OU-1 PUMP AND TREATMENT
OPERATION AND MAINTENANCE PLAN

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1. INTRODUCTION

This Operation and Maintenance (O&M) Plan has been prepared consistent with the requirements of the CERCLA Record of Decision (ROD) for Operable Unit One (). The O&M Plan describes the general guidelines for effective operation and maintenance of the pump-and-treat system. Mound Plant personnel will operate the plant, conduct sampling, and prepare reports. The Mound Plant may elect to subcontract some or all of the O&M tasks to others.

The O&M Plan presents the purpose of the pump-and-treat system, general safety guidelines, general procedures for operation, and routine maintenance procedures for various equipment. Closely related to the operation of the system are certain measurements of groundwater, which are used to verify the satisfactory functioning of the pump-and-treat system. The groundwater measurements are briefly described in the O&M Plan, but a complete discussion is reserved for the Sampling and Analysis Plan (SAP), presented as Appendix C.

2. PURPOSE OF THE PUMP-AND-TREAT SYSTEM

A groundwater contaminant plume emanates southward from the landfill and travels toward the Mound Plant water production wells. The primary contaminants of concern are cis-1,2-dichloroethene; trans-1,2-dichloroethene; tetrachloroethene; tetrachloromethane; 1,1,1-trichloroethane; trichloroethene; trichlorofluoromethane; chloroform, and vinyl chloride. The main purpose of the pump-and-treat system is to prevent further migration of affected groundwater, and to treat extracted water to acceptable levels for disposal.

3. PROCESS SUMMARY

The proposed system will extract the affected groundwater, treat the affected groundwater in a low-profile air stripper, and discharge the treated effluent to a new storm drain that passes along the west side of . The pump-and-treat system consists of a system of pumps, valves, trays, instruments and electrical controls.

The three extraction wells will pump at a combined rate of approximately 100 gallons per minute (g.p.m.). The estimated average initial VOC concentrations in the extracted groundwater before treatment are 274 μg/L cis-1,2-dichrloroethene; 3.2 μg/L trans-1,2-dichloroethene; 125 μg/L tetrachloroethene; 3.4 μg/L tetrachloromethane; 0.7 μg/L 1,1,1-trichloroethane; 86 μg/L trichloroethene; 5.4 μg/L trichlorofluoromethane; 43 μg/L chloroform, and 3.6 μg/L vinyl chloride. (Note: These concentrations represent the untreated water concentrations below ground. The aforementioned concentrations are taken from the "Operable Unit 1 Contract Documents for Remedial Action Pump and Treatment System Construction, " June 1996 (Appendix E). The air stripper will reduce the concentrations before discharge. See Section 7 "Effluent Monitoring" for a discussion of tested water quality.)

Three submersible pumps, one in each extraction well, pump groundwater to the treatment system building. The pipelines conveying the water are constructed of Schedule 80 PVC plastic. Most of the pipe run is below ground, but a small portion of the pipe run where the pipe enters the side of the building is aboveground. The aboveground portion is heated and insulated. The pipes join together at a manifold system.

After the manifold, the water flows to a low-profile air stripper. In the air stripper, the contaminants of concern are each reduced to less than the MCL (generally <5 μg/L, typically not detectable). The contaminants are transferred from the water to the air medium and exhausted outdoors through the air vent. The contaminants dissipate and decompose rapidly in the atmosphere.

After passing through the stripper, the water enters a gravity-flow effluent pipe. The effluent pipe is constructed of Schedule 80 PVC plastic. The effluent pipe flows to a below-grade storm drain that runs along the West Side of .

4. SAFETY GUIDELINES

Safety procedures and lists of any hazardous materials must be made and kept with responsible personnel for reference during operation and maintenance. Periodic review of safety procedures is recommended. All procedures must be in compliance with OSHA regulations. The equipment manufacturers provide specific safety requirements associated with the operation and maintenance of specific equipment. Similarly, the chemical vendors provide specific safety requirements of water treatment chemicals. Safety guidelines for the treatment system are contained in the Site Specific Health and Safety Plan (HASP), Appendix D, and are generally summarized below.

Environmental

Volatile organic compounds contaminate the water being treated by this plant. These contaminants are not present in high concentrations, but have been shown to in some cases to be carcinogenic (cancer causing) or in other ways harmful to human health. The following general safety guidelines must be employed:

1. Prevent skin contact with the influent water being treated.

2. Repair all water leaks immediately. Water that has spilled or leaked should be routed to the floor sump, where it should be pumped to the air stripper for treatment.

3. Repair all air leaks immediately. The vent pipe contains contaminants liberated from the water, so the air should be considered hazardous like the water. Although Ohio EPA considers the air emissions from the unit to be "de minimis," it is still prudent to minimize occupational exposure to the air. If air is leaking, stop the system, ventilate the building's interior, and repair the leak.

4. Ventilate the building's interior if water leaks are large or have rested on the floor for a long time. The contaminants tend to evaporate quickly from water, thereby entering the air.

Chemicals

Depending on manufacturer's instructions, industrial chemicals may be used for cleaning, and those chemicals may be hazardous. The chemicals in question often pose hazards from splashing or spraying. Suitable protective clothing, eye protection, and gloves are recommended. A portable eyewash/safety shower should be kept in the building as a backup protection if protective equipment somehow fails.

5. PUMP-AND-TREAT SYSTEM OPERATION

This subsection describes the operation of the pump-and-treat system. The narrative description is intended to assist in the operation and adjustment of the plant.

Well Pumps

Three well pumps are located underground, one within each extraction well. Each well's water travels through a dedicated influent pipe to the treatment system building. A check valve assures that water cannot flow backward toward a well. A valve to achieve the desired flow rate can individually throttle each influent pipe.

Water Level Control

Each well contains a level control switch that prevents the well pump from running without adequate water level. The pump would become damaged if it ran without proper water flow. When the water level drops below the low-level switch, the individual pump stops. The well automatically restarts when water level rises above the operating-level switch, after a brief (programmable) reset period elapses. The reset period is controlled by a timer, which eliminates the possibility of the well pump cycling too rapidly.

Pressure Indicators

An inline pressure gauge, located on the composite header, displays the head produced by the pumps and the force of air in the stripper. Exact pressure readings (analyzed together with flow readings) can be compared to pump curves to indicate the condition of each pump. If unusual pressure is indicated relative to the amount of water that is flowing, the pump must be turned off until the source of blockage is found.

Flow Meter

Three individual flow meters indicate the water flow from each well and a non-resettable totalizer integrates individual flow to record total flow to date. If a well's flow rate drops without explanation, test the transmission pipe for leakage.

Sampling Ports

Sampling ports allow monitoring of influent and effluent quality. Ports are located at each individual well influent, at the composite manifold influent, and at the effluent.

Floor Sump

A floor sump collects spilled water. Spilled water can be manually returned to the stripper by a sump pump. An alarm is sounded if a high-level indicator is triggered in the floor sump. Simultaneously, the well pumps and stripper are all shut down.

Low-Profile Air Stripper

The air stripper uses a series of trays for the distribution of water, which is met with a crosscurrent of forced air. Water enters at the top of the stripper, and air enters at the bottom. The air and volatilized contaminants are vented to vapor phase treatment while the treated water falls into the sump tank. The air stripper sump has a high-level switch that can deactivate the three well pumps and the air stripper blower.

Air Stripper Blower

The air stripper blower introduces air at the bottom of the stripper. The blower is equipped with pressure switches and a pressure indicator (magnehelic®). The pressure switches shut off the pumps and blower if minimal or excessive pressure develops at the blower discharge. The system shutdown caused by an unacceptable pressure condition activates the associated alarm, shuts down the blower and shuts down the three well pumps simultaneously. A typical cause of excessive pressure is fouling of the stripper trays, indicating a need to clean the trays. Typical causes of minimal pressure is fouling of the air intake filter(s), loss of large port cover, or closing of the air intake gate.

5.1 Building Power

WARNING

Building power must be maintained in winter to prevent freezing of water. If power must be disconnected, precautions MUST be taken to prevent freezing.

5.1.1 Switch PP-1-A disconnect to ON position.

5.1.2 Switch PP-1-B Breaker 2 and 7 to ON position.

5.1.3 Switch PP-1-D disconnect to ON position.

5.1.4 Ensure heater on/off switch is in on position with thermostat set to maintain temperature above 50 degrees Fahrenheit.

NOTE

LP-1-B Main Breaker and Breaker 6 must stay ON during freezing conditions. See above warning.

5.1.5 Switch LP-1-B Master Breaker and Breakers 1 through 6 to ON position.

5.2 **System Startup**

NOTE

If system has been drained,
the system **MUST** be primed with clean water
prior to continuing. See Appendix A for LP-1-A Layout.

5.2.1 If needed, prime the system via the three inch port on top of the Stripper with clean water until the Stripper sump has approximately one foot of water in it (approximately 125 gallons of water). Ensure Valve 12, for the sight tube is open.

5.2.2 Ensure LP-1-A switches for Panel Main, Well 412, Well 413, Well 414, and Blower are in the OFF position.

5.2.3 Turn LP-1-A Panel Main switch to the ON position.

5.2.4 Push LP-1-A RESET Button and wait for Low Air Pressure alarm indication.

5.2.5 Switch PP-1-C disconnect to ON position.

5.2.6 Switch PP-1-B Breakers 1, 8, 13, and 14 to ON position.

NOTE

See Appendix B for Valve Layout.

5.2.7 Ensure Valves 7, 9, 11, and SP-1 through SP-5 are in the CLOSED position.

5.2.8 Ensure Valves 1 through 6, 8, 10, 12, 13, and 14 are in the OPEN position.

5.2.9 Ensure Blower air intake gate valve is in the fully open position.

5.2.10 Turn LP-1-B Blower switch to "Automatic" position and push "RESET" button.

5.2.11 Allow Blower to come up to speed and turn LP-1-A switches for Well 412, Well 413, and Well 414 to the "Automatic" position.

5.2.12 Observe that all four green "ON" lamps are illuminated.

5.2.13 Observe that all three red "ALARM" lamps are not illuminated.

5.2.14 Observe Magnehelic® gauge reads approximately 15 inches of water column.

5.2.15 Observe that the pressure gauge above Valve 14 reads approximately 10 psi.

5.3 System Shutdown

NOTE

See Appendix A for LP-1-A Layout.
Turn OFF LP-1-A Well switches first!
Blower will continue to run for time preset
on internal timer (TD-5) to ensue all water is treated.

5.3.1 Turn LP-1-A switches for Well 412, Well 413, Well 414, and Blower to the OFF position.

5.3.2 Wait until Blower stops running and Turn LP-1-A Panel Main switch to the OFF position.

5.3.3 Switch PP-1-C disconnect to OFF position.

5.3.4 Switch PP-1-B Breakers 1, 8, 13, and 14 to OFF position.

NOTE

See Appendix B for Valve Layout.
If below freezing temperatures are expected and
power to building disconnected, the system
must be drained to prevent freezing.

5.3.5 Ensure ALL Valves (1 through 14) and Sample Ports (SP-1 through SP-5) are in the CLOSED position.

5.3.6 Close Blower air intake gate valve.

5.4 System Draining

NOTE

See Appendix A for LP-1-A Layout.
Turn OFF LP-1-A Well switches first!
Blower will continue to run for time preset
on internal timer (TD-5) to ensue all water is treated.

5.4.1 Turn LP-1-A switches for Well 412, Well 413, Well 414, and Blower to the OFF position.

5.4.2 Wait until Blower stops running and Turn LP-1-A Panel Main switch to the OFF position.

5.4.3 Switch PP-1-C disconnects to OFF position.

5.4.4 Switch PP-1-B Breakers 1, 8, 13, and 14 to OFF position.

NOTE

See Appendix B for Valve Layout.
If below freezing temperatures are expected and
power to building disconnected, the system
must be drained to prevent freezing.

5.4.5 Ensure Valves 1 through 6, 8, 12, and 14 are in the OPEN position.

5.4.6 Ensure Valves 7, 9, 10, 11, 13 and Sample Ports (SP-1 through SP-5) are in the CLOSED position.

5.4.7 Close Blower air intake gate valve.

NOTE

All untreated water must be containerized, sampled,
and disposed of through the SD treatment facility.

5.4.8 Obtain appropriate containers to capture contaminated water.

5.4.9 Consult Health and Safety Plan and Industrial Hygiene for proper Personal Protective Equipment and monitoring requirements.

5.4.10 Place a container under Valve 7 quick disconnect cap and remove cap.

5.4.11 Operate Valve 7 to drain manifold piping to container(s).

5.4.12 Open Sample Ports 1 through 4 to drain and use container to capture water.

5.4.13 Obtain the Pitless Adapter tool from the southwest corner of the Building.

5.4.14 Proceed to each well, remove cap, and carefully loosen Pitless Adapter to drain unprocessed water back into the well. Be certain not to change the orientation of the Pitless Adapter to the opening in the well casing.

5.4.15 After unprocessed water flow back into the wells stops, tighten the Pitless Adapter and secure the well cap. Return the Pitless Adapter tool to storage location.

5.4.16 Close all Valves on the incoming piping to the Stripper and secure the Valve 7 quick disconnect cap.

5.4.17 Drain the processed water from the Stripper utilizing Valve 11 and hose. This water only needs to be containerized when loss of power occurs or system is turned off in any manner other than that described in System Shutdown Section.

5.4.18 Drain the water from SP-5 and Valve 9.

5.4.19 Close all Valves from the Stripper to effluent discharge (All Valves in the Building in the CLOSED position).

5.4.20 Containerize any water found in the Building sump.

5.4.21 Dispose of all containerized water through SD treatment facility.

6. REGULAR INSPECTION AND MAINTENANCE GUIDELINES

Regular inspection and maintenance of the pump-and-treat system is required for continued effective operation. Regular activities, which shall be documented in the system logbook, include the following:

- Note pressure readings on all pressure indicators.
- Note flow rate indicated on all flow meters.
- Note any alarms. Determine underlying the cause of the alarm. Perform necessary maintenance or adjustment to resolve the underlying cause. Reset the alarm.
- Check lubrication on electric blower motor on the air stripper.
- Periodically disassemble gauges and meters and clean according to manufacturer directions.
- Periodically check trays for fouling and clean openings to permit uniform flow of air through stripper trays, or change trays.
- Determine the underlying cause of any new noises or vibrations then correct the underlying cause.
- Well pumps require no regularly scheduled maintenance. If an influent line does not produce sufficient flow, check its throttle valve and electrical connection. If flow remains insufficient, replace the entire well pump assembly. If well continues to fail to produce water, contact a hydro geologist to diagnose the problem and determine a solution.

NOTE

Magnehelic® readings lower than 10 inches water closet can be caused by air intake restriction.

6.1 Check Building air intake filter on a weekly basis.

6.1.1 Clean and/or replace filter media. Clean media by removing it and spraying it with clean water.

6.1.2 Replacement media should be permanent washable natural hairs that are cured, treated and permanently coated with a plastic and neoprene compound (or equivalent). The media is approximately 2" thick and comes on a roll.

6.2 Perform System Shutdown and check Stripper air intake filter monthly.

6.2.1 Clean pre-filter media by removing it and spraying it with clean water.

6.2.2 Replace pre-filter and filter approximately every 60 days. New filters are ordered from Solberg Manufacturing, Inc. and are part number 377P. See filter housing for address and telephone number.

NOTE

Magnehelic® readings greater than 20 inches
water closet can be caused by Stripper fouling/restriction.

6.3 If system fouling is suspected, perform a System Shutdown.

6.3.1 Consult Health and Safety Plan and Industrial Hygiene for proper Personal Protective Equipment and monitoring requirements.

6.3.2 Remove inspection/clean out ports on the West end of the stripper and inspect for fouling with a flashlight.

6.3.3 If system is fouled perform System Draining omitting Steps 5.4.5 through 5.4.15.

6.3.4 Obtain fresh water supply, "Steam Genie/Pressure Washer", and any other needed supplies.

6.3.5 Obtain the cleaning wand from the southwest corner of the Building.

6.3.6 Open effluent drain Valve 10.

6.3.7 Starting at the bottom and working to the top, use the wand to clean the stripper at a rate no faster than one inch per second.

6.3.8 If necessary, remove top of Stripper to thoroughly clean air de-mister screen.

6.3.9 Drain the Stripper sump utilizing Valve 11 and remove solid residue with a wet/dry shop vacuum.

6.3.10 Restore Stripper to a ready to run condition.

6.4 If system automatic shutdown occurs due to all three wells recharging at the same time, reset TD-5 to a longer timeout value. The TD-5 timer value must take TD-1 through TD-3 values into consideration. The time delay on TD-5 shall never be less than 5 minutes (300 seconds). See Appendix C for timer locations.

7. EFFLUENT MONITORING

The effluent, which is also known as Outfall 003, must be monitored. The automatic sampler located within Building 300 is to be operated solely by the Environmental Monitoring and Compliance organization, unless extenuating circumstances prevail (i.e., the sampling system container is overflowing). In the event that the sampling system is paused/turned off (given an extenuating circumstance) or needs attention, contact the appropriate Environmental Monitoring and Compliance representative. Should the building loose power for any reason, contact the appropriate Environmental Monitoring and Compliance representative to check the sampler for proper operation.

Monitoring is most intense during initial startup, both when the system is new and after any major overhaul of the air stripper. Refer to the Sampling and Analysis Plan (Appendix C) for detailed instructions on how to monitor the effluent. The results of the water treatment system measurements have a direct bearing on the operation of the system. Separate rules govern initial startup and routine operation.

Initial Startup

Before its first use and after any major overhaul, the air stripper must be subjected to initial startup testing. Ohio EPA must be notified before start-up. Containerize all treated effluent during the two-hour initial startup. Collect and analyze samples as described in the SAP Section 3.3 of Appendix C. If at least four of five effluent samples show all contaminants of potential concern (COPCs) less than 5 μg/L, the initial startup is successful, and routine operation may begin, and the containerized water may be released to the effluent pipe. All management of water shall comply with ER SOP 1.15 and Ohio EPA Policy DSW-DERR 100.027. If the initial startup is not successful, dispose of containerized effluent into the Mound sewage system, and troubleshoot the air stripper, and repeat the initial testing when the stripper is properly prepared.

Routine Operation

Collect and analyze sample as described in the SAP. Compare effluent samples against the criteria for acceptable treatment.

The criteria for acceptable treatment are as follows:

Daily Maximum: 10 μg/L for each of the COPCs.
Thirty-day Average: 5 μg/L for each of the COPCs.
(Reference: Ohio EPA Policy DSW-DERR 100.027.)

If one or both of the criteria are exceeded, repeat the sampling and then stop operation. After the repeated sample is analyzed, operation may resume only if the repeated sample discloses that neither criterion is exceeded when the second sample is included in calculations. If the repeated sample confirms exceedance, do not resume operation. Troubleshoot the treatment system, perform the

indicated maintenance, and return to the "Initial Startup" procedure described above.

8. GROUNDWATER MONITORING

The pump-and-treat system is designed to gain control of groundwater flow and contaminant transport within the groundwater beneath OU1. Accordingly, certain measurements must be taken of the groundwater elevations and groundwater chemistry. These measurements are made in certain nearby groundwater monitoring wells. Refer to the Sampling and Analysis Plan, Sections 3.1 and 3.2 of Appendix C, for detailed instructions on how to monitor the groundwater.

The results of groundwater monitoring influence the operation of the system. Head measurements and concentration measurements each play a role.

Head Measurements

On a quarterly frequency, using methods consistent with the Mound Plant Groundwater Protection Management Program Plan (GWPMPP), conduct head measurements as described in the SAP. Notify Ohio EPA before taking measurements. Contour the head data. If a 0.002-foot/foot (or greater) inward gradient is created across the boundary, consider the hydraulic control of the landfill a success. If the inward gradient greatly exceeds 0.002-foot/foot across the entire boundary, consider throttling back the flow rate to avoid wasting groundwater. If the inward gradient does not meet the 0.002-foot/foot criterion, throttle up the system to a higher flow rate. Continue provisionally operating at the higher flow rate and reassess at the next round of head measurements. Submit results to the Mound Plant Environmental Group, Ohio EPA, and U.S. EPA.

Groundwater Chemical Measurements

On a quarterly frequency using methods consistent with the GWPMPP, conduct VOA analyses of select groundwater monitoring wells as defined in the SAP. Notify Ohio EPA before taking samples. Develop concentration-versus-time plots for each well. Over a number of sampling rounds, trends will develop for each well. A sustained downward slope will be interpreted as proof of successful capture of the plume. A steady or upward slope will be interpreted as failure to capture the plume. In the case of success, continue operation. In the case of failure, throttle up the pumping rate on nearby extraction wells, even if hydraulic head calculations suggest that the higher flow is unnecessary. Submit results to the Mound Plant Environmental Group, Ohio EPA, and U.S. EPA.