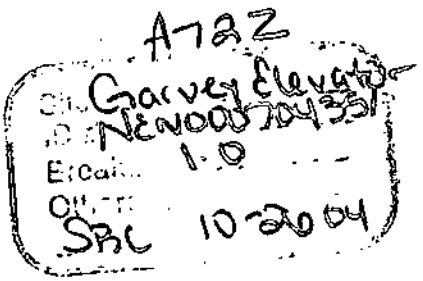
"Rodriguez, Joshua"
<JRodriguez@ENSR.com>
10/26/2004 03:04 PM

To Brian Mitchell/SUPR/R7/USEPA/US@EPA
cc
bcc
Subject RE: Garvey Elevator

Included are the system drawings and the original O&M manual. Both should have the information that you need. If you need anything else please let me know.

Joshua Rodriguez
Environmental Scientist
ENSR Dallas
2200 10th Street Bldg 2 #100
Plano, TX 75074
V: (972) 509-7639
F: (972) 509-1840
M: (469) 387-9931
www.ensr.com



-----Original Message-----
From: Mitchell.Brian@epamail.epa.gov [mailto:Mitchell.Brian@epamail.epa.gov]

Sent: Tuesday, October 26, 2004 12:46 PM
To: JRodriguez@ENSR.com
Subject: Garvey Elevator

Can you send me specs for the ground water pump and strip unit, and SVE and carbon tetrachloride air treatment unit [i.e. max flow rates/concentrations the equipment can handle as opposed to what is managed now, etc..]. Thanks!

O&M Manual.pdf

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1 INTRODUCTION

This operation and maintenance (O&M) manual applies to the Garvey Elevators Interim Corrective Measure (ICM) groundwater treatment and soil vapor extraction system at the grain elevator facility located at 2315 W. Highway 6, Hastings, Nebraska (see Figure 1-1 and Photograph 1-1). The groundwater treatment system pumps and treats groundwater impacted with volatile organic compounds (VOCs) and is intended to prevent impacted groundwater from migrating off the site. The soil vapor extraction system is designed to remove VOCs from the soil under the site that have yet to migrate down to the upper unconfined groundwater aquifer.

The purpose of this manual is to inform the reader of system components and provide a routine maintenance schedule. In addition, system construction details and permit requirements are discussed. EMCON assumes the operator of the system has a basic understanding of system components and operation. The vendors for major pieces of the treatment equipment have provided extensive O&M manuals for their respective equipment and those manuals will be referred to as necessary.

Groundwater is extracted from on-site wells EW-1, EW-2, EW-3, EW-4, EW-5, EW-6, RW-1, and EW-8. EW-1 through EW-5 are screened in the upper unconfined aquifer, EW-6, RW-1, and EW-8 are screened in the medial confined aquifer. Each wellhead is housed in a 4 feet by 4 feet by 4.5 feet deep concrete vault which also contains wiring junction boxes (see Photograph 1-2). Groundwater extraction wells were installed in April 1998. System piping and equipment were installed from July through December 1998. The piping to EW-1 through EW-5 is 2-inch diameter DR-11 High Density Polyethylene (HDPE) pipe. The piping to EW-6, RW-1, and EW-8 is 3-inch DR-11 HDPE. All piping was installed in trenches. The groundwater extraction lines terminate in the system building at a 6-inch diameter SCH 80 PVC header, which runs through dual 6-bag particulate filters and discharges to the top of the packed tower air stripper. The treated groundwater is pumped from the packed tower air stripper sump, through dual 6-bag particulate filters, into two 10-inch diameter groundwater injection wells located up gradient from the site. The injection wells are screened in a deep confined aquifer located beneath, and hydraulically isolated from, the medial aquifer that is being used for groundwater extraction.

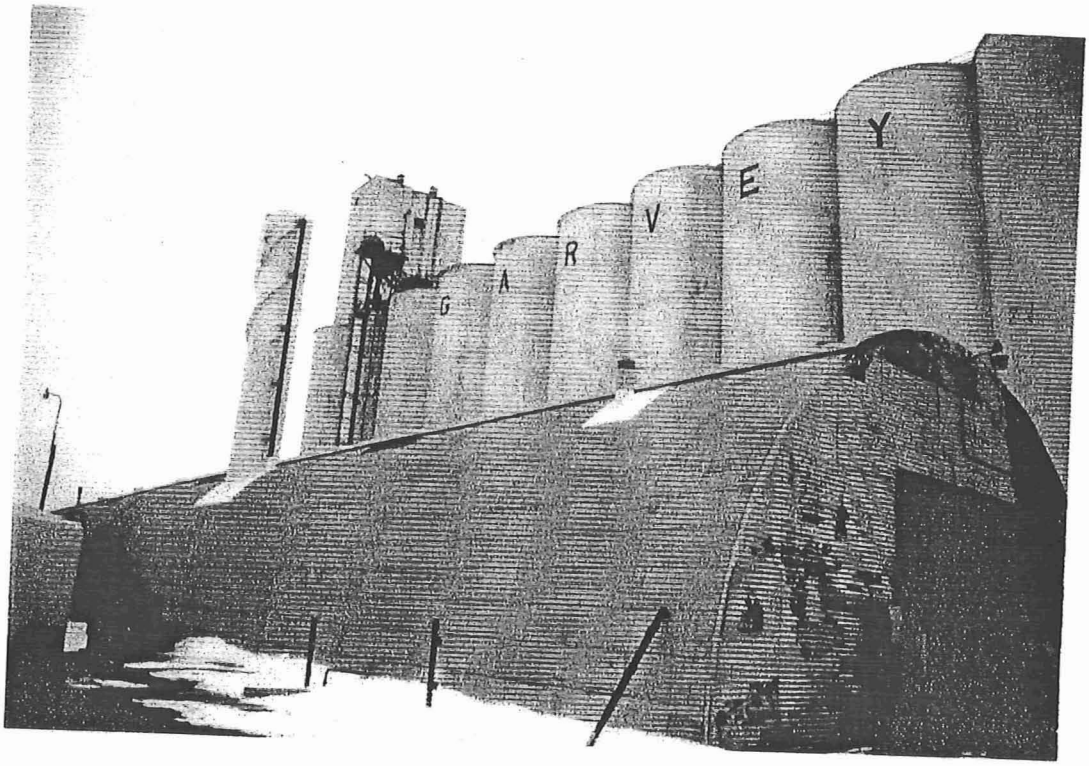
Soil vapor is extracted from eight on-site wells, SVE-1, SVE-3, SVE-4, SVE-7, SVE-8, SVE-9, SVE-10, and SVE-11. Each well is housed in a 4 feet by 4 feet by 4.5 feet

concrete vault. The soil vapor extraction wells were installed during April 1998. System piping and equipment were installed from July through December 1998.

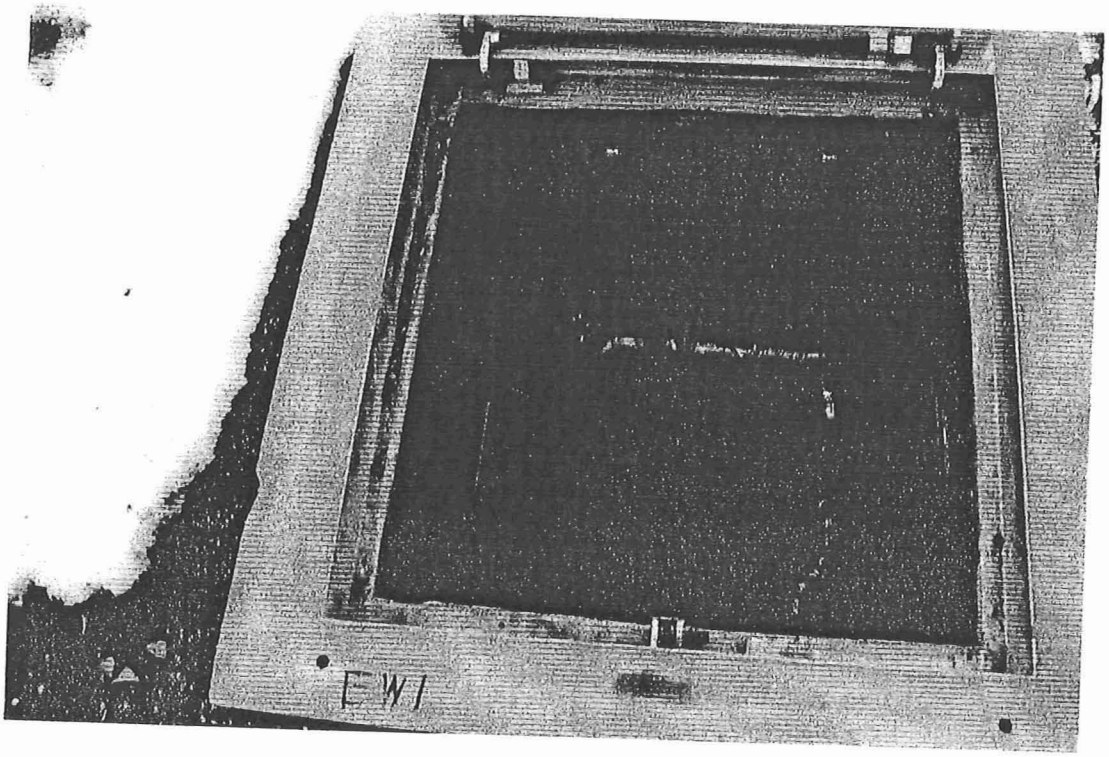
The trenches were backfilled and compacted to ensure minimal future settling. All treatment equipment and pipe terminations are housed in a pre-existing corrugated metal building. A concrete pad with a secondary containment curb was constructed for all the groundwater treatment piping and equipment. Another concrete pad was constructed for the soil vapor extraction system equipment. Three phase, 480 volt, 300 amp power service and two telephone lines are supplied to the system. Record drawings for the system are included in Appendix B.

Groundwater treatment is accomplished by diffusion aeration in a Carbonair® Model OS-500 packed tower air stripper. The treated groundwater is discharged into two up-gradient groundwater injection wells under a permit with the Nebraska Department of Environmental Quality (NDEQ). A programmable logic controller (PLC) in the control panel controls the groundwater treatment system equipment. The system is also equipped with a personal computer running state-of-the-art Human Machine Interface (HMI) software. The HMI software provides a user friendly interface with the PLC to monitor and control the groundwater treatment system. The HMI software also provides remote control via a modem and data logging capabilities. System safety features shut down the system under certain scenarios and an autodialer is programmed to page an OWT employee should these events occur.

Soil vapor is treated in a Global Technologies® Model CC10-370 Catalytic Oxidizer which destroys the contaminates by a catalytic combustion process. The highly acidic vapors created by VOC destruction are neutralized via a sodium hydroxide scrubbing process and discharged to the atmosphere under an air permit with the NDEQ (see Appendix X). The catalytic oxidation system and associated scrubber are independently controlled systems that are beyond the scope of this manual. See the highly detailed O&M manuals provided by Global Technologies® for questions concerning the soil vapor extraction system operation and maintenance. Section 5 of this manual does provide a brief system overview and discusses the caustic supply tank and brine discharge tank equipment associated with the system.



Photograph 1-1 System Building



Photograph 1-2 Wellhead Vault

2 EQUIPMENT

Specific equipment for groundwater extraction and treatment, system monitoring and control, and ancillary operations are discussed below. A summary of the maintenance schedule for the major components of the groundwater control system is presented in Table 1-1.

2.1 Groundwater Extraction

Submersible pumps controlled by variable frequency drives (VFDs) extract groundwater from each well. The VFD regulates the pumping rate of each well so that the desired groundwater elevation (setpoint) is obtained. The groundwater elevation in each well is monitored by a submersible pressure transmitter in that well and a barometric pressure transmitter mounted on the outside of the treatment system control panel. Based on the current groundwater elevation and the setpoint, the PLC instructs the VFD to increase or decrease the speed of the submersible pump motor. This allows pumping rates to vary, depending on the amount of water in the extraction well. A summary of well construction details is presented in Table 2-1.

Extracted groundwater from each well is pumped to the system building. Inside the building, the discharge line from each of the eight wells is equipped with a flow meter, sample tap, and ball valve.

2.1.1 Submersible Pumps

Grundfos®, 460 volt, three-phase, submersible pumps were installed in each extraction well. The five wells screened in the shallow unconfined aquifer have 5 horsepower (hp) pumps capable of pumping approximately 40 gallons per minute (GPM) at 245 feet of head. The medial wells have 10 hp pumps capable of pumping approximately 100 GPM at 260 feet of head. Pump speeds are controlled by VFDs located in the control panel.

At a minimum, pump heads should be cleaned and inspected annually. If pump performance (i.e., flow capacity) decreases, then the pump heads should be cleaned immediately. The pump motors are manufactured by Franklin Electric. There are no

user-serviceable parts on the pump motor. Appendix C contains the owner's manual for the submersible pumps.

2.1.2 Pressure Transmitters (Submersible)

Water levels in the extraction wells are monitored by Instrumentation Northwest, Inc. (INW), absolute pressure transmitters, model PS9000, with 4-20 milliamp output. Transmitters in shallow wells have a range of 0 to 30 pounds per square inch absolute (psia) while transmitters in medial wells have a range of 0 to 50 psia. The two injection wells are equipped with 0 to 100 psia pressure transmitters

The manufacturer recommends that the pressure transmitter be returned to the factory for recalibration and maintenance every one to two years, or if problems develop with sensor stability or accuracy. The pump cannot be operated in an automatic mode if the transmitter is removed from the well. The can however, be operated in the hand mode at the frequency noted during normal automatic operation. There are no user-serviceable parts on the pressure transmitter. Specification sheets, operation and maintenance manual, and calibration sheets for each pressure transmitter is presented in Appendix D.

2.1.3 Barometric Pressure Transmitter

To compensate for fluctuating barometric pressure without the use of vented tubing and desiccant chambers, an INW barometric pressure transmitter, model BV-9000, with 4-20 milliamp output was mounted on the outside of the groundwater treatment system control panel.

The manufacturer recommends that the barometric pressure transmitter be returned to the factory for recalibration and maintenance every one to two years, or if problems develop with sensor stability or accuracy. If the transmitter is removed, the system can continue to operate if the barometric pressure memory location in the PLC is set to a typical barometric pressure reading. There are no user-serviceable parts on the transmitter. A specification sheet, operation and maintenance manual, and calibration sheet for the barometric pressure transmitter is presented in Appendix E.

2.1.4 Flow Meters

A Signet 3-8510-XX paddlewheel flow sensor and Signet 8512 flow rate transmitter were installed in each of the wells extraction lines (see Photograph 2-1 and Appendix F). The individual well flow sensors were installed in SCH 80 PVC saddles provided by Signet and mounted using Signet 8010 integral mounting kits, which allow for reading water velocities from 1.0 to 20.0 feet per second. A k-factor programmed into the Signet 8512

transmitter automatically calculates and displays the flow rate in GPM based on the pipe diameter and water velocity. Another paddlewheel flow sensor and transmitter was installed in-line with the groundwater discharge piping after the packed tower air stripper. This sensor was installed in a 6-inch diameter SCH 80 PVC tapping saddle, which allows for reading total system flow rate.

The transmitters internally totalize and record total flow. The units can either display the current flow rate or total flow. In addition, the flow rate from each meter is transmitted to the PLC, which allows for logging and remote monitoring via the HMI software.

The flow transmitters have no user-serviceable parts and should be returned to the manufacturer if they malfunction. The paddlewheel flow sensors may become partially clogged with particulate matter. If this occurs, the submersible pump should be shut off and the sensor carefully removed from the installation tee and cleaned.

2.2 Groundwater Treatment

Groundwater from the individual well extraction lines is combined, filtered through 25 micron bag filters, monitored for flow, treated with a Carbonair® Model OS-500 packed tower air stripper, filtered through 10 micron bag filters, and then discharged to the injection wells.

2.2.1 Particle Filter

Once groundwater from the individual wells is combined, particulates are removed using two Krystil Klear 4-bag filter housings skid mounted and valved to be operated normally in parallel, or individually during bag changes (see Appendix G). Each 24-inch diameter carbon steel housing (see Photograph 2-2) is a Model 2424 with a 6-inch threaded inlet and outlet, a pressure rating of 150 pounds per square inch (psi), an ethylene propylene cover gasket, and is coated inside and out with a 2-part epoxy. The basket is made of perforated stainless steel. The filter bags are No. 2 sized polyester felt with a 25-micron opening.

Once the groundwater is treated, it is passed through an identical set of filter housings prior to being reinjected. During the air stripping process, precipitation of certain solids may take place. The effluent filter housings will remove these solids and prevent their introduction into the injection wells. The filter bags currently being used for effluent are No. 2 sized polyester felt with a 10-micron opening

The filter housing gasket should be replaced if leakage occurs. The filter bags should be replaced when the pressure transmitters indicate an excessive pressure drop across the filter (see following section)

To replace the filter bags use the following procedure:

- On the front of the main control panel, place the Sump Pump Run System Shutdown switch to Override, and the Filter Package Change High D.P. Override switch to Override. This will prevent an automatic system shutdown when the water draining from the open filter housing starts the secondary containment sump pump. It will also prevent an automatic system shutdown if the differential pressure setpoint across the filter bag housing is exceeded during the isolation process. A timer will start that will give an alarm if the Filter Package Change High D.P. Override switch is not returned to normal within 2 hours.

