FINAL ENGINEERING REPORT

FORMER TAYLOR INSTRUMENTS SITE
ROCHESTER, NEW YORK

VOLUME 1
Part 2 of 3
Appendix J

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APPENDIX J

OPERATION AND MAINTENANCE MANUAL WITH AS-BUILT DRAWINGS

DUAL-PHASE VACUUM EXTRACTION REMEDIATION SYSTEM OPERATIONS AND MAINTENANCE MANUAL

FORMER TAYLOR INSTRUMENTS SITE

95 AMES STREET

ROCHESTER, NEW YORK

MARCH 2001

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Operations And Maintenance Manual
Former Taylor Instruments Site
95 Ames Street
Rochester, New York

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ACRONYMS

ABB	Asea Brown Boveri, Ltd.
bgs	below ground surface
BREW	bedrock extraction well
ºC	degrees Celsius
C-E	Combustion Engineering
cfm	cubic feet per minute
CFR	Code of Federal Regulations
COC	chain of custody
DL	detection limit
DPVE	dual-phase vacuum extraction
EPA	Environmental Protection Agency (United States)
ºF	Fahrenheit
FID	flame ionization detector
FIR	Final Investigative Report
gpm	gallons per minute
HASP	health and safety plan
HDPE	high density polyethylene
Hg	mercury
HLA	Harding Lawson Associates
Hz	hertz
µg/L	micrograms per liter
MCPW	Monroe County Pure Waters
MDL	method detection limit
mg/L	milligrams per liter
MH	manhole
ml/min	milliliters per minute
m	meter
mV	millivolts
NYSDEC	New York State Department of Environmental Conservation
O&M	Operations and Maintenance
ORP	oxidation-reduction potential
PID	photoionization detector
PLC	programmable logic controller
ppb	parts per billion

ACRONYMS (Continued)

PPE	personal protective equipment
ppm	parts per million
PQL	practical quantitation limit
psig	pounds per square inch gauge
PVC	polyvinyl chloride
Site	former Taylor Instruments Site, located at 95 Ames Street in Rochester, New York
Sybron	Sybron Corporation
TCE	trichloroethene
VCA	Voluntary Cleanup Agreement
VOC	volatile organic compound

1.0 INTRODUCTION

1.1 OBJECTIVES

This Operations and Maintenance (O&M) Manual has been prepared to aid project personnel in monitoring, operating, and maintaining the on-site dual-phase vacuum extraction (DPVE) remediation system at the former Taylor Instruments Site, 95 Ames Street in Rochester, New York. Section 1.0 of this manual provides general information and describes the DPVE remediation system at the Site. System operation is outlined in Section 2.0, and maintenance and data collection procedures to be followed during system operation are discussed in Section 3.0. Section 4.0 outlines health and safety requirements for O&M and groundwater well monitoring tasks. Section 5.0 discusses the environmental sampling to be performed to evaluate the effectiveness of the groundwater treatment system and to monitor compliance with the industrial sewer use permit. Section 6.0 outlines the project reporting requirements. A list of the points of contact connected with this project is included as Subappendix A.

1.2 BACKGROUND

The former Taylor Instruments site (Site) consists of approximately 14 acres of unoccupied land located in a mixed industrial, commercial, and residential neighborhood. The Taylor Brothers Company (later renamed the Taylor Instruments Company) developed and operated the majority of the Site between 1904 and 1968. During this time, the company produced mercury-filled glass instruments. In 1968, the Taylor Instruments Company merged with the Ritter-Pfaudler Company to form Sybron Corporation (Sybron). Taylor Instruments operated as a division of Sybron until 1983 when Combustion Engineering (C-E) purchased it. C-E continued to operate the Taylor Instruments facility until 1990 when Asea Brown Boveri, Ltd. (ABB) acquired C-E. ABB closed the facility between 1991 and 1993. All but one building at the site were demolished in 1995 and 1996. The remaining building was demolished in January 2001.

On November 6, 1997, the New York State Department of Environmental Conservation (NYSDEC) and C-E entered into a Voluntary Cleanup Agreement (VCA). Under the agreement, C-E investigated the site under NYSDEC supervision and defined the site-specific cleanup goals for volatile organic compounds (VOCs) and mercury, which NYSDEC approved.

In the 1999 Final Investigative Report (FIR), Harding Lawson Associates (HLA) concluded that on-site storm sewers contained sediment that had been a past source of mercury contamination to off-site Monroe County Pure Waters (MCPW) combined sewers. Remediation of the on-site sewers was completed as an interim action in November 1999. Harding ESE, Inc. (formerly Harding Lawson Associates) currently monitors selected on-site locations to determine the effectiveness of these actions. These locations are identified as manholes (MH) 6, 22, 23, and 24.

Another conclusion in the FIR was that mercury and trichloroethene (TCE) were the main site contaminants in subsurface soils and that VOCs were being released to groundwater from two subsurface soil areas within the site. These areas correspond to the locations of former TCE storage and distribution facilities. VOCs present in groundwater include TCE and related chlorinated hydrocarbons thought to be present largely as the result of natural biodegradation of TCE. Remediation of the VOC- and mercury-contaminated on-site soils above their cleanup goals was completed in November 2000. Soil from TCE- and mercury-contaminated areas was excavated above the saturated zone and sent to off-site disposal.

As part of the remedial effort for VOC-contaminated groundwater, Harding ESE installed DPVE wells, vent wells, bedrock extraction wells (BREWs), additional groundwater monitoring wells, and a

groundwater extraction and treatment system in the fall of 2000. This effort was completed in December 2000, and the DPVE remediation system began routine operations on January 3, 2001.

1.3 REMEDIATION SYSTEM OVERVIEW

The remediation system treats VOC-contaminated deep soil and groundwater in the TCE source areas. The extraction portion of the system includes a total of 23 dual-phase vacuum extraction (DPVE) wells, 21 DPVE vent wells, and two BREWs. The process equipment for groundwater extraction and treatment is housed in a 30-by-50-foot building. Subappendix B, Drawing No. C-101 provides a plan view of the extraction and vent wells and the treatment system building. Subappendix B, Drawing No. P-302 provides a plan view of the process equipment and piping. Pictures of the treatment system are provided in Subappendix C.

The remediation system consists of

- Extraction and treatment of a mixture of contaminated groundwater and soil vapors from the DPVE wells. Two vacuum pumps operated in parallel extract a water/vapor mixture from 17 DPVE wells in the South TCE Source Area and one vacuum pump extracts a water/vapor mixture from 6 DPVE wells in the North TCE Source Area. The groundwater/vapor mixture from the South TCE Source Area flows to one air/water separator, and the mixture from the North TCE Source Area flows to a second air/water separator. A condensate pump transfers separated water from each air/water separator to the same equalization tank prior to its treatment by a tray air stripper. The air stream from each air/water separator flows through an in-line filter prior to flowing through one of the vacuum pumps and venting to the atmosphere.

- Passive air supply to enhance soil vapor movement through overburden soils. Fourteen DPVE vent wells in the South TCE Source Area and seven DPVE vent wells in the North TCE Source Area perform this function.

- Extraction and treatment of contaminated groundwater from the BREW wells. Submersible, centrifugal pumps extract groundwater from one BREW in the South TCE Source Area and from one BREW in the North TCE Source Area. Groundwater flows from each BREW to the equalization tank prior to treatment by the tray air stripper.

- Discharge of treated water from the air stripper to the Monroe County sanitary sewer system in accordance with a permit issued by the County.

1.4 OPERATION AND MAINTENANCE ORGANIZATION

The project team whose assigned responsibilities are described below will perform O&M activities for the DPVE remediation system.

- Project Manager – The Harding ESE Project Manager, Rick Ryan, P.E., has first line responsibility for managing Harding ESE and subcontractor personnel in performing the work. This includes controlling the project budget and schedule and ensuring the availability of necessary personnel, equipment, subcontractors, and services. The project manager will also be responsible for communications with the client (ABB Inc.).

- Site Engineer and O&M Manager – The Site Engineer and O&M Manager is Louis Barrentine. He will be the focal point for communication within the project team. He is responsible for the day-to-

day operation of the system, including ensuring that all system components are functioning correctly. He will coordinate all system repairs and adjustments. He is responsible for establishing maintenance tasks and frequency of performance of such tasks. He will ensure that maintenance and treatment system environmental sampling tasks are being performed correctly and on schedule. Treatment system environmental sampling will include sampling of treatment system influent and effluent. He will also be responsible for O&M data management, reporting, and general coordination within the project team. He will be responsible for periodically evaluating system performance and recommending operational adjustments to optimize performance.

- Site Hydrogeologist – The Site Hydrogeologist, Ronny Fields, P.G., is responsible for ensuring that all groundwater and sewer environmental sampling is conducted. This includes sampling and analysis of groundwater and sewer water from select monitoring wells and manholes, respectively.

- Site Technician – Matrix Environmental (Harding ESE subcontractor) will perform all O&M activities at the Site under Harding ESE's direction. These activities include, but are not limited to performing monthly and quarterly maintenance and data collection, and collecting monthly groundwater levels. In addition, the site technician may perform or support non-routine system maintenance, repairs, and adjustments.

- Site Security – The Nichols Team (Harding ESE subcontractor) will perform site security and landscaping tasks at the Site under Harding ESE's direction.

The organization of this project during system O&M is depicted in Figure 1.

1.5 O&M MANUAL REVISIONS AND DISTRIBUTION

Occasionally, modifications will be made to the groundwater treatment system operation that will require this O&M Manual to be updated. Should a modification be required, the O&M manager will be responsible for updating the manual and forwarding the updated pages/sections to the manual holders. The Revisions page and the cover page of the manual will also be updated to outline the changes.

Figure 1: Project Organization

Dual-Phase Vacuum Extraction Remediation System
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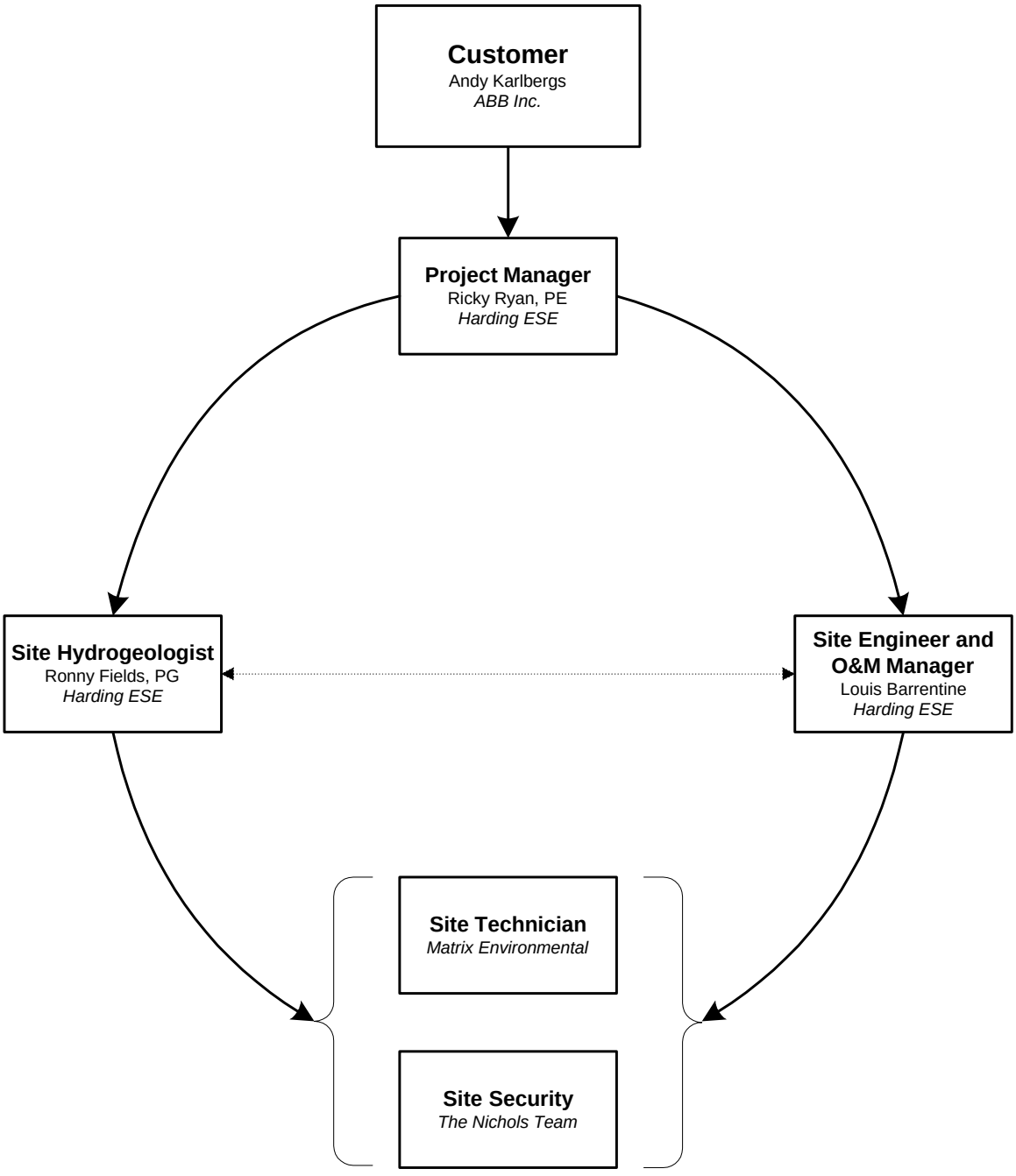


2.0 SYSTEM OPERATION

2.1 OVERVIEW

This section of the O&M Manual provides a description of the components and operation of the DPVE remediation system. As-built drawings of the system are included as Subappendix B.

The DPVE remediation system is housed in a 30-foot by 50-foot weather-tight metal building. The building foundation is concrete. The concrete floor slopes at approximately 1 percent to a 2-by-2-foot sump that will collect any liquid spillage or wash water. The water will be removed, if present, from the sump by a sump pump and discharged into the equalization tank for treatment by an air stripper.

With the exception of the watt-hour meter, all electrical equipment for the treatment system is housed inside the treatment system building. Overhead electrical power (3-phase 480/277 VAC) along with a single pair telephone line was brought to the west side of the building by Rochester Gas and Electric and Frontier Telephone, respectively. Inside the building, a step-down transformer changes the power to 120/240. A panel schedule and wiring details are shown on Drawing E-403 in Subappendix B.

The process equipment for the DPVE remediation system is designed to be an entirely automated operation with only minimal operator activity limited to periodic monitoring and maintenance. Maintenance requirements for the system are outlined in Section 3.0.

2.2 EXTRACTION WELLS

2.2.1 DPVE Wells

Three vacuum pumps in the treatment building extract contaminated groundwater and soil vapors from DPVE wells. There are 6 DPVE wells in the North TCE Source Area and 17 DPVE wells in the South TCE Source Area. The expected air flowrate from the vacuum pumps is approximately 40 cubic feet per minute (cfm) per well. The DPVE wells are 4-inch diameter, with stainless-steel well screens and polyvinyl chloride (PVC) risers. Extracted groundwater and soil vapors flow up the wells through 1.5-inch PVC pipe. Outside the well, the flow is conveyed by 3-inch high density polyethylene (HDPE) piping to a 6-inch and a 8-inch HDPE main pipe header for the North and South TCE Source Areas, respectively. The design flowrate is 3.3 gallons per minute (gpm) for the northern DPVE wells and 8.8 gpm for the southern DPVE wells. Each DPVE well is enclosed in a 36-inch by 36-inch concrete vault. A schematic of the DPVE well detail is enclosed in Subappendix B, Drawing No. C-103.

2.2.2 DPVE Vent Wells

There are 7 vent wells in the North TCE Source Area and 14 vent wells in the South TCE Source Area. Vent wells were installed to help enhance soil vapor movement through overburden soils and are constructed from 2-inch diameter PVC. Each vent well is enclosed in a 36-inch by 36-inch concrete vault. Details of the vent wells are shown in Subappendix B, Drawing No. C-103.

2.2.3 BREWs

There is one BREW in the North TCE Source Area and one BREW in the South TCE Source Area. The BREWs are constructed with 6-inch diameter PVC casings. Submersible, centrifugal pumps extract groundwater from the bedrock extraction wells. Groundwater from the pump is conveyed up the well through a 1.5-inch hose and to the treatment system building by 1.5-inch HDPE piping. The flowrate is

approximately 4 gpm for the north BREW and 14 gpm for the south BREW. Each bedrock extraction wellhead has a locking well cap and is enclosed in a 48-inch by 48-inch concrete vault with a 2.5-foot-square hatch. The layout of the bedrock recovery wells and piping is shown in Subappendix B, Drawing No. C-102.

2.3 TREATMENT SYSTEM

Subappendix B, Drawing No. P-302, shows a plan view of the process piping and instrumentation diagram.

2.3.1 Vacuum Pumps and Air/Water Separators

There are three oil-sealed, liquid ring vacuum pumps that extract vapor and groundwater from the DPVE wells. The vapor and groundwater flows from the wells to two air/water separator tanks inside the treatment building. Air is removed from the top of the tanks by the vacuum pumps and flows through an inline filter prior to reaching each vacuum pump. Water is removed from the bottom of each air/water separator tank by a condensate pump.

The two vacuum pumps for the South TCE Source Area have a design discharge air flowrate of 350 cfm, a minimum discharge air flowrate of 170 cfm, and a maximum horsepower of 25. The vacuum pump for the North TCE Source Area has a design discharge air flowrate of 250 cfm, a minimum discharge air flowrate of 120 cfm, and a maximum horsepower of 20. Each of the three vacuum pumps has a design inlet vacuum of 28 in mercury (Hg), a maximum discharge pressure of 2 pounds per square inch gauge (psig), and an inlet air temperature of 60 degrees Fahrenheit (ºF). The pump motors are 460 volt, 3-phase, and 60 hertz (Hz). They are designed for indoor operation at an ambient temperature not exceeding 40 degrees Celsius (ºC).

The air/water separator for the South TCE Source Area has a design air flowrate of 700 cfm and a design water flowrate of 8.8 gpm, with a working capacity of 36 gallons. The air/water separator for the North TCE Source Area has a design air flowrate of 250 cfm and design water flowrate of 3.3 gpm, with a working capacity of 22.5 gallons. For each of the air/water separators, the maximum vacuum is 28 inch Hg, and the design percent moisture removal is 100 percent. Each air/water separator has a 2-inch-diameter PVC liquid level site tube on the side of the tank, which houses level controls for the condensate pumps, and a vacuum relief valve on top of the tank.

2.3.2 Equalization Tank and Air Stripper

Water from the air/water separators and from the BREW pumps flows into the equalization tank. Any water collected by the building floor sump is also pumped into the equalization tank. The equalization tank has a 1,000-gallon working capacity and is constructed of HDPE with a 24-inch access manhole. The equalization tank has a 4-inch PVC vent to the atmosphere through the roof.

Water is pumped from the tank to the top of the tray air stripper. The flowrate from the equalization tank is regulated by an in-line modulating valve to ensure a constant flow of groundwater through the air stripper. This flowrate ranges from approximately 20 gpm to 35 gpm. A centrifugal blower provides air for the air stripper. The air is forced upward through six trays that volatilize contaminants from the groundwater before discharging to the atmosphere.

Following treatment, water is discharged from the air stripper sump by gravity to the Monroe County sewer. The water is discharged to the sanitary sewer in accordance with MCPW Industrial Sewer Use Permit #827. The permit requires quarterly monitoring with the following discharge limits:

- total mercury: 50 micrograms per liter (µg/L)
- total VOCs: 2.13 milligrams per liter (mg/L), where total VOC is defined as the sum of all VOCs detected above 10 µg/L.

Additional information on permit testing and reporting is provided in Sections 5.3 and 5.7. A copy of the permit is provided in Subappendix D.

2.3.3 Instrumentation and Controls

Control Panel

There is a control panel inside the treatment building that includes the following features:

- Effluent flow recorder: a paper recording of the flowrate (gpm) historically treated by the system, along with a digital reading of the current effluent flowrate.

- The programmable logic controller (PLC) information display. A red light indicates a problem with one or more of the system components, such as the in-line filters, the vacuum pumps, the air stripper, and the sump pump. Pressing the button below the alarm light sequences through information on each system component that has an operational problem. The alarm conditions that can be displayed on the PLC are as follows:

  - vacuum pump #1 not running
  - vacuum pump #2 not running
  - vacuum pump #3 not running
  - high/high level in south air/water separator
  - low/low level in south air/water separator
  - high/high level in north air/water separator
  - low/low level in north air/water separator
  - high/high level in equalization tank
  - low/low level in equalization tank
  - blower trouble
  - differential pressure switch on vacuum pump #1
  - differential pressure switch on vacuum pump #2
  - differential pressure switch on vacuum pump #3

  The PLC can also display information on various components of the treatment system. These displays include

  - equalization tank water level
  - BREW-N-1 flow rate
  - BREW-N-1 totalized flow
  - BREW-S-1 flow rate
  - BREW-S-1 totalized flow
  - system effluent flowrate
  - system effluent totalized flow

- Effluent flow totalizer: a digital display showing current flowrate of the treatment system effluent and the total gallons historically treated by the system.

- Hand/Off/Auto switches and red light trouble indicators for the North TCE Source Area BREW pump, the South TCE Source Area BREW pump, the North TCE Source Area condensate pump, the South TCE Source Area condensate pump, and the equalization tank transfer pump. The North and South TCE Source Area condensate pumps transfer water from the North and South TCE Source Area air/water separators, respectively. When the switch is in the "auto" position, it will cause the indicated pump to start at a high water level and stop at a low water level in the relevant equipment. When the control switch is in the "hand" position, it will cause the indicated pump to start and will bypass the controls within the air/water separator site glass. When the control switch is in the "off" position, it will cause the pump to stop. The applicable red light will come on for a low-low level in an air/water separator. Similarly, a red light trouble indicator will come on for a low-low level in the equalization tank. The control panel will also display a red light if a BREW pump stops operating.

Other Control Mechanisms

- There is an emergency cut-off switch for the equalization tank pump on the power panel on the wall behind the pump.

- There is an autodialer that calls Harding ESE when there is an alarm condition in the PLC. There are eight alarm conditions monitored by the autodialer, as follows:

  - vacuum pump #1 not running
  - vacuum pump #2 not running
  - vacuum pump #3 not running
  - high/high level in south air/water separator
  - high/high level in north air/water separator
  - high/high level in equalization tank
  - blower trouble
  - high/high level in floor sump

- Harding ESE can communicate via a modem with the PLC to collect flowrate information.

2.4 WELL SPECIFICATIONS

Listed below are descriptions of wells related to system operation and performance assessment.

- **23 DPVE Wells**: 4-inch diameter, 21 to 27 feet deep, with approximately 16 to 22 feet of stainless steel, 0.02-inch continuous-slot screen. The riser pipe is Schedule 40 PVC. The filter pack is Morie sand #00N.

- **21 Vent Wells**: 2-inch-diameter PVC, 23 to 28 feet deep, with approximately 18 to 20 feet of 0.02-inch slot screen. The filter pack is Morie sand #00N.

- **2 BREWs**: The North TCE Source Area BREW is 6-inch-diameter Schedule 40 PVC, approximately 76 feet deep, with 50 feet of stainless steel, 0.02-inch continuous-slot screen. The filter pack for the North TCE Source Area BREW is Morie sand #1 and its 8-inch steel permanent casing is set to a depth of 29 feet below ground surface (bgs). The South TCE Source Area BREW is 6-inch-diameter Schedule 40 PVC, approximately 62 feet deep, with approximately 30 feet of stainless steel, 0.02-inch continuous-slot screen. The filter pack for the South TCE Source Area BREW is Morie sand #1 and its 8-inch steel permanent casing is set to a depth of 24 feet bgs.

- **38 Monitoring Wells**: There are a total of 38 monitoring wells located on the site that are associated with the groundwater monitoring program. The monitoring wells are set within the overburden and the bedrock stratigraphic units underlying the site.

  – Overburden: Twenty-one of the thirty-eight monitoring wells are screened in the overburden. The overburden is the subsurface unit located above the bedrock unit. The overburden consists of fill material in the upper most 2 to 5 feet below the subsurface with glacially deposited sand, silt, and gravel in the remaining 5 to 30 feet.

    The following wells are overburden monitoring wells: W-1, W-2, W-3, W-4, W-5, W-6, TW-01, TW-04, TW-07, TW-09, TW-13, TW-17, TW-20, TW-74, MW-00, OB-04, OB-05, OB-06, OB-07, OB-08, and OB-09. The overburden monitoring wells were installed from September 1982 to August 2000, as part of the investigation implemented at the site. Well identification convention has changed over time due to the fact that the wells were installed during different phases of the investigation associated with the Site.

    Monitoring wells W-1, W-2, W-3, W-4, W-5, W-6, and MW-00 are generally constructed of the following materials with the following dimensions: 2-inch-diameter Schedule 40 PVC riser; 5-foot section of 2-inch-diameter Schedule 40 PVC, 0.010-inch cut-slot screen; filter pack; and bentonite seal. W-6 differs by having a screened interval of 2 feet. The depths of these overburden monitoring wells range from 10 to 26 feet bgs.

    Monitoring wells TW-01, TW-04, TW-07, TW-09, TW-13, TW-17, TW-20, and TW-74 are constructed of the following materials with the following dimensions: 2-inch-diameter Schedule 40 PVC riser; 5-foot section of 2-inch diameter Schedule 40 PVC, 0.010-inch cut-slot screen; filter pack; and bentonite seal. The depths of these overburden monitoring wells range from 15 to 22 feet bgs.

    Monitoring wells OB-04 and OB-05 are constructed of the following materials with the following dimensions: 2-inch-diameter Schedule 40 PVC riser; 15-foot section of 2-inch-diameter Schedule 40 PVC, 0.010-inch cut-slot screen; filter pack; bentonite seal above the filter pack; and grout to the surface. The depths OB-04 and OB-05 are approximately 17.5 to 18 feet bgs, respectively.

    Monitoring wells OB-06, OB-07, OB-08, and OB-09 are constructed of the following materials and with the following dimensions: 2-inch-diameter Schedule 40 PVC riser; 10-foot section of 2-inch-diameter Schedule 40 PVC, 0.020-inch cut-slot screen; Morie sand #00N filter pack; a 2-foot bentonite seal above the filter pack; and grout within 2 feet of the ground surface. The depths of these overburden monitoring wells range from 17 to 26 feet bgs.

  – Bedrock: The remaining 17 of the 38 monitoring wells penetrate the bedrock. The bedrock has been mapped as the Lockport Dolomite. Regionally this formation consists of light to medium gray, fine- to medium-grained, siliceous dolomite with flat to gently dipping, thin to medium bedding. On-site depth to competent bedrock is approximately 20 to 30 feet bgs. The bedrock monitoring wells are identified as BR-01 through BR-17. Monitoring wells BR-08 and BR-14 are considered “deep” bedrock monitoring wells.

    The bedrock monitoring wells BR-01 through BR-07 are constructed of the following materials with the following dimensions: a 4-inch-diameter steel casing, socketed and grouted into bedrock approximately 2 to 3 feet and a 3 7/8-inch-diameter open borehole to depth. The depths range from 42 to 53 feet bgs.

The bedrock monitoring wells BR-09, BR-10, BR-11, BR-12, BR-13, BR-15, BR-16, and BR-17 are constructed of the following materials with the following dimensions: a 6-inch-diameter steel casing, socketed and grouted into bedrock approximately 2 to 3 feet and a 5 7/8-inch-diameter open borehole to depth. The depths range from 42 to 67 feet bgs.

The "deep" bedrock monitoring wells BR-08 and BR-14 are constructed of the following materials and with the following dimensions: a 6-inch-diameter steel casing, socketed and grouted into bedrock approximately 2 to 3 feet; a second 4-inch-diameter still casing installed at 63 and 66 feet bgs, respectively; and a 3 7/8-inch-diameter open borehole to depth. The depths are 73 and 75 feet bgs, respectively.

2.5 EQUIPMENT LIST

Subappendix E provides system equipment information. The remedial treatment system consists of the following equipment.

- **2 Air/Water Separator Tanks**: The South TCE Source Area air/water separator has a design air flowrate of 700 cfm and a design water flowrate of 8.8 gpm, with a working capacity of 36 gallons. The North TCE Source Area air/water separator has a design air flowrate of 250 cfm and design flowrate of 3.3 gpm, with a working capacity of 22.5 gallons. For each of the air/water separators, the maximum vacuum is 28 inch Hg, and the design percent moisture removal is 100 percent. Each air/water separator has a 2-inch-diameter PVC liquid level site tube on the side of the tank that houses level control switches for the respective condensate pumps and a vacuum relief valve on top of the tank.
- **3 Oil-Sealed, Liquid Ring Vacuum Pumps**: Two of the vacuum pumps have a design discharge air flowrate of 350 cfm, a minimum discharge air flowrate of 170 cfm, and a maximum horsepower of 25. The third vacuum pump has a design discharge air flowrate of 250 cfm, a minimum discharge air flowrate of 120 cfm, and a maximum horsepower of 20. Each of the three vacuum pumps has a design inlet vacuum of 28 in Hg, a maximum discharge pressure of 2 psig, and an inlet air temperature of 60 ºF. The pump motors are 460 volt, 3-phase, and 60 Hz. They are designed for continuous indoor operation at an ambient temperature of 40 ºC.
- **1 Equalization Tank**: The equalization tank has a 1,000-gallon working capacity. It is constructed of HDPE and has a 4-inch PVC vent to the atmosphere through the roof.
- **1 Tray Air Stripper**: Water flowrate through the stripper ranges from approximately 20 gpm to 35 gpm. A centrifugal blower provides air for the air stripper.
- **Various Transfer Pumps**, including:
  - two condensate pumps that transfer water from the two air/water separators to the equalization tank,
  - one sump pump that transfers liquid collected in the building sump to the equalization tank, and
  - one equalization tank pump that transfers water from the equalization tank to the air stripper.
- **1 Main Control Panel**: the main control panel controls are described in Section 2.3.3.

3.0 SYSTEM MAINTENANCE

3.1 OPERATION AND MAINTENANCE DOCUMENTATION

O&M shall be documented by completing the forms provided in Subappendix F. The completed forms will be faxed to Harding ESE, fax number 865-531-8226, on the day of each visit. Harding ESE will be immediately notified by phone (865-531-1922) of any observed deficiencies of the system.

3.2 ROUTINE EQUIPMENT MAINTENANCE

The site technician will conduct various maintenance activities on a monthly and quarterly basis.

3.2.1 Monthly Equipment Maintenance

Monthly maintenance will be conducted during the first week of each month during which there is no quarterly event. Monthly maintenance activities will include the following:

- General Operational:
  - Collect treatment system operational data on O&M data collection sheets, titled "Data Collection Sheet: Treatment Building" and "Data Collection Sheet: System Well Data". A copy of these O&M data collection sheets is provided in Subappendix F. The operational data to be collected includes line pressures, equipment run time, flows, vacuum at wellheads, etc. The completed data collection sheets will be faxed (865-531-8226) to the Harding ESE O&M manager. A copy will be kept at the Site, and the original will be mailed to Harding ESE.
  - Collect and record groundwater levels from 36 monitoring wells: BR-01 through BR-17, OB-04 through OB-09, W-1 through W-5, TW-01, TW-04, TW-07, TW-09, TW-13, TW-17, TW-20, and TW-74. Record groundwater levels on the data collection sheet titled "Water Level Data: Groundwater Monitoring Wells". A copy of this data sheet is provided in Subappendix F.
  - Check operation of all equipment for vibration, unusual noise, or leaks. Record any unusual observations on the data sheet. Report any deficiencies to the Harding ESE O&M manager immediately by phone.
  - Use a water hose to wash down the treatment building floor with water.
- Vacuum pumps (three):
  - Inspect the inlet filter element and replace or clean as needed.
  - Check that oil is flowing through the scavenging line.
  - Check for oil leaks.
  - Check the oil level. Add additional oil if needed.
  - Clean the y-strainer screen.
  - Check for water in the air-oil separator and drain if necessary.
- Air Stripper:
  - Inspect the air stripper trays. Clean the trays if any fouling is found. If cleaning is needed, use a pressure washer with washer wand. Follow the instructions given on pages 16 through 18 of the QED Environmental Systems *QED EZ-Tray Air Stripper System, Operations and Maintenance Manual* in Subappendix G.

3.2.2 Quarterly Equipment Maintenance

Quarterly events will be conducted during the first week of March, June, September, and December of each year. Quarterly maintenance activities will include:

- General Operational:
  - Collect treatment system operational data on O&M Data Collection Sheets, titled "Data Collection Sheet: Treatment Building" and "Data Collection Sheet: System Well Data". A copy of these O&M Data Collection Sheets is provided in Subappendix F. The operational data includes line pressures, equipment run time, flows, vacuum at wellheads, etc. All data collection sheets will be faxed (865-531-8226) to the Harding ESE O&M manager. A copy will be kept at the Site, and the original will be mailed to Harding ESE.
  - Check operation of all equipment for vibration, unusual noise, or leaks. Record any unusual observations on the data sheet. Report any deficiencies to the Harding ESE O&M manager immediately by phone.
  - Use a water hose to wash down the treatment building floor with water.

- Vacuum pumps (three):
  - Inspect the inlet filter element and replace or clean as needed.
  - Check that oil is flowing through the scavenging line.
  - Check for oil leaks.
  - Check the oil level. Add additional oil if needed.
  - Clean the y-strainer screen.
  - Check for water in the air-oil separator and drain if necessary.
  - Check couplings or pulleys for tightness on the shafts. Adjust as necessary.
  - Check and note the ampere draw for each motor.

- Air Stripper:
  - Clean the air stripper trays, using a pressure washer with washer wand. Follow the instructions given on pages 16 through 18 of the QED Environmental Systems *QED EZ-Tray Air Stripper System, Operations and Maintenance Manual* in Subappendix G.

- Air/Water Separators (two):
  - Clean the sight tubes and level probes.

3.3 BACKFLOW PREVENTION DEVICE

3.3.1 Prohibition of Connections Prior to the Backflow Prevention Device

No connection will be made to the sanitary sewer prior to the backflow prevention device.

3.3.2 Yearly Inspection of Backflow Prevention Device

Harding ESE will arrange a yearly inspection and testing of the backflow prevention device by a New York State Department of Health (NYSDOH) Certified Backflow Prevention Device Tester to comply

with the NYSDOH "Approval of Completed Works" provided in Subappendix D. A copy of the inspection and testing results will be kept at the site.

3.4 NON-ROUTINE MAINTENANCE

When the O&M manager is notified of a problem by the autodialer or by a site technician phone call, the O&M manager will immediately direct the site technician to fix the problem and restart the system as soon as possible.

4.0 HEALTH AND SAFETY

4.1 OVERVIEW

This section of the O&M manual supplements the original Health And Safety Plan (HASP) prepared for this project in April 2000. The original HASP is attached as Subappendix H. Excavation, staging, and loading of mercury- and TCE-contaminated soil, installation of recovery and monitoring wells, and remedial system installation tasks are completed; however, the HASP contains administrative, communication, and emergency procedures that still apply during the treatment system O&M. The original HASP did not address lockout procedures and well sampling procedures. These topics are discussed in the following sections.

4.2 ENERGY LOCKOUT/RELIEF

Extreme caution should be used when maintaining the groundwater treatment system equipment. Dangerous sources of energy include electricity and pressurized water. Prior to beginning any maintenance task, the electrical source to the equipment must be shut down by turning the Hand/Off/Auto switch to the off position and by turning off the equipment's circuit breaker in the power panel or lighting panel. The panel must be "locked out" after de-energizing the equipment and the lock may be removed only after maintenance is successfully completed. Lockout/tagout regulations are found in 29 Code of Federal Regulations (CFR) 1910.147 and 29 CFR 1910.147, Appendix A.

In addition to electrical hazards, several groundwater system components may contain negative pressures that could result in injury if not properly relieved prior to O&M work. The components that encounter these negative pressures are the three vacuum pumps and the two air/water separators. The system is equipped with numerous valves that can be used to bleed off pressurized lines and equipment.

4.3 GROUNDWATER WELL SAMPLING

The air quality shall be monitored in the breathing zone prior to and during sampling of groundwater wells. Level D personal protective equipment (PPE) (with nitrile gloves) shall be used unless air quality data demonstrates the breathing zone air is being impacted. The following action limits will be used to upgrade PPE based on the type of monitoring instrument used:

- Monitoring of breathing zone using a photoionization detector (PID): If PID readings reach or exceed 0.4 parts per million (ppm), upgrade to Level C PPE. If PID readings reach or exceed 3.5 ppm, upgrade to Level B PPE.

- Monitoring of breathing zone using a flame ionization detector (FID): If FID readings reach or exceed 0.4 ppm, upgrade to Level C PPE. If FID readings reach or exceed 2.5 ppm, upgrade to Level B PPE.

5.0 ENVIRONMENTAL DATA

5.1 OVERVIEW

Environmental data will be collected as described in the following sections to determine compliance with the Industrial Sewer Use Permit, the concentration of contaminants of concern in the groundwater, and the effectiveness of the treatment system. Chains of custody (COCs) must be completed for all analytical samples. Copies of the COCs for samples must be filed at the site and faxed to the O&M manager.

5.2 SEWER SAMPLING

The MCPW Industrial Sewer Use permit requires that grab samples be collected quarterly from each of the four manholes (MH-6, MH-22, MH-23, and MH-24) on the western boundary of the site along Hague Street. Harding ESE will collect grab samples of the sewer water from the specified monitoring points in March, June, September, and December through September 2002. Samples will be collected using long-handled equipment such that samples can be obtained without physical entry into the manhole. Samples will be sent to Columbia Analytical Services for analysis of total mercury by U.S. Environmental Protection Agency (EPA) Method 7471A and VOCs by EPA Method 601/602. A copy of the MCPW Industrial Sewer Use permit is provided in Subappendix D.

5.3 GROUNDWATER TREATMENT SYSTEM EFFLUENT COMPLIANCE SAMPLING

The MCPW Industrial Sewer Use permit requires that grab samples be collected monthly from the effluent piping valve in the groundwater treatment system. Matrix Environmental will collect monthly grab samples from the air stripper effluent line sampling port. The samples will be sent to Columbia Analytical Services for analysis. The samples will be analyzed for total mercury by EPA Method 7471A and for VOCs by EPA Method 601/602.

In addition to filing a copy of each COC at the site, a copy of it must be faxed (865-531-1922) to the O&M manager at Harding ESE.

5.4 WATER LEVELS

Matrix Environmental will collect water levels monthly from each of 36 monitoring wells (see Section 3.2.1). As part of each groundwater monitoring event, Harding ESE will collect water levels from the monitoring wells included in the site groundwater monitoring program (see Section 5.5).

5.5 SITE GROUNDWATER MONITORING

Harding ESE will conduct groundwater monitoring events quarterly for the first 2 years of treatment plant operation (2001 and 2002) and semi-annually for the next 5 years (2003 through 2007). Table 5-1 shows the monitoring wells and analyses for each site groundwater monitoring event. Section 5.7 provides information on analytical methods.

Table 5-1
Summary Of Groundwater Monitoring Event Analyses

Dual-Phase Vacuum Extraction Remediation System, Operations And Maintenance Manual
Former Taylor Instruments Site, 95 Ames Street
Rochester, New York

Well	Type of Analysis*															
	VOC (8260)	Alkalinity	Chloride	CO_2	Ethane	Ethene	Iron (II)	Methane	Nitrate	Sulfate	Sulfide	TOC	DO	pH	Temperature	ORP
BR-01	X												X	X	X	X
BR-02	X												X	X	X	X
BR-03	X												X	X	X	X
BR-04	X												X	X	X	X
BR-05	X												X	X	X	X
BR-06	X												X	X	X	X
BR-07	X												X	X	X	X
BR-08	X												X	X	X	X
BR-09	X												X	X	X	X
BR-10	X												X	X	X	X
BR-11	X												X	X	X	X
BR-12	X												X	X	X	X
BR-13	X												X	X	X	X
BR-14	X												X	X	X	X
BR-15	X												X	X	X	X
BR-16	X												X	X	X	X
BR-17	X												X	X	X	X
EW-S-8[a]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW00	X												X	X	X	X
OB-04	X												X	X	X	X
OB-05[a]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
OB-06	X												X	X	X	X
OB-07[b]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
OB-08	X												X	X	X	X
OB-09[b]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TW-04[c]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TW-07[c]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TW-09[c]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TW-13	X												X	X	X	X
TW-17[c]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TW-20[c]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
W-2[d]		X	X	X									X	X	X	X
W-4	X												X	X	X	X
W-5[c]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
W-6	X												X	X	X	X

* Each monitoring event will include 10 quality assurance/quality control samples. This table does not include all parameters measured to determine stabilization.

[a] Includes natural biodegradation parameters for conditions in the source area.
[b] Includes natural biodegradation parameters for conditions at the leading edge of the plume.
[c] Includes natural biodegradation parameters for conditions at the downgradient perimeter of the plume.
[d] Includes natural biodegradation parameters for background conditions.

Notes: CO_2 = carbon dioxide. DO = dissolved oxygen.
ORP = oxidation-reduction potential. TOC = total organic compound.
VOC = volatile organic compound.
X = Required analyses; DO, pH, temperature, and ORP are field measurements.

All samples will be collected using a low-flow purging technique. Sampling protocol will be:

1. The "Field Data Record – Low Flow Groundwater Sampling" form must be completed for each sampled monitoring well. A copy of this form is provided in Subappendix I.

2. Measure the depth to water in the well.

3. Use a peristaltic pump capable of producing a flowrate of less than 400 milliliters per minute (ml/min) to remove groundwater from the well. The pump intake should be located in the middle or slightly above the level of the screened interval. Monitor the depth to water in the well and keep flowrates as low as possible to minimize drawdown. Drawdown should remain less than 0.1 meter (m).

4. Use a flow-through cell (e.g., Horiba U-22) to determine when the following parameters stabilize: pH, specific conductivity, oxidation-reduction potential (ORP), turbidity, dissolved oxygen, and temperature. Readings for these parameters should be taken at sufficient intervals so that each reading represents a separate, distinct volume of water. The interval will be based on the flowrate and the volume of the flow-through cell to ensure that enough water passes through the flow-through cell between readings. A parameter is considered stable when readings taken for three separate, successive volumes of water in the flow-through cell are within a certain range. Three successive readings should be within ±0.1 for pH, ±3 percent for conductivity, ±10 millivolts (mV) for ORP, and ±10 percent for turbidity, dissolved oxygen, and temperature.

5. Collect samples after the parameters stabilize. At a minimum, pH, conductivity, and turbidity or dissolved oxygen should stabilize. The flow-through cell should be disconnected during sample collection. Samples should be unfiltered. Collect samples in containers appropriate for the analyses to be performed. COC forms must be completed that include all analytical samples. Samples must be placed on ice in coolers immediately and delivered to the analytical laboratory in a timely manner to allow for sample analysis within the required holding time.

6. If significant drawdown occurs, continue removing groundwater at a low flowrate until the well is dry. As the well refills with water, collect samples when parameters become stable. Another option is to take water samples when the groundwater level in the well reaches the original level or 24 hours later, depending on the rate of refill.

7. Any purge water generated during sampling shall be sent to the groundwater treatment system as directed by the O&M manager.

5.6 GROUNDWATER TREATMENT SYSTEM PERFORMANCE SAMPLING

Matrix Environmental will collect water and vapor samples monthly to enable Harding ESE to assess the treatment system effectiveness. Columbia Analytical Services will provide sample analysis. The following samples will be collected and sent for analysis:

Location	Quantity of Samples	Media/Type	Analysis and Method
Vacuum Pump Exhaust	1 at each of the 3 vacuum pumps	Vapor/Grab	VOCs by EPA Modified Method TO-14
Air Stripper Exhaust	1	Vapor/Grab	VOCs by EPA Modified Method TO-14
Air Stripper Influent	1	Water/Grab	VOCs by EPA Method 8260B
Air Stripper Effluent	1	Water/Grab	VOCs by EPA Method 8260B

Note: The air stripper effluent will also be sampled as outlined in Section 5.3.

In addition to filing a copy of each COC at the site, a copy of it must be faxed (865-531-8226) to Harding ESE.

5.7 ANALYTICAL METHODS

Analytical methods for environmental samples are summarized below. Further information on sampling events is given is Sections 5.1, 5.2, 5.3, 5.5, and 5.6.

Purpose	Media	Location	Analyte	Method	Frequency
Permit Compliance	Water (grab samples)	Sewers	Total Mercury	7471A	Quarterly
			VOCs	601/602	Quarterly
Permit Compliance	Water (grab samples)	Air Stripper Effluent	Total Mercury	7471A	Monthly
			VOCs	601/602	Monthly
Assess GW Remediation, including Biodegradation Conditions	Water	Groundwater Wells	VOCs	8260B	See Note 1 and Note 2
			Alkalinity	310.1	See Note 1
			Chloride	325.1	See Note 1
			CO_2*	4500B	See Note 1
			Ethane	RSK175/8015M	See Note 1
			Ethene	RSK175/8015M	See Note 1
			Methane	RSK175/8015M	See Note 1
			Iron (II)*	6010-FE*	See Note 1
			Nitrate*	353.2	See Note 1
			Sulfate	375.4	See Note 1
			Sulfide	376.1	See Note 1
			TOC	415.1	See Note 1
			DO	Field Measurement	See Note 1
			pH	Field Measurement	See Note 1
			Temp.	Field Measurement	See Note 1
			ORP	Field Measurement	See Note 1
Assess Groundwater Treatment System Performance	Vapor (grab sample)	Vacuum Pumps Exhaust	VOCs	Modified Method TO-14	Monthly
	Vapor (grab sample)	Air Stripper Exhaust	VOCs	Modified Method TO-14	Monthly
	Water (grab sample)	Air Stripper Influent	VOCs	Method 8260B	Monthly
	Water (grab sample)	Air Stripper Effluent	VOCs	Method 8260B	Monthly

Note 1: Frequency for groundwater monitoring is quarterly for the first two years, then semi-annually for the next five years.
Note 2: For each groundwater monitoring event, 10 quality assurance/quality control (QA/QC) samples will be analyzed for 8260 parameters.
*CO_2, Iron (II), and nitrate analyses have a 24-hour hold time. If shipping is required to get these samples to the laboratory, field test kits should be used to determine the concentration of these analytes.

Subappendix J provides a constituent list of the VOCs obtained by EPA Methods 8260 and 601/602.

5.8 LABORATORY REQUIREMENTS

The laboratory must have current NYSDEC ELAP certification for the analytes listed in Section 5.7. The laboratory must demonstrate the ability to meet a detection limit (DL) of 0.2 mg/L for mercury, a practical quantitation limit (PQL) of 5 µg/L for VOCs other than vinyl chloride, and a PQL of less than 2 µg/L for vinyl chloride.

The laboratory is required to provide pre-preserved containers in coolers with trip blanks, temperature blanks, and COC forms. The laboratory will provide a standard turnaround time of 10 to 14 days from receipt of the samples to delivery of the hard copy results. The hard copy results will be provided to the Harding ESE site hydrogeologist. The laboratory will also provide an electronic copy of the data as a

*.txt file. The electronic copy shall be sent by email to the Harding ESE site hydrogeologist (jrfields@mactec.com). The fields required in the electronic deliverable are:

Field	Examples	Notes
SAMP_ID	MW-1, QATB, Rinse Blank	Sample ID from COC
SAMP_DATE	06/04/98	Format: xx/xx/xx, sample date from COC
SAMP_TIME	15:20	24-hour time clock, sample time from COC
MEDIA	GW, S, SED	Sample media: GW for groundwater, S for soil, SED for sediment
METHOD_ID	8260	Analytical method
LSAMP_ID	184368	Internal laboratory sample identification number
CAS_NUM	79-01-6	CAS number for the analyte
NAME	Trichloroethylene	Analyte name
DL_FLAG	<, +	< for nondetects, + for detections
CONC	50	Analyte concentration
PQ_LIMIT	5	Practical quantitation limit
SQ_LIMIT	5	Sample quantitation limit
UNITS	µg/L	Units of the analyte concentration
QUALIFIER	E, J	Data qualifier, if any
DILUTION	10	Dilution factor
SAMPLER	RF	Initials of sampler, from COC
NOTE		Analytical notes, if any. Maximum of 50 characters.

6.0 REPORTING AND NOTIFICATION

6.1 OVERVIEW

O&M of the DPVE remediation system will require periodic reporting to the MCPW and to the NYSDEC. The MCPW requires that discharge monitoring reports be submitted to Monroe County upon receipt of analytical results from the laboratory. The sewer use permit also requires a notification within 24 hours of becoming aware that discharge monitoring results are in violation of any permit limit. Groundwater monitoring reports will be submitted to NYSDEC quarterly for the first 2 years and semi-annually for the following 5 years. The results of a yearly inspection and testing of the backflow prevention device must be submitted to MCPW and to the Monroe County Department of Health.

6.2 MCPW INDUSTRIAL SEWER USE PERMIT REPORTING AND NOTIFICATION

6.2.1 Compliance Reports

The MCPW Industrial Sewer Use Permit requires that Harding ESE submit discharge monitoring reports to Monroe County upon receipt of the laboratory analytical report. Harding ESE collects samples for analysis quarterly from the sewer monitoring points (MH-6, MH-22, MH-23, and MH-24) and monthly from the treatment system effluent piping. Harding ESE will submit monthly discharge reports to Monroe County. The discharge monitoring reports will include:

- The results of sampling compared to the permit limits for the treatment effluent. The permit limits for the treatment effluent are 50 parts per billion (ppb) for mercury and 2.13 ppm for total VOCs. Total VOCs are defined as the summary of all VOCs detected above 10 µg/L.

- The results of sampling compared to the permit limits each of the four sewer monitoring points, if the sewers were monitored during the month. The permit limits for each monitoring point are 50 ppb for mercury and 2.13 ppm for total VOCs. Because the sewer monitoring is quarterly, typically four of the monthly reports will include sewer sampling results. The exception will be if the sewers are resampled during a different month; in this case, the results will be included in the discharge report for that month.

- A copy of the laboratory analytical reports and COC forms pertaining to the discharge monitoring report.

6.2.2 Notification of Violation of Permit Limit

The MCPW Sewer Use Permit requires that Harding ESE notify Monroe County within 24 hours of becoming aware that discharge monitoring is in violation of any permit limit. Notification shall be directed to the Monroe County Department of Environmental Services, Division of Pure Waters, Industrial Waste Section at 716-760-7600.

The permit also requires that Harding ESE repeat sampling and analysis for the analyte in non-compliance and submit the results of the repeat analysis to Monroe County within 30 days after becoming aware of the violation.

6.3 GROUNDWATER MONITORING REPORTS

Harding ESE will submit groundwater monitoring reports to NYSDEC quarterly for the first 2 years and semi-annually for the following 5 years. Groundwater monitoring reports will include, but not be limited to:

- A summary of activities, such as wells sampled, type of sampling (e.g., low flow), analytical methods, field tests, and field measurements;
- Map(s) showing the location of monitored wells
- Groundwater levels for the monitoring event
- Potentiometric surface map(s) and interpretation of groundwater flow direction(s) and gradient(s)
- Analytical results for contaminants of concern
- Analytical results for natural attenuation parameters
- Interpretation and analysis of data, including:
  - comparison of analytical results for contaminants of concern to remediation goals
  - comparison of data to previous results
  - evidence for the occurrence of biodegradation
- A copy of laboratory analytical reports and COC forms

6.4 BACKFLOW PREVENTION DEVICE INSPECTION REPORT

Harding ESE will submit the results of the yearly inspection and testing of the backflow prevention device to MCPW and the Monroe County Department of Health. The inspection and testing must be conducted by a NYSDOH certified backflow prevention device tester. Subappendix D provides a copy of the NYSDOH "Approval of Completed Works" that describes this requirement.

SUBAPPENDIX A

POINTS OF CONTACT

SUBAPPENDIX A
POINTS OF CONTACT

Item	Organization	Contact	Telephone Number
Industrial Sewer Permit Use – Monthly Reporting	MCPW	Harry Reiter Monroe County Pure Waters 444 East Henrietta Road Building 15 Rochester, NY 14620-4630	716 760-7600 716-428-4780 (fax)
Groundwater Monitoring – Quarterly Reporting	NYSDEC	Davida Pratt, PE 6274 East Avon-Lima Rd. Avon, NY 14414	716-226-5355 716-226-8696 (fax)
Project Manager	Harding ESE	Ricky Ryan, PE Harding ESE 1400 Centerpoint Blvd. Suite 158 Knoxville, TN 37932	865-531-1922 865-694-2964 (direct) 865-531-8226 (fax) 423-322-0281 (mobile)
Site Engineer and O&M Manager	Harding ESE	Louis Barrentine Harding ESE 1400 Centerpoint Blvd. Suite 158 Knoxville, TN 37932	865-531-1922 865-694-2998 (direct) 865-531-8226 (fax) 865-406-3851 (mobile)
Site Hydrogeologist	Harding ESE	Ronnie Fields, PG Harding ESE 1400 Centerpoint Blvd. Suite 158 Knoxville, TN 37932	865-531-1922 865-694-2996 (direct) 865-531-8226 (fax) 423-505-5800 (mobile)
Site Technician	Matrix Environmental Technologies	Pat Bliek / Steve Marchetti 5835 Ellis Rd. P.O. Box 427 Orchard Park, NY 14127-0427	716-662-0745 716-662-0946 (fax) 716-583-5761 (Mobile)
Site Security	The Nichols Team	Bill Randle 125 Tech Park Dr. #104 Rochester, NY 14623-2438	716-427-9480 716-427-8744 (fax) 716-370-1407 (Mobile) 716-955-2260 (pager)
Telephone Company	Frontier Telephone of Rochester, Inc.	P.O. Box 23008 Rochester, NY 14692-3008	716-777-1234
Electric Company	Rochester Gas and Electric (RG&E)	Bill Flood Senior Acct Manager 89 East Ave. Rochester, NY 14649-0001	716-724-8168 716-724-8811 (fax)
Electrician	Yaeger Electric Co., Inc.	Martin Yaeger 147 Route 104 Ontario, NY 14519	716-265-1866 716-265-1719 (Fax)
Instrumentation	ABB Instrumentation, Inc.	Joseph R. Dioguardi P.O. Box 20550 1175 John Street W. Henrietta, NY 14586	716-273-6204 716-273-6232 (Fax)
Tray Air Stripper	QED Environmental Systems, Inc.	Tim Rinesmith P.O Box 3726 Ann Arbor, MI 48106	800-624-2026 734-995-1170 (fax)

Item	Organization	Contact	Telephone Number
Vacuum Pumps and Air/Water Separators	Gustavo Preston Co.	David Downey 10 Kidder Road, Suite 8 Chelmsford, MA 01824	978-250-3333 978-256-9611 (fax)
Transfer Pumps	F.E. Myers	Technical Support 1101 Myers Parkway Ashland, OH 44805	419-289-1144 419-289-6658 (fax)
Submersible Pumps	Grundfos	Technical Support 2555 Clovis Ave. Clovis, CA 93612	559-292-8000 559-291-1357 (fax)
Plumber	Billone Mechanical Contractors	Tom Billone 195 Dewey Ave. Rochester, NY 14608	716-647-2880 716-647-6364 (fax)
General Contractor	L & O Mechanical	Darren Oswald 768 Brooks Ave. Rochester, NY 14619	716-436-4620 716-436-4659 (fax)
Quarterly Groundwater Sampling Laboratory	Columbia Analytical Services	Michael Perry 1 Mustard Str., Ste. 250 Rochester, NY 14609	716-288-5380 716-288-8475 (fax)
Discharge Permit Sampling Laboratory	Columbia Analytical Services	Michael Perry 1 Mustard Str., Ste. 250 Rochester, NY 14609	716-288-5380 716-288-8475 (fax)
Performance Sampling Laboratory	Columbia Analytical Services	Michael Perry 1 Mustard Str., Ste. 250 Rochester, NY 14609	716-288-5380 716-288-8475 (fax)

SUBAPPENDIX B

AS-BUILT DRAWINGS

FORMER TAYLOR INSTRUMENT SITE

DUAL PHASE VACUUM EXTRACTION REMEDIAL CONSTRUCTION

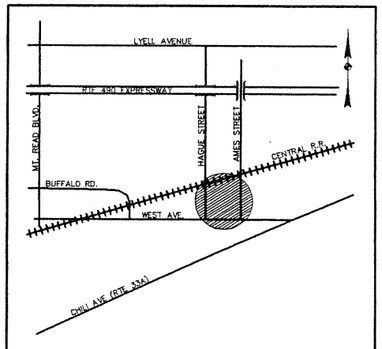
ABB COMBUSTION ENGINEERING, INC.

ROCHESTER, NEW YORK

AS-BUILT DRAWINGS

NOTES:

1. THE ENGINEER CERTIFIES THE AS-BUILT CONDITIONS ONLY. THIS AS-BUILT CERTIFICATION IS NOT INTENDED TO CERTIFY THE DESIGN OR CONFIGURATION AS CERTIFIED BY THE ORIGINAL DESIGNERS.
2. ALL SHEETS EXCEPT SHEETS 9 AND 12 HAVE BEEN REVISED TO REFLECT MODIFICATIONS TO INDICATE TRUE FIELD CONFIGURATIONS.
3. THE ORIGINAL DESIGN FOR THE DUAL-PHASE VACUUM EXTRACTION REMEDIAL SYSTEM IS REFLECTED IN THE PLANS AND SPECIFICATIONS CERTIFIED ON JUNE 30, 2000.



PROJECT LOCATION
(NOT TO SCALE)

DRAWING NUMBER	SHEET NUMBER	DRAWING TITLE
I-1	1	COVER SHEET
C-10	2	SYMBOLS, ABBREVIATIONS AND GENERAL NOTES
C-101	3	SITE PLAN
C-102	4	WELL DETAILS
C-103	5	VAULT DETAILS
C-104	6	CIVIL DETAILS
S-201	7	TREATMENT BUILDING EQUIPMENT LAYOUT PLAN AND BUILDING ELEVATIONS
S-202	8	TREATMENT BUILDING BUILDING FOUNDATION, FLOOR SLAB, AND STRUCTURAL
P-301	9	PIPING AND INSTRUMENTATION SYMBOLS
P-302	10	PIPING AND INSTRUMENTATION DIAGRAM
P-303	11	TREATMENT BUILDING PIPING PLAN AND SECTIONS
E-401	12	ELECTRICAL LEGEND
E-402	13	ELECTRICAL BUILDING PLAN
E-403	14	ONE LINE DIAGRAM AND PANEL SCHEDULE
E-404	15	CONTROL PANEL AND MISCELLANEOUS DETAILS

NO.	DATE	REVISIONS	BY	CHK
0	2/20/01	AS-BUILT DRAWING	EJL	LB
C	6/30/00	FINAL DESIGN	DEL	LB
B	5/22/00	90% DESIGN	DEL	LB
A	3/22/00	INTERNAL REVIEW	DEL	LB

DRAWN: E.J.LEDUC | PROJECT NO: 51870 TASK 2
ENGINEER: W TAYLOR | SCALE: N.T.S.
CHECKED: - | APPROVED: -
DATE: 02-23-2000 | DATE: -

Harding ESE
A MACTEC COMPANY
1400 Centerpoint Blvd., Suite 158, Knoxville, TN 37932-1968 (865) 531-1922
P.O. Box 7050, 511 Congress Street, Portland, ME 04112-7050 (207) 775-5401

FORMER TAYLOR INSTRUMENT SITE
DPVE REMEDIAL CONSTRUCTION
ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

GENERAL
COVER SHEET

DRAWING NO: I-1
1/15

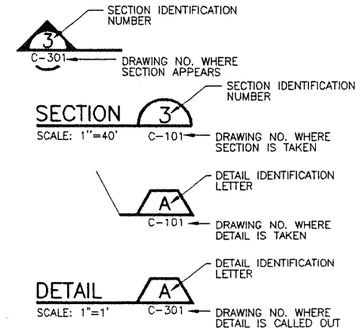
P:/CAD/DATA1/48454/48454COV.DWG

Existing	PROPOSED		Existing	PROPOSED		Existing	PROPOSED	
N		NORTH ARROW (PLAN)	(Wood)	(WOOD)	FENCE LINE (WOOD)	G	G 8"	UNDERGROUND GAS MAIN AND SIZE
25	25	CONTOUR LINES	(Chain link) X	(CHAIN LINK) X	FENCE LINE (WIRE)	E	E	UNDERGROUND ELECTRIC CABLE/CONDUIT
25.63	25.63	SPOT ELEVATION (GRADE)	(Conc.)	(CONC.)	RETAINING WALL AND TYPE	O.E.	O.E.	OVERHEAD ELECTRIC
E.G.		EXISTING GROUND (PROFILES AND SECTIONS)	2	2	SIGN AND TYPE	O.T.	O.T.	OVERHEAD TELEPHONE
SB		SURVEY BASELINE WITH TRIANGULATION OR INTERSECTION POINT			GUARD RAIL			HYDRANT
℄	℄	CENTER LINE		S	SILTATION FENCE	8" D.I.	8" D.I.	WATER MAIN, SIZE, AND TYPE
R		PROPERTY OR DEED LINE (NOT SURVEYED)			BUILDING OR STRUCTURE	8" PVC	8" PVC	SANITARY SEWER, SIZE, AND TYPE
525.14' N 51° 10' 41" E	525.14' N 51° 10' 41" E	PROPERTY LINE WITH BEARING AND DISTANCE	(Conc.)	(CONC.)	STEPS AND TYPE	12" R.C.P.	12" R.C.P.	STORM DRAIN, SIZE, AND TYPE
		ROAD EASEMENT OR RIGHT OF WAY LINE		2 / 1 OR 2:1	SLOPE RATIO HORIZONTAL TO VERTICAL (PROFILE OR SECTION VEIW)	12" B.C.C.M.P.	12" B.C.C.M.P.	CULVERT, SIZE, AND TYPE
		BOUNDARY LINE (STATE, COUNTY, OR MUNICIPALITY)		TOP OF SLOPE 2:1	SLOPE RATIO (PLAN VIEW)	Or		CATCH BASIN
Mon.	MON.	SURVEY MONUMENT	(Bit.)	(BIT.)	EDGE OF TRAVELED WAY AND TYPE		EW-D-12	DUAL PHASE VACUUM EXTRACTION WELL
I.F.		SURVEY IRON (FOUND)	(Granite)	(GRANITE)	CURBING AND TYPE		VW-D-1	DUAL PHASE VACUUM EXTRACTION VENT WELL
		SURVEY IRON (SET)		C.L.L.	CLEARING LIMIT LINE		BREW-D-2	BEDROCK EXTRACTION WELL
P.K. STK. D.H.	P.K. STK. D.H.	DRILL HOLE, P.K., OR STAKE			BITUMINOUS PAVEMENT	TW-69		TW-TEMPORARY WELL
		WOODS OR BRUSH LINE			CONCRETE	TW-69		MW-MONITORING WELL
		INDIVIDUAL TREE (DECIDUOUS)			RAILROAD TRACKS	TW-13		OB/TW/W-OVERBURDEN MONITORING WELL
		INDIVIDUAL TREE (CONIFEROUS)			UTILITY POLE	BR-11		BR-BEDROCK MONITORING WELL
		TREE, TO BE REMOVED			MANHOLE			ABANDONED SEWER LATERAL PLUG
		STONE WALL		8"	WATER VALVE AND SIZE		FB-1	ELECTRICAL PULL BOX
		ROCK OUTCROP OR LEDGE	Or		CATCH BASIN			

NOTES:

1. UTILITY INFORMATION SHOWN ON THE DRAWINGS ARE TAKEN FROM DATA SUPPLIED BY THE UTILITY COMPANIES OR THE OWNER. THE CONTRACTOR SHALL VERIFY THE ACTUAL FIELD LOCATION OF UTILITIES PRIOR TO CONSTRUCTION.
2. THE CONTRACTOR SHALL COORDINATE THE CONSTRUCTION AND ABIDE WITH THE REGULATIONS OF THE RESPECTIVE UTILITIES WHEN WORKING IN PROXIMITY TO UTILITY LINES AND STRUCTURES.
3. RELOCATION OF UTILITIES SHALL BE BY THE RESPECTIVE UTILITY UNLESS OTHERWISE DESIGNATED IN THE CONTRACT DOCUMENTS
4. THE CONTRACTOR SHALL LIMIT THE CONSTRUCTION ACTIVITY TO THE LIMITS SHOWN ON THE DRAWINGS.
5. THE CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL PERMITS AND REGULATIONS GOVERNING THE CONSTRUCTION ACTIVITY.
6. FOR SPECIFIC PROJECT NOTES, REFER TO PROJECT DRAWINGS.

VIEW MARKERS AND IDENTIFICATION



SYMBOLS ABBREVIATIONS

AS-BUILT DRAWINGS

AC.	ACRE
AGG.	AGGREGATE
ALT.	ALTERNATE
ALUM.	ALUMINUM
APPD.	APPROVED
APPROX.	APPROXIMATE
ARCH.	ARCHITECT
ASB.	ASBESTOS
A.C.P.	ASBESTOS CEMENT PIPE
ASPH.	ASPHALT
A.C.C.M.P.	ASPHALT COATED CORRUGATED METAL PIPE
ASSY.	ASSEMBLY
AUTO.	AUTOMATIC
AUX.	AUXILIARY
AVE.	AVENUE
AVG.	AVERAGE
A.D.T.	AVERAGE DAILY TRAFFIC
A.A.D.T.	AVERAGE ANNUAL DAILY TRAFFIC
AZ.	AZIMUTH
℄	BASELINE
BRG.	BEARING
B.M.	BENCH MARK
BIT.	BITUMINOUS
B.C.C.M.P.	BITUMINOUS COATED CORRUGATED METAL PIPE
BD.	BOARD
B.O.B.	BOTTOM OF BANK
B.O.E.	BOTTOM OF EXPLORATION
BOT.	BOTTOM
BLDG.	BUILDING
BR	BEDROCK
BREW	BEDROCK EXTRACTION WELL
CATV.	CABLE TELEVISION
C.I.	CAST IRON
C.B.	CATCH BASIN
CEM.	CEMENT
CTR.	CENTER
C TO C (C/C)	CENTER TO CENTER
℄	CENTERLINE
△	CENTRAL ANGLE OR A CIRCULAR CURVE
C.L.F.	CHAIN LINK FENCE
CHAM.	CHAMFER
CL.	CLASS
C.O.	CLEAN OUT
CLR.	CLEAR
COL.	COLUMN
CONC.	CONCRETE
CND.	CONDUIT
CONN.	CONNECTION
CONST.	CONSTRUCTION
CONTR.	CONTRACTOR
C.J.	CONTROL JOINT
C.M.P.	CORRUGATED METAL PIPE
CRS.	COURSE
C.F.S.	CUBIC FEET PER SECOND
C.F.	CUBIC FOOT
C.Y.	CUBIC YARD
Dc.	DEGREE OF CURVE (ARC DEF.)
Dc.	DEGREE OF CURVE (CHORD DEF.)
DEG. OR °	DEGREE
DEPT.	DEPARTMENT
D.H.V.	DESIGN HOURLY VOLUME
DET.	DETAIL
DIA. OR Ø	DIAMETER
DIM.	DIMENSION
DIST.	DISTANCE
DIV.	DIVISION
DBL.	DOUBLE
DWL.	DOWEL
DN.	DOWN
DPVE	DUAL PHASE VACUUM EXTRACTON
DR.	DRAIN
DRWY.	DRIVEWAY
DWG.	DRAWING
D.I.	DUCTILE IRON
EA.	EACH
ELL.	ELBOW
ELEC.	ELECTRIC
EL. OR ELEV.	ELEVATION
ENG.	ENGINEER
ENT.	ENTRANCE OR ENTERING
EQ. OR =	EQUAL
EQUIP.	EQUIPMENT
EST.	ESTIMATED
EXC.	EXCAVATE
EXCAV.	EXCAVATION
EXIST	EXISTING
E.G.	EXISTING GRADE
EXP.	EXPANSION
EXT.	EXTERNAL
FAB.	FABRICATE
FT. OR '	FEET OR FOOT
F.P.S.	FEET PER SECOND
FBRGL.	FIBERGLASS
FIG.	FIGURE
FIN.	FINISH
F.G.	FINISHED GRADE
FLG.	FLANGE
FLEX.	FLEXIBLE
FLR.	FLOOR
F.D.	FLOOR DRAIN
FTG.	FOOTING
FDN.	FOUNDATION
FURN.	FURNISH
GAL.	GALLON
G.P.D.	GALLONS PER DAY
G.P.M.	GALLONS PER MINUTE
GALV.	GALVANIZED
GA.	GAUGE
G.C.	GENERAL CONTRACTOR
GR.	GRADE
GRAN.	GRANITE
HPDE	HIGH DENSITY POLYETHYLENE
HDWR.	HARDWARE
HW.	HEADWATER
HTG.	HEATING
HGT.	HEIGHT
H.PT.	HIGH POINT
H.S.	HIGH STRENGTH
HOR.	HORIZONTAL
HP.	HORSEPOWER
HYD.	HYDRANT
IN OR "	INCHES
INCL.	INCLUSIVE OR INCLUDING
INFO.	INFORMATION
I.D.	INSIDE DIAMETER
INS.	INSULATION
INT.	INTERIOR
INTER.	INTERSECTION
INV.	INVERT
JT.	JOINT
JCT.	JUNCTION
KVA.	KILOVOLT-AMPERE
K	RATE OF VERTICAL CURVATURE
LAB.	LABORATORY
LAT.	LATITUDE
LT.	LEFT
LG.	LENGTH OR LONG
LEV.	LEVEL
L.F.	LINEAR FOOT
LOC.	LOCATION
LONG.	LONGITUDE
L.PT.	LOW POINT
LBR.	LUMBER
MACH.	MACHINE
MH.	MANHOLE
MFR.	MANUFACTURE
MAINT.	MAINTENANCE
MATL.	MATERIAL
MAX.	MAXIMUM
MECH.	MECHANICAL
M.J.	MECHANICAL JOINT
MED.	MEDIUM
M.P.H.	MILES PER HOUR
MIN.	MINIMUM
MISC.	MISCELLANEOUS
MON.	MONUMENT
MW	MONITORING WELL
NEG.	NEGATIVE
N.R.	NO REFUSAL
NOM.	NOMINAL
N.I.T.C.	NOT IN THIS CONTRACT
N.T.S.	NOT TO SCALE
N/F	NOW OR FORMERLY
NO. OR #	NUMBER
OB	OVERBURDEN
O/S	OFFSET
O.C.	ON CENTER
OPP.	OPPOSITE
O.G.	ORIGINAL GROUND
O.D.	OUTSIDE DIAMETER
O.E.	OVERHEAD ELECTRIC
O.T.	OVERHEAD TELEPHONE
OVHD.	OVERHEAD
OVLY.	OVERLAY
PAR.	PARALLEL
P.S.D.	PASSING SIGHT DISTANCE
OVHD.	OVERHEAD
OVLY.	OVERLAY
PAR.	PARALLEL
P.S.D.	PASSING SIGHT DISTANCE
PVMT.	PAVEMENT
%	PERCENT
PERF.	PERFORATED
PC.	PIECE
PLMBG.	PLUMBING
PT.	POINT
P.C.	POINT OF CURVE
P.I.	POINT OF INTERSECTION
P.T.	POINT OF TANGENT
P.V.C.	POINT OF VERTICAL CURVE
P.V.I.	POINT OF VERTICAL INTERSECTION
P.V.T.	POINT OF VERTICAL TANGENCY
P.O.C.	POINT ON CURVE
P.O.T.	POINT ON TANGENT
PVC	POLYVINYL CHLORIDE
POS.	POSITIVE
LB.	POUND
P.S.I.	POUND PER SQUARE INCH
PWR.	POWER
PREFAB.	PREFABRICATED
PROJ.	PROJECT
℄	PROPERTY LINE
PROP.	PROPOSED
PB	PULL BOX
QTY.	QUANTITY
R	RADIUS
RR.	RAILROAD
RECONST.	RECONSTRUCT OR RECONSTRUCTION
REF.	REFUSAL
REINF.	REINFORCED
R.C.P.	REINFORCED CONCRETE PIPE
REQD.	REQUIRED
RT.	RIGHT
R.O.W.	RIGHT OF WAY
RTE.	ROUTE
SAN.	SANITARY
SCH.	SCHEDULE
SEC.	SECOND
SECT.	SECTION
SHT.	SHEET
SDWK.	SIDEWALK
SLV.	SLEEVE
S	SLOPE
S.F.	SQUARE FOOT
S.Y.	SQUARE YARD
STA.	STATION
STL.	STEEL
S.S.D.	STOPPING SIGHT DISTANCE
S.D.	STORM DRAIN
ST.	STREET
SUB.	SUBSTITUTE
SW	SIDEWALK
SYM.	SYMMETRICAL
TW	TEMPORARY WELL OR TAILWATER
TAN.	TANGENT
TECH.	TECHNICAL
TEL.	TELEPHONE
TEMP.	TEMPORARY
T.P.	TEST PIT
THK.	THICK
T.O.B.	TOP OF BANK
T.O.C.	TOP OF CONCRETE
TYP.	TYPICAL
UD.	UNDERDRAIN
U/G OR U.G.	UNDERGROUND
U.O.N.	UNLESS OTHERWISE NOTED
VERT.	VERTICAL
V.C.	VERTICAL CURVE
V.C.P.	VITRIFIED CLAY PIPE
VOL.	VOLUME
W	WELL
WHSE.	WAREHOUSE
W.W.F.	WELDED WIRE FABRIC
WTH.	WIDTH
W/	WITH
W/O	WITHOUT
W.P.	WORKING POINT
YD.	YARD

NOTES:

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2. ALL SHEETS EXCEPT SHEETS 9 AND 12 HAVE BEEN REVISED TO REFLECT MODIFICATIONS TO INDICATE TRUE FIELD CONFIGURATIONS.
3. THE ORIGINAL DESIGN FOR THE DUAL-PHASE VACUUM EXTRACTION REMEDIAL SYSTEM IS REFLECTED IN THE PLANS AND SPECIFICATIONS CERTIFIED ON JUNE 30, 2000.

NO.	DATE	REVISIONS	BY	CHK
0	2/20/01	AS-BUILT DRAWING	EJL	LB
C	6/30/00	FINAL DESIGN	DEL	LB
B	5/22/00	90% DESIGN	DEL	LB
A	3/22/00	INTERNAL REVIEW	DEL	LB

DRAWN: E.J.LEDUC | PROJECT NO: 51870 TASK 2
ENGINEER: L. BARRENTINE | SCALE: N.T.S.
CHECKED: . | APPROVED: .
DATE: 02-23-2000 | DATE: .

Harding ESE
A MACTEC COMPANY
1400 Centerpoint Blvd., Suite 158, Knoxville, TN 37932-1968, (865) 531-1922
P.O. Box 7050, 511 Congress Street, Portland, ME 04112-7050, (207) 775-5401

FORMER TAYLOR INSTRUMENT SITE
DPVE REMEDIAL CONSTRUCTION
ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

CIVIL

SYMBOLS, ABBREVIATIONS AND GENERAL NOTES

DRAWING NO: C-10
2/15

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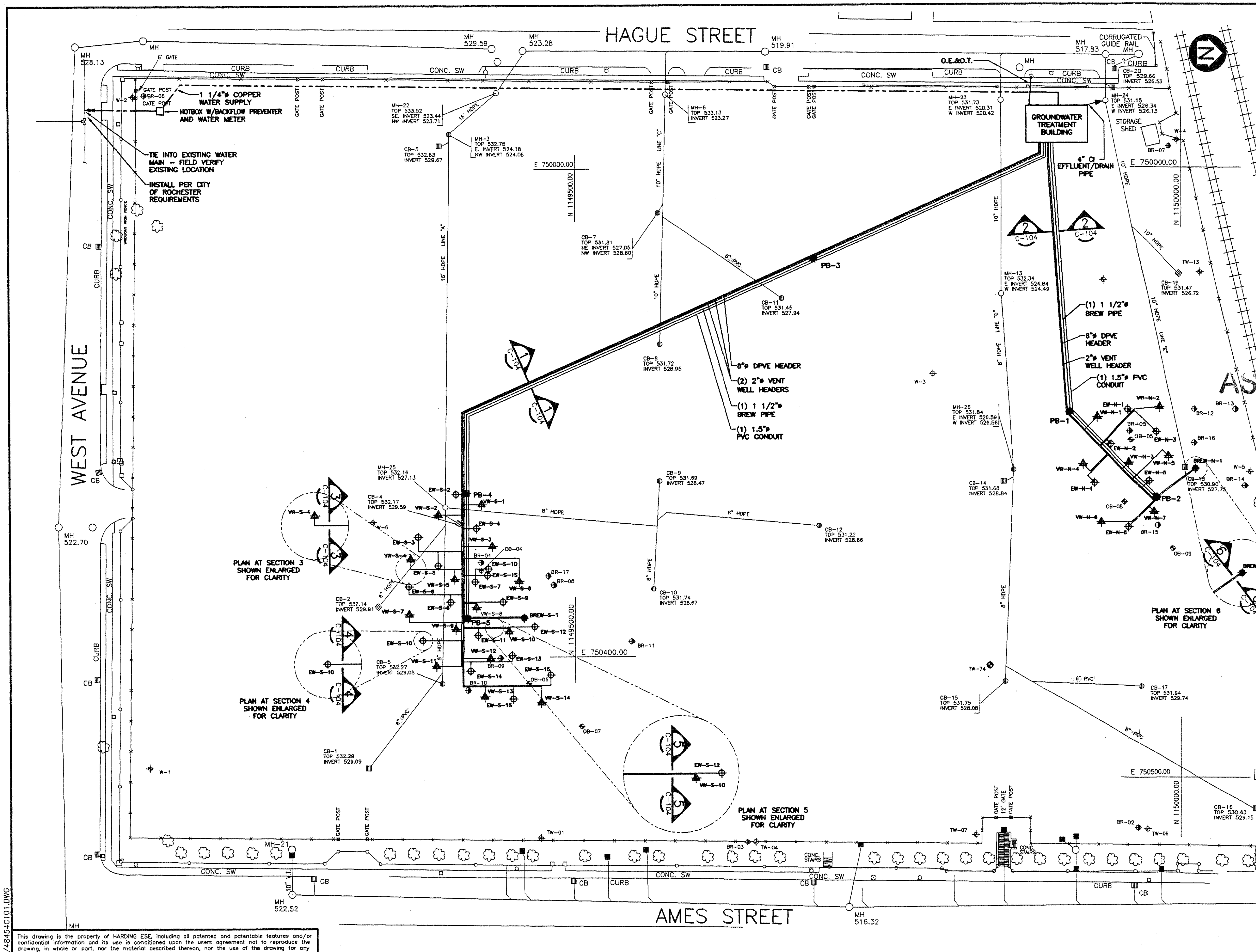

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NOTES:

1. THE AREA IS COVERED WITH BITUMINOUS PAVEMENT INSIDE FENCED AREA.
2. LOCATIONS OF TRENCH LINES, GROUNDWATER TREATMENT BUILDING, STORAGE SHED AND PIPELINES ARE APPROXIMATE.

NO.	DATE	REVISIONS	BY	CHK
D	2/20/01	AS-BUILT DRAWING	EJL	LB
D	6/30/00	FINAL DESIGN	DEL	WAT
C	6/15/00	FOR BUILDING PERMIT	DEL	LB
B	5/22/00	90% DESIGN	DEL	LB
A	3/22/00	INTERNAL REVIEW	DEL	LB

DRAWN: E.J.LEDUC	PROJECT NO: 51870 TASK 2
ENGINEER: L.BARRENTINE	SCALE: 1=40
CHECKED:	APPROVED:
DATE: 02-23-2000	DATE:

Harding ESE
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FORMER TAYLOR INSTRUMENT SITE
DPVE REMEDIAL CONSTRUCTION
ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

CIVIL

SITE PLAN

DRAWING NO: C-101

3 / 15

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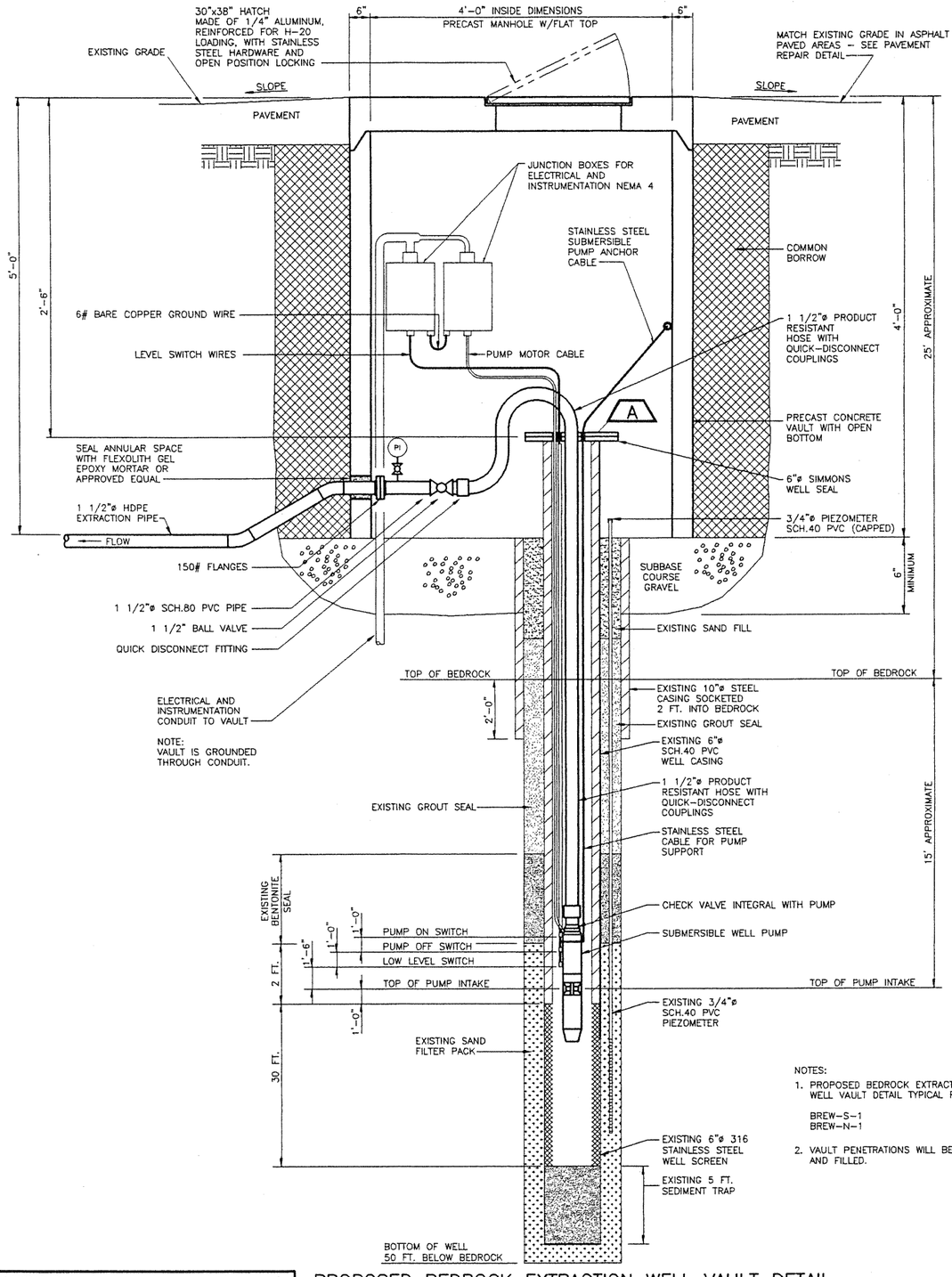
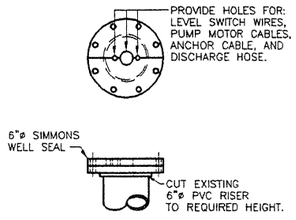


NOTES:
1. PROPOSED BEDROCK EXTRACTION WELL VAULT DETAIL TYPICAL FOR:
   BREW-S-1
   BREW-N-1
2. VAULT PENETRATIONS WILL BE CORED AND FILLED.

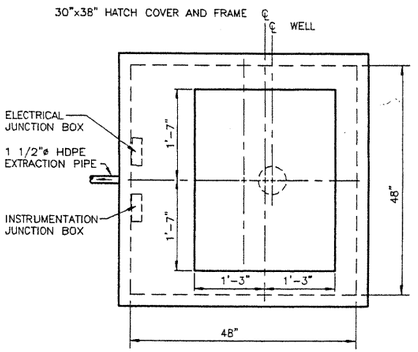
PROPOSED BEDROCK EXTRACTION WELL VAULT DETAIL

NOT TO SCALE



WELL CAP DETAIL A

NOT TO SCALE



PLAN - 4'ø PRECAST MANHOLE w/FLAT TOP AT EXTRACTION WELLS

NOT TO SCALE

AS-BUILT DRAWINGS

STATE OF NEW YORK
RICKY A. RYAN
068227
LICENSED PROFESSIONAL ENGINEER
3/14/01

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NO.	DATE	REVISIONS	BY	CHK
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C	6/30/00	FINAL DESIGN	DEL	LB
B	5/22/00	90% DESIGN	DEL	LB
A	3/22/00	INTERNAL REVIEW	DEL	LB

DRAWN: D LAWRENCE | PROJECT NO: 51870 TASK 2
ENGINEER: W TAYLOR | SCALE: NOTED
CHECKED: . | APPROVED: .
DATE: 02-25-2000 | DATE: .

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A MACTEC COMPANY
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Portland, ME 04112-7050
(207) 775-5401

FORMER TAYLOR INSTRUMENT SITE
DPVE REMEDIAL CONSTRUCTION
ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

CIVIL
WELL DETAILS

DRAWING NO: C-102
4
15

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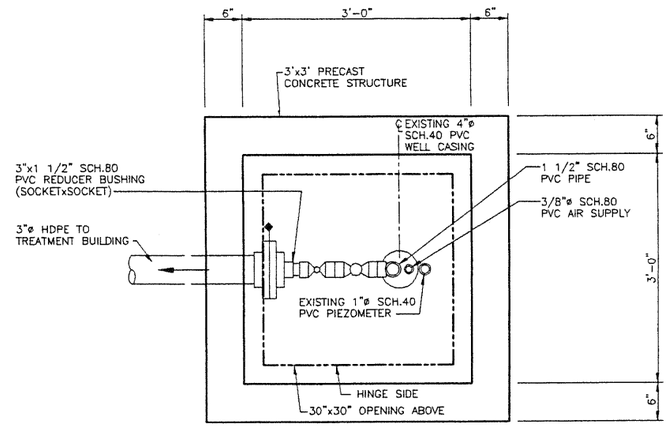
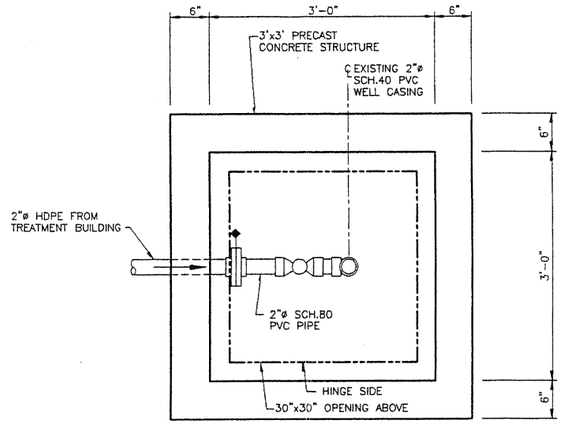
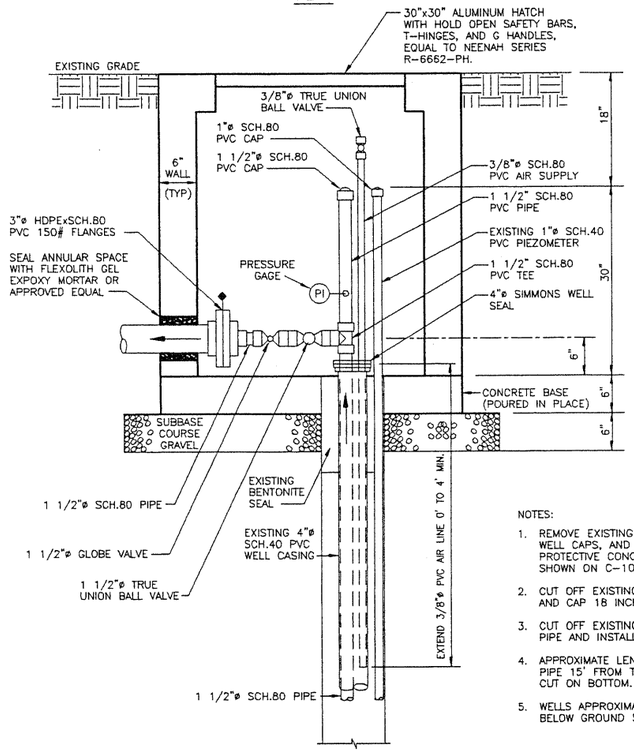




PLAN



SECTION

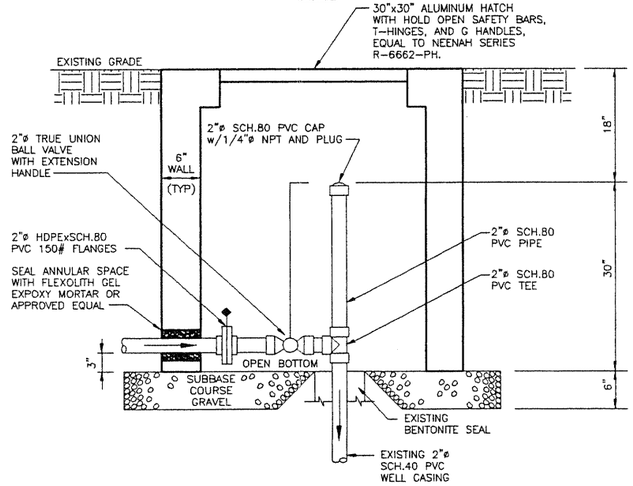
DPVE EXTRACTION WELL DETAIL

SCALE: 1"=1'-0"

NOTES:

1. REMOVE EXISTING MANHOLE COVER, WELL CAPS, AND CONCRETE PAD, AND PROTECTIVE CONCRETE PADS AS SHOWN ON C-102.
2. CUT OFF EXISTING 1"ø PVC PIPE AND CAP 18 INCHES BELOW GRADE.
3. CUT OFF EXISTING 4"ø PVC PIPE AND INSTALL NEW COVER.
4. APPROXIMATE LENGTH 1 1/2" DROP PIPE 15' FROM TEE, w/45° ANGLE CUT ON BOTTOM.
5. WELLS APPROXIMATE 20' DEEP BELOW GROUND SURFACE.

PLAN



SECTION

VENT WELL DETAIL

SCALE: 1"=1'-0"

NOTES:

1. EXCAVATE APPROXIMATELY 4 FEET TO TOP OF BENTONITE SEAL. EXCAVATE AN ADDITIONAL 6 INCHES DEPTH UNDER CONCRETE WALLS AND FILL WITH STONE BEDDING.
2. REMOVE EXISTING MANHOLE COVER, LOCKING WELL CAP, AND CONCRETE PAD, AS SHOWN ON DRAWING C-102.
3. CUT OFF EXISTING 2"ø PVC RISER TO SUIT NEW PIPING.

AS-BUILT DRAWINGS

NOTE:
ALL WELLS PREVIOUSLY INSTALLED BY OTHERS.

NOTES:

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2. ALL SHEETS EXCEPT SHEETS 9 AND 12 HAVE BEEN REVISED TO REFLECT MODIFICATIONS TO INDICATE TRUE FIELD CONFIGURATIONS.
3. THE ORIGINAL DESIGN FOR THE DUAL-PHASE VACUUM EXTRACTION REMEDIAL SYSTEM IS REFLECTED IN THE PLANS AND SPECIFICATIONS CERTIFIED ON JUNE 30, 2000.

NO.	DATE	REVISIONS	BY	CHK
O	02/22/01	AS-BUILT DRAWING	DEL	LB
C	6/30/00	FINAL DESIGN	DEL	LB
B	5/22/00	90% DESIGN	DEL	LB
			DEL	LB

DRAWN: D LAWRENCE
ENGINEER: RALPH OULTON
CHECKED: .
DATE: 03-22-2000
PROJECT NO: 51870 TASK 2
SCALE: NOTED
APPROVED: .
DATE: .

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A MACTEC COMPANY
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P.O. Box 7050, 511 Congress Street Portland, ME 04112-7050 (207) 775-5401

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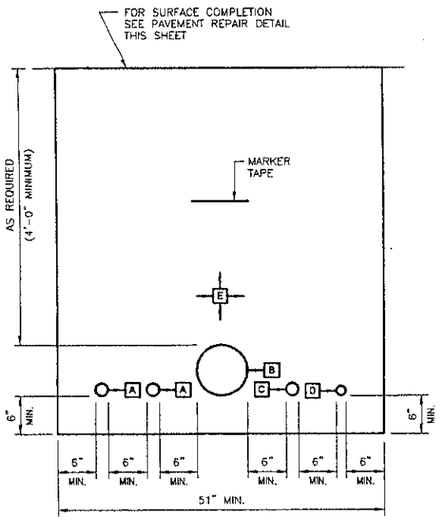
ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

CIVIL

VAULT DETAILS

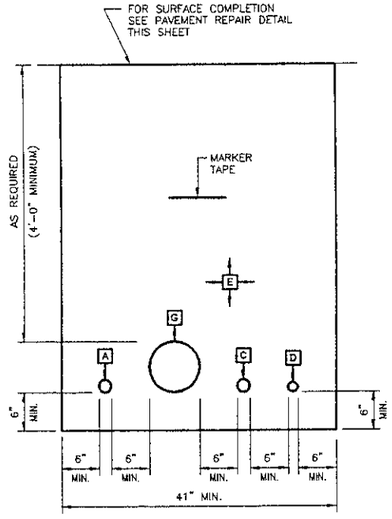
DRAWING NO: C-103
5/15

J:/CAD/DATA1/48454/48454103.DWG
drawir



TRENCH DETAIL

SECTION 1 — SCALE: N.T.S. — C-101

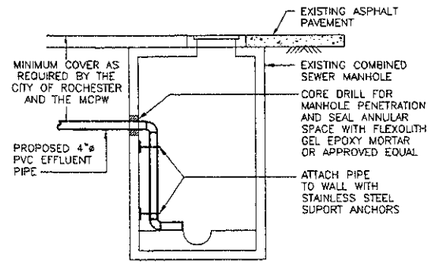


TRENCH DETAIL

SECTION 2 — SCALE: N.T.S. — C-101

LEGEND

- A 2"ø, SDR 17, HDPE VENT PIPE
- B 8"ø, SDR 11, HDPE DPVE PIPE
- C 1.5"ø, SDR 11, HDPE BREW PIPE
- D 1.5"ø, PVC CONDUIT
- E #57 CRUSHED LIMESTONE
- G 6"ø, SDR 11, HDPE DPVE PIPE
- H 1.5"ø, SDR 11, HDPE DPVE PIPE

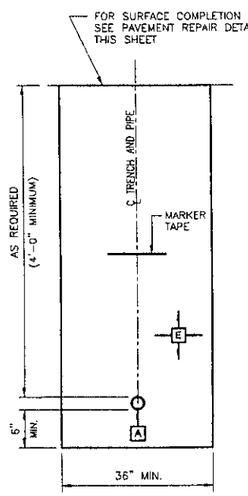


NOTE:
PIPE MATERIAL, FITTINGS, AND INSTALLATION SHALL MEET THE REQUIREMENTS OF THE CITY OF ROCHESTER AND MONROE CO. PUBLIC WORKS

EFFLUENT MANHOLE DETAIL

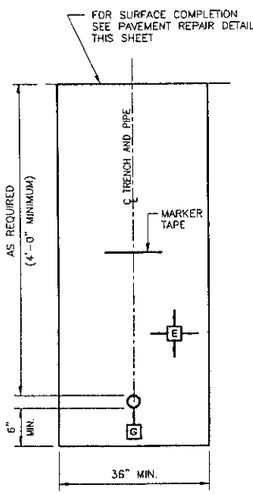
N.T.S.

AS-BUILT DRAWINGS



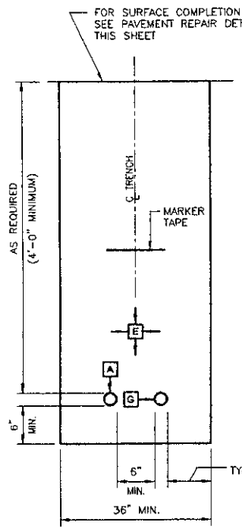
TRENCH DETAIL

SECTION 3 — SCALE: N.T.S. — C-101



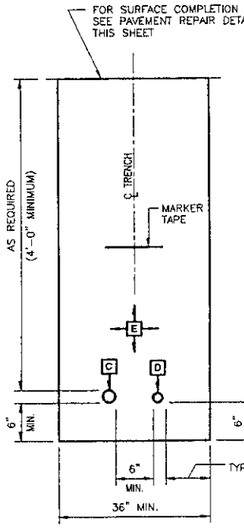
TRENCH DETAIL

SECTION 4 — SCALE: N.T.S. — C-101



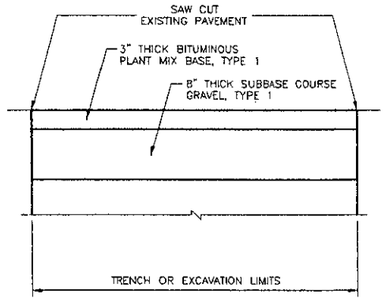
TRENCH DETAIL

SECTION 5 — SCALE: N.T.S. — C-101



TRENCH DETAIL

SECTION 6 — SCALE: N.T.S. — C-101



TYPICAL PAVEMENT REPAIR DETAIL

N.T.S.

NOTE:
SLOPE PIPE TO LOW POINT AT BUILDING WITH NO LOW POINT FOR WATER TO COLLECT.

STATE OF NEW YORK — TROY A. RYAN — 068027 — LICENSED PROFESSIONAL ENGINEER — 3/14/01

NOTES:

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C	6/30/00	FINAL DESIGN	DEL	LB
B	5/22/00	90% DESIGN	DEL	LB
			DEL	LB

DRAWN: D LAWRENCE | PROJECT NO: 51870 TASK 2
ENGINEER: RALPH OULTON | SCALE: NOTED
CHECKED: - | APPROVED: -
DATE: 03-22-2000 | DATE: -

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P.O. Box 7050, 511 Congress Street, Portland, ME 04112-7050 (207) 775-5401

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ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

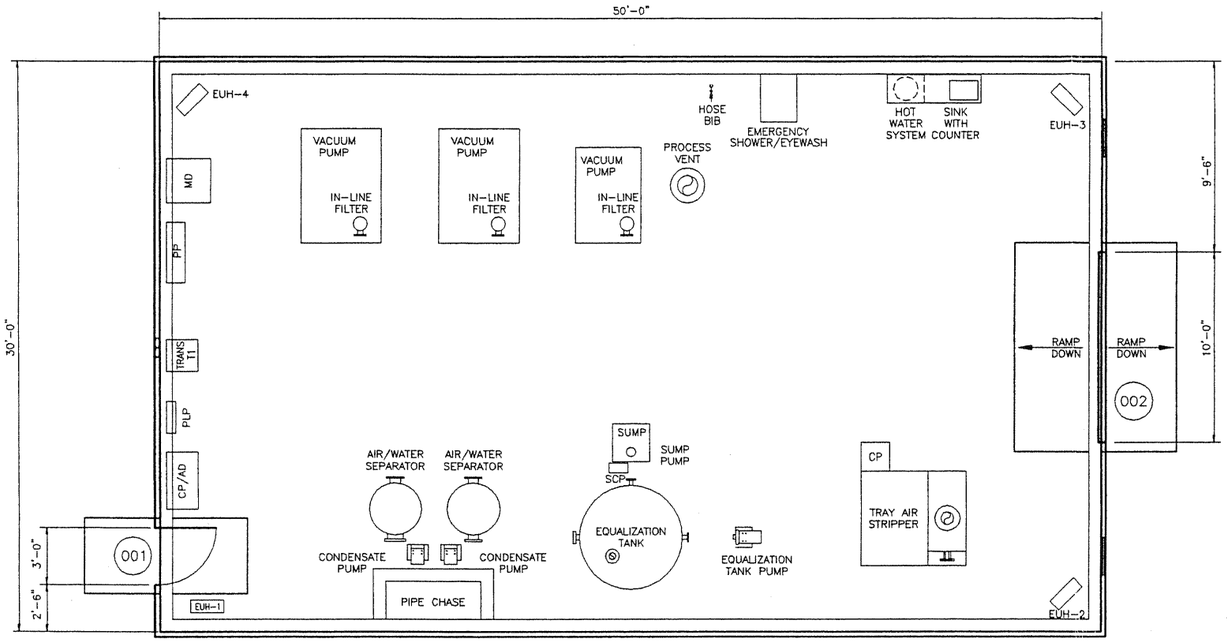
CIVIL

CIVIL DETAILS

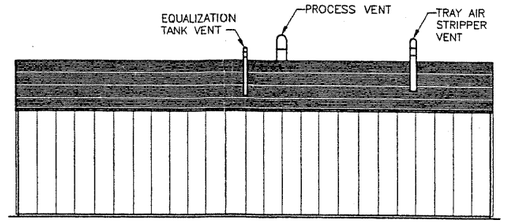
DRAWING NO: C-104

6/15

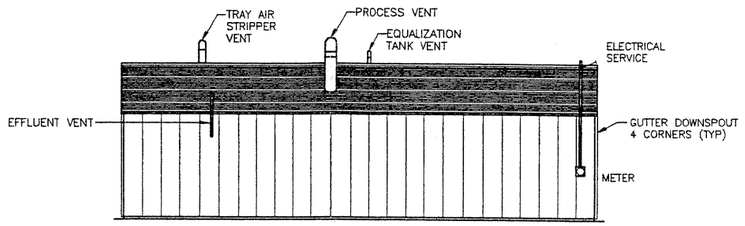
P:/CAD/DATA1/48454/48454C104.DWG



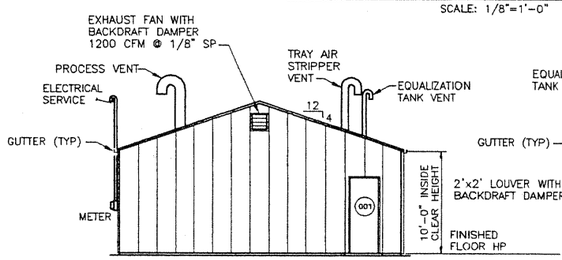
TREATMENT BUILDING
EQUIPMENT LAYOUT PLAN
SCALE: 1/4"=1'-0"



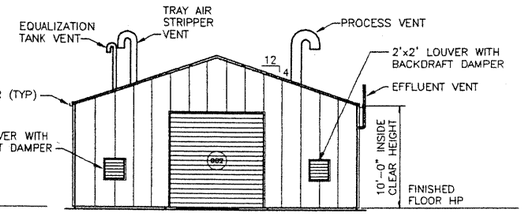
TREATMENT BUILDING–EAST ELEVATION
SCALE: 1/8"=1'-0"



TREATMENT BUILDING–WEST ELEVATION
SCALE: 1/8"=1'-0"



TREATMENT BUILDING–SOUTH ELEVATION
SCALE: 1/8"=1'-0"



TREATMENT BUILDING–NORTH ELEVATION
SCALE: 1/8"=1'-0"

AS-BUILT DRAWINGS

STATE OF NEW YORK
RICKY A. RYAN
068227
LICENSED PROFESSIONAL ENGINEER
3/14/01

NOTES:

1. REFER TO SPECIFICATION 13121 PRE–ENGINEERED BUILDING SYSTEMS FOR DESIGN LOAD REQUIREMENTS.
2. BUILDING MANUFACTURER SHALL PROVIDE CAST IN ANCHOR BOLT SIZES AND LAYOUT REQUIREMENTS PRIOR TO POURING CONCRETE FOUNDATION.
3. BUILDING DIMENSIONS ARE MEASURED FROM OUTSIDE FACE OF CONCRETE FOUNDATION. DOOR DIMENSIONS SHOWN ARE ACTUAL DOOR SIZE, NOT ROUGH (UNFRAMED) OPENING.
4. REFER TO SPECIFICATION 13121 FOR LOUVER OPENING SIZE AND FOR EXHAUST FAN OPENING SIZES.
5. METAL LINER PANELS SHALL BE PROVIDED FOR ALL INTERIOR WALLS.

DOOR SCHEDULE

DOOR NUMBER	TYPE	WIDTH AND HEIGHT	THRESHOLD MATERIAL	NUMBER OF LEAFS
001	FLUSH	3'–0"x7'–0"	ALUMINUM	SINGLE
002	FLUSH	10'–0"x10'–0"	ALUMINUM	ROLL–UP

SEE SPECIFICATION 13121 PRE–ENGINEERED BUILDING SYSTEMS FOR DOOR AND HARDWARE SPECIFICATIONS.

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NO.	DATE	REVISIONS	BY	CHK
0	02/21/01	AS–BUILT DRAWING	DEL	LB
D	6/30/00	FINAL DESIGN	DEL	LB
C	6/14/00	FOR BUILDING PERMIT	DEL	LB
B	5/22/00	90% DESIGN	DEL	LB
A	3/22/00	INTERNAL REVIEW	DEL	LB

DRAWN: D LAWRENCE
ENGINEER: M PETERS
CHECKED: .
DATE: .
PROJECT NO: 51870 TASK 2
SCALE: AS NOTED
APPROVED: .
DATE: .

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Knoxville, TN 37932–1968
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Portland, ME 04112–7050
(207) 775–5401

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ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

PROCESS
TREATMENT BUILDING
EQUIPMENT LAYOUT PLAN
AND BUILDING ELEVATIONS

DRAWING NO: S–201
7/15

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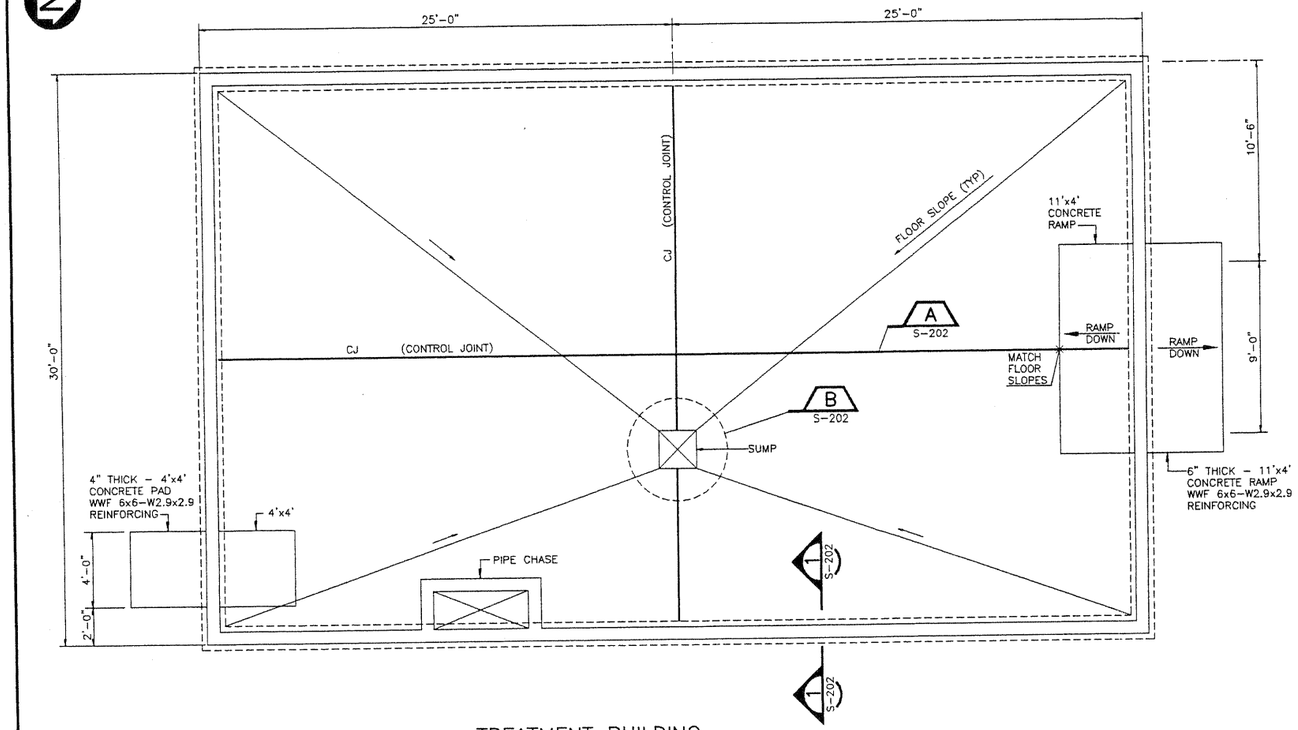
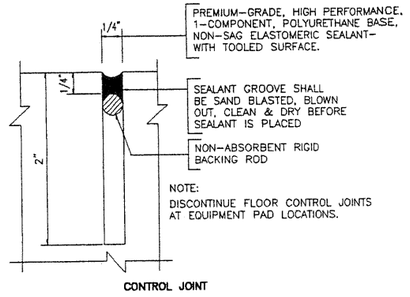
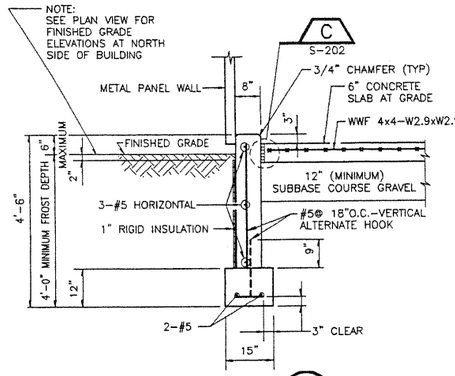


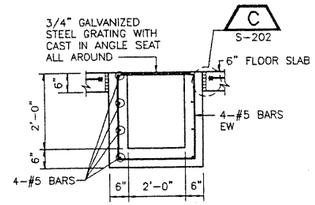
TREATMENT BUILDING
FOUNDATION PLAN
SCALE: 1/4"=1'-0"



DETAIL A
SCALE: N.T.S. S-202



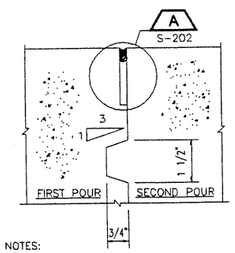
SECTION 1
SCALE: 1/2"=1'-0" S-202



DETAIL B
SCALE: 1/2"=1'-0" S-202

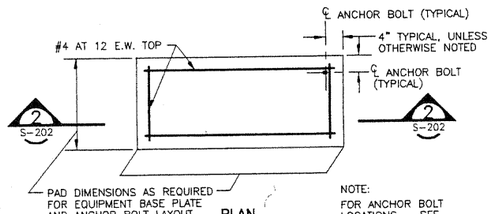
AS-BUILT DRAWINGS

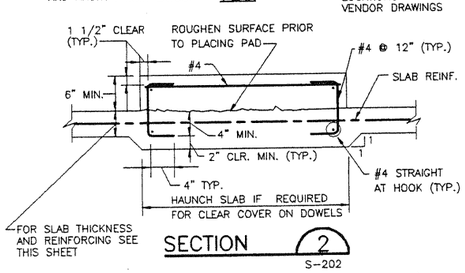
STATE OF NEW YORK
RICKY A. RYAN
068227
LICENSED PROFESSIONAL ENGINEER
1/4/01



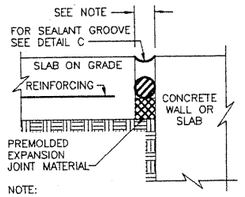
NOTES:
1. NO REINFORCING SHALL EXTEND THROUGH CONSTRUCTION JOINT (SLAB REINFORCING NOT SHOWN FOR CLARITY)
2. ALL CONSTRUCTION JOINTS IN THE SLAB SHALL HAVE CONTROL JOINTS.

TYPICAL CONSTRUCTION
JOINT FOR SLAB
SCALE: N.T.S.





EQUIPMENT PAD (SLAB ON GRADE)
SCALE: 1/2"=1'-0"



DETAIL C
SCALE: N.T.S. S-202

NOTES:
1. CONCRETE SHALL BE PREPARED, PLACED AND CURED IN ACCORDANCE WITH ACI 318-89 LATEST EDITION AND WITH SPECIFICATION SECTION 03300, CAST-IN-PLACE CONCRETE.
2. ALL SPLICES IN REINFORