAD DB:G.STEINBERGER LD:G.STEINBERGER PIC:P.FARR PM:D.SAUDA TM:S.BATTAGLIA LYR:ON=*;OFF=*REF*
R:\ENVCAD\SYRACUSE\ACTIC\B0031174\0003\0002\DWG\CONTRACT\31174P05.dwg LAYOUT: P5 SAVED: 2/12/2013 10:38 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: D2B-PDF PLOTSTYLETABLE: PLTCONT.CTB PLOTTED: 2/12/2013 4:22 PM BY: KOWALCZYK, STEVE
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Professional Engineer's Name: **DONALD F. SAUDA**
Professional Engineer's No.: 084145
State: NY | Date Signed: | Project Mgr.: DFS
Designed by: SAB | Drawn by: KLS | Checked by: TEM

ARCADIS OF NEW YORK, INC.


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GROUNDWATER AND LEACHATE TREATMENT SYSTEM

# LEGEND, ABBREVIATIONS, AND INTERLOCKS

PROCESS


ARCADIS Project No.: B0031174.0003.00002
Date: FEBRUARY 2013
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**P5**