- Isolate one of the filter packages by shutting the housing effluent valve. Next shut the influent valve for the same filter package.

- Slowly open the drain valve on the bottom of the filter housing. Notice the pressure gauges to ensure the internal pressure has been relieved. Both gauges should indicate 0 psi.

- Allow the housing to drain for approximately 10 minutes and then open the filter housing by loosening the swing bolts. Swing the lid to either side to access the filter bags. The stainless steel baskets can be removed for convenient replacement of the filter bags.

- Reverse the process to restore the filter housing to service. Ensure the rubber gasket seal is clean prior to replacing the housing lid.

- Place both of the switches on the front of the control panel back to normal.

2.2.2 Pressure Transmitters (In-Line)

The pressure differential across the Model 2424 filter is monitored by two Cole-Parmer® P-07356-53, 0 to 100 psi pressure transmitters (see Photograph 2-2 and Appendix H). These convey the differential pressure electronically to the PLC, for remote system monitoring via the HMI software. As the bag filter accumulates particulates, the pressure differential will increase, indicating that the bag filter should be changed. The recommended maximum differential pressure across the filter bags is 15 pounds per square inch gauge. The transmitters have no user-serviceable parts and should be returned to the manufacturer if they malfunction.

2.2.3 Air Stripper

The Carbonair® Model OS-500 packed tower air stripper (see Photograph 2-3) is used to remove VOCs from the groundwater. A detailed vendor provided manual and drawings for the air stripper is included in Appendix I. The manual discussed key maintenance items such as acid washing, media exchange, and tower inspections. The manual should be thoroughly read and understood. Also included in Appendix I is information on the tower internals and sump differential pressure transmitter used for level control.

The air stripper should be checked semi-annually for clogging due to calcium carbonate build-up, iron build-up, or bacteria growth, and cleaned if necessary.

2.2.4 Packed Tower Air Stripper Blower

A 2.0 hp, 3-phase general purpose fan manufactured by The New York Blower Company® (see Photograph 2-4) is used to force air through the packing located inside the air stripper. Detailed manufactures instructions are located in Appendix J. The blower will move approximately 2000 cubic feet per minute of air at 3 inches of water pressure.

The blower and motor should be inspected for proper operation and maintained per manufactures directions every six months.

2.2.5 Discharge Pump

A Myers Model M341A, 10 hp, 3-phase, 230-460 volt horizontal end suction pump is used to transfer the treated system effluent to the injection wells (see Photograph 2-5). A manufactures repair instruction manual and product information are located in Appendix K.

rate?

The pump and motor should be inspected for proper operation and maintained per manufacturers directions.

2.3 System Control

2.2.1 Control Panel

Groundwater extraction and treatment system controls are found in the main control panel (see Photographs 2-6). Main components of the control panel include switches and indicator lights on the front of the panel, and the PLC, VFDs, and personnel computer

used for HMI on the inside. Appendix L contains control panel component specification sheets and component layouts prepared by Telemetry, Process, and Controls, Inc., the manufacturer and installer. The front of the control panel includes an Emergency-Off button, which shuts down all system equipment, a Sump Pump Run System Shutdown switch that will shut the system down if the sump pump starts and the switch is in normal, and a Filter Package Change High Differential Pressure Override switch that allows for shutdown protection against differential pressure transients while changing filter bags. An air conditioner unit is mounted on top of the control panel. The filter for the air conditioner unit should be inspected regularly and changed as needed.

The control panel is the source of power for all groundwater treatment system equipment, and as such, contains many live contacts. Extreme caution should be exercised when working in the panel. Never work inside without a safety observer.

2.3.2 Programmable Logic Controller

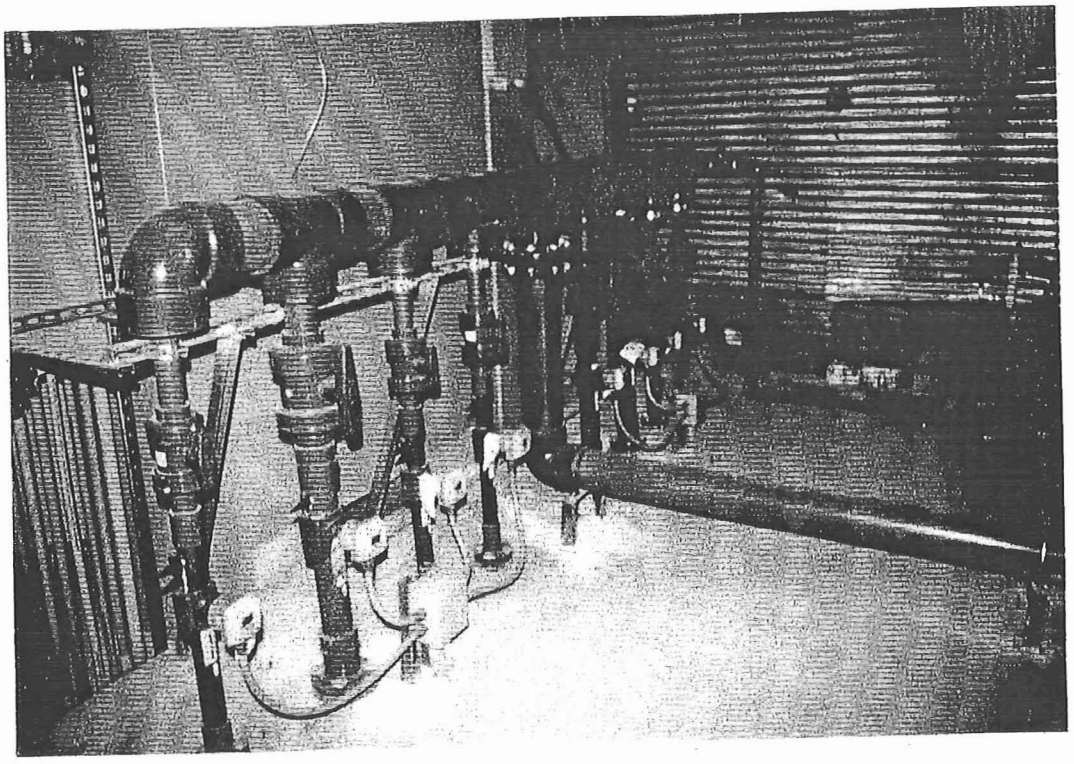
Most of the system equipment is ultimately controlled by a GE Fanuc Series 90-30™ Model 352 PLC, located in the control panel (see Appendix M). The PLC utilizes GE Fanuc Logicmaster™ 90 relay ladder logic (RLL) software to control a variety of system functions on the basis of equipment inputs, and to transfer system data to the HMI software package (Appendix N includes a copy of the RLL program). A proportional, integral, derivative (PID) co-processor is included for groundwater elevation and air stripper sump setpoint control. There are no user-serviceable parts of the PLC. The units should be sent to the manufacturer if they malfunction.

2.3.3 Auto Dialer

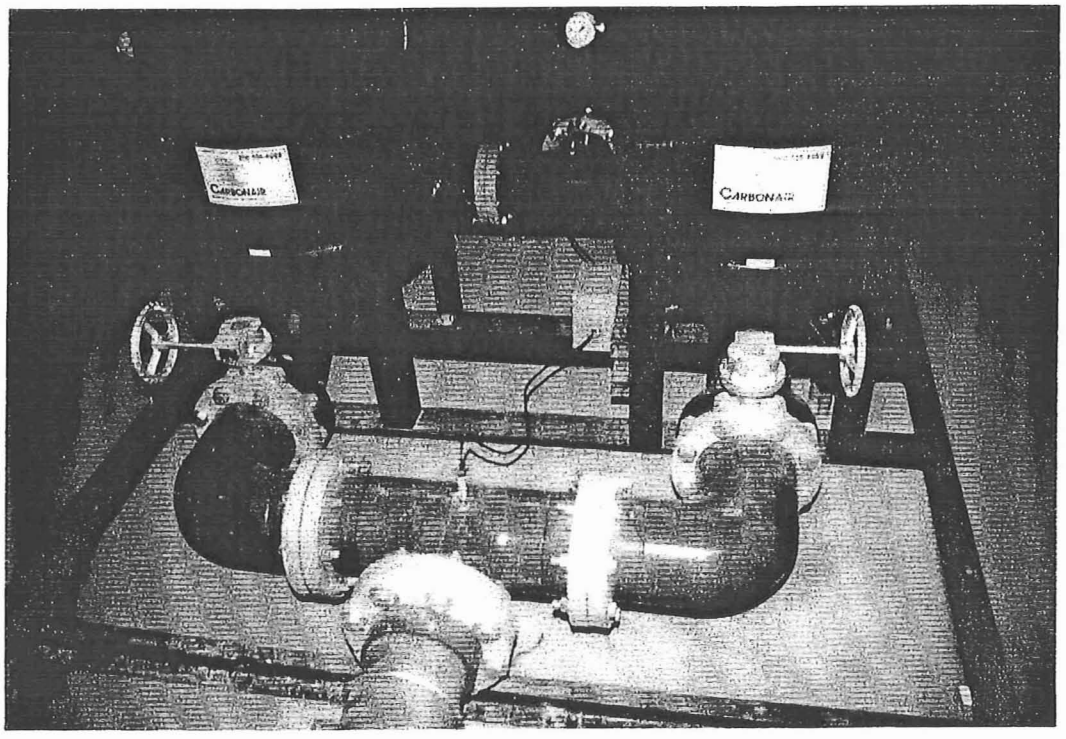
A Sensaphone® Model 1104 autodialer was installed in the control panel to call EMCON if certain pre-set alarm conditions occur. The autodialer currently calls an EMCON pager if any alarm condition exists. The autodialer can be called by dialing 402-463-0893. The electronic voice will tell the listener if an alarm condition exists as well as other system information. To remotely acknowledge an alarm, call the autodialer, press 555, and hanging up. Programming instructions for the autodialer are included in Appendix O. The complete autodialer manual is also located inside the main control panel door.

2.3.4 Variable Frequency Drives

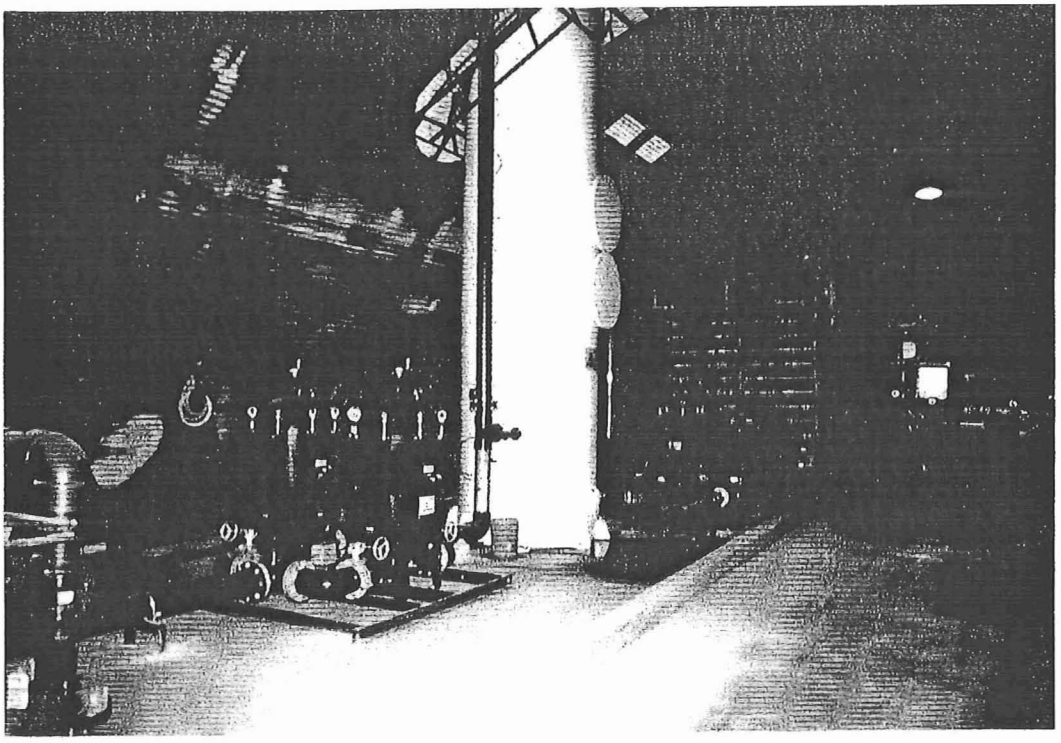
The groundwater extraction submersible pump speeds and the system discharge pump speed are controlled by ABB ACS 600 inverters located in the control panel (see Photograph 2-6 and Appendix P). The inverters (identified as VFDs in this report) supply variable-frequency power to the submersible pumps. The VFDs receive analog inputs



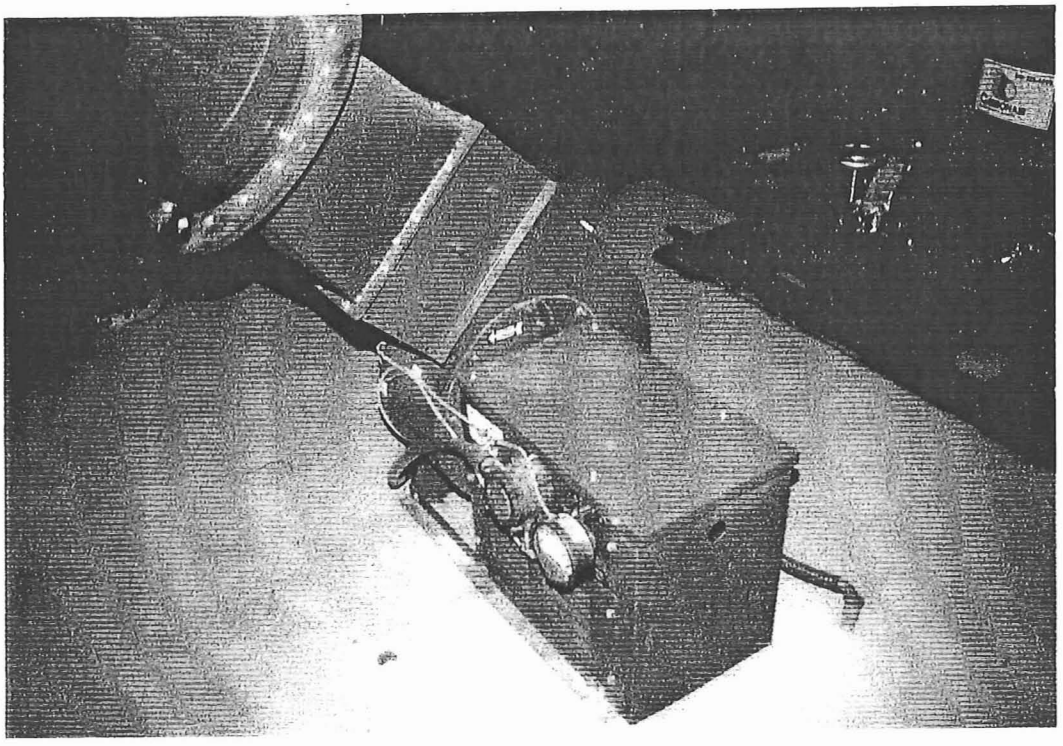
Photograph 2-1 Manifold with Individual Well Flow Meters



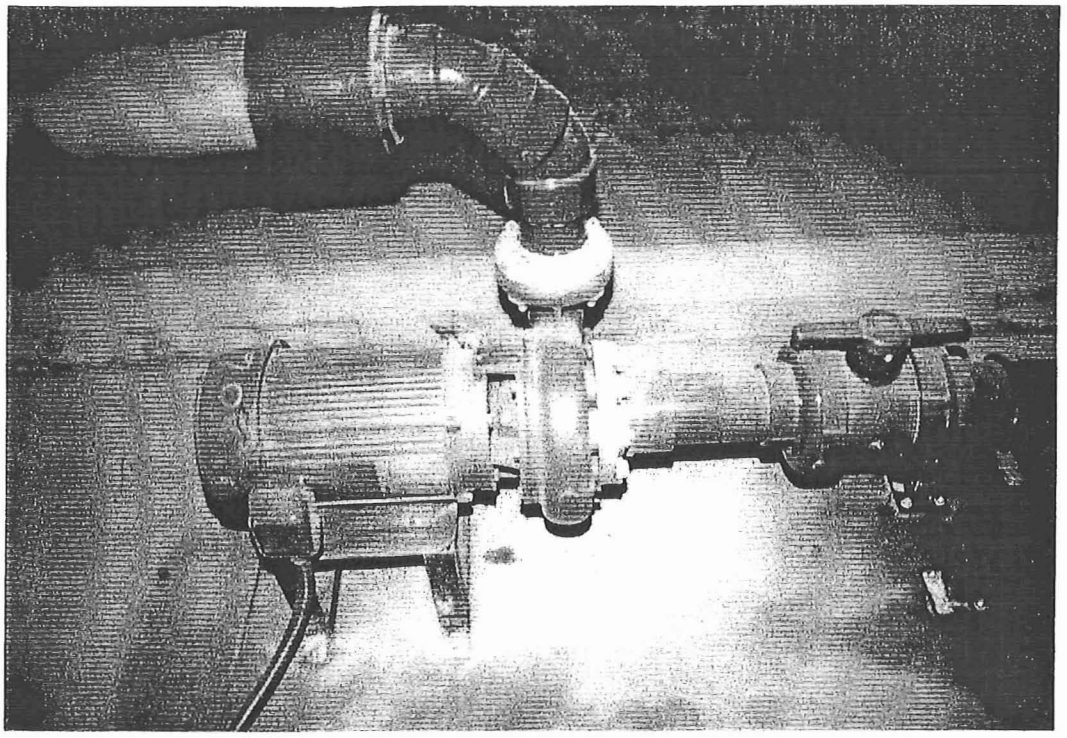
Photograph 2-2 Particle Filters with Pressure Transmitters (In-line)



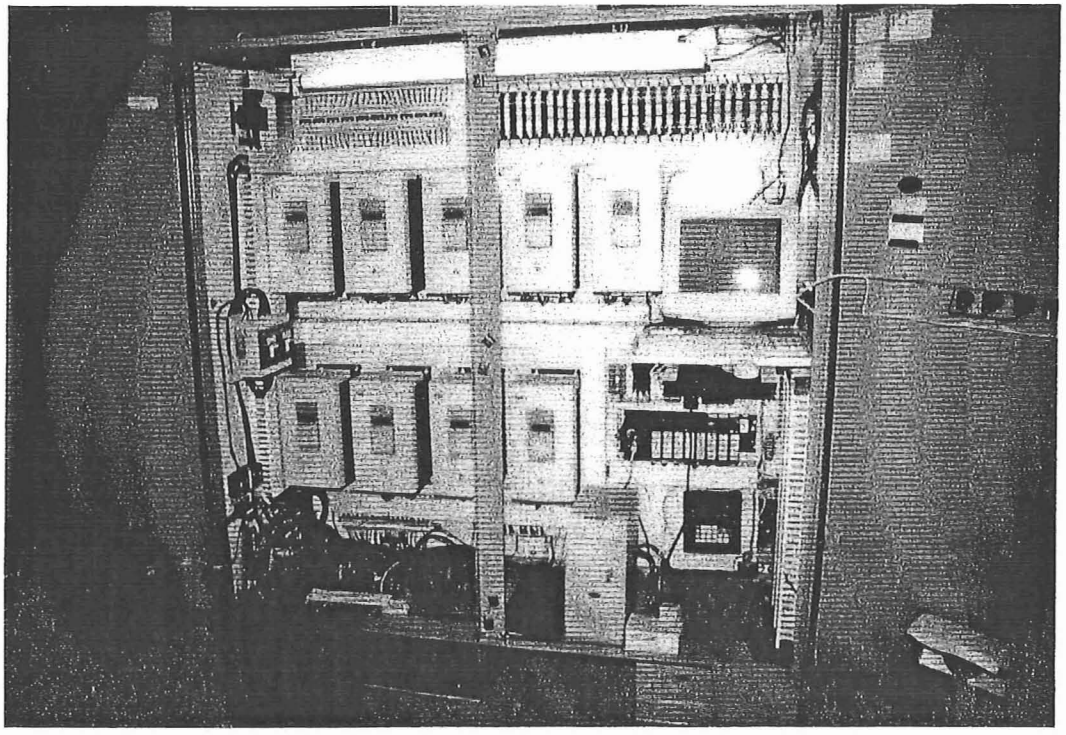
Photograph 2-3 Air Stripper



Photograph 2-4 Air Stripper Blower



Photograph 2-5 Discharge Pump



Photograph 2-6 Control Panel with VFDs, PLC, and PC

from the PLC based on groundwater elevation and setpoint and adjust the speed of the pumps to obtain the desired drawdown. A programming interface is provided on the front of each VFD. There are no user-serviceable parts of the VFDs. The units should be sent to the manufacturer if they malfunction.

2.3.5 Personal Computer

A standard personal computer running Microsoft Windows NT™ is used to run the HMI software. The personnel computer is located inside the main control panel. An uninterruptable power supply has been provided to protect the computer from voltage transients.

2.4 Ancillary

2.4.1 Sump Pump

The secondary containment pad for the groundwater extraction system includes a concrete sump to collect water from leaks or filter package changes. The sump is equipped with a Little Giant® Model 20E-CIM (see Appendix Q), 3-phase submersible effluent pump. A float switch is provided to automatically turn the pump on or off depending on the water level in the sump. When running, the pump will direct water to the treatment system influent header where it will mix with incoming groundwater before going to the packed tower air stripper. A Sump Pump Run switch located on the front of the control panel has two positions. In the normal position, the system will be shut down if the sump pump starts. This is to protect against a potential release of untreated groundwater if a pipe should rupture. In the override position, the system will not be shut down if the sump pump starts. This is to allow for the sump to provide a catch basin during filter bag changes, or the use of effluent water pressure to hose down equipment for cleaning.

2.4.2 Heat Tracing

Where system piping is exposed to the elements, heat tracing has been installed to prevent ruptures due to freezing (see Appendix R). Each groundwater extraction vault is equipped with the heat tracing. The heat tracing is also equipped with a temperature switch that will automatically apply power to the heat trace when the temperature nears freezing.

3 SYSTEM OPERATION

The system is operated using the HMI screens on the personal computer located inside the main control panel. The screens are very intuitive. Simply position the mouse pointer at the on-screen switch or button for the desired operation and click. All system equipment is operated in this manner. Water level, packed tower air stripper sump level, and filter package high differential pressure setpoints can also be changed.

The system normally operates in automatic mode. In this mode, the RLL program and operating setpoints control equipment functions (see Appendix N). Hand mode overrides portions of the RLL program and is usually used for system testing. In either Hand or Auto, the RLL program instructs the PLC to monitor alarm conditions. Changing the program specifications or default setpoints is done by changing the program or the value of the appropriate PLC memory location (variable memory). Altering these requires knowledge of GE Fanuc Logicmaster™ 90 RLL programming which is beyond the scope of this O&M manual. Table 1-1 includes additional groundwater elevation setpoint information.

3.1 Automatic Mode

The system is placed into automatic mode by setting the on-screen HOA switches for the blower, submersible pumps, sump pump, and transfer pump to Auto. In Auto mode, the following occur:

- The blower, submersible pumps, flow meters, pressure transmitters (submersible and in-line), and control panel components are on.
- Submersible pumps only if no system alarms are active and the blower is on.
- Submersible pumps attempt to operate at a speed which creates the desired drawdown in each well.
- The transfer pump attempts to operate at a speed which maintains the desired water level in the packed tower air stripper sump.

- The sump pump will operate when the float valve indicates that water is present in the sump. If water is present, and the Sump Pump Run System Shutdown switch is in normal, when the sump pump starts the system will shutdown.

- Data pre-selected in the RLL program is logged by the HMI system and place in a database.

- Preset operating parameters are monitored for alarm conditions.

3.2 Hand Mode

Submersible pumps and the sump pump can be operated in Hand mode by turning their on-screen HOA switches to Hand. The centrifugal blower does not operate differently in Hand or Auto. In Hand mode, the following occur:

- The blower, submersible pumps, sump pump, flow meters, pressure transmitters (submersible and in-line), and control panel components are on.

- Submersible pumps operate only if no system alarms are active.

- Submersible pumps operate at a preset speed (defined by programming within the VFD).

- Sump pump operates regardless of whether water is present in the sump.

- Data pre-selected in the RLL program is logged to the HMI system and place in a database.

- Preset operating parameters are monitored for alarm conditions.

3.3 Alarms

Certain objectionable conditions activate system alarms in the PLC. These alarms can perform certain functions (i.e. call out) or shut down certain system operations (i.e. submersible pump shut down). Alarms are visible via a HMI software screen and can be accessed remotely. The following alarms conditions create the following responses:

- Blower shutdown - submersible pumps, transfer pump shut down and the autodailer calls an OWT employee.

- High filter package differential pressure - submersible pumps shut down, transfer pump shuts down, an on-screen alarm will be visible on the HMI system, and the autodialer calls OWT.

- A sump pump start will shut down the system. This is to protect against a discharge of untreated groundwater should a pipe rupture inside the secondary containment pad. An OWT employee will be called.

- System loses power - system shuts down and autodialer calls OWT.

- Individual pumps can be shut down by their respective VFDs if an operating parameter outsized desired specifications is sensed. The autodialer will call OWT but the rest of the system will remain in operation.

Once the condition that caused the alarm has been cleared, the alarm can be reset by pressing the on-screen RESET button associated with the alarm. If the red emergency shutdown button located on the front of the control panel is used to shut down the system, it can be reset by pushing the button a second time.

3.4 Data Logging

Certain data is automatically logged by the HMI system and place in a Microsoft® Access database. The data can be downloaded remotely via computer by calling the system and accessing the ARC folder located inside the CIMPLICTY folder of the C: drive. The file name is Pointlog. Currently, total and individual daily flows, groundwater elevations, pump and blower duty cycle, and date and time are being stored in the database. Water level data is logged every 15 minutes, all other data is logged at midnight daily. To prevent losing data, the data must be downloaded once per month.

3.5 System Startup

These steps should be followed to start-up the system:

- Check to make sure valves on extraction well lines are open (valve handles in vertical position).

- Check the valve lineup on the filter packages. The filter package influent and effluent valves should be open and the drain valve and air relief valves should be shut. The effluent filter package has automatic air relief valves that need no attention.

- Ensure the valve on the suction side of the discharge pump is open (valve handle aligned with the piping).

- If the system blower has been off for more than 3 minutes, the on-screen blower reset button, located on the alarm screen, must be pressed. The button should read "OK."

- On the graphics screen, position the mouse cursor on the blower "auto" button and press to start the blower.

- Position the mouse cursor on the discharge pump "auto" button and press to start the discharge pump.

- Position the mouse cursor on the sump pump "auto" button and press to place the sump pump in auto. The pump is controlled by a float switch located in the sump and will only start when sufficient water is in the sump.

- On the extraction well screen, press the "auto" button for each well to start the pumps. Notice the red indicator changing to green, the increasing motor frequency, and increasing flow rate. The water level in each well should slowly fall to the current setpoint.

- Check system piping and fittings for leaks.

- When system pressure builds up, slowly open the air vent valve (do not stand in front of the valve) located on top of the influent bag filter housings. This will allow trapped air to escape the housing. When the filter housing fills with water quickly shut the valve. Repeat on the second filter housing. The effluent filter housings are equipped with automatic air relief valves.

- Briefly monitor system for proper operation before leaving the site.

4 SOIL VAPOR EXTRACTION SYSTEM OVERVIEW

The soil vapor extraction (SVE) system is comprised of the eight vapor extraction wells, catalytic oxidizer, acid scrubber, control components, and piping briefly discussed in Section 1 (see Photograph 4-1). A brief discussion of the system design will be presented but detailed information on system equipment operation and maintenance should be taken from comprehensive manuals provided by vendors.

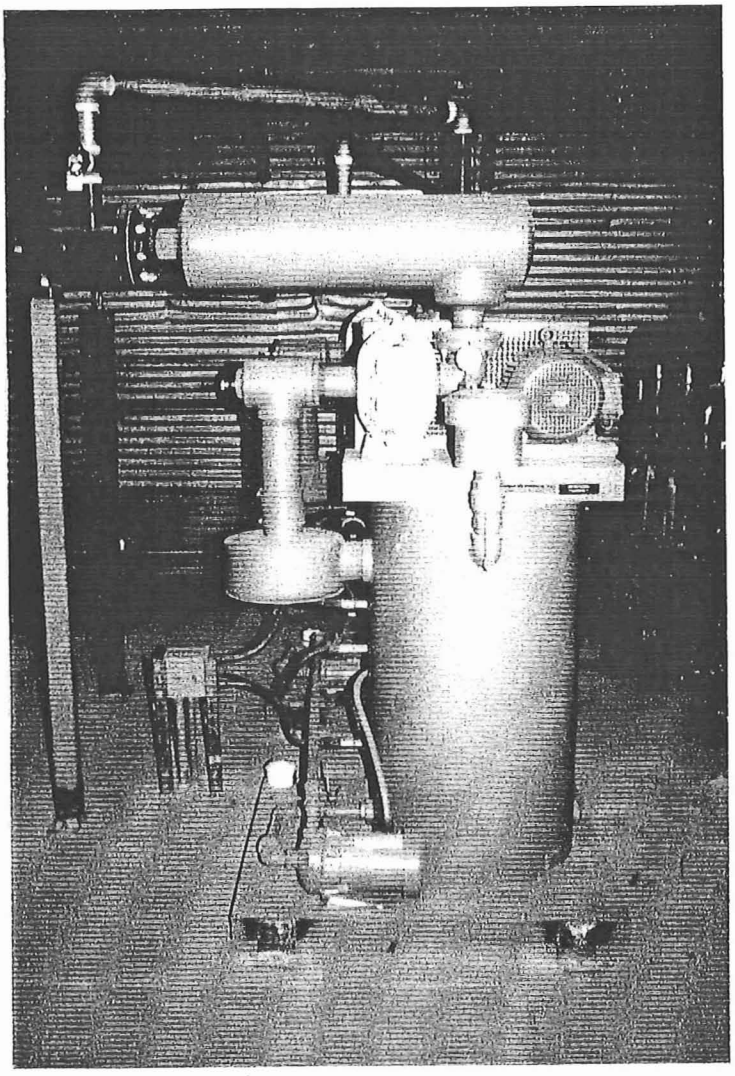
The vapor extraction wells can be split into two groups. The first group of wells, SVE-1, SVE-3, SVE-4, SVE-7, and SVE-8 are screened in an upper unsaturated zone from approximately 20 feet to 50 feet below ground surface. Piping from these wells terminate in a common manifold located near the soil vapor treatment equipment (see Photograph 4-2). Each line is equipped with an isolation valve and sampling port. The sample port can also be used to measure the air flow rate using a Kurtz™ air velocity meter. Vacuum is drawn on the wells with a blower capable of a flow rate of 200 standard cubic feet per minute (SCFM) at 90 inches of water column. A moisture separator is also provided to remove entrained moisture from the soil vapors before entering the catalytic oxidation unit. Water collected by the moisture separator is pumped into the groundwater treatment system header.

The second group of wells, SVE-9, SVE-10, and SVE-11 are screened in a lower unsaturated zone from approximately 60 feet to 110 feet below ground surface. The general manifold design and equipment are identical to that of the other wells with the exception of the blower, which is capable of a flow rate of 600 SCFM at 25 inch of water column.

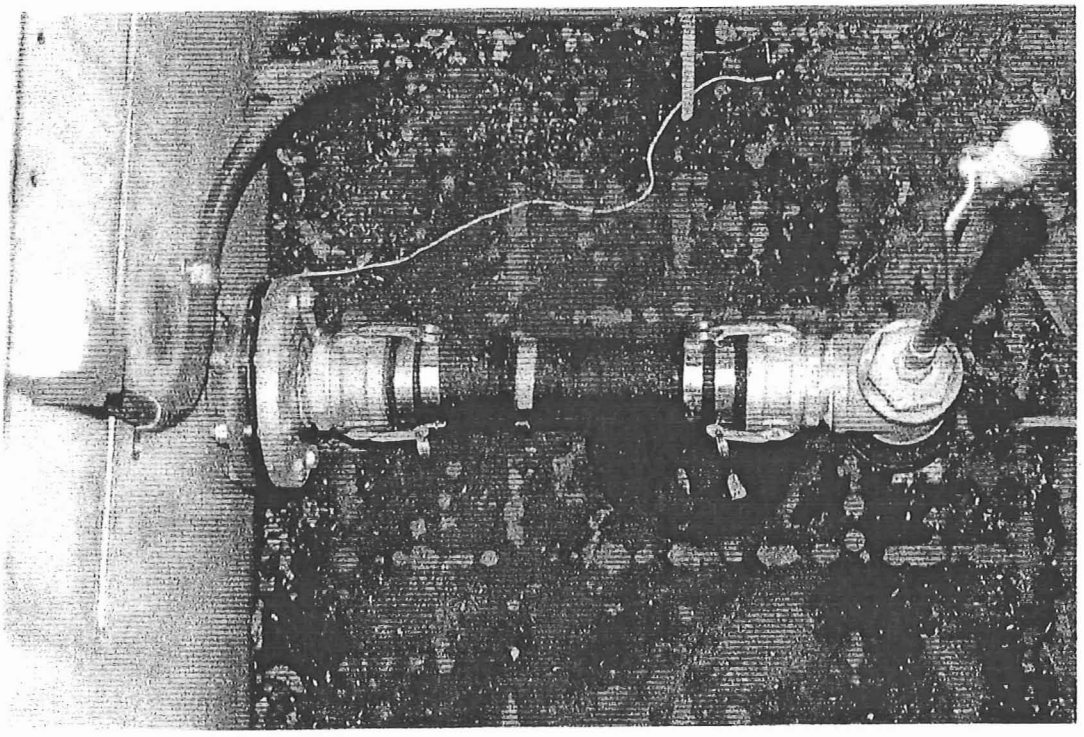
Soil vapors from the eight wells are combined and passed through the catalytic oxidation unit where the carbon tetrachloride is destroyed. The catalytic oxidation unit has a guaranteed destruction efficiency of 97 percent. The highly acidic treated soil vapors are then passed through an acid scrubber and neutralized with sodium hydroxide before being emitted to the atmosphere.

The 50 percent caustic solution is delivered to the site in 55 gallon drums and transferred to a 525 gallon heated tank and diluted with water (see Appendix S). A corrosive quality drum pump is used to transfer the sodium hydroxide solution to the heated tank (see Appendix T). The caustic is mixed with pre-softened water to achieve a 25 percent caustic solution. An electronic metering pump (see Appendix U) is used to pump the

caustic solution to the acid scrubber at a rate determined by a pH sensor located in the acid scrubber control equipment. The brine created by the acid neutralization process is pumped to a 6,500 gallon polyethylene tank located outside the building (see Appendix V). The tank is periodically pumped out and the brine solution is disposed of at the City of Hastings wastewater treatment plant in accordance with the City of Hastings Sewer Use Ordinance and applicable NDEQ and United States Environmental Protection Agency requirements. Tank levels are electronically monitored (see Appendix W) and visible via the HMI system. See Table 3-1 for instructions for ordering the caustic solution and disposing of the brine waste.



Photograph 4-3 SVE Blower and Moisture Separator



Photograph 4-4 SVE Vault

5 PERMIT REQUIREMENTS

Treated water is discharged to injection wells located up gradient of the site under a permit issued by the NDEQ. Both wells are on-line at all times. Water samples are collected from the influent and effluent monthly and analyzed for VOCs by U.S. Environmental Protection Agency Method 8010. Monthly sample results are submitted to the NDEQ. The combined influent sample tap is located on the riser pipe beside the packed tower air stripper. The combined effluent sample tap is located downstream of the effluent filter package. Individual wells can be sampled via taps located within the extraction system manifold.

Treated soil vapors are discharged to the atmosphere after they have been neutralized by the acid scrubber. The soil vapor is discharged under a permit with the NDEQ. Soil vapor is sampled monthly and analyzed for VOCs using U.S. Environmental Protection Agency Method TO-14. Combined influent samples are collected from a sample port located prior to the catalytic oxidizer. Combined effluent samples are collected from a sample port located in the scrubber effluent stack. See Appendix X for more information on the effluent permits.

LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

Table 1-1

Major Component Maintenance Schedule
Garvey Elevators

Component	Inspect/check	Maintenance	Frequency	Comments
Submersible pumps	Pump head and motor Pipe connections to pump	Clean or replace Replace	Annually or as needed Annually or as needed	
Pressure transmitters (submersible)	Verify readings Transmitter	Return to manufacturer Return to manufacturer	Annually or as needed Every 1 to 2 years	Setpoints will need to be reset if transducers are moved
Totalizing flow meters	Paddlewheel sensor Flow transmitter	Clean sensor Return to manufacturer	Annually or as needed As needed	
Particle filters	Filter bags	Change when discolored or excessive pressure drop	As needed	Recommend not exceeding 15 psig Open pressure release valve before opening filter
Pressure transmitters (in-line)	Transmitter	Return to manufacturer	As needed	
Air Stripper	Air Stripper	Inspect and clean	Bi-annually or as needed	
Air Stripper Blower	Blower/motor	See page 4 of Appendix J Check for proper operation	per Appendix J	
Discharge Pump	Bearings	See Appendix K Lubricate Bearings	Monthly	
PLC	PLC	Return to manufacturer	As needed	
VFDs	VFD	Return to manufacturer	As needed	
Sump pumps	Pump intake Float valve	Clean Clean and remove obstructions	Monthly or as needed Monthly or as needed	
Building space heater	Heater	Return to manufacturer	As needed	
Control Panel Air Conditioner	Filter	Replace	Quarterly or as needed	
Metering Pump	Connections for leaks	Tighten fittings/replace	As needed	Observe safety procedures
Tank Level Sensors	Transmitters	Return to manufacturer	As needed	

Table 2-1

Extraction Well Details and Water Level Setpoint Data
Garvey Elevators

Well	Aquifer	Diameter (inches)	TOC Elevation	Depth (feet below TOC)[1]			Groundwater Elevation Setpoint
				Well	Pump	Transducer	
EW-1AB	upper	6	1932.01	125	121	119*	1814
EW-2AB	upper	6	1930.02	126	122	120*	1811
EW-3AB	upper	6	1930.34	124	120	118*	1813
EW-4AB	upper	6	1929.22	126	122	120*	1810
EW-5AB	upper	6	1932.69	127	123	121*	1813
EW-6C	medial	6	1930.77	147	142	139	1817
EW-8C	medial	6	1932.21	152	147	144	1813
RW-1	medial	8	1931.98	150	145	142	1807
I-1	deep	10	1927.64	225	N/A	120	N/A
I-2	deep	10	1927.40	225	N/A	120	N/A

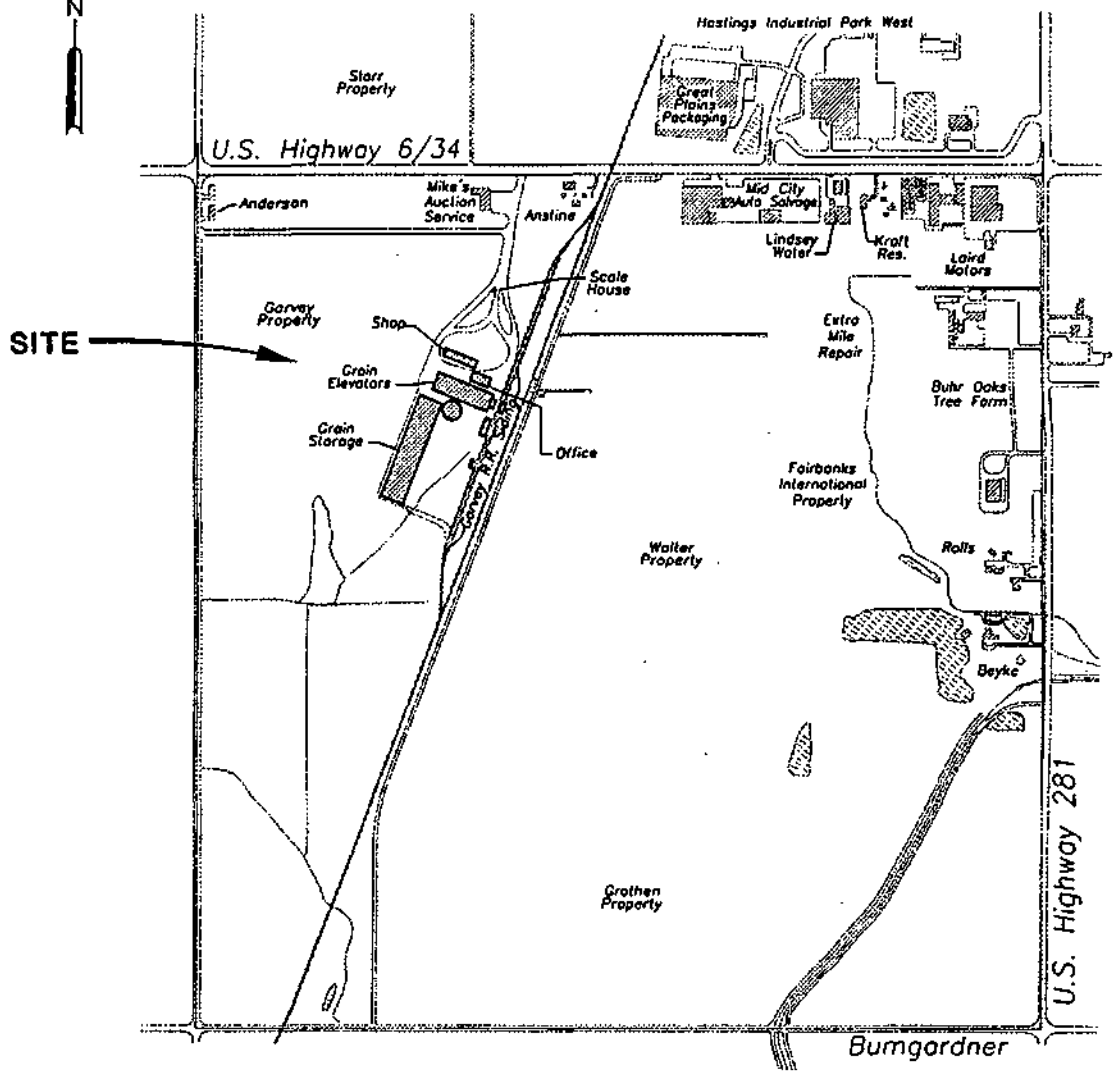
Note: TOC = Top-of-Casing Measuring Point

*Trasducers lowered 2 feet by site personnel after startup

Table 3-1

Caustic Supply Ordering and Brine Removal Instructions
Garvey Elevators

Caustic Supply:	Source:	Special Instructions:
50% Caustic Soda	Barton Solvents Council Bluffs Branch 2135 9th Avenue Council Bluffs, IA 51502 (712) 322-2509	Always wear proper personal protective equipment when transferring the caustic solution to the heated tank. Dilute the caustic solution no lower than 25%.
Brine Disposal:	**Trucking Company:**	**Special Instructions:**
SVE Brine	Svoboda Plumbing 1726 N. Kansas Street Hastings, NE 68901 (402) 463-8087	Notify Svoboda Plumbing that pickup is needed when the level in the brine tank reaches 3.0 feet. Svoboda will remove the brine within 2 days.



SOURCE: HWS CONSULTING GROUP, INC. (1995)

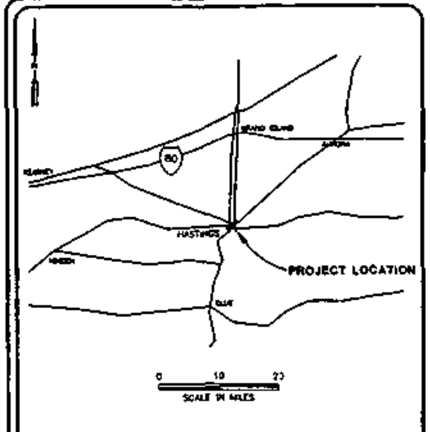
0 300 600

SCALE IN FEET

EMCON

DATE 5/99
DWN SRM
APP
REV
PROJECT NO.
01462-002.001

FIGURE 1-1
GARVEY ELEVATORS, INC.
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA
VACINITY MAP



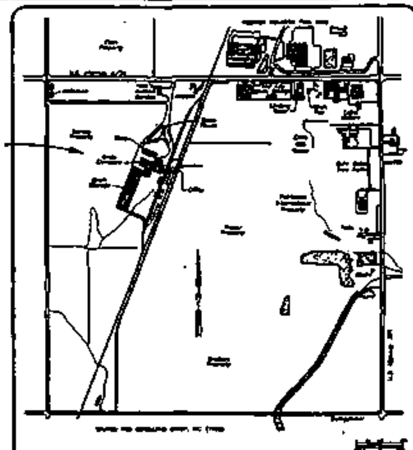
PROJECT LOCATION
NEBRASKA

CONSTRUCTION PLANS

PHASE 1 GROUNDWATER & SOIL REMEDY IMPLEMENTATION

for

GARVEY ELEVATORS INC.
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA



PROJECT VICINITY
HASTINGS, NEBRASKA

ABBREVIATIONS

APPROX.	APPROXIMATE	MPT	MALE PIPE THREAD
BGS	BELOW GROUND SURFACE	NTS	NOT TO SCALE
CONC	CONCRETE	OD	OUTSIDE DIAMETER
CMP	CORRUGATED METAL PIPE	OHE	OVERHEAD ELECTRICAL POWERLINE(S)
Ø OR DIA	DIAMETER	PH	PHASE (ELECTRICAL)
DEG	DEGREE	PVC	POLYVINYL CHLORIDE PIPE
ELEV.	ELEVATION	PLC	PROGRAMMABLE LOGIC CONTROLLER
EXIST	EXISTING	PSI	POUNDS PER SQUARE INCH
EQUIV	EQUIVALENT	SCFM	STANDARD CUBIC FEET PER MINUTE
FL	FLOWLINE	SCH	SCHEDULE
FPT	FEMALE PIPE THREAD	SOC	SOCKET/SLIP FIT
FT	FEET	SS	STAINLESS STEEL
GI	GALVANIZED IRON PIPE	TYP	TYPICAL
GPM	GALLONS PER MINUTE	UGE	UNDERGROUND ELECTRICAL UTILITY
HDPE	HIGH DENSITY POLYETHYLENE	W.C.	WATER
I.E.	INVERT ELEVATION	W/O	WITHOUT
mA	MILLIAMPERE	VAC	VOLTAGE ALTERNATING CURRENT
MAX	MAXIMUM	VDC	VOLTAGE DIRECT CURRENT
MH	MANHOLE	VFD	VARIABLE FREQUENCY DRIVE
MIL	EQUALS 0.001 INCH	VG	VACUUM GAGE
MIN	MINIMUM		

LEGEND

- SPOT ELEVATION SYMBOL
- MANHOLE
- LIGHT POLE
- POWER POLE
- CB STORM DRAIN CATCH BASIN
- FIRE HYDRANT
- UTILITY VAULT
- EXISTING MONITORING WELL
- EXISTING PIEZOMETER
- GATE VALVE
- BALL OR BUTTERFLY VALVE
- ELECTRICAL POWER PULL BOX
- ELECTRICAL CONTROL PULL BOX

- NATIVE OR EXISTING MATERIAL
- COMPACTED NATIVE MATERIAL
- 3/4" - 0" CRUSHED ROCK
- BEDDING SAND
- CONCRETE
- ASPHALT

DRAWING INDEX

C1	COVER SHEET
C2	SITE MAP
C3	TREATMENT COMPOUND
C4	PROCESS FLOW DIAGRAM
C5	TYPICAL INJECTION WELL DETAILS
C6	TYPICAL EXTRACTION WELL AND VAULT DETAILS
C7	TRENCH SECTIONS AND DETAILS
C8	CATALYTIC OXIDIZER LAYOUT
C9	SCRUBBER PIPING SECTION AND DETAILS
C10	AIR STRIPPING TOWER SECTION AND DETAILS
C11	FILTER PACKAGE SECTION AND DETAILS

SYMBOLS

DETAIL INDICATOR:
- DETAIL NUMBER
- DRAWING NUMBER ON WHICH DETAIL APPEARS
- DRAWING NUMBER ON WHICH DETAIL IS REFERENCED

SECTION INDICATOR:
- SECTION LETTER
- DRAWING NUMBER ON WHICH DETAIL APPEARS
- DRAWING NUMBER ON WHICH DETAIL IS REFERENCED

APPROVED:
[signature] 3/5/99
PROJECT DIRECTOR — DATE
Mark Wagenhoffer 3/5/99
PROJECT ENGINEER — DATE

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1	7/28/98	ISSUED FOR CONSTRUCTION	APS	MWW	MWW	
0	2/98	ISSUED FOR REVIEW	RLB	MW		

DRN BY A. BURCHART — CHK BY M. WAGENHOFFER

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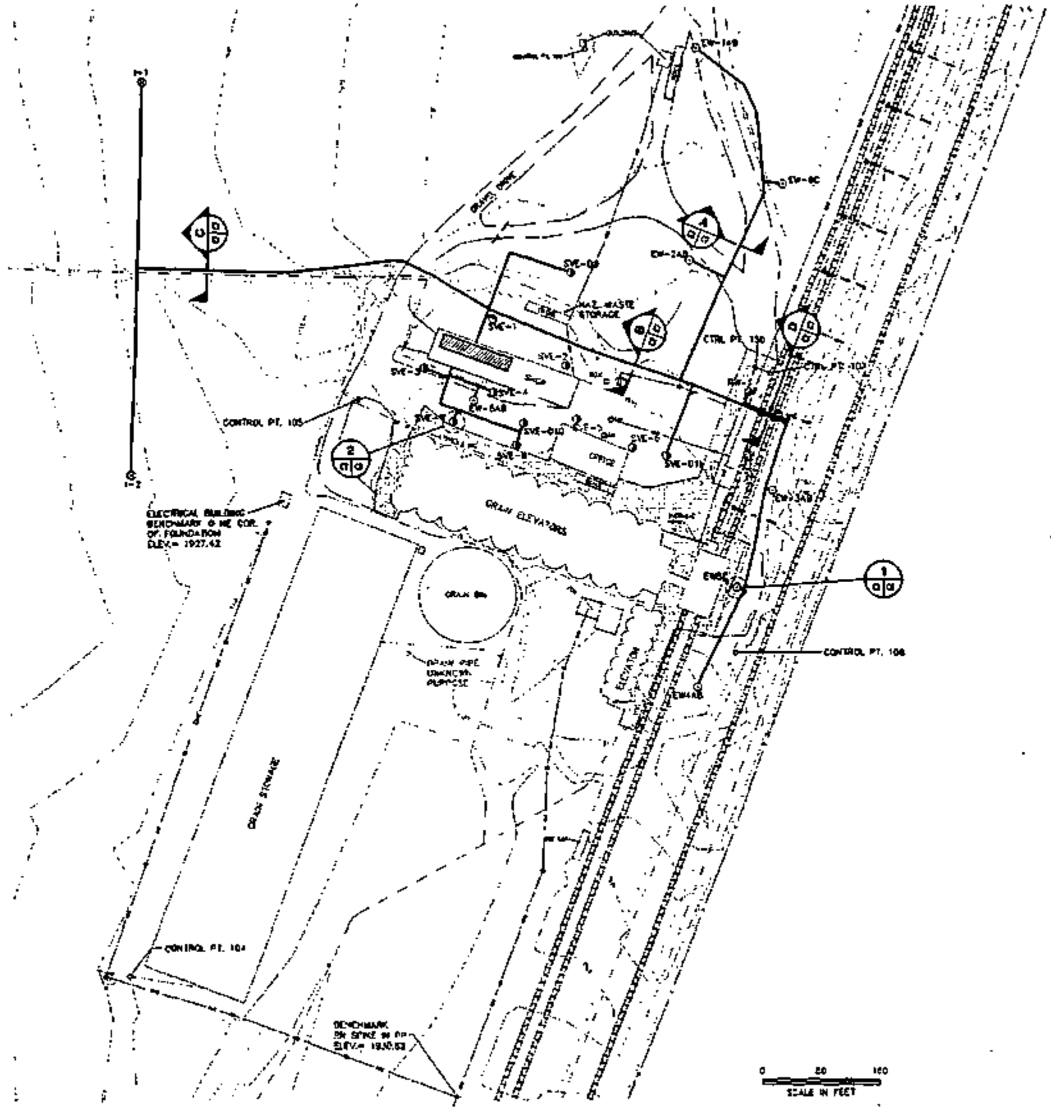
GARVEY ELEVATORS, INC.
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA
PHASE 1 GROUNDWATER & SOIL
REMEDY IMPLEMENTATION
COVER SHEET

DRAWING NO. C1
PROJECT NO. 21463-002.001



Symbol	Description
EW-8C	GROUNDWATER EXTRACTION WELL
SVE-1	SOIL VAPOR EXTRACTION WELL
RW-1	PRE-EXISTING RECOVERY WELL
I-1	INJECTION WELL
	TRENCH EXCAVATION & UTILITY CORRIDOR
	CONTROL POINT
	POWER POLE
	LIGHT POLE
	GAS METER
	TELEPHONE RISER
	ELECTRIC RISER
	ELECTRICAL & CONTROL PULL BOXES
	EXISTING RAILROAD TRACKS
	FLOWLINE
	TOP OF BANK
	TOE OF BANK
OHE	OVERHEAD ELECTRIC
UGE	UNDERGROUND ELECTRIC
UGU	UNDERGROUND UTILITY
x	EXISTING FENCE
GAS	EXISTING GAS LINE
	CONTOUR LINE
	CONCRETE

UTILITY STATEMENT
NOTE: THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NO WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES

CONTROL POINT DATA

CONTROL POINT	NORTHING	EASTING	ELEVATION
104	5672.0700	2124.4510	1926.15
105	6454.4590	2438.8100	1926.95
106	6925.9150	2744.1950	1931.81
107	6490.5210	2992.8000	1930.04
109	6110.0900	2942.2600	1927.73
118	7633.9300	3591.0200	1930.57
150	6496.7160	2972.7420	1929.14

MONITORING WELL DATA

MONITORING WELL	NORTHING	EASTING	TOP OF CASING ELEVATION	GROUND ELEVATION	AS-BUILT BOTTOM CENTER OF VAULT		
					NORTHING	EASTING	ELEVATION
SVE1	6564.6760	2620.0160	1933.83	1930.81	6564.6760	2620.0160	1933.83
*SVE2	6500.4260	2717.5790	1933.49	1930.81			
SVE3	6487.2900	2527.8860	1932.20	1929.44	6497.0620	2528.4560	1930.21 TOP
SVE4	6464.6570	2620.9010	1933.26	1930.42	6464.9560	2620.2280	1926.64
*SVE5	6426.9250	2731.9250	1931.39	1931.45			
*SVE6	6389.0920	2806.1560	1933.94	1935.69			
SVE7	6423.5500	2567.1190	1930.24	1930.77	6424.5210	2567.3780	1926.15
SVE8	6392.2920	2650.8050	1931.46	1931.82	6393.0090	2651.4970	1926.47
SVE09	6627.0960	2724.3730	1929.02	1928.65	6627.3130	2723.8650	1924.70
SVE010	6423.2940	2661.3700	1930.96	-----	6422.2900	2660.9100	1926.48
SVE011	6378.3590	2851.1770	1929.82	1930.05	6379.1270	2851.4460	1925.98
EW1AB	6931.5660	2892.9360	1932.01	1930.33	6931.7190	2894.4040	1926.74
EW2AB	6542.8190	2883.3690	1930.02	1928.19	6543.1750	2884.8860	1924.59
EW3AB	6331.6870	2994.3870	1930.34	1928.44	6331.2060	2993.9160	1924.32
EW4AB	6062.8640	2891.6830	1929.22	1927.87	6063.8450	2891.5030	1924.15
EW5AB	6453.0260	2595.3330	1932.69	1930.77	6453.8740	2595.0810	1926.84
EW6C	6750.0370	3011.5890	1930.77	1929.03	6749.2820	3010.6540	1924.92
EW8C	6199.0750	2943.6980	1932.21	1930.07	6199.4400	2944.6840	1926.80
RW1	6466.5300	2963.2650	1931.98	1929.36	6465.8110	2963.4930	1925.24
I1	6883.9520	2146.5620	1927.64	1924.65	6882.7260	2148.5450	1919.08
I2	6352.2640	2131.4070	1927.40	1922.98	6353.2760	2131.4420	1918.05

* INDICATES WELLS NOT CONNECTED TO SYSTEM

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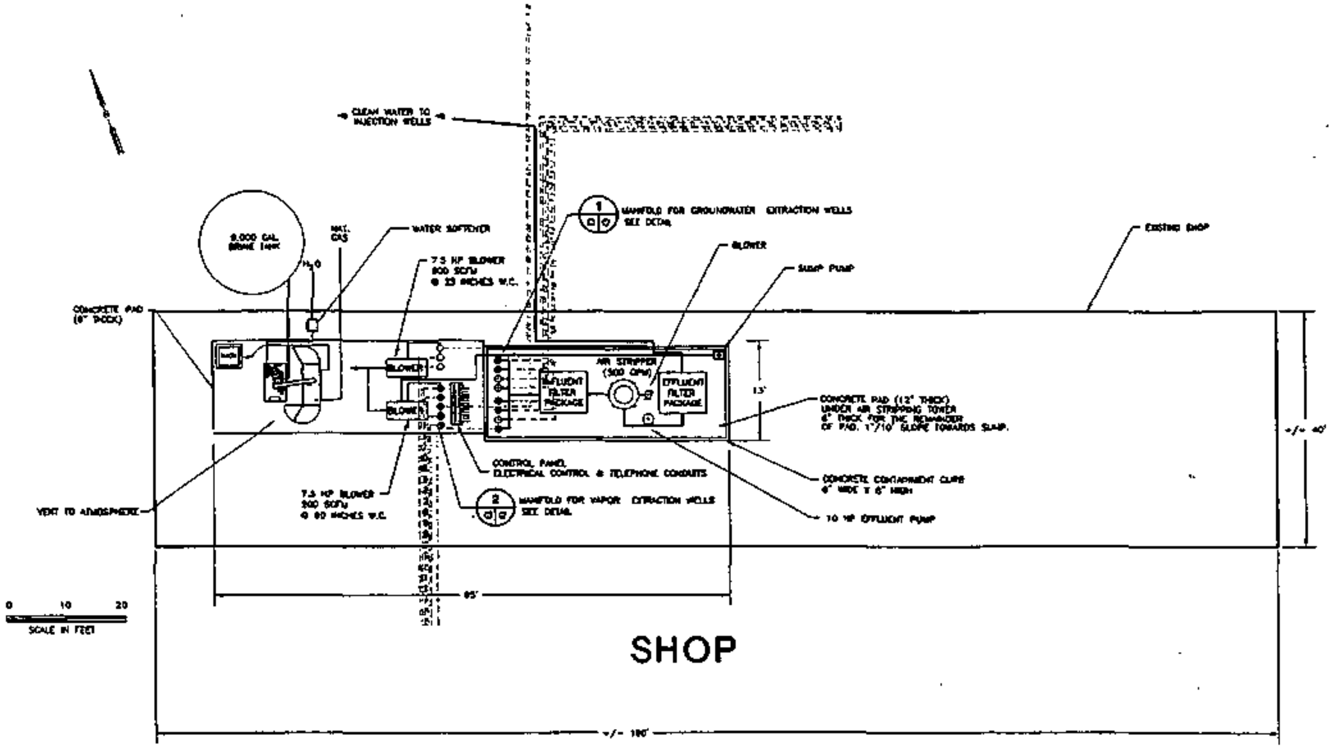
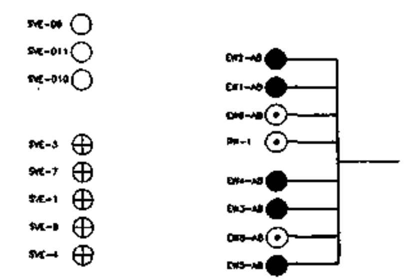
GARVEY ELEVATORS, INC.
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA
PHASE 1 GROUNDWATER & SOIL REMEDY IMPLEMENTATION
SITE MAP

DRAWING NO. C2
PROJECT NO. 04142-002.001


CLEAN WATER TO INJECTION WELLS
6,000 GAL. BRINE TANK
NAT. GAS
H_2O
WATER SOFTENER
7.5 HP BLOWER
800 SCFM
@ 25 INCHES W.C.
MANIFOLD FOR GROUNDWATER EXTRACTION WELLS
SEE DETAIL
BLOWER
SUMP PUMP
EXISTING SHOP
CONCRETE PAD (6" THICK)
AIR STRIPPER (300 GPM)
INFLUENT FILTER PACKAGE
EFFLUENT FILTER PACKAGE
13'
CONCRETE PAD (12" THICK) UNDER AIR STRIPPING TOWER
6" THICK FOR THE REMAINDER OF PAD. 1"/10' SLOPE TOWARDS SUMP.
+/- 40'
CONTROL PANEL
ELECTRICAL CONTROL & TELEPHONE CONDUITS
CONCRETE CONTAINMENT CURB
6" WIDE X 6" HIGH
7.5 HP BLOWER
300 SCFM
@ 60 INCHES W.C.
MANIFOLD FOR VAPOR EXTRACTION WELLS
SEE DETAIL
VENT TO ATMOSPHERE
10 HP EFFLUENT PUMP
85'
0 10 20
SCALE IN FEET
SHOP
+/- 180'

LEGEND

- ● SVE – SHALLOW SOIL VAPOR EXTRACTION WELL, 2" HDPE CONVEYANCE
- ○ MEDIAL SOIL VAPOR EXTRACTION WELL; 4" HDPE CONVEYANCE
- ◆ GROUNDWATER EXTRACTION WELL (ZONE A/B); 2" HDPE CONVEYANCE
- ⊙ GROUNDWATER EXTRACTION WELL (ZONE C); 3" HDPE CONVEYANCE



VAPOR EXTRACTION MANIFOLD

GROUNDWATER EXTRACTION MANIFOLD

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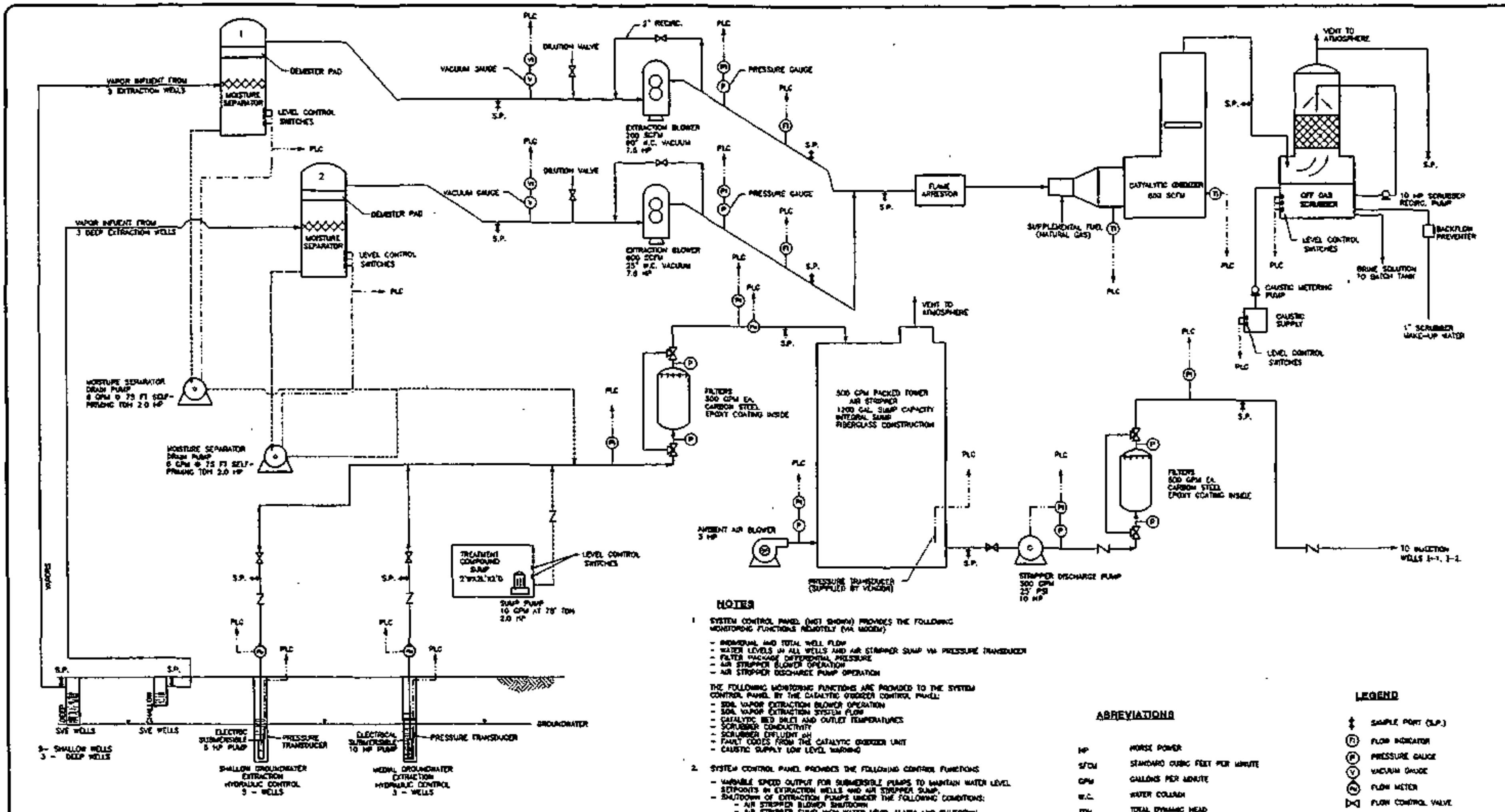
GARVEY ELEVATORS, INC
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA
PHASE 1 GROUNDWATER & SOIL REMEDY IMPLEMENTATION
TREATMENT COMPOUND

DRAWING NO. C3

PROJECT NO. 61462-002.001



VAPOR INFLUENT FROM 3 EXTRACTION WELLS
DEMISTER PAD
MOISTURE SEPARATOR
LEVEL CONTROL SWITCHES
VAPOR INFLUENT FROM 3 DEEP EXTRACTION WELLS
VACUUM GAUGE
DILUTION VALVE
2" RECIRC.
EXTRACTION BLOWER
PRESSURE GAUGE
FLAME ARRESTOR
SUPPLEMENTAL FUEL (NATURAL GAS)
CATALYTIC OXIDIZER
VENT TO ATMOSPHERE
OFF GAS SCRUBBER
10 HP SCRUBBER RECIRC. PUMP
BACKFLOW PREVENTER
BRINE SOLUTION TO BATCH TANK
CAUSTIC METERING PUMP
CAUSTIC SUPPLY
1" SCRUBBER MAKE-UP WATER
MOISTURE SEPARATOR DRAIN PUMP
FILTERS 500 GPM EA. CARBON STEEL EPOXY COATING INSIDE
500 GPM PACKED TOWER AIR STRIPPER 1200 GAL. SUMP CAPACITY INTEGRAL SUMP FIBERGLASS CONSTRUCTION
AMBIENT AIR BLOWER 5 HP
PRESSURE TRANSDUCER (SUPPLIED BY VENDOR)
STRIPPER DISCHARGE PUMP 500 GPM 25' PSI 10 HP
TO INJECTION WELLS
TREATMENT COMPOUND SUMP
SUMP PUMP
SVE WELLS
GROUNDWATER
SHALLOW GROUNDWATER EXTRACTION HYDRAULIC CONTROL 3 - WELLS
MEDIAL GROUNDWATER EXTRACTION HYDRAULIC CONTROL 3 - WELLS

NOTES

1 SYSTEM CONTROL PANEL (NOT SHOWN) PROVIDES THE FOLLOWING MONITORING FUNCTIONS REMOTELY (VIA MODEM)

- INDIVIDUAL AND TOTAL WELL FLOW
- WATER LEVELS IN ALL WELLS AND AIR STRIPPER SUMP VIA PRESSURE TRANSDUCER
- FILTER PACKAGE DIFFERENTIAL PRESSURE
- AIR STRIPPER BLOWER OPERATION
- AIR STRIPPER DISCHARGE PUMP OPERATION

THE FOLLOWING MONITORING FUNCTIONS ARE PROVIDED TO THE SYSTEM CONTROL PANEL BY THE CATALYTIC OXIDIZER CONTROL PANEL:

- SOIL VAPOR EXTRACTION BLOWER OPERATION
- SOIL VAPOR EXTRACTION SYSTEM FLOW
- CATALYTIC BED INLET AND OUTLET TEMPERATURES
- SCRUBBER CONDUCTIVITY
- SCRUBBER EFFLUENT pH
- FAULT CODES FROM THE CATALYTIC OXIDIZER UNIT
- CAUSTIC SUPPLY LOW LEVEL WARNING

2. SYSTEM CONTROL PANEL PROVIDES THE FOLLOWING CONTROL FUNCTIONS

- VARIABLE SPEED OUTPUT FOR SUBMERSIBLE PUMPS TO MAINTAIN WATER LEVEL SETPOINTS IN EXTRACTION WELLS AND AIR STRIPPER SUMP.
- SHUTDOWN OF EXTRACTION PUMPS UNDER THE FOLLOWING CONDITIONS:
  - AIR STRIPPER BLOWER SHUTDOWN
  - AIR STRIPPER SUMP HIGH WATER LEVEL ALARM AND SHUTDOWN
  - STRIPPER DISCHARGE PUMP SHUTDOWN
  - HIGH FILTER DIFFERENTIAL PRESSURE SHUTDOWN

3 THE CATALYTIC OXIDIZER IS CONTROLLED BY ITS OWN PANEL (NOT SHOWN) THAT PROVIDES THE FOLLOWING CONTROLS:

- SYSTEM START-UP AND SHUTDOWN CONTROLS
- BURNER AND FLAME SAFETY CONTROLS
- INLET AND OUTLET TEMPERATURE CONTROLS
- SYSTEM SAFETY AUTOMATIC SHUTDOWN CONTROLS

ABREVIATIONS

HP	HORSE POWER
SFCM	STANDARD CUBIC FEET PER MINUTE
GPM	GALLONS PER MINUTE
W.C.	WATER COLUMN
TDH	TOTAL DYNAMIC HEAD
PLC	PROGRAMMABLE LOGIC CONTROLLER
TI	TEMPERATURE INDICATOR
PI	PRESSURE INDICATOR
VI	VACUUM INDICATOR

LEGEND

- SAMPLE PORT (S.P.)
- FLOW INDICATOR
- PRESSURE GAUGE
- VACUUM GAUGE
- FLOW METER
- FLOW CONTROL VALVE
- CHECK VALVE
- 3-WAY CHECK VALVE
- PROCESS LINE & FLOW DIRECTION
- PERIODIC FLOW
- CONTROL AND DATA TO PLC

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REV	DATE	DESCRIPTION				
2	3/5/99	RECORD DRAWINGS	APS	MVW	MVW	LAD
1	7/29/98	ISSUED FOR CONSTRUCTION	APS	MVW	MVW	
0	3/3/98	ISSUED FOR REVIEW	SPW	MW		

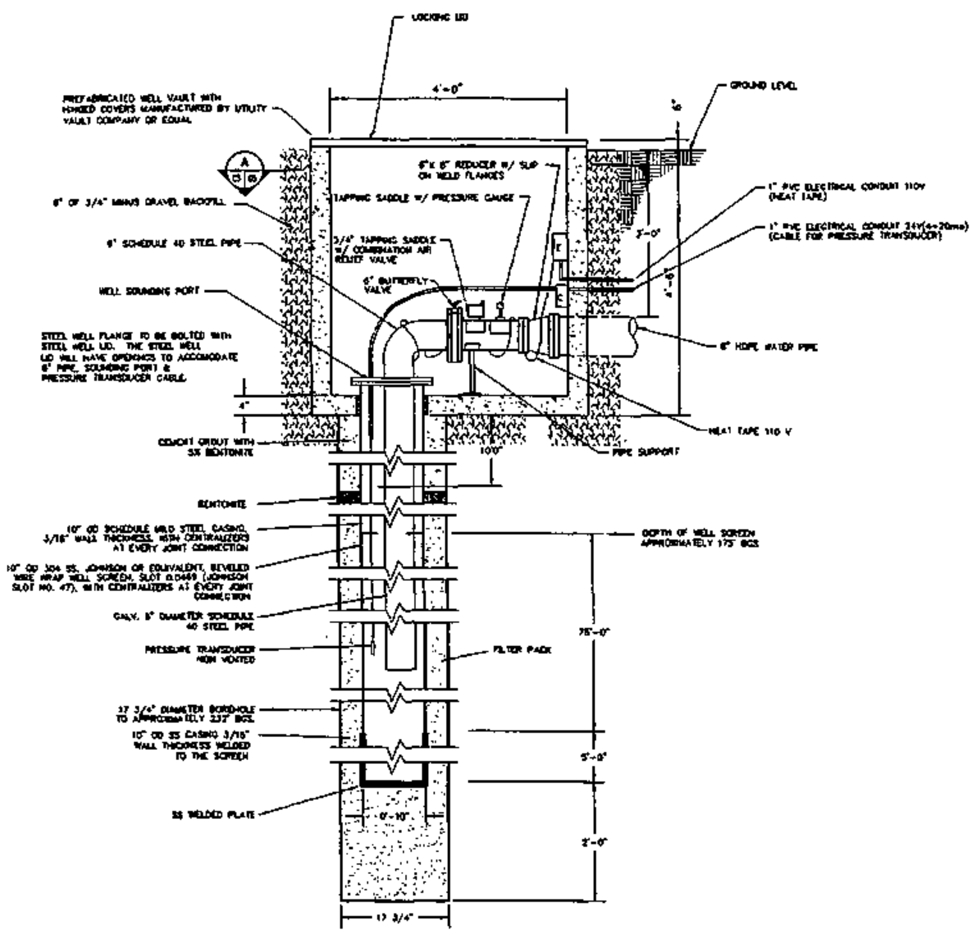
DATE 3/98 — DRN BY A. STINER — DES BY M. WAGENHOEFER

EMCON

GARVEY ELEVATORS, INC
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA
PHASE 1 GROUNDWATER & SOIL REMEDY IMPLEMENTATION
PROCESS FLOW DIAGRAM

DRAWING NO C4

PROJECT NO. 01482-002.001

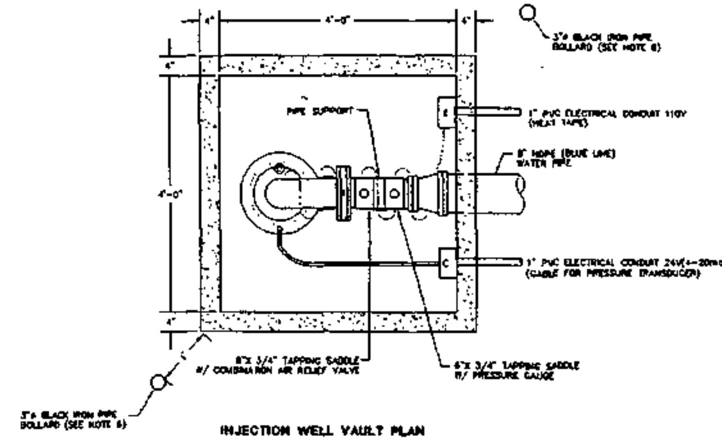


LOCKING LID
4'-0"
PREFABRICATED WELL VAULT WITH HINGED COVERS MANUFACTURED BY UTILITY VAULT COMPANY OR EQUAL
GROUND LEVEL
6" X 8" REDUCER W/ SLIP ON WELD FLANGES
TAPPING SADDLE W/ PRESSURE GAUGE
6" OF 3/4" MINUS GRAVEL BACKFILL
1" PVC ELECTRICAL CONDUIT 110V (HEAT TAPE)
1" PVC ELECTRICAL CONDUIT 24V(4-20ma) (CABLE FOR PRESSURE TRANSDUCER)
6" SCHEDULE 40 STEEL PIPE
3/4" TAPPING SADDLE W/ COMBINATION AIR RELIEF VALVE
6" BUTTERFLY VALVE
WELL SOUNDING PORT
3'-0"
4'-6"
8" HDPE WATER PIPE
STEEL WELL FLANGE TO BE BOLTED WITH STEEL WELL LID. THE STEEL WELL LID WILL HAVE OPENINGS TO ACCOMODATE 6" PIPE, SOUNDING PORT & PRESSURE TRANSDUCER CABLE.
4"
HEAT TAPE 110 V
CEMENT GROUT WITH 5% BENTONITE
10'0"
PIPE SUPPORT
BENTONITE
10" OD SCHEDULE MILD STEEL CASING, 3/16" WALL THICKNESS, WITH CENTRALIZERS AT EVERY JOINT CONNECTION
DEPTH OF WELL SCREEN APPROXIMATELY 175' BGS
10" OD 304 SS. JOHNSON OR EQUIVALENT, BEVELED WIRE WRAP WELL SCREEN, SLOT 0.0469 (JOHNSON SLOT NO. 47), WITH CENTRALIZERS AT EVERY JOINT CONNECTION
GALV. 6" DIAMETER SCHEDULE 40 STEEL PIPE
75'-0"
PRESSURE TRANSDUCER NON VENTED
FILTER PACK
17 3/4" DIAMETER BOREHOLE TO APPROXIMATELY 232' BGS
10" OD SS CASING 3/16" WALL THICKNESS WELDED TO THE SCREEN
5'-0"
SS WELDED PLATE
0'-10"
2'-0"
17 3/4"

TYPICAL INJECTION WELL

DETAIL 1/C5

SCALE: NTS



4'
4'-0"
4'
3"ø BLACK IRON PIPE BOLLARD (SEE NOTE 6)
PIPE SUPPORT
1" PVC ELECTRICAL CONDUIT 110V (HEAT TAPE)
8" HDPE (BLUE LINE) WATER PIPE
4'-0"
1" PVC ELECTRICAL CONDUIT 24V(4-20ma) (CABLE FOR PRESSURE TRANSDUCER)
6"X 3/4" TAPPING SADDLE W/ COMBINATION AIR RELIEF VALVE
6"X 3/4" TAPPING SADDLE W/ PRESSURE GAUGE
3"ø BLACK IRON PIPE BOLLARD (SEE NOTE 6)

INJECTION WELL VAULT PLAN

SECTION A/C5

SCALE: 1" = 1'

NOTES:

1. PROVIDE METALLIC WARNING TAPE READING "BURIED TREATED WATER PIPELINE" (BURY 24" BGS)
2. THE BACKFILL MATERIAL AROUND PIPE AND CONDUIT SHALL BE TAMPED USING TAMPING TOOL.
3. IN NON-TRAFFIC AREAS, NATIVE SOIL (FREE FROM ORGANIC DEBRIS) MAY BE USED AS BACKFILL IF COMPACTION TO 90% OF MAXIMUM DENSITY IS ACHIEVED.
4. BEDDING AND BACKFILL MATERIAL AROUND PIPE AND CONDUIT'S SHALL CONSIST OF COARSE SAND.
5. AS AN OPTION, A LEAN SAND/CEMENT SLURRY CAN BE USED IN PLACE OF BEDDING, AND INITIAL BACKFILL NEAR THE INJECTION VAULTS
6. BOLLARDS SHALL BE CONSTRUCTED WITH 3" BLACK IRON PIPE, 7.5' LONG. ABOVE GROUND PIPE SHALL BE PRIMED AND PAINTED YELLOW. INSTALL AT ALL VAULTS IN NON TRAFFIC AREAS.

THESE RECORD DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. EMCON HAS NOT VERIFIED THE ACCURACY AND/OR COMPLETENESS OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.

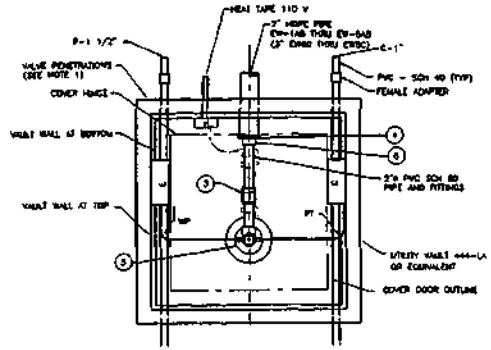
REV	DATE	DESCRIPTION	DRN BY	DES BY	CHK BY	APP BY
2	2/23/99	RECORD DRAWINGS	APS	MVW	MVW	LAD
1	7/30/98	ISSUED FOR CONSTRUCTION	APS	MVW	MVW	
0	3/13/98	ISSUED FOR REVIEW	SM	MVW		

EMCON

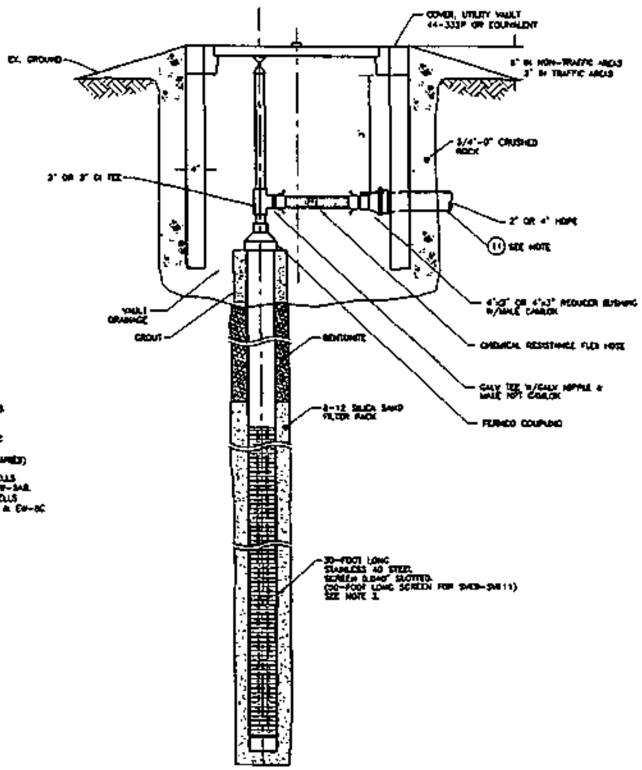
GARVEY ELEVATORS, INC.
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA
PHASE 1 GROUNDWATER & SOIL
REMEDY IMPLEMENTATION
TYPICAL INJECTION WELL DETAILS

DRAWING NO. C5

PROJECT NO. 01442-002.001

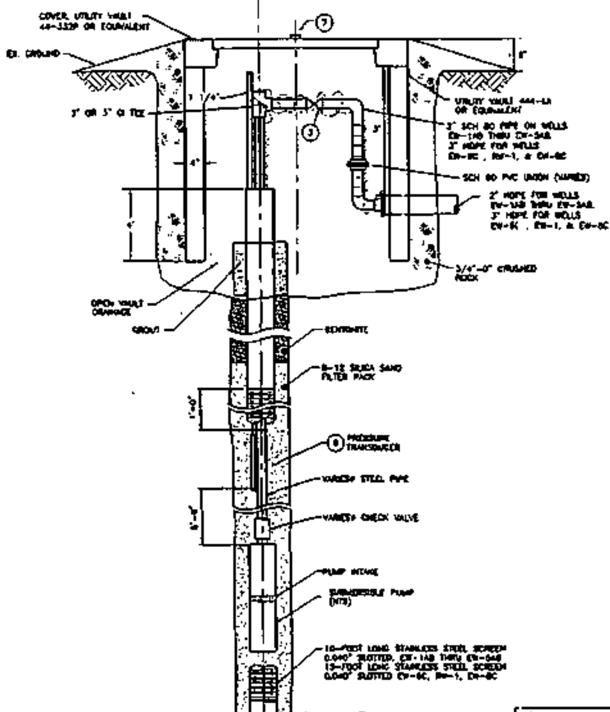


GROUNDWATER EXTRACTION WELL VAULT
TOP VIEW



TYPICAL VAPOR EXTRACTION WELL

DETAIL 2
SCALE NTS



TYPICAL GROUNDWATER EXTRACTION WELL

DETAIL 1
SCALE NTS

WELL INSTALLATION SCHEDULE

WELL No.	TOTAL DEPTH OF WELL (TOC)	WATER DEPTH (TOC)	PUMP INTAKE	TRANS-DUCER BOTTOM	BOTTOM OF 1.25" PVC	TRANSDUCER LENGTHS
EW-1	125	111	121	117	117	132
EW-2	126	108	122	118	118	133
EW-3	124	107	120	116	116	131
EW-4	126	107	122	118	118	133
EW-5	127	109	123	119	119	134
RW-1	150	111	145	142	142	157
EW-6	147	110	142	139	139	154
EW-8	152	112	147	144	144	159
I-1	225	103	150	120	NA	135
I-2	220	101	150	120	NA	135

NOTES

1. ALL SIDE VAULT PENETRATIONS TO BE SEALED WITH A NON-SHRINK CONCRETE GROUT OR CONCRETE SEALANT.
2. OVER EXCAVATE BY A 6" MIN. AT WELL VAULT LOCATIONS AND PLACE COMPACTED 3/4"-0" CRUSHED ROCK PRIOR TO VAULT PLACEMENT. FOLLOWING VAULT PLACEMENT COMPACT CRUSHED ROCK IN 12" MAXIMUM LIFTS AROUND THE VAULTS TO THE SURFACE.
3. SVE WELLS SVE9 THROUGH SVE11 WILL EXTEND APPROXIMATELY 5 FEET INTO THE GROUND WATER TABLE. FIVE SHALLOW SVE WELLS (SVE-1,3,4,7, & 8), AND THREE DEEP WELLS (SVE9-11) WILL BE INSTALLED.
4. NEMA 12 DISCONNECT IN ONE VAULTS.

EQUIPMENT

(1) NOT USED
(2) NOT USED
(3) GATE VALVE: WARES BRASS NPT.
(4) HDPE FLANGE ADAPTER, GASKET AND STAINLESS STEEL BOLTS, NUTS, AND WASHERS TO BE INSTALLED AT ALL FLANGED CONNECTIONS.
(5) WELL SEAL FOR PIPE, WITH TWO 1/2" FEMALE PIPE THREAD HOLES, AND 1 1/4" FEMALE THREADED HOLE.
(6) TRANSITION BUSHING PRIOR TO FLANGE.
(7) HINGED VAULT LID RECESSED WITH LOCKING BOLTS FOR WELL SECURITY.
(8) SUBMERSIBLE PRESSURE TRANSDUCER (TRANSMITTER) WITH PRESSURE RANGE FOR STATIC AND OPERATIONAL WELL CONDITIONS WITH 4-20 mA OUTPUT AND 24 VDC INPUT.
(9) NOT USED
(10) NOT USED
(11) ALL SVE WELL'S SLOPE A MIN. OF 0.5% BACK TO WELL HEAD.

LEGEND

1", 2"	ELECTRICAL POWER CONDUIT; 1", 2" PVC SCH 40
C-1"	CONTROL CONDUIT; 1" PVC SCH 40
W-3"	WELL DISCHARGE, 3"ø HDPE, SDR 11
PT	PRESSURE TRANSDUCER ELECTRICAL LINE
EP	EFFLUENT SAMPLING PORT
BGS	BELOW GROUND SURFACE

THESE RECORD DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. EMCON HAS NOT VERIFIED THE ACCURACY AND/OR COMPLETENESS OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.

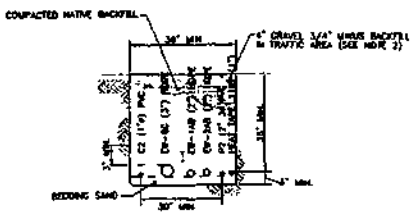
REV	DATE	DESCRIPTION	DRN BY	DES BY	CHK BY	APP BY
2	1/8/98	RECORD DRAWINGS	APS	MVW	MVW	LAD
1	7/29/96	ISSUED FOR CONSTRUCTION	APS	MVW	MVW	
0	3/3/96	ISSUED FOR REVIEW	SJM	MW		

DATE OF ISSUE 3/96 · DRN BY A. STINER · DES BY M. [illegible] · CHK BY · APP BY

EMCON

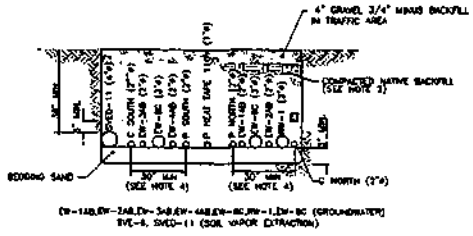
GARVEY ELEVATORS, INC
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA
PHASE I GROUNDWATER & SOIL
REMEDY IMPLEMENTATION
TYPICAL EXTRACTION WELL AND VAULT DETAILS

DRAWING NO. C6
PROJECT NO. 01462-002.001



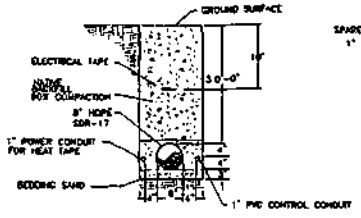
EW-1AB, EW-2AB, & EW-6C UTILITY TRENCH

SECTION



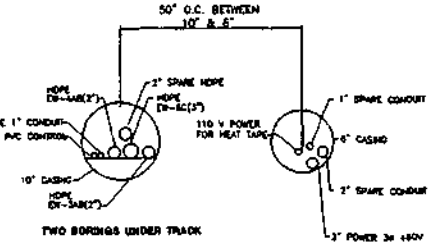
UTILITY TRENCH

SECTION



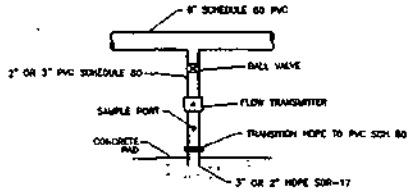
DISCHARGE LINE TRENCH

SECTION



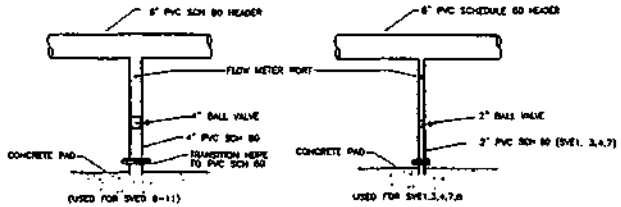
TWO BORINGS UNDER TRACK

SECTION



GROUNDWATER EXTRACTION MANIFOLD

DETAIL



SOIL VAPOR EXTRACTION MANIFOLD

DETAIL

NOTES

1. TRENCH TO BE BACKFILLED ABOVE BEDDING SAND WITH NATIVE SOIL.
2. 3/4" MINUS GRAVEL TO BE COMPACTED TO 95% OF MAXIMUM DENSITY IN TRAFFIC AREAS.
3. NATIVE MATERIAL ENCOUNTERED IN THE ROAD OR HIGH TRAFFIC AREAS IS TO BE 95% COMPACTED.
4. ELECTRICAL POWER CONDUIT AND CONTROL CONDUIT TO BE SEPARATED BY A MINIMUM OF 30" AND SHOULD NOT CROSS.
5. TREATED DISCHARGE PIPELINE WITH MINIMUM BURIAL DEPTH OF 3'
6. ELECTRICAL PVC SCH 40 CONDUIT TO BE USED FOR STRAIGHT RUNS AND SWEEPS
7. 2" HDPE IS USED FOR WELLS (EW1AB-8AB) AND 3" HDPE IS USED FOR WELLS (EW6C, RW-1, EW8C)

LEGEND

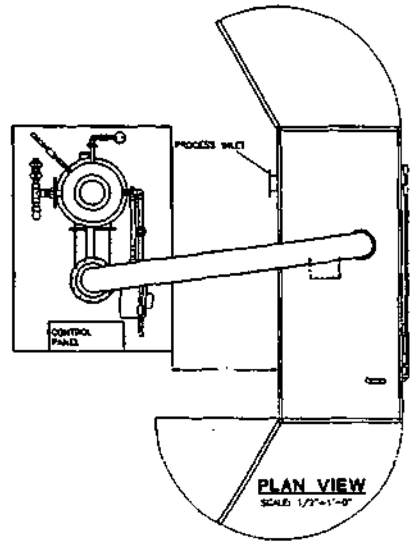
VG	VACCUM GAUGE 0-100" W.C.
EW-6C, Ew-1, EW-8C	WATER DISCHARGE, 3" HDPE - SDR 11
1AB,2AB,3AB,4AB	WATER DISCHARGE, 2" HDPE - SDR 17
T	TRACER WIRE, 14 GAUGE THHN, GREEN, STRANDED
ET	ELECTRICAL WARNING BURIAL TAPE

NO	DATE	DESCRIPTION	DRN BY	APP BY	CHK BY	APP BY
2	3/5/96	RECORD DRAWINGS	APS	MVM	MVM	LAD
1	7/19/95	ISSUED FOR CONSTRUCTION	APS	MVM	MVM	
0	3/1/95	ISSUED FOR REVIEW	SPM	MVM		

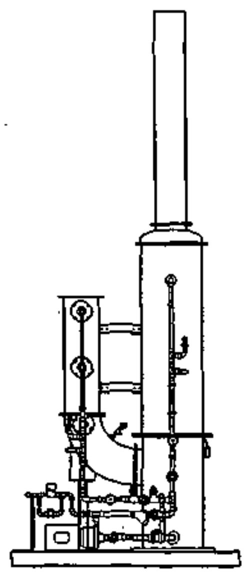
emcon

GARVEY ELEVATORS, INC.
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA
PHASE 1 GROUNDWATER & SOIL
REMEDY IMPLEMENTATION
TRENCH SECTIONS AND DETAILS

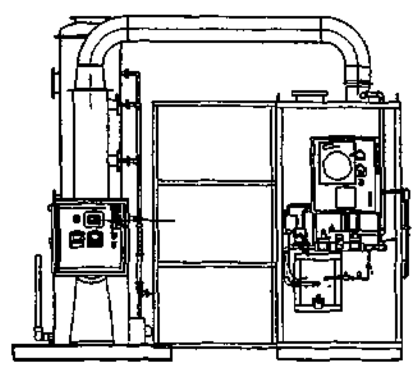
DRAWING NO
C7
PROJECT NO.
61492-007.001



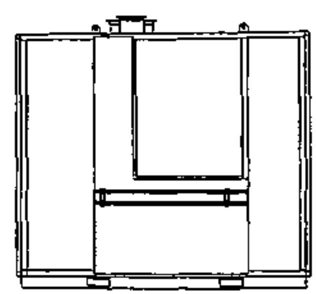
PLAN VIEW
SCALE: 1/2"=1'-0"



FRONT VIEW
SCALE: 1/2"=1'-0"



SIDE VIEW
SCALE: 1/2"=1'-0"
SCRUBBER STACK NOT SHOWN



FRONT VIEW
SCALE: 1/2"=1'-0"
SCRUBBER NOT SHOWN

GLOBAL
Global Technologies Div. of Anguil Environmental Systems, Inc. Milwaukee, Wisconsin

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
2	3/5/99	RECORD DRAWINGS	APS	MVW	WVP	LAD
1	7/29/98	ISSUED FOR CONSTRUCTION	APS	MVW	WVP	
0	3/3/98	ISSUED FOR REVIEW	SRM	MVW		

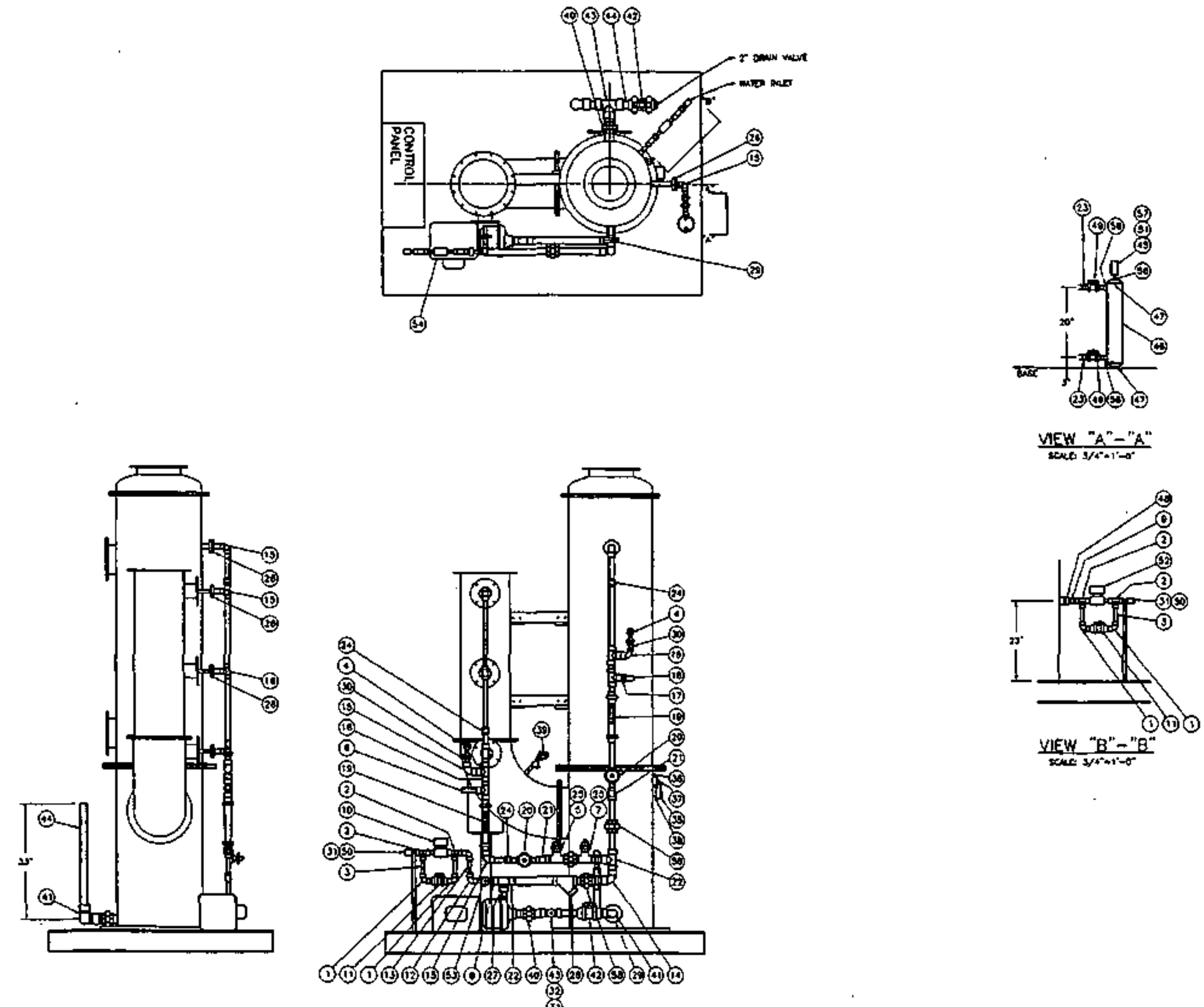
DATE OF ISSUE 9/97 — DWN BY A. STINER — DES BY M. WAGENBRENNER — CHK BY — APP BY

EMCON

GARVEY ELEVATORS, INC.
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA
PHASE 1 GROUNDWATER & SOIL
REMEDY IMPLEMENTATION
CATALYTIC OXIDIZER LAYOUT

DRAWING NO
C8
PROJECT NO.
01462-002.001

ITEM	PARTS	QTY.	DESCRIPTION	MATERIAL	[illegible]
1		6	1/2" x 90° ELBOW SLIP x SLIP	CPVC	-
2		4	1/2" TEE SLIP x SLIP x SLIP	CPVC	-
3		AS REQ'D	1/2" SCH. 80 PIPE	CPVC	-
4	BY ANGUIL	2	PRESSURE GAUGE [illegible]		-
5	BY ANGUIL	1	SENSOR, CONDUCTIVITY GREAT LAKES INSTRUMENTS		-
6	BY ANGUIL	1	1" FLOW SWITCH [illegible]		-
7	BY ANGUIL	1	SENSOR, pH [illegible] PROBE GREAT LAKES INSTRUMENTS		-
8		1	REDUCING BUSHING 1 1/2" x 1/2" SPIG x SLIP	CPVC	-
9		1	1/2" UNION SLIP x SLIP	CPVC	-
10	BY ANGUIL	1	SOLENOID VALVE w/1/2" FPT CONN. [illegible]	STAINLESS STEEL	-
11		2	1/2" MANUAL BALL VALVE (SOCKET-FPT) [illegible]	CPVC	-
12	BY ANGUIL	1	[illegible] w/1/2" NPT CONN. [illegible]		-
13		2	1/2" x 90° ELBOW SLIP x FPT	CPVC	-
14		3	1 1/2" 90° ELBOW SLIP x SLIP	CPVC	-
15		8	1" 90° ELBOW SLIP x SLIP	CPVC	-
16		4	1" TEE SLIP x SLIP x SLIP	CPVC	-
17		1	1" TEE SLIP x SLIP x FPT	CPVC	-
18	BY ANGUIL	1	FLOW SWITCH, 0-1.5 GPM [illegible]		-
19	BY ANGUIL	2	FLOW METER [illegible] w/1" FPT CONN.		-
20	BY ANGUIL	2	1" MANUAL DIAPHRAGM VALVE, EPDM [illegible]		-
21		2	REDUCING BUSHING 1 1/2" x 1" SPIG x SLIP	CPVC	-
22		2	1 1/2" TEE SLIP x SLIP x SLIP	CPVC	-
23		AS REQ'D	1" SCH. 80 PIPE	CPVC	-
24		3	1" UNION SLIP x SLIP	CPVC	-
25	BY ANGUIL	2	[illegible], MOUNT GREAT LAKES INSTRUMENTS		-
26		2	1" FLANGE SLIP-FIT w/ RUBBER GASKET	CPVC	-
27		2	1 1/2" UNION SLIP x FPT	CPVC	-
28	BY ANGUIL	1	1 1/2" STRAINER (SOCKET) [illegible]	CPVC	-
29		1	3" FLANGE SLIP-FIT w/ RUBBER GASKET	CPVC	-
30		2	REDUCING BUSHING 1 1/2" x 1/2" SPIG x FPT	CPVC	-
31		2	1/2" PLUG MPT	CPVC	-
32		1	REDUCING BUSHING 1" x 1/2" SPIG x FPT	CPVC	-
33					-
34		AS REQ'D	1 1/2" SCH. 80 PIPE	CPVC	-
35	BY ANGUIL	1	[illegible]		-
36		1	ADAPTER, [illegible] 1/2" MPT x 1/4" HOSE	CPVC	-
37		AS REQ'D	1/4" HOSE	[illegible]	-
38		1	[illegible] MOUNTING BRACKET [illegible]		-
39	BY ANGUIL	1	THERMOCOUPLE		-
40		2	3" UNION SLIP x FPT	CPVC	-
41		1	3" 90° ELBOW	CPVC	-
42		2	3" MANUAL UNION BALL VALVE [illegible]	CPVC	-
43		2	3" TEE SLIP x SLIP x SLIP	CPVC	-
44		AS REQ'D	3" SCH. 80 PIPE	CPVC	-
45	BY ANGUIL	1	PROBE, [illegible]		-
46			4" [illegible] PIPE CUT TO LENGTH	[illegible] PVC	-
47		2	4" CAP SLIP [illegible]	CPVC [illegible]	-
48		1	1" x 1/2" REDUCER BUSHING SPIG x SLIP	CPVC	-
49		2	1" MANUAL UNION BALL VALVE [illegible]	CPVC	-
50		2	1/2" COUPLING SLIP x FPT	CPVC	-
51	BY ANGUIL	1	SWITCH, LEVEL [illegible]		-
52	BY ANGUIL	1	SOLENOID VALVE 1/2" FPT	BRASS	-
53	BY ANGUIL	1	1/2" MANUAL DIAPHRAGM VALVE, EPDM [illegible]		-
54	BY ANGUIL	1	PUMP, [illegible] HORIZONTAL, [illegible] 3HP [illegible]		-
55					-
56		2	1" FULL THREADED COUPLING	CPVC	-
57	BY ANGUIL	1	1/4" THREADED ROD x 48" LONG	[illegible]	-
58		4	1 1/2" UNION SLIP x SLIP	CPVC	-



GLOBAL

Global Technologies Div. of Anguil Environmental Systems, Inc. Milwaukee, Wisconsin

REV	DATE	DESCRIPTION				
2	3/5/99	RECORD DRAWINGS	APS	MVW	MVW	LAO
1	7/29/98	ISSUED FOR CONSTRUCTION	APS	MVW	MVW	
0	3/3/98	ISSUED FOR REVIEW	SRM	MW		

emcon

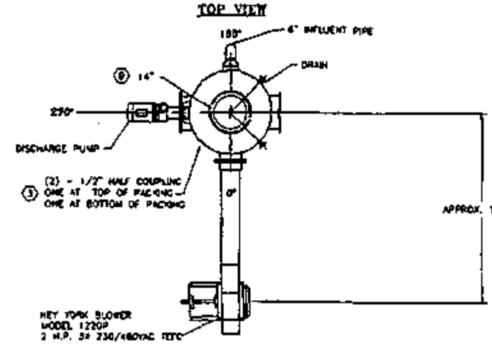
GARVEY ELEVATORS, INC.
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA
PHASE 1 GROUNDWATER & SOIL REMEDY IMPLEMENTATION
SCRUBBER PIPING

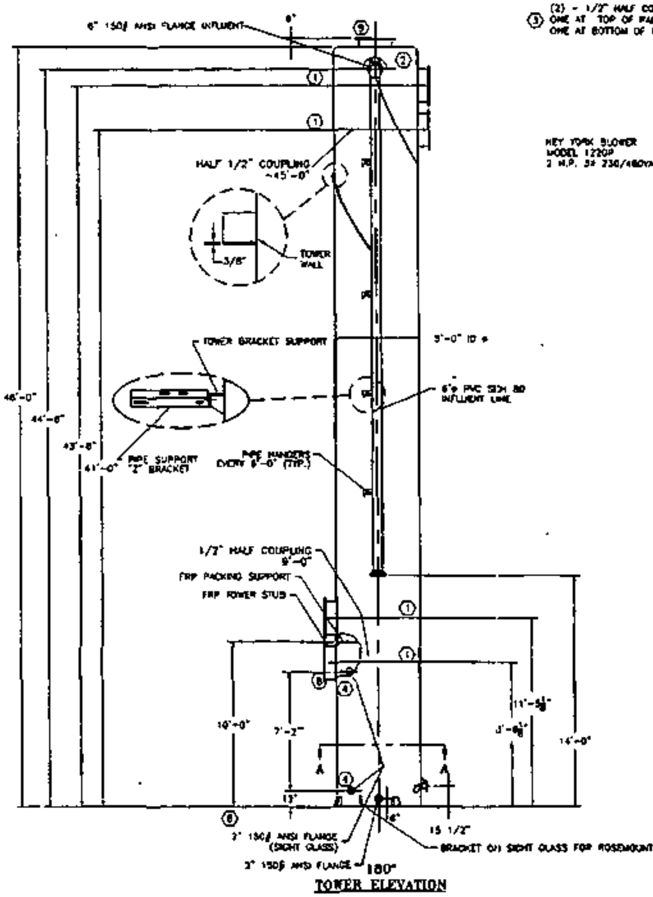
DRAWING NO. C9

PROJECT NO. [illegible]

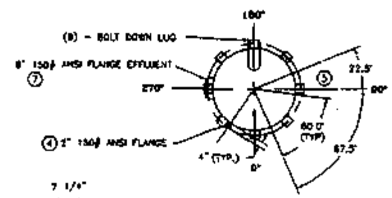
REVISIONS				
REV	ECO	DESCRIPTION	DATE	DRN
A	---	RELEASE FOR SUBMITTAL	9/16/98	S.O.
B	---	REVISED	9/30/98	BRM
C	---	REVISED	10/6/98	BRM

TOP VIEW

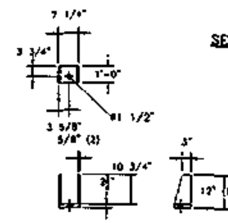




TOWER ELEVATION



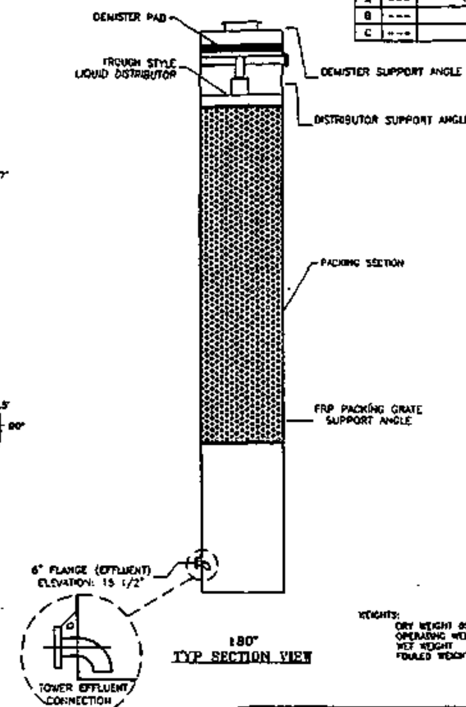
SECTION A-A



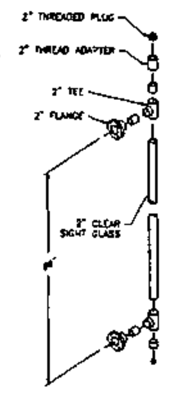
DETAIL 2
TOWER MOUNTING FEET (8)

NOTE:

1. GRATING TO BE FIBERGRATE / CHEMGRATE FRP GRATING. 1" x 4" RECTANGULAR MESH, 1" THICK, 92% MIN. OPEN AREA, WITHOUT ANTI-SKID TREATMENT, OR GRATING MANUFACTURED BY MARTIN MANUFACTURING OR ENGINEERING APPROVED EQUIVALENT. MUST SUPPORT 14,000 LBS OF 3 1/2" DIA. SPHERES
2. GRATING TO BE BONDED BOTH SIDES WITH 3 LAYERS 1 1/2 OZ. MAT ALL AROUND 1" MAX BOND WIDTH OVER GRATING.
3. ALL FLANGE FACES TO BE FLAT AND TRUE TO 1/32" GASKET AREA. FLANGE BOLT HOLES MUST STRADDLE CENTER LINES. FLANGES SHALL BE RATED AT 125 PSI WITH A SAFETY FACTOR OF 5:1. TOWER MUST BE STRAIGHT AND TRUE TO WITHIN A TOLERANCE OF 1/2" OVER THE ENTIRE LENGTH OF THE TOWER. FLANGE GASKETS SHALL BE 1/4" TO 3/8" THICK CLOSED CELL SPONGE NEOPRENE.
4. EXTERIOR COATING TO BE OFF WHITE.
5. DRAWINGS ARE NOT CERTIFIED FOR CONSTRUCTION UNLESS NOTED
6. CONTACT MOLDED: 0.22-V,2M,MRM 0.49-V,2M,3(MR)V,MRM
FILAMENT WOUND: 0.29-V,2M,2,(FW,U),FW 0.29-V,2M,3FW
LEGEND: V-C-VEIL, M-1-1/2 OZ/SQ FT MAT OR CHOP LAYER R-24 OZ/SQ YD WOVEN ROVING U-18 OZ/SQ YD UNI DIRECTIONAL FW-FILAMENT WOUND HELICAL CYCLE
7. REFERENCE DESIGN CALCULATIONS DATED 9/25/98



180°
TYP SECTION VIEW



SIGHT GLASS DETAIL

WEIGHTS:
DRY WEIGHT 6000LBS
OPERATING WEIGHT 15,000LBS
WET WEIGHT
FOULED WEIGHT 30,000LBS

NOZZLE SCHEDULE

ITEM #	QTY.	DESCRIPTION	[illegible]	C.L. ELEVATION
1	2	24" MANWAY	90°	SEE ELEVATION
1	2	24" MANWAY	270	SEE ELEVATION
2	1	6" 150# ANSI FLANGE PATTERN INFLUENT	180°	42'-2"
3	2	1/2" HALF COUPLING	315°	9'-0" & 45'-0"
4	2	2" 150# ANSI FLANGE PATTERN SIGHTGLASS	315°	12" & 88"
5	1	1" NPT-DRAIN	135°	2"
6	1	2" 150# ANSI FLANGE PATTERN	0°	6"
7	1	6" 150# ANSI FLANGE PATTERN EFFLUENT	270°	8"
8	1	12" STUB, AIR INFLUENT	0°	9'-0"
9	1	14" 150# FLANGE AIR EFFLUENT	CIR.	48'-6"

MATERIAL: FIBER GLASS, ISOPHTHALIC POLYESTER RESIN

TOLERANCES UNLESS NOTED OTHERWISE: DECIMAL .03 | FRACTIONAL 1/32" | ANGLES 1°

APPROVAL | DATE
DRN BRM | 9/15/98
38 | 16
PROJECT NO. 407891

CARBONAIR
©1996

TITLE: TOWER PLOT AND ELEVATION EMCON GARVEY GRAIN

SIZE D | DWG NO. 165292 | REV A

SCALE 1=35 | 05-530 | SHEET 1 OF 1

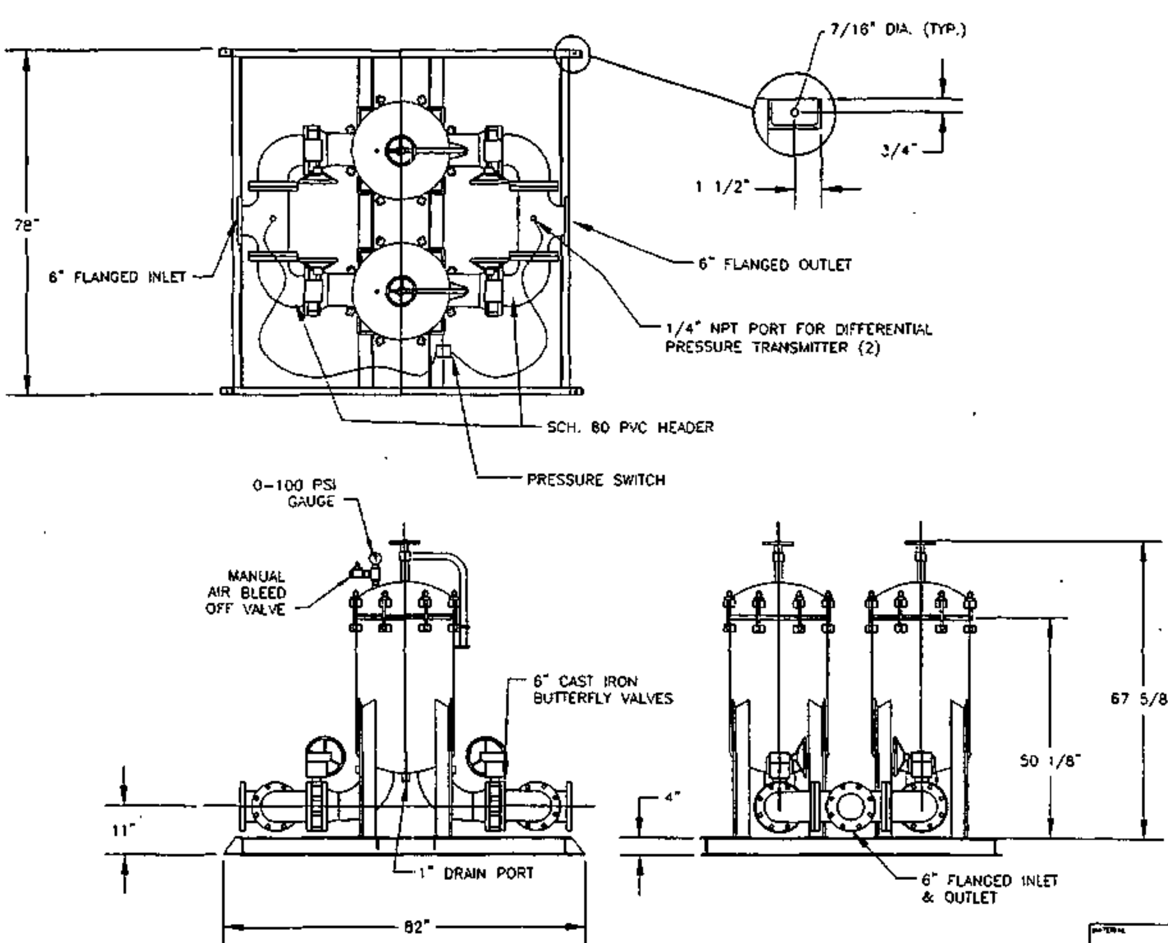
2	3/5/99	RECORD DRAWINGS	APS	MVW	MVW	LAD
1	7/29/98	ISSUED FOR CONSTRUCTION	APS	MVW	MVW	
0	3/3/98	ISSUED FOR REVIEW	SRW	MB		
REV	DATE	DESCRIPTION				

emcon

GARVEY ELEVATORS, INC
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA

STRIPPING TOWER
SECTIONS AND DETAILS

DRAWING NO. C10



REVISIONS				
REV	ECO	DESCRIPTION	DATE	DRN
-	--	RELEASED FOR REVIEW	9/18/98	SHS

MULTI-ROUND LIQUID BAG HOUSING
FEATURES:
EPOXY COATED CARBON STEEL HOUSING, BLACK SATIN FINISH
-150 PSI PRESSURE RATING
-LOW PRESSURE DROP
-316 SST STAINER BASKETS

FILTER SKID ASSEMBLY COLOR TO BE SATIN BLACK.

2	3/9/99	RECORD DRAWINGS	APS	M/W	M/W	JAD
1	3/29/99	ISSUED FOR CONSTRUCTION	APS	M/W	MVB	
0	3/3/98	ISSUED FOR REVIEW	SRM	LW		
REV	DATE	DESCRIPTION	DRN BY	DES BY	CHK BY	APP BY

DESIGNED BY: A. STIKER

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APPROVAL: BRM — DATE: 9/11/98

TOLERANCES: DECIMAL .03 — FRACTIONAL 1/32" — ANGLES 1°

PROJECT NO. 407891

TITLE: PLOT & EL. EMCON GARVEY GRAIN

SIZE B — DWG. NO. 165235 — REV *

SCALE 1=24 — SHEET 1 of 1

emcon

GARVEY ELEVATORS, INC
GARVEY ELEVATORS FACILITY
HASTINGS, NEBRASKA

FILTER PACKAGE
SECTIONS AND DETAILS

DRAWING NO. C11