OPERATION, MAINTENANCE & MONITORING PLAN
SVE/SSD SYSTEM
GM COMPONENTS HOLDINGS, LLC
LOCKPORT, NEW YORK

PREPARED FOR:
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LOCKPORT, NEW YORK
TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

This document is intended as a plan for operating, maintaining and monitoring the soil vapor extraction (SVE) and sub-slab depressurization (SSD) system located within Building 10 at the GM Components Holdings, LLC (GMCH) Facility in Lockport, New York (see Figure 1). This document provides a description of the following seven items:

1. SVE/SSD System Components;
2. System Operation;
3. Permits;
4. Reporting;
5. Waste Management;
6. Roles and Responsibilities; and
7. References.

Detailed information on the various components and equipment "cut sheets" can be found in the National Environmental Systems (NES) Operation & Maintenance Manual 08-197 dated October 2008 (NES O&M Manual) attached as Appendix A. A copy of this manual is located inside the SVE System shed located in Building 10. Copies may also be obtained from the GMCH Environmental Department staff identified in Section 7.0.

1.1 SYSTEM SUBSURFACE COMPONENTS

There are two subsurface components to the operating system: Soil Vapor Extraction (SVE) and Sub-Slab Depressurization (SSD).

SVE is an in-situ unsaturated or vadose zone soil remediation technology in which vacuum is applied to the subsurface soil to induce the flow of air to remove volatile organic compound (VOC) contaminants from the soil. The vacuum is applied through a series of vertical wells which are connected to a carbon treatment system used to remove the contaminants from the air stream prior to discharge to the atmosphere above the building.

SSD is a method of intercepting vapors that volatilized from a contaminated media (i.e., soil, groundwater and/or product), that migrate upwards and may become trapped beneath or infiltrate into a building. The vapors are collected by applying a vacuum to the horizontal piping system located beneath the floor slab. The SSD piping is connected to a carbon treatment system to remove the VOC contaminants from the air stream prior to discharge to the atmosphere above the roof.

1.1.1 Subsurface Soil Vapor Extraction Components

The subsurface SVE system components consist of 17, 4-inch diameter vertical extraction wells (see Figure 2). The 17 extraction wells were installed using rotary drilling methods and are constructed of 4-inch diameter flush coupled polyvinyl chloride (PVC) riser and screen. Depth of the wells ranged from about 5.5 to 7 feet below ground surface (bgs). The screened portion of the wells ranged from about 3.5 to 5-foot in length and consisted of #10 machine slotted PVC pipe. The riser pipes consisted of 4-inch diameter solid PVC pipe approximately 2 feet in length. The annulus space around the well screen was backfilled with a #00 sand pack. An approximate 2-foot thick layer of bentonite chips were placed above the sand filter and hydrated with water.

Three trenches were excavated to an approximate depth of 2 feet bgs through the concrete slab-on-grade, subbase and soil. The trenches were used to install 1.5 inch diameter high density

polyethylene (HDPE) piping to connect the extraction wells to the manifold located within the SVE shed. The tops of the extraction wells were fitted with 4-inch by 4-inch by 2-inch Schedule 40 PVC Tees (see Figure 3) which were connected to the 1.5-inch diameter HDPE piping.

The tops of the PVC Tees were fitted with removable J-plugs to allow access into the extraction wells, if needed. After the HDPE piping and PVC Tees were connected, a bentonite seal was placed around the Tee/HDPE piping connection at the extraction well heads. Additionally, grout caps (mixture of water, Portland cement and powdered bentonite) were placed over the extraction well heads to better seal the extraction wells from the pea stone used as backfill in the trenches (see Figure 4).

The trenches were backfilled with pea stone to approximately 6 to 8-inches below the concrete slab. The sub-slab depressurization piping, as discussed in Section 1.1.2, was then installed in the upper portion of the pea stone.

1.1.2 Subsurface Sub-Slab Depressurization Components

The subsurface sub-slab depressurization (SSD) system components consist of 2-inch diameter #10 machine slotted PVC well screen lengths (see Figure 3) connected with PVC couplers. Once assembled, the PVC well screen lengths were covered with a fabric sleeve and placed horizontally in the three north-south orientated trenches (see Figure 2 for locations). The three lengths of piping were placed on top of the pea stone used to backfill the SVE HDPE lines. The three lengths, called sub-slab (SS) legs 1, 2 and 3 are connected to the manifold inside the SVE shed via 1.5-inch diameter HDPE piping.

After the installation of the SS-legs, the trenches were topped with approximately 6-inches of crushed stone (#1 run-of-crusher) and compacted with a vibrating plate tamper. Holes were drilled into the side walls of the existing concrete and rebar dowels were installed to "key" the new concrete to be placed into the existing concrete. Concrete was placed and troweled to meet the existing slab-on-grade. Cracks and seams in the existing concrete floor were filled using a self-leveling polyurethane caulk.

2.0 SVE SYSTEM MAJOR PROCESS EQUIPMENT AND INSTRUMENTATION

The following section contains a brief description of the major process equipment and instrumentation associated with the SVE/SSD system. Detailed information on the components along with Record drawings can be found in the NES O&M Manual.

A Vapor Extraction System Shed Layout drawing is included as Figure 5 and a Process and Instrumentation Diagram is included as Figure 6. These two drawings can also be found in Section 2 of NES O&M Manual.

2.1 SVE SYSTEM COMPONENTS

A list and description of the major process equipment of the SVE/SSD system can be found on Table 1. Detailed information on the process equipment can be found in the NES O&M Manual.

2.2 INSTRUMENTATION

A list and a description of the major instruments of the SVE/SSD system can be found on Table 2. Detailed information on the instruments of the SVE/SSD system can be found in the NES O&M Manual.

3.0 SYSTEM OPERATION

3.1 GENERAL SYSTEM START-UP PROCEDURE

The following procedures apply to the general start-up of the SVE/SSD system after a routine maintenance and/or an alarm condition has occurred.

1. The Hand-Off-Auto (HOA) switches on the swing panel of the control panel should be in their "OFF" position (see Photograph 1 in Appendix B).

2. Check to see if there is an alarm conditions displayed on the swing panel of the control panel via an illuminated alarm light (see Photograph 1). Refer to Table 4 if an alarm condition exists and resolve such condition. After resolving the alarm condition, clear alarm indicator light on the Sensaphone Autodialer (see Section 3.8) located on the front of the swing panel (see Photograph 2), by pressing the red "Alarm Cancel" button.

3. Set the HOA swing panel switches for the SVE Blower and Heat Exchanger to the "AUTO" position. The M/S Effluent Pump should be kept in the "OFF" position.

4. Set the HOA Control Power swing panel switch to the "ON" position. The SVE/SSD system should now be operating.

5. The Variable Frequency Drive (VFD) should be set to operate the motor of the blower between 45 hertz (hz) and 60 hz (see Photograph 1).

3.2 GENERAL SYSTEM SHUT-DOWN PROCEDURE

To shut-down the system for any non-emergency reason, turn the HOA Control Power swing panel switch to the "OFF" position. Press the "Alarm Cancel" button (see Photograph 2) on the Sensaphone Autodialer located on the front of the swing panel to prevent the system from making an outgoing Alarm Condition call. The SVE/SSD system should now be off.

3.3 EMERGENCY SHUT-DOWN PROCEDURE

To shut-down the system in an emergency situation:

- Open the Distribution Panel located to the left of the Control Panel on the south side of the SVE shed and place the MAIN breaker switch in the "OFF" position (see Photograph 14).

3.4 BALANCING THE SVE/SSD SYSTEM

The goal of the SVE/SSD system is two fold.

- To remediate the subsurface soils via the SVE; and
- To mitigate vapors from migrating upward into the building via the SSD.

The goal of the SVE will be accomplished by establishing "air flow" in the subsurface which will promote removal of the VOC contamination in the subsurface soil. The goal of the SSD will be accomplished by establishing a "vacuum" in the sub-slab which will draw air towards the SS-legs, depressurize the sub-slab and limit vapors from migrating upward through the floor slab.

Balancing the SVE/SSD system will require two approaches; (1) Establish a balanced air flow in the SVE extraction wells to allow an equal distribution across the remedial area; and (2) Maintain a vacuum in the SS-legs to depressurize the sub-surface.

3.4.1 Balancing the SVE Air Flow

Presently, the 17 extraction wells of the SVE do not have similar air flow capacities based on air flow velocity measurements collected. These varying air flows are likely due to the heterogeneities in the subsurface soils and presence of subsurface features (i.e., piping, manholes, etc.). The air flow capacities of the 17 extraction wells have been compared to each other and divided into the following three categories, good (highest 6 air velocities), fair (middle 6 air velocities) and low (lowest 5 air velocities). See Figure 2 for locations and Table 5 for previously measured flow rates.

Good:	EW-1, -4, -5, -6, -7, and -13.
Fair:	EW-2, -3, -12, -15, -16 and -17.
Low:	EW-8, -9, -10, -11 and -14.

To balance the air flow of the extraction wells, an air velocity meter should be used to measure flow rates in the individual extraction wells. This can be done by removing the vacuum gauge and sample port mounting tee (see Photograph 3) from the manifold and inserting the probe of the air velocity meter into the 1.5 inch diameter PVC manifold piping.

Measurements should be collected from the 17 extraction wells before adjusting the flow rates. Adjusting the extraction well flow control valves (see Photograph 3) will increase or decrease the air flow, as desired. The air flow rates in the SVE are dynamic, adjusting the flow rate at one well location will have an affect on vacuum and flow rate at other locations. Once the air flow rates have been measured at the 17 extraction wells, an average flow rate can be calculated. Note, the air flow rates at the wells generally identified as low (EW-9, -10, -11 and -14) should not be used in calculating at average and adjustments to these wells have minimal affect on the overall air flow or vacuum of the SVE.

Once the average flow rate has been determined, the individual well locations can be adjusted. The adjustments to the flow control valves should be made while measuring air flow rates. Adjustments and measurements to the individual extraction wells may need to be made multiple times to "fine tune" the SVE as adjustments to the individual wells have affects on the entire system.

3.4.2 Maintaining Vacuum in the SSD

The three SS-legs of the SSD require vacuum to create the depressurized condition in the sub-slab. Presently, the SS-legs are operating at about 1 to 2 water column inches of vacuum. This vacuum should be maintained in the three SS-legs.

3.5 REMEDIAL SYSTEM ROUTINE MONITORING

The following activities should be performed during routine monitoring of the SVE/SSD system.

- Collect tedlar bag air samples from the three air discharge monitoring points (Pre Carbon, Mid Carbon and Post Carbon; see Photographs 4 and 5 for monitoring point locations) Samples should be field screened with an organic vapor meter (OVM). The tedlar bags are located in the SVE shed.

- Field screen the Mid Carbon monitoring point with detector tubes, capable of measuring tetrachloroethylene, to measure for carbon bed break through. If the readings on the detector tubes is greater than 2 parts per million (ppm), break through has begun to occur and a carbon vessel change out should be scheduled. See Section 3.5.5 for carbon vessel change out procedures.

- Check the sight tube (see Photograph 6) on the moister separator for water accumulation in the moisture separator. If water is required to be transferred from the moisture separator to another storage container, see Section 3.5.3. Presently, the SVE/SSD system operation conditions are not generating water.

- Record the vacuum readings on the two vacuum gauges located above and below the inline filter (see Photograph 7). If the difference between the two vacuum readings is 1-inch of mercury (in Hg) or greater, then the in-line filter will need to be replaced. See Section 3.5.4 for inline filter replacement.

- Observe and record readings from the following gauges inside the SVE shed.

    - Pressure Magnehelic Gauge (Photograph 8)
    - Vacuum Magnehelic Gauge (Photograph 9)
    - Static Pressure Gauge (Photograph 8)
    - Temperature Gauge (Photograph 8)
    - Extraction Well and Sub-slab Gauges (Photograph 3)

The readings from these various gauges will need to be input into a calculation to determine the system flow rate. A copy of the Microsoft Excel spreadsheet with the calculations has been provided to GMCH.

Routine monitoring activities and data for the SVE/SSD system should be recorded by field personnel on the "Routine Monitoring Form" found in Appendix C. A copy of the completed forms should be maintained on site to provide a reference of tasks completed. The forms will provide a historical record of site activities for reference by field personnel during subsequent monitoring visits.

3.6 REMEDIAL SYSTEM ROUTINE MAINTENANCE

The following five maintenance activities should be performed on a routine basis as further discussed.

- Blower Maintenance – Lubrication, Oil Change & Belt Check
- Motor Maintenance – Lubrication
- Moisture Separator – Water Transfer & Cleanout
- In-Line Filter – Change out & Clean
- Carbon Vessels – Vessel Change out & Carbon Replacement

Routine maintenance for the above listed equipment is further described on Table 3. Suggested routine maintenance activities are indicated in the manufacturer's literature provided in the NES O&M Manual.

Routine maintenance activities for the SVE/SSD system should be recorded by the maintenance personnel on the "Routine Maintenance Form" found in Appendix C. A copy of the completed form should be maintained on site to provide a reference of maintenance completed. The form will provide a historical record of the maintenance activities completed by maintenance personnel to assist in maintaining the proper maintenance schedule.

Prior to performing Routine Maintenance activities, the SVE/SSD System should be shut down. The General System Shut-Down procedure in Section 3.2 should be followed. Upon completion of the Routine Maintenance activities, the SVE/SSD System should be turned back on using the General System Start-Up Procedures in Section 3.1.

3.6.1 Blower Maintenance

The rotary positive displacement blower will require monthly lubrication of its bearings via the grease fittings located on the housing of the blower. Photograph 10 identifies the location of the grease fittings and oil drains for the vertical flow left drive blower. See Table 3 for the manufacturer recommended grease to be used for lubrication.

The blower will require the oil to be changed every 1,000 hours of operation (approximately 41 days assuming 24 hour/day operation) if a petroleum based oil is used and every 3,000 hours (approximately 125 days) if a synthetic oil is used. See Table 3 for manufacturer recommended oil.

The blower Oil Fill Port Plug, Oil Level Indication Plug and Oil Drain Plugs are identified in Photograph 10. After the oil is drained from the blower, new oil should be poured into the fill port until it is observed exiting the Oil Level Indication Plug. Excess oil shall be cleaned from the equipment and not allowed to drip/spill onto the floor.

The blower belt tension and condition should be checked monthly and the belt replaced as needed (70 inch, BX67; Grainger Item #6L281).

3.6.2 Motor Maintenance

The electric motor will require yearly lubrication via the grease fittings located on the housing of the motor. Photograph 11 identifies the location of the grease fittings. The proper synthetic grease should be used for lubrication (see Table 3 for manufacturer recommendations).

3.6.3 Moisture Separator

The moisture separator should be emptied when it is approximately ½ full as observed through the sight glass on the separator (see Photograph 6). The water from the moisture separator shall be transferred to another storage container (i.e., 55-gallon drum) located on the exterior of the shed (see Photograph 12). Water transfer should be done manually and will require two people to perform the transfer. The moisture separator tank discharge hose on the exterior of the SVE shed should be placed inside the storage container and monitored during the water transfer. A reading on the transfer pump flow meter should be made prior to opening the gate valve to allow the water transfer (see Photograph 6). A second individual should operate the transfer pump by

manually turning and holding the HOA M/S Effluent Pump swing panel switch in the "HAND" position. When the moisture separator is empty or the storage container is full, release the HOA M/S Effluent Pump swing panel switch and it will return to the "OFF" position. A reading on the flow meter should be made to determine the volume of water transferred and the gate valve should be closed. The volume of water transferred shall be recorded on the Routine Monitoring Form (see Appendix C).

The interior of the moisture separator should be inspected on an annual basis to determine if sediment is accumulating on the bottom of the unit. This can be done by removing the bolts associated with the clean out (see Photograph 6). If sediment has accumulated, it should be removed and documented. The sediments should be containerized for proper disposal (see Section 6.0 for Waste Management).

3.6.4 In-Line Filter

The in-line filter is located directly above the blower as shown in Photograph 7. The filter should be changed when the vacuum below the filter (directly above the blower) is 1 inch of mercury (in Hg) greater than the vacuum above the filter as indicated by the gauges shown in Photograph 7.

The black filter housing can be removed by releasing the four wire-form clips. After removing the housing, remove the hex bolt and washer on the top plate of the filter. Clean the sealing surfaces of the housing, top & base plates and element end cap so that they are free of visible dirt or other particulates. Place the new or cleaned element evenly on the base plate so that the filter element is seated properly on the base and there is no visible dirt or particulate present on the sealing surfaces. Place the top plate on the element by centering it on the tap bolt and secure it with the washer and hex bolt. The element must be tightly secured, but do not over tighten.

Used filters should be placed in the 55-gallon labeled "Debris" located on the north side of the SVE Shed. When the drum is full, GMCH Supervisor of Waste Storage (Ms. Cindy Tudor-Schultz) should be notified that the "Debris" drum is ready to be transferred to hazardous waste storage area and should be replaced with an empty drum. Extra filters should be kept in the SVE shed, as one filter is removed for cleaning another filter can be installed and the system can continue to operate. Replacement filters can be obtained from Solberg Manufacturing, Part # 234P.

Section 6.0 provides information about the waste management of the filters and Section 7.0 provides information about GMCH personnel responsible for the management of the filters.

3.6.5 Carbon Vessels

The carbon vessels that are being used to treat the air stream from the SVE/SSD system contain about 2,000 pounds of granular activated carbon (GAC) each. Two vessels are connected to the system at a time (see Photograph 13). They are connected in series so the air stream moves from the first vessel (Lead Vessel) to the second vessel (Polishing Vessel) prior to discharging to the atmosphere above the building.

The Lead Vessel is monitored for breakthrough (discussed in Section 3.4) by monitoring the Mid Carbon monitoring point. When it is determined that breakthrough has occurred, the Lead Vessel is removed from the system and replaced with the Polishing Vessel, which becomes the new Lead Vessel. A new carbon vessel is put on-line, becoming the new Polishing Vessel. Delphi Environmental Department personnel should be contacted regarding GAC change out.

Carbon change outs will be based on the breakthrough of the Lead Vessel and are occurring at approximately two to three month intervals during the first year of operation. The time frame between vessel change outs will likely increase over time as diminishing contaminant returns are typical of these systems.

The used carbon vessels will be stored at the Building 8 Decontamination Area. GMCH's Supervisor of Environmental Operations (Ms. Cindy Tudor-Schultz) should be notified that the carbon vessel is ready to be transferred to the Building 8 Decontamination Area.

The carbon vessels that have reached breakthrough and have been taken to the Building 8 Decontamination Area for storage, will be shipped out to have the GAC regenerated or replaced with new GAC.

After the carbon change outs have occurred, the fernco fittings used to connect the transfer piping to the vessels should be manually checked for air leaks. If a leak is detected, the fernco fitting should be repositioned, retightened and rechecked for an air leak. This procedure should be followed until the air leak is addressed. If the air leak cannot be addressed by repositioning and retightening, the fernco fitting should be replaced.

Section 6.0 provides information about the waste management of the GAC and Section 7.0 provides information about GMCH personnel responsible for the management of the GAC.

3.7 NON-ROUTINE MAINTENANCE

Non-routine maintenance activities will occur when the SVE/SSD system shuts down do to a malfunction or if an alarm condition has occurred. The SVE/SSD system equipment will operate if the swing panel switch is in the "AUTO" position and no alarm is present. Equipment will operate if the swing panel switch is in the "HAND" position with or without an alarm present.

There are six Alarm Condition Display lights which are labeled on the front of the swing panel (see Photograph 1). They are as follows.

- SVE Low Vacuum
- Moisture Separator High Level
- SVE Blower High Discharge Temperature
- Holding Tank High Level
- Power Monitor Alarm
- VFD Fault

To assist with non-routine site activities, Table 4 has been prepared to provide a general summary of alarm conditions, potential causes and potential solutions. This is a preliminary set of failure conditions, but operator experience and familiarity with the system is a prerequisite to adequately addressing non-routine system failures. Alarm conditions exist when one of the six alarm lights are illuminated. The Sensaphone dials out to the preprogrammed telephone numbers (see Section 3.7) to alert of the alarm condition.

The "Non-Routine Maintenance Form" has been generated for use when non-routine maintenance activities are performed. This form (see Appendix C) should also be completed by the field and/or maintenance personnel when responding to alarm conditions or other non-routine site visits when a full

system inspection may not be required or performed. A copy of this form should also remain on site to provide a record of site activities and/or maintenance performed.

3.8 REMOTE SYSTEM MONITORING

The SVE/SSD system contains an auto dialer, Sensaphone Model 400 (Sensaphone), a programmable, environmental monitoring system that allows for remote monitoring capabilities. The Sensaphone has been connected with a telephone line to allow the unit to call out if an alarm condition is present or allow for incoming calls to check on the status of the SVE/SSD system.

If an alarm condition occurs, the Sensaphone has been programmed to dial out to three programmed telephone numbers to alert these individuals of the alarm condition that has occurred. When the Sensaphone dials out, a pre-recorded message will play identifying one of four zones "is not OK", identifying an alarm condition.

The following alarm conditions are associated with one of the four zones.

ZONE	ALARM CONDITION
1	Low Vacuum
(any of 3 Conditions)	Moisture Separator High Level
	SVE High Discharge Temperature
2	Holding Tank High Level
(any of 2 Conditions)	Power Monitor Alarm
3	VFD Fault
(any of 3 Conditions)	M/S Effluent Pump Overload
	Heat Exchanger Overload
4	SVE System is not running

See Table 4 or Section 3 of the NES O&M Manual for additional information on the Alarm and/or Zone conditions.

The telephone number of the Sensaphone is 716-439-2518 and can be called to check on the status of the system. The Sensaphone may also be used to make outgoing telephone calls. The number "9" must be entered prior to entering the outgoing telephone number.

The Sensaphone is currently programmed to make a sequence of three outgoing telephone calls, when an alarm condition occurs. Each of the three numbers will be called one time and be asked for an acknowledgement. If no acknowledgement is received, the next telephone number is called until the three numbers have been dialed. The incoming call from the Sensaphone can be acknowledged by entering the number "555". Presently the Sensaphone is programmed to call out and send alarms notifications to three telephone numbers in the following order:

315-463-2391 James Hartnett, GMCH Project Manager, Syracuse, NY
716-439-2942 – Cathy Ver, Delphi Senior Environmental Engineer, Lockport, NY
716-844-7046 – Chris Boron, GZA GeoEnvironmental of NY, Buffalo NY

Refer to Section 4 of the NES O&M Manual for additional information about the Sensaphone unit.

4.0 PERMITS

The following is a list of applicable permits associated with the operation and maintenance of the SVE/SSD system.

- *City of Lockport, Public Utilities Department, Waste Water Discharge Permit, CL860103.*

This permit is applicable to water generated from the operation of the SVE/SSD system. Water is containerized and sampled for volatile organic compounds. The analytical results are provided to the Department of Public Utilities to obtain permission to discharge the water generated to the City of Lockport sanitary sewer.

No additional permits are currently required for the operation, maintenance and monitoring of the SVE/SSD system.

5.0 REPORTING

A SVE/SSD system operation report will be prepared annually. The system operation report will include performance monitoring data, SVE operational information and indoor air sampling results. The reports will also present conclusions regarding overall system effectiveness and recommendations for modifications to the SVE program, if appropriate.

Operation of the SVE/SSD system began in March 2009. The annual report will be submitted in May of each subsequent calendar year.

6.0 WASTE MANAGEMENT

Various types of waste, both hazardous and non-hazardous, will be generated during the operation, maintenance and monitoring of the SVE/SSD system. These wastes will be handled according to following internal GMCH document.

- *ISO 14001 EMS WI 016 - "Handling Hazardous and Non-Hazardous Waste".*

This document is an internal GMCH instruction document to provide guidelines for employees and their supervisors that handle hazardous and non-hazardous wastes. This work instruction is applicable to waste streams generated by the operation and maintenance of the SVE/SSD system and may include, but is not limited to, the following.

- Operation wastes – water, sediment, soil, particulate and spent GAC
- Maintenance waste – oil, grease, and filters
- Monitoring waste – latex gloves, paper towel and detector tubes

This document can found in the Delphi Lockport ISO 14001 management system.

7.0 GMCH RESPONSIBILITIES

Three GMCH Departments will be associated with the operation, maintenance and monitoring of the SVE/SSD system. They are as follows.

Environmental Department – Has the overall responsibility for the management of the operation, maintenance and monitoring of the SVE/SSD system. The following GMCH Environmental Department employees have a role in the management of the system.

James Hartnett: Project Manager, 315-463-2391
Overall management responsibility for the system and is the contact for the regulatory agencies.

Cathy Ver: Sr. Environmental Engineer, 716-439-2942.
Responsibility for the day to day operations and monitoring of the system.

Cindy Tudor-Schultz: Sr. Environmental Engineer, 716-439-3302.
Responsibility for the disposal of the wastes stream generated by the operation, maintenance and monitoring of the system.

Maintenance Department – Will have the overall responsibility for the maintenance of the SVE/SSD system. The following GMCH Maintenance Department employee is responsible for coordinating the required maintenance activities.

Jim Hereth: Maintenance Supervisor, 716-439-2895.

Security – Securitas is responsible for security at the GMCH Lockport facility.

Emergency: Dial ext. 3333.
General Security: Dial ext. 2237.

From an outside line General Security can be reached at 716-439-2237.

8.0 REFERENCES

The following pertinent documents were referenced within this document.

- National Environmental Systems, Operation & Maintenance Manual", NES Project Number: 08-197, dated October 2008.
- *"Handling Hazardous and Non-Hazardous Waste", ISO 14001 Document Control Number: EMS WI 016.*

TABLES

TABLE 1
MAJOR PROCESS EQUIPMENT
OPERATION, MAINTENANCE AND MONITORING PLAN
SVE/SSD SYSTEM
GM COMPONENTS HOLDINGS, LLC
LOCKPORT, NEW YORK

Component Name	Qty	Component Serial #	Manufacturer	Model #	Equipment Description
Rotary Blower	1	142470	Tuthill	5009-21L2	M-D Pneumatics Competitor Plus Rotary Positive Blower, 25 hp; 460 volts, 3 phase, 60 hertz, 250 SCFM at 13" Hg vacuum. See Section 4 of NES O&M Manual for additional information.
Blower Motor	1	NO7-BL96-7	US Motor	H25E2D	Horizontal motor with 25 hp; 460 volts, 3 phase, 60 hertz. Variable frequency drive controlled. See Section 4 of NES O&M Manual for additional information.
Blower Belt	1		Dayton	6L281	The blower belt (V-Belt BX67) has an outside length of 70-inches, a top width of 21/23-inch and a thickness of 13/32-inch. Replacement belts can be order from Grainger, Item # 6L281.
Moisture Separator Tank	1		NES		120 gallon capacity constructed of carbon steel with bronze drain valve. Operates on principal of cyclonic section aided by velocity reduction. See Section 5 of NES O&M Manual for additional information.
Moisture Separator Pump	1	E0883654	Goulds	1ST1E5C4	The pump is total enclosed fan cooled 1 hp, 3 phase, 60 hertz. It can pump 150 gallons per minute at 3,500 RPM. See Section 5 of NES O&M Manual for additional information.
Heat Exchanger	1	154742	American Industrial	ACA 6361-92544	Heat exchanger is 3 hp, 3 phase, 460 volts, 60 hertz, 10,500 cfm. See Section 6 of NES O&M Manual for additional information.
Exhaust Fan	1		Grainger	4C020	Exhaust Fan is an aluminum ring, vertically mounted fan unit. It contains a 1/4 hp, 1725 RPM, 1 phase, 115 volts, 60 hertz motor. The fan has 4 propellers and is 12-inches in diameter. See Section 7 of NES O&M Manual for additional information.
Inline Filter Unit	1		Solberg Manufacturing	CT-235P-400C	The inline filter housing is made of carbon steel and has a 4-inch diameter inlet and outlet. See Section 4 of NES O&M Manual for additional information
Inline Filter Element	1		Solberg Manufacturing	234P	The replacement element is paper and can handle flow up to 570 cfm. It has an inner diameter of 4.75 inches, out diameter of 8.77 inches and height of 9.63 inches. Replacement filter can be ordered from Solber Mfg, Part # 234P. See Section 4 of NES O&M Manual for additional information.
Discharge Silencer	1	80286	Stoddard	PD13-4-C	The discharge silencer is located beneath the blower, motor and belt guard which are mounted on top. It is approximately 54 inches long and 14 inches in diameter. A drain plug is located on the west side of the unit. See Section 4 of NES O&M Manual for additional information
Vacuum Relief Valve	1		Knuckle	215-HO1QE0015	The vacuum relief valve has a 2-inch diameter inlet and is set for approximately 13 in Hg. See Section 4 of NES O&M Manual for additional information.
Dilution Valve Filter/Silencer	1		Solberg Manufacturing	FS-19P-150	The dilution valve filter/silencer filters air and attenuates air inlet noise that is brought into the system from the manual dilution valve. It has an 6 inch diameter inlet housing and a 1 1/2 inch outlet diameter. See Section 4 of NES O&M Manual for additional information.

TABLE 2
MAJOR INSTRUMENTATION
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LOCKPORT, NEW YORK

Component Name	Qty	Component Serial #	Manufacturer	Model #	Instrument Description
Variable Frequency Drive	1	8.80812E+11	Square D	ATV	The VFD has been programmed to operate the blower motor in the 45 hz to 60 hz operating ranges only. Adjusting the VFD to operate below 45 hz or above 60 hz will not occur. See Section 3 of the NES O&M Manual for additional information.
Autodialer	1	272008-11458	Sensaphone	400	The Sensaphone will call out to programmed telephone numbers when an alarm condition occurs. The three telephone numbers presently programmed can be found in Section 3.7 of this document. See Section 3 of the NES O&M Manual for additional information.
SVE Vacuum Switch	1		Dwyer	1950-20-2F	The SVE Vacuum Switch has been placed between the blower and moisture separator and set to trigger a low vacuum alarm when the system vacuum falls below 4 water column inches. See Section 4 of the NES O&M Manual for additional information
Pitot Tube	2		Dwyer	DS-300-4	There are two pitot tubes installed in the 4-inch diameter air flow piping inside the shed. One pitot is reading vacuum flow and the second pitot tube is reading pressure flow. See Section 4 of the NES O&M Manual for additional information.
Pitot Tube Magnehelic Gauge	2		Dwyer	2003	There are two magnehelic gauges indicating readings from the two pitot tubes installed in the system. One gauge is reading vacuum flow and the second is reading pressure flow. See Section 4 of the NES O&M Manual for additional information.
Temperature Switch	1		United Electric Controls	100 Series	The temperature switch has been installed after the heat exchanger and set to shut the system down if the system discharge temperature exceeds about 110° F. Presently, the system must operate with the heat exchanger on to stay below 110° F. See Section 6 of the NES O&M Manual for additional information.
Moisture Separator Level Switch	1		Innovative Solutions	L312	The moisture separator level switch can be seen in the sight tube on the moisture separator. The high level will trigger the moisture separator high level alarm and shut the system down. Water from the moisture separator will need to be transferred manually. See Section 5 of the NES O&M Manual for additional information.
Effluent Flowmeter Display	1	60807240524	Signet	3-8150	The effluent flow meter display will monitor the volume of water that is transferred from the moisture separator to the external storage containers. See Section 5 of the NES O&M Manual for additional information.
Exhaust Fan Thermostat	1		Grainger	2E834	The exhaust fan thermostat is located inside the shed and monitors the ambient temperature in the shed. The temperature control is located inside the control panel, behind the swing door and has been set at 75° F. See Section 7 of NES O&M Manual for additional information.

TABLE 3
ROUTINE MAINTENANCE ACTIVITIES
OPERATION, MAINTENANCE AND MONITORING PLAN
SVE/SSD SYSTEM
GM COMPONENTS HOLDING, LLC
LOCKPORT, NEW YORK

Frequency	Task	Description
Monthly	Blower Bearing Lubrication	Lithium grease should be applied to the blower grease fittings on a monthly basis until grease is observed exiting the relief fittings. The manufacturer recommends using Tuthill PneuLube NLGI#2 premium grade petroleum based lithium grease. See Section 3.6.1 of this document or Section 5 of the NES Operation & Maintenance Manual for additional information.
Monthly	Blower Belt Tension	The blower belt tension should be inspected during the monthly blower bearing lubrication. The belt gaurd will need to be removed in order to check the tension and it should be adjusted as necessary. There should be 1/64" deflection per inch of span between sheaves when applying 8 to 10 pounds of force at the center point of the top section of the belt. See Table 1 for belt replacement information. See Section 3.6.1 of this document or Section 4 of the NES Operation & Maintenance Manual for additional information.
Quarterly	Blower Oil Change	Synthetic Based Oil should be used to replace the oil in the blower every 3,000 hours of operation. However, the oil should be changed every 1,000 hours if petroleum based oil is being used. The manufacturer recommends using the following synthetic based oils: Tuthill PneuLube; Exxon Mobile SHC 627, or Shell OMALA RL 100. See Section 3.5.1 for this document or Section 5 of the NES Operation & Maintenance Manual for additional information.
Annually	Motor Lubrication	Synthetic grease should be applied to the motor grease fittings on an annual basis. The manufacturer recommends using the following grease: Exxonmobile PolyREX-EM or Chevron SRI No. 2. See Section 3.6.2 of this document or Section 5 of the NES Operation & Maintenance Manual for additional information.
As Needed	Moisture Separator Cleanout	The moisture separator should be cleaned out to remove sediment that may be accumulating in the bottom of the unit. As no water is currently accumulating under its current operating conditions, an annual inspection and as needed cleanout is currently sufficient. Frequency should be altered if water begins to accumulate.
As Needed	In-Line Filter Change Out	The in-line air filter should be changed out on an as needed basis. A change out should be done when there is a 1 in Hg or greater difference between the vacuum gauges before and after the in-line filter. The used filters should be placed in the debris drum located on the north side of the SVE Shed.
As Needed	Carbon Vessel Change Out	The carbon vessel should be changed out when break through is measured in the Mid Carbon monitoring point. Break through has been defined when detector tube readings at the Mid Carbon monitoring point are greater than 2 ppm for tetrachloroethylene. See Section 3.6.5 of this document for additional information.

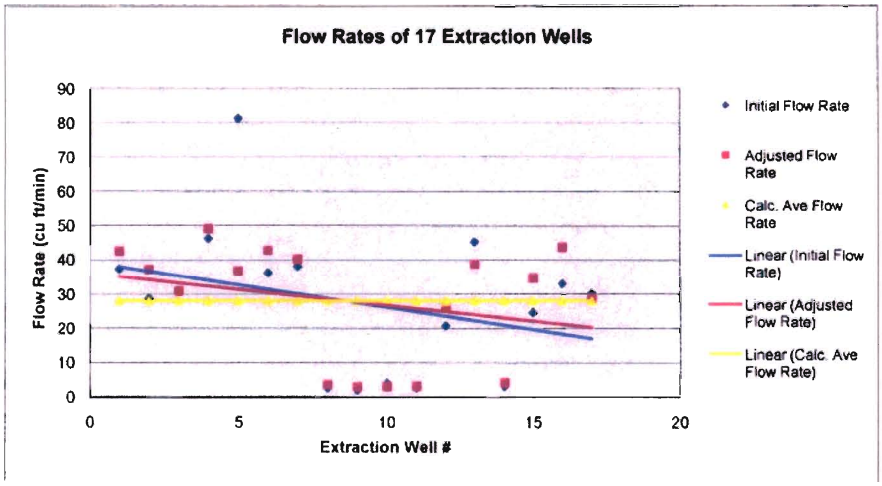
TABLE 4
ALARM CONDITIONS
OPERATION, MAINTENANCE AND MONITORING PLAN
SVE/SSD SYSTEM
GM COMPONENTS HOLDINGS, LLC
LOCKPORT, NEW YORK

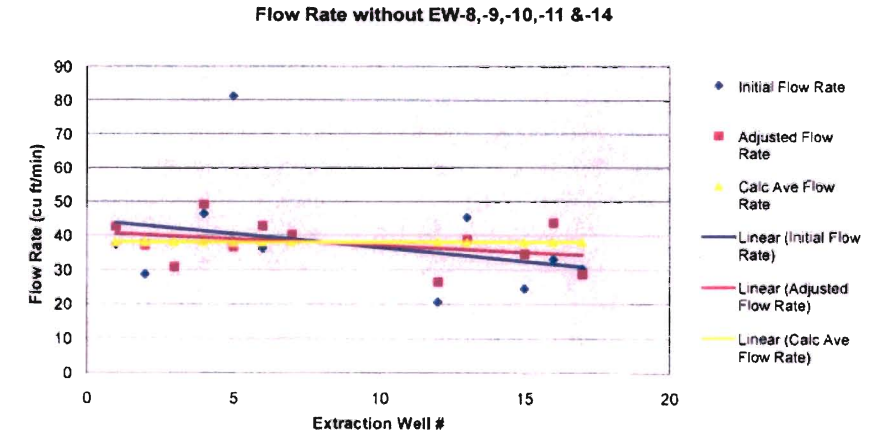
Alarm Condition	Alarm Rationale	System Response	Sensaphone Zone Condition
SVE Low Vacuum	Indicates that there is low vacuum in the SVE/SSD system. Blower may or may not be in operation. If none of the other 5 potential alarm condition exists then the SVE Blower swing panel switch is in the "OFF" position or the blower belt is broken and/or loose.	Alarm light is illuminated. Remaining system equipment continues to operate.	ZONE 1
Moisture Separator High Level	Indicates that the moisture separator is full. This alarm condition should be coupled with the SVE Low Vacuum Alarm. If the Moisture Separator High Level alarm is not coupled with the SVE Low Vacuum, then the system is still in operation and generating water.	Alarm light is illuminated. Blower and heat exchanger are shut down. The moisture separator effluent pump, if set in the "AUTO" position, will continue to run until water level in the moisture separator is drawn below the low level switch.	ZONE 1
SVE Blower High Discharge Temperature	Indicates that there is high vacuum and low flow within the system which causes a temperature increase. This could mean that the vacuum relief valve has failed, there is water in the extraction wells or the transfer lines impeding flow. High temperature condition may also be caused if the heat exchangeror is off or has failed. The high temperature sensor will trigger at approximately 110°F.	Alarm light is illuminated. Blower and heat exchanger are shut down.	ZONE 1
Holding Tank High Level	Indicates the external storage container is full.	Alarm light is illuminated. Blower, heat exchanger and moisture separator effluent pump are shut down.	ZONE 2
Power Monitor Alarm	Indicates that there is low voltage, an electrical phase reversal, a phase loss or an imbalance in the electrical load.	Alarm light is illuminated. Blower, heat exchanger and moisture separator effluent pump are shut down.	ZONE 2
VFD Fault	Indicates there is either a problem with the variable frequency drive or the blower motor.	Alarm light is illuminated. Blower and heat exchanger are shut down.	ZONE 3
No Formal Alarm	SVE/SSD system is not running.		ZONE 4

Note: Refer to the NES Operation & Maintenance Manual, 08-197 dated October 2008 for additional information.

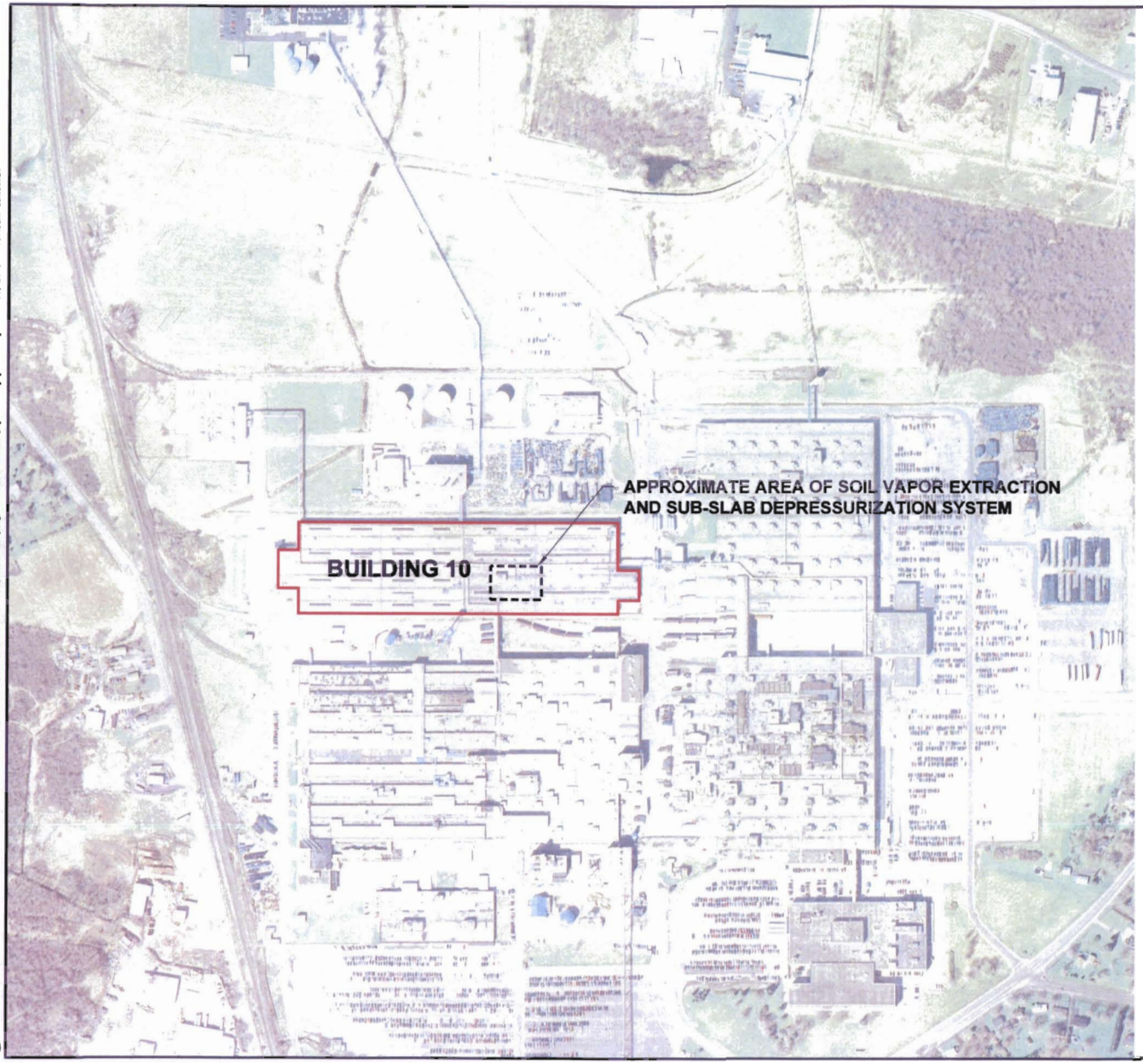
TABLE 5
PREVIOUSLY MEASURED FLOW RATES
OPERATION, MAINTENANCE AND MONITORING PLAN
SVE/SSD SYSTEM
GM COMPONENTS HOLDINGS, LLC
LOCKPORT, NEW YORK

INITIAL FLOW RATES			ADJUSTED FLOW RATES		
SVE Vacuum at start of testing: 3 " Hg at 52 hz			SVE Vacuum after adjustment: 3 " Hg at 60 hz		
Calculated flow based on Pressure Gauge: 315 SCFM			Calculated flow based on Pressure Gauge: 360 SCFM		
Extraction Well	Flow Reading (ft/min)	Flow Rate (ft^3/min)	Extraction Well	Flow Reading (ft/min)	Flow Rate (ft^3/min)
1	3040	37	1	3465	43
2	2335	29	2	3030	37
3	2500	31	3	2510	31
4	3770	46	4	4000	49
5	6600	81	5	3000	37
6	2950	36	6	3490	43
7	3100	38	7	3280	40
8	228	3	8	308	4
9	172	2	9	250	3
10	330	4	10	260	3
11	228	3	11	270	3
12	1680	21	12	2160	27
13	3685	45	13	3160	39
14	260	3	14	350	4
15	2000	25	15	2825	35
16	2690	33	16	3560	44
17	2460	30	17	2340	29
SS1	690	8	SS1	500	6
SS2	580	7	SS2	460	6
SS3	2600	32	SS3	420	5
Total Flow	**41898**	**515**	Total Flow	**39638**	**488**





FIGURES



NORTH

LEGEND:

INDICATES BUILDING 10 FOOTPRINT

APPROXIMATE LOCATION OF SVE/SSD SYSTEM

NOTES:

1. BASE MAP ADAPTED FROM A 2005 AERIAL PHOTOGRAPH DOWNLOADED FROM http://www.nysgis.state.ny.us/gateway/mg/interactive_main.html AND SITE OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: DEW

DATE: MARCH 2010

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET

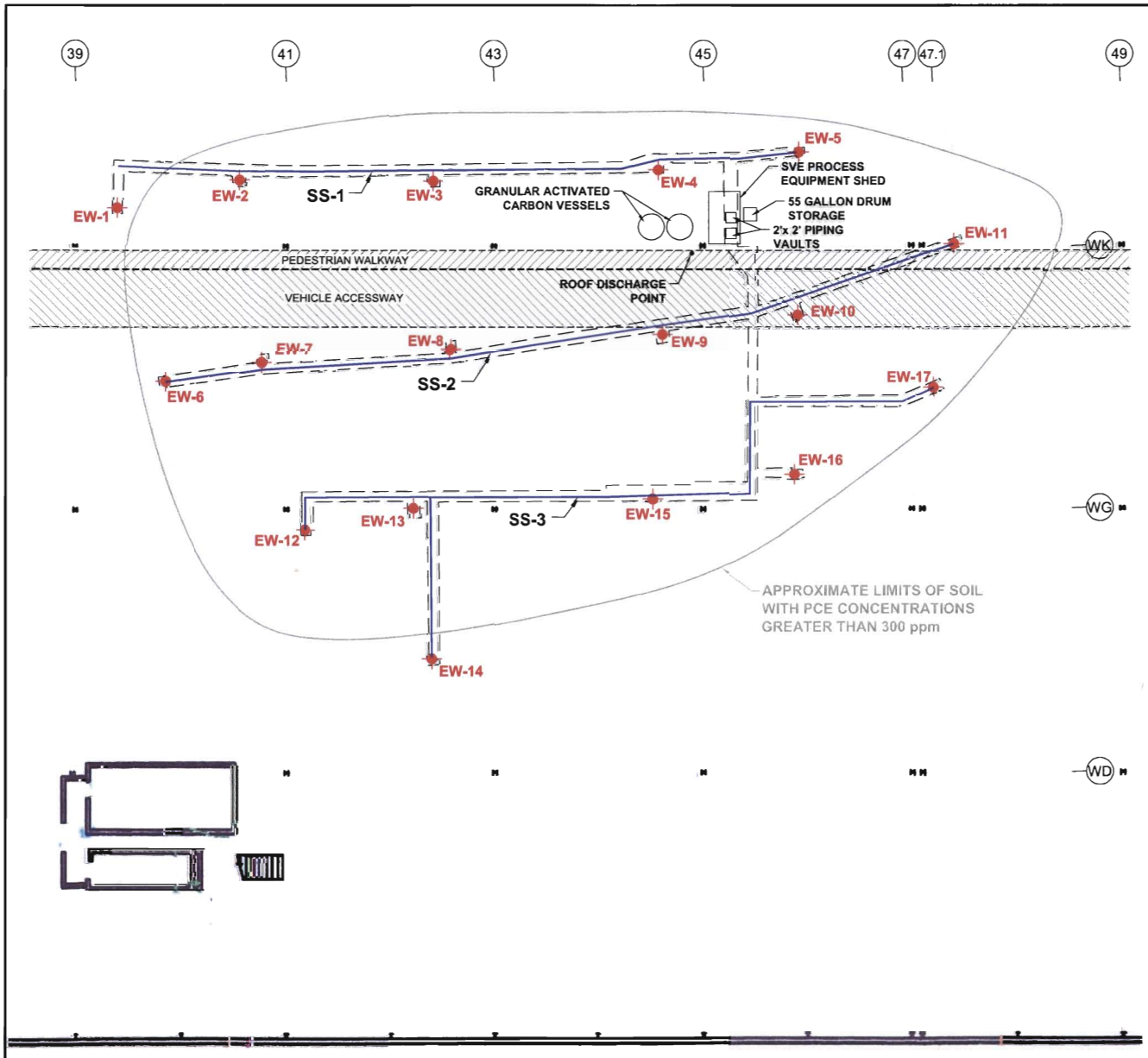
0 200 400 800

GM COMPONENTS HOLDINGS, LLC
GMCH LOCKPORT FACILITY
200 UPPER MOUNTAIN ROAD, LOCKPORT, NEW YORK
BUILDING 10
SVE / SSD SYSTEM OPERATION MAINTENANCE AND MONITORING PLAN
SITE PLAN

PROJECT No.
21.0056546.00

FIGURE No.
1

G:\ZA-1\PROJECTS\56500s\56548 GM Component LLC\Bldg 10 O & M Manual\Figure 1.dwg [FIGURE 1] March 30, 2010 - 10:45am donlel.wulf



LEGEND:

APPROXIMATE LOCATION OF TRENCHES INSTALLED BENEATH CONCRETE SLAB FOR SVE AND SSD PIPING

SS-1 SUB-SLAB LEG 1

EW-1 APPROXIMATE LOCATION AND DESIGNATION OF 4-INCH DIAMETER SOIL VAPOR EXTRACTION WELL

NOTES:

1. BASE MAP ADAPTED FROM A SITE PLAN PROVIDED BY THE CLIENT.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: DEW

DATE: MARCH 2010

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET

0 10 20 40

GM COMPONENTS HOLDINGS, LLC

GMCH LOCKPORT FACILITY

200 UPPER MOUNTAIN ROAD, LOCKPORT, NEW YORK

BUILDING 10

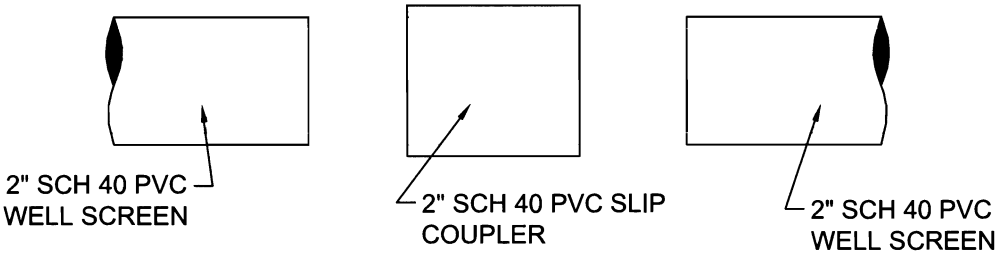
SVE / SSD SYSTEM OPERATION MAINTENANCE AND MONITORING PLAN

SVE / SSD SYSTEM LAYOUT

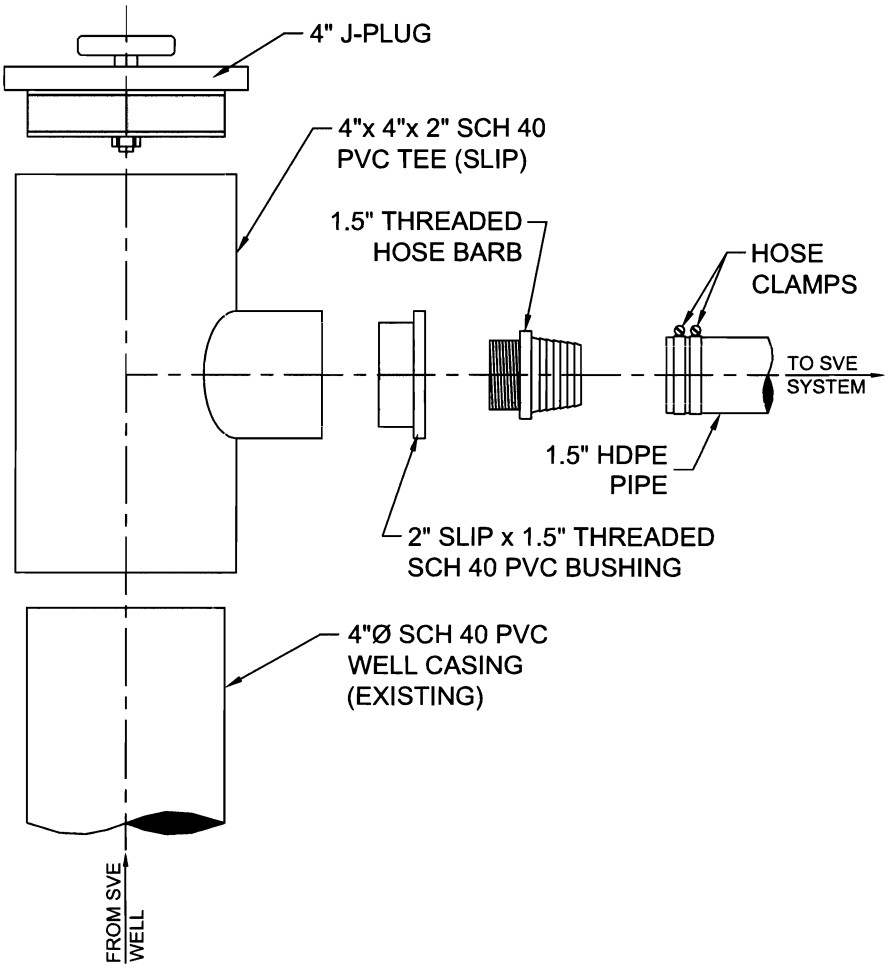
PROJECT No. 21.0056546.00

FIGURE No. 2

SUB-SLAB DEPRESSURIZATION SYSTEM PIPING



SOIL VAPOR EXTRACTION SYSTEM PIPING



DRAWN BY: DEW

DATE: MARCH 2010

GZA GeoEnvironmental of New York

NOT TO SCALE

GM COMPONENTS HOLDINGS, LLC

GMCH LOCKPORT FACILITY

200 UPPER MOUNTAIN ROAD, LOCKPORT, NEW YORK

BUILDING 10

SVE / SSD SYSTEM OPERATION MAINTENANCE AND MONITORING PLAN

PIPE FITTING SCHEMATIC FOR SVE WELL HEAD AND SSD PIPING

PROJECT No.

21.0056546.00

FIGURE No.

3

 GZA-T:\PROJECTS\56500s\56546 GM Component LLC\Bldg 10 O & M Manual\Figure 4.dwg [Figure 4] March 30, 2010 - 10:49am daniel.wulf

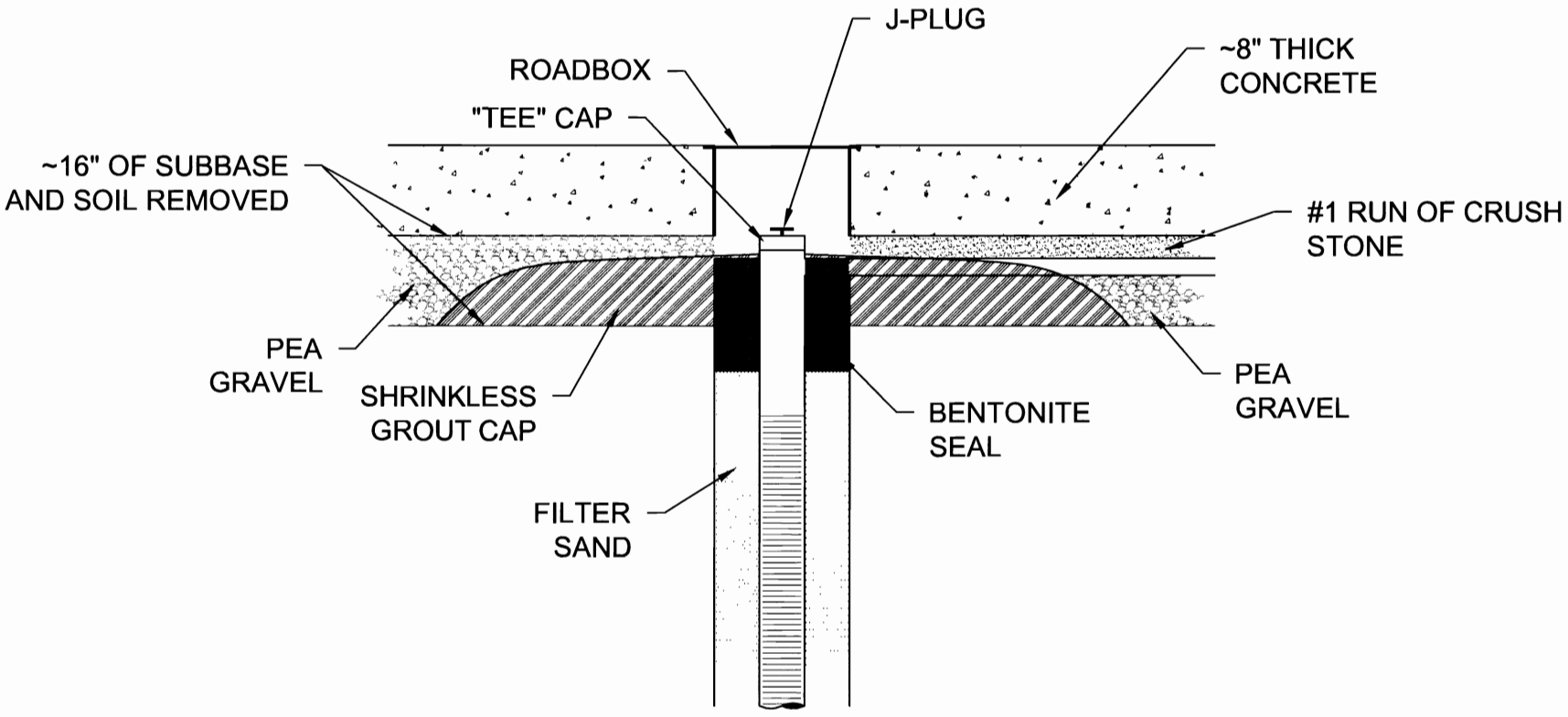


FIGURE No. 4

PROJECT No. 21.0056546.00

GM COMPONENTS HOLDINGS, LLC

GMCH LOCKPORT FACILITY

200 UPPER MOUNTAIN ROAD, LOCKPORT, NEW YORK

BUILDING 10

SVE / SSD SYSTEM OPERATION MAINTENANCE AND MONITORING PLAN

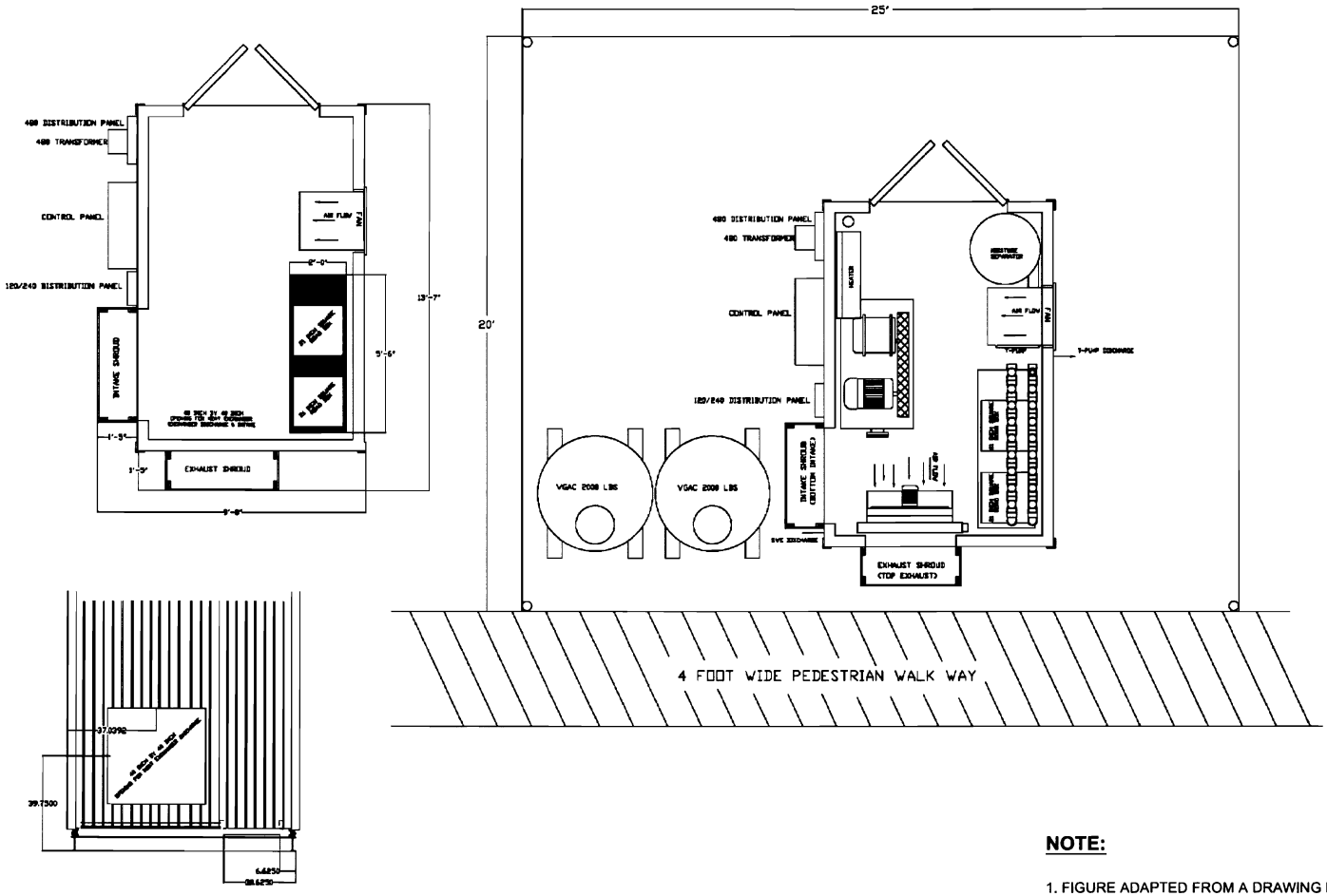
SVE WELL HEAD GROUT CAP DETAIL

NOT TO SCALE

DRAWN BY: **DEW**

DATE: **MARCH 2010**

GZA GeoEnvironmental of New York



NOTE:

1. FIGURE ADAPTED FROM A DRAWING DEVELOPED AND PROVIDED BY NATIONAL ENVIRONMENTAL SYSTEMS, DATED 10-07-06.

DRAWN BY: DEW

DATE: MARCH 2010

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET

0 2 4 8

GM COMPONENTS HOLDINGS, LLC

GMCH LOCKPORT FACILITY

200 UPPER MOUNTAIN ROAD, LOCKPORT, NEW YORK

BUILDING 10

SVE / SSD SYSTEM OPERATION MAINTENANCE AND MONITORING PLAN

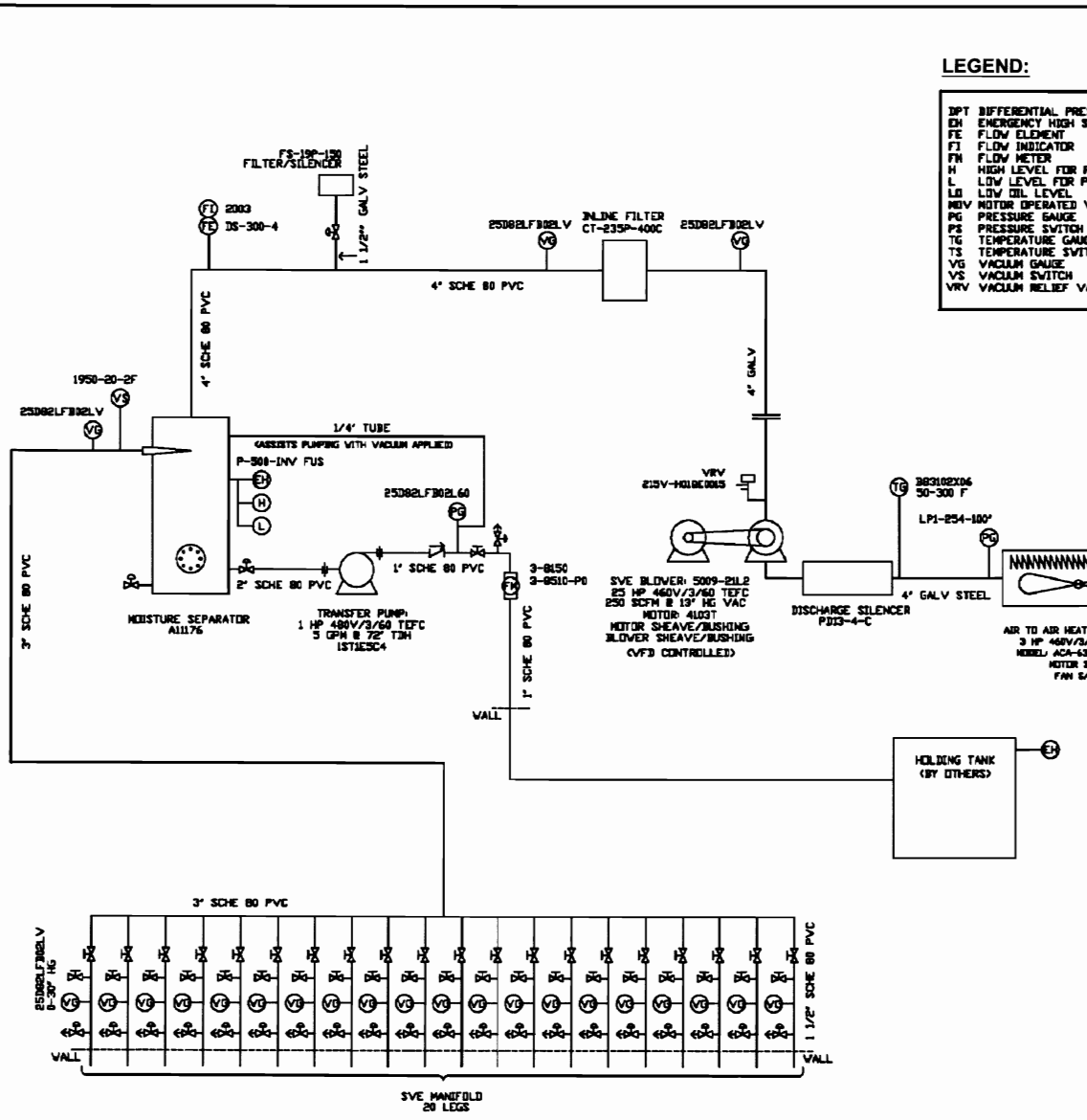
SVE / SSD SYSTEM SHED LAYOUT

PROJECT No.

21.0056546.00

FIGURE No.

5



NOTE:

1. FIGURE ADAPTED FROM A DRAWING DEVELOPED AND PROVIDED BY NATIONAL ENVIRONMENTAL SYSTEMS, DATED 10-07-06.

DRAWN BY: DEW

DATE: MARCH 2010

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NOT TO SCALE

GM COMPONENTS HOLDINGS, LLC
GMCH LOCKPORT FACILITY
200 UPPER MOUNTAIN ROAD, LOCKPORT, NEW YORK
BUILDING 10
SVE / SSD SYSTEM OPERATION MAINTENANCE AND MONITORING PLAN

SVE / SSD SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM

PROJECT No.
21.0056546.00

FIGURE No.
6

APPENDIX A

NES Operation & Maintenance Manual

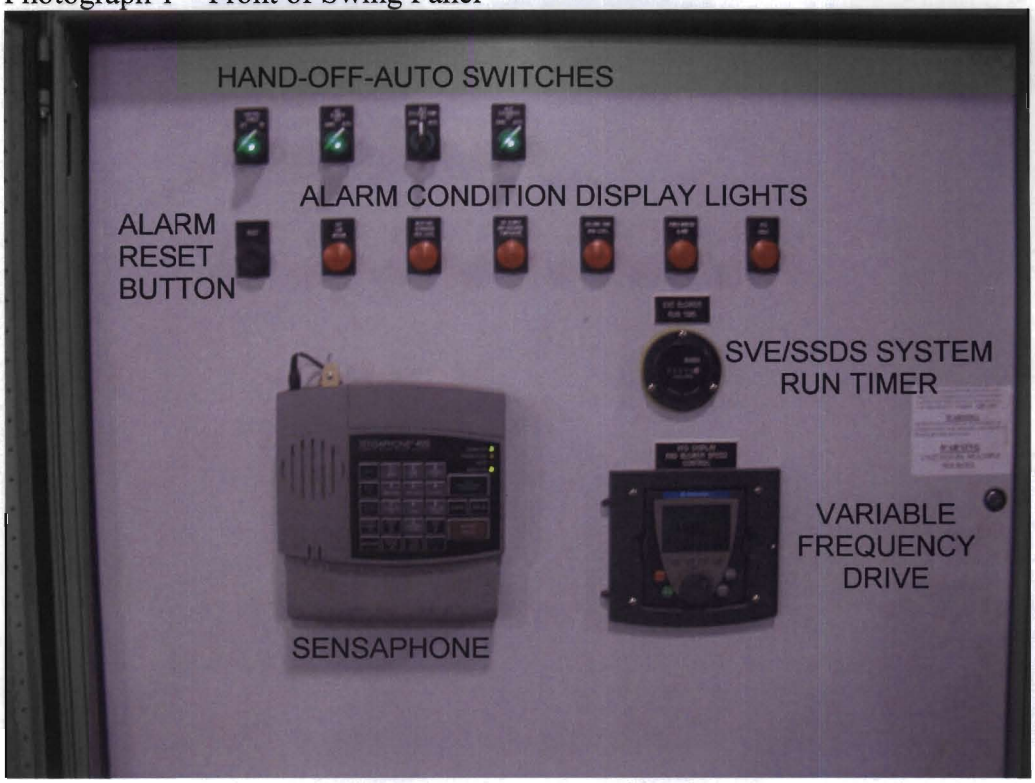
Provided Electronically on Compact Disc

APPENDIX B

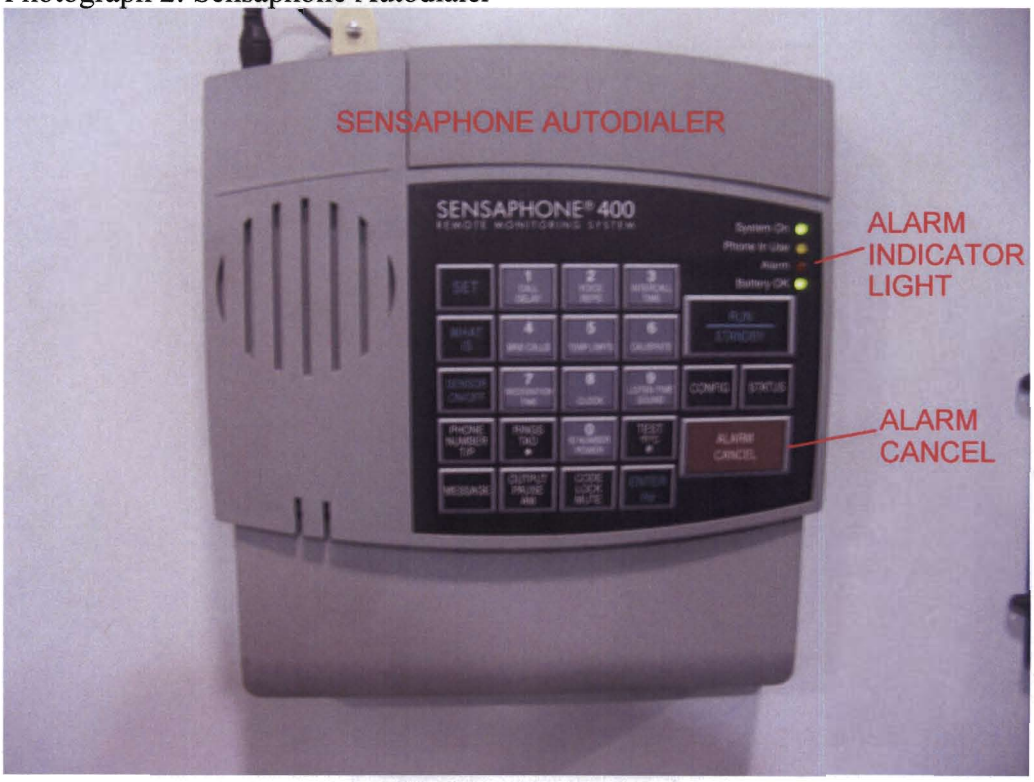
PHOTOGRAPHS

APPENDIX B
Photographs

Photograph 1 – Front of Swing Panel

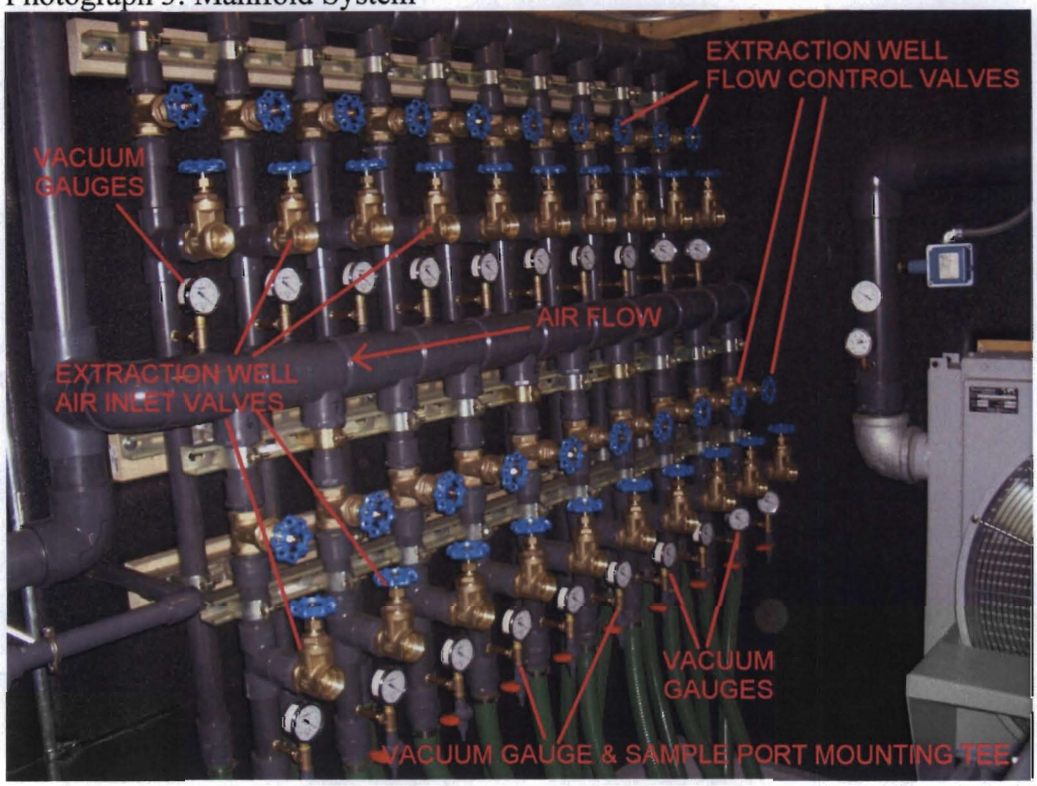


Photograph 2: Sensaphone Autodialer

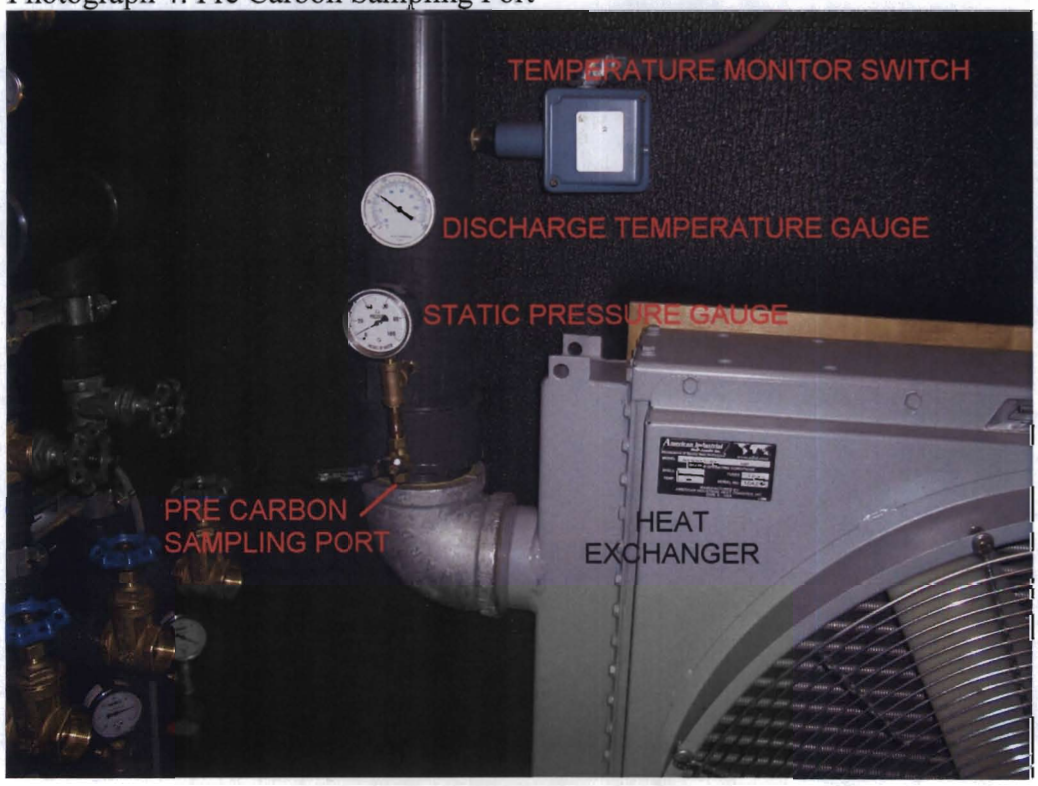


APPENDIX B
Photographs

Photograph 3: Manifold System

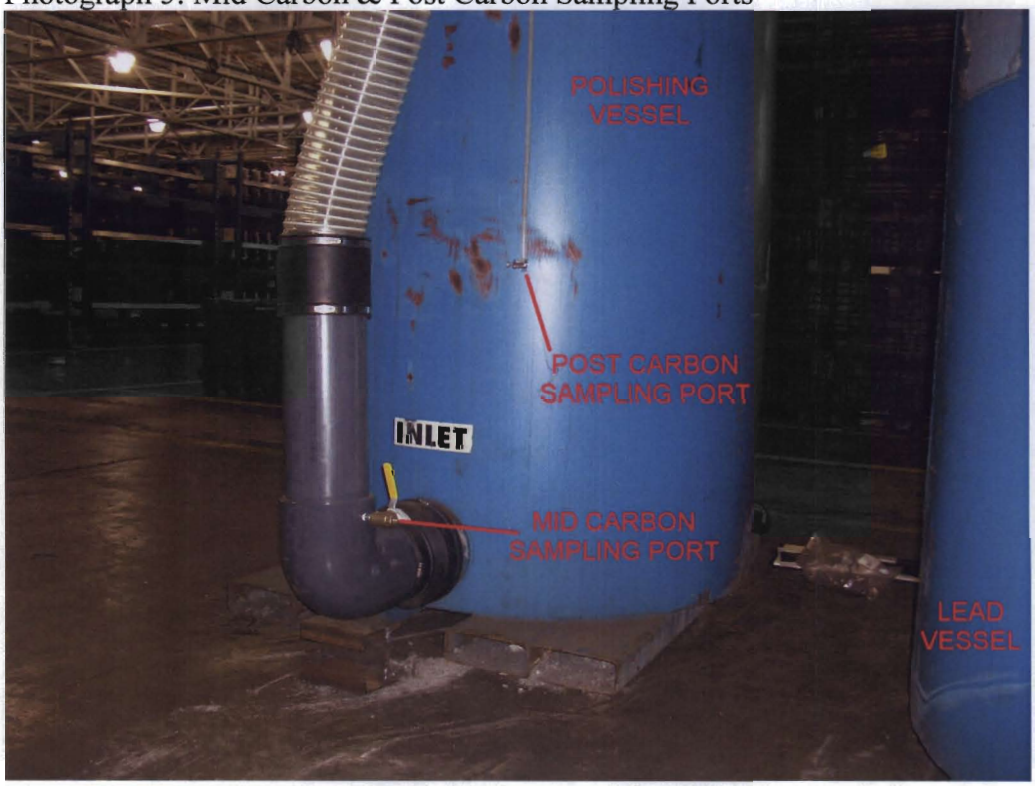


Photograph 4: Pre Carbon Sampling Port

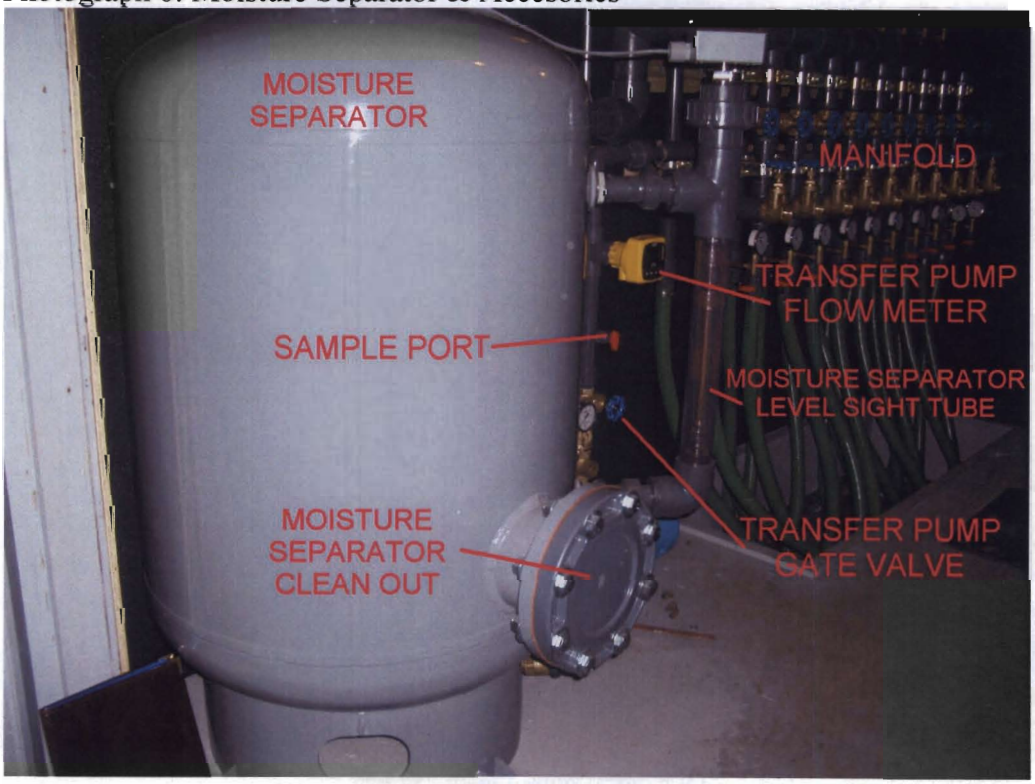


APPENDIX B
Photographs

Photograph 5: Mid Carbon & Post Carbon Sampling Ports

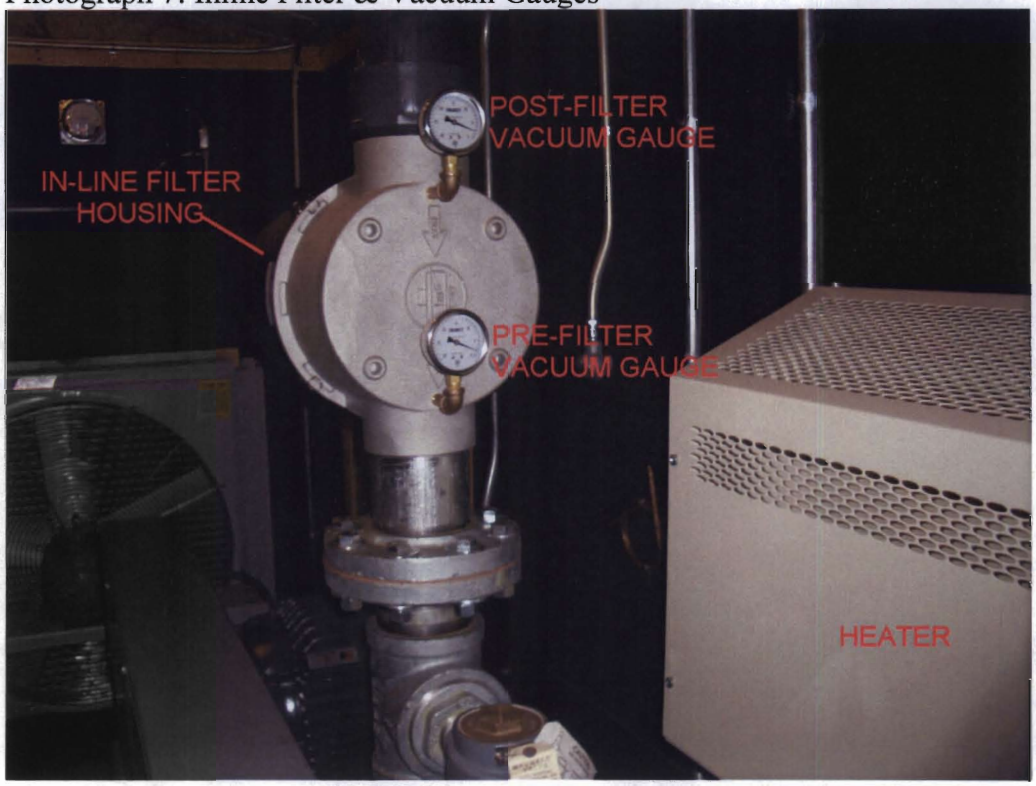


Photograph 6: Moisture Separator & Accesories

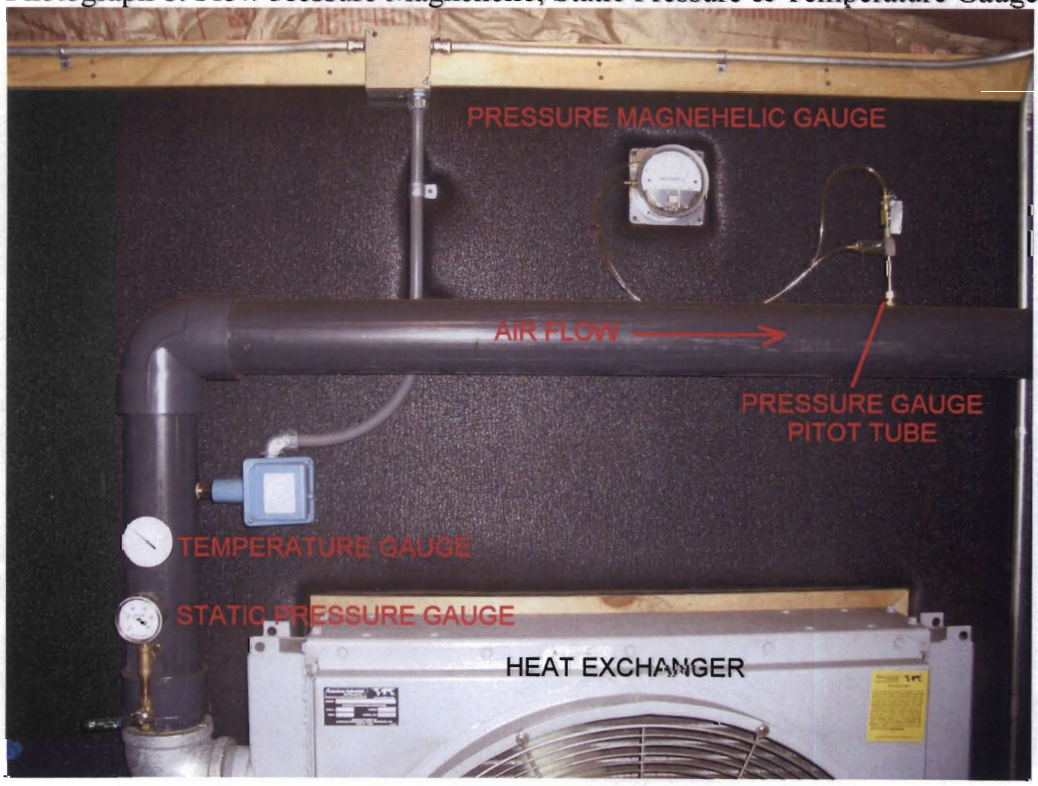


APPENDIX B
Photographs

Photograph 7: Inline Filter & Vacuum Gauges



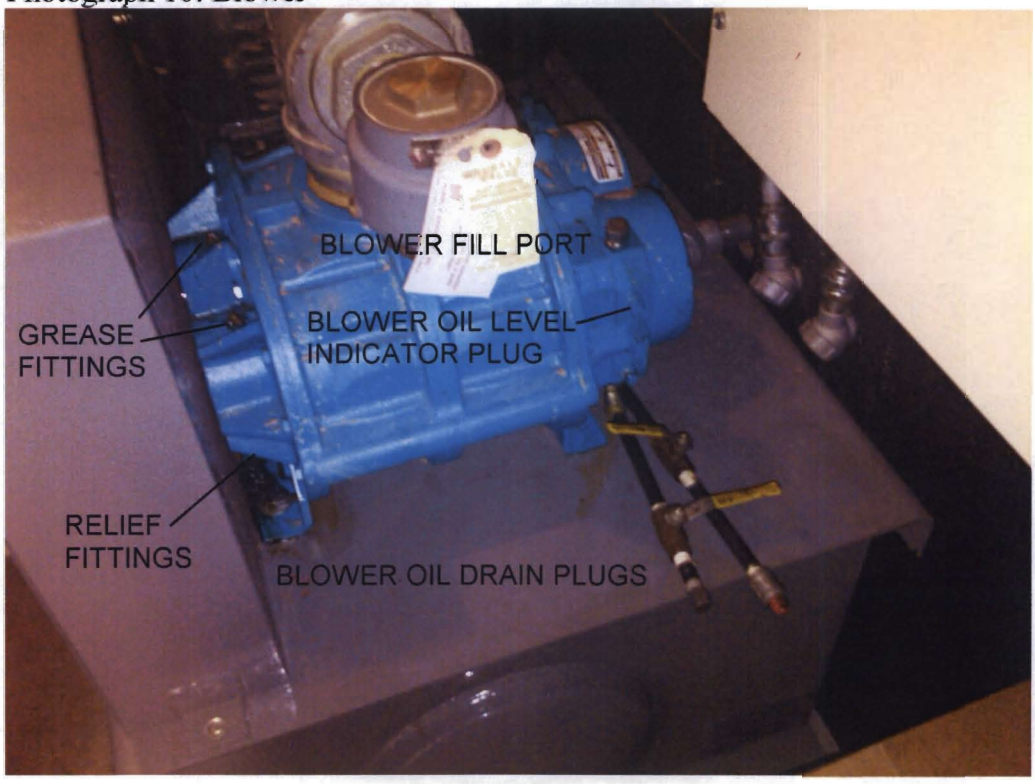
Photograph 8: Flow Pressure Magnehelic, Static Pressure & Temperature Gauges



APPENDIX B
Photographs

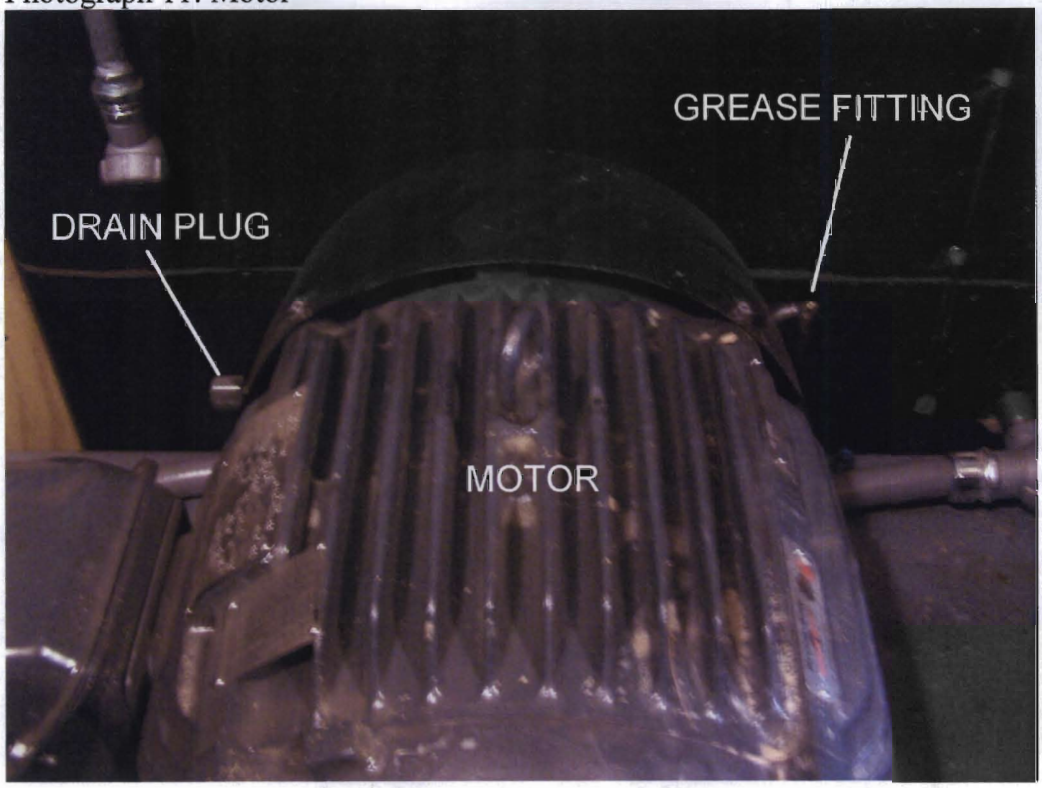
Photograph 9: Flow Vacuum Magnehelic Gauge

Photograph 10: Blower



APPENDIX B
Photographs

Photograph 11: Motor

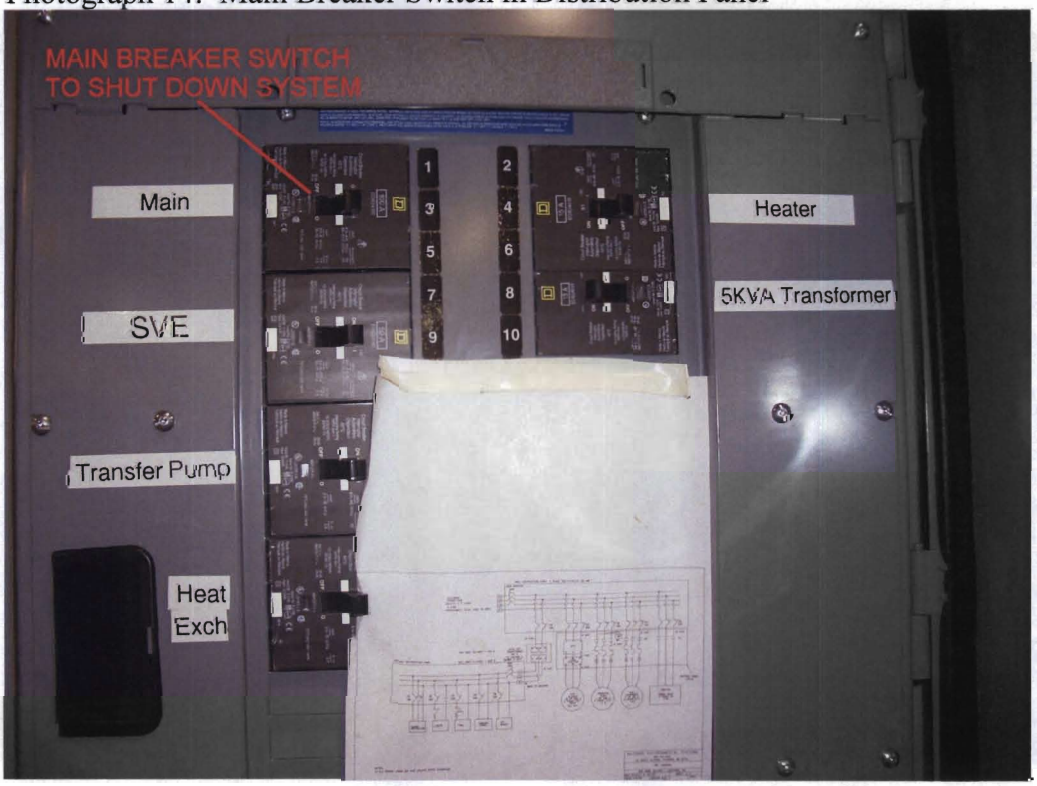


Photograph 12: Exterior Drum Storage Area

APPENDIX B
Photographs

Photograph 13: Carbon Vessels

Photograph 14: Main Breaker Switch in Distribution Panel



APPENDIX C

FORMS

ROUTINE MONITORING FORM

OPERATION, MAINTENANCE AND MONITORING PLAN
SVE/SSD SYSTEM
GM COMPONENTS HOLDINGS, LLC
LOCKPORT, NEW YORK

Name: _____ Time On-Site: _____ Time Off-Site: _____

Date: SVE Blower Run Time: hours VDF: hertz

SYSTEM STATUS

SVE System Operating:	YES	NO	If no:
Alarm lights off:	YES	NO	If no:
Autodialer Alarm On:	YES	NO	If Yes:

Postion of Swing Panel HOA Switches:

Control Power Switch	ON		OFF	SVE Blower Switch	HAND	OFF	AUTO
M/S Effluent Pump Switch	HAND	OFF	AUTO	Heat Exchanger Switch	HAND	OFF	AUTO
Heat Exchanger Operating		YES	NO	If no:			
SVE System appear to be operating properly?		YES	NO	If no:			

Moisture Separator Tank Level: Empty 1/4 Full 1/2 Full 3/4 Full Full Volume Tranfered: gals

SYSTEM MONITORING READINGS

Vacuum Gauge Pre-Inline Filter:	in Hg
Vacuum Gauge Post-Inline Filter:	in Hg
Temperature on Discharge Silencer:	° F
Temperature after Heat Exchanger:	° F
Pressure After Heat Exchanger	in H_2O
Pressure Before Heat Exchanger	in H_2O
Pressure Magnehelic Gauge:	in H_2O
Vacuum Magnehelic Gauge:	in H_2O
Vacuum Gauge After Manifold:	in Hg

System Monitoring Notes:

Flow Rate Based on Pressure Gauge: cfm

Flow Rate Based on Vacuum Gauge: cfm

EXTRACTION WELL VACUUM GAUGE READINGS

EW -1	in Hg	EW-11:	in Hg	SS-1:	in H2O
EW-2:	in Hg	EW-12:	in Hg	SS-2:	in H2O
EW-3:	in Hg	EW-13:	in Hg	SS-3:	in H2O
EW-4:	in Hg	EW-14:	in Hg		
EW-5:	in Hg	EW-15:	in Hg		
EW-6:	in Hg	EW-16:	in Hg		
EW-7:	in Hg	EW-17:	in Hg		
EW-8:	in Hg				
EW-9:	in Hg				
EW-10:	in Hg				

Vaccum Gauge Reading Notes:

AIR FLOW FIELD SCREENING

Background Outside SVE Shed:	ppm
Background Inside SVE Shed:	ppm
Pre Carbon Discharge:	ppm
Mid Carbon Discharge:	ppm
Post Carbon Discharge:	ppm

Detector Tube Readings

Pre Carbon	YES	NO	_____ ppm
Mid Carbon	YES	NO	_____ ppm
Post Carbon	YES	NO	_____ ppm

Additional Notes:

ROUTINE MAINTENANCE FORM
OPERATION, MAINTENANCE AND MONITORING PLAN
SVE/SSD SYSTEM
GM COMPONENTS HOLDINGS, LLC
LOCKPORT, NEW YORK

NAME: _____		TIME ON SITE. _____	
DATE:		TIME OFF SITE:	
MAINTENANCE ACTIVITY TO BE PERFORMED			
Blower Bearing Lubrication	YES	NO	
Blower Oil Change	YES	NO	
Motor Lubrication	YES	NO	
Moisture Separator Water Transfer	YES	NO	
Moisture Separator Clean Out	YES	NO	
>1 in Hg Difference in Pre & Post In-Line Filters	YES	NO	
In-Line Filter Change Out	YES	NO	
Was Used Filter Put In Debris Drum	YES	NO	
Was PPE Put In Debris Drum	YES	NO	
Is Debris Drum Full	YES	NO	
Carbon Vessel Change Out	YES	NO	
DESCRIPTION OF ACTIVITIES			
SUBCONTRACTORS		TIME ON SITE	TIME OFF SITE

Comments:

NON ROUTINE MAINTENANCE FORM
OPERATION, MAINTENANCE AND MONITORING PLAN
SVE/SSD SYSTEM
GM COMPONENTS HOLDINGS, LLC
LOCKPORT, NEW YORK

NAME: _____		TIME ON SITE: _____	
DATE:		TIME OFF SITE:	
SYSTEM STATUS		ALARM CONDITION:	YES NO
Date and time alarm received:			
Description of alarm condition:			
Date and time system restarted:			
DESCRIPTION OF ACTIVITIES			
SUBCONTRACTORS		TIME ON SITE	TIME OFF SITE

Comments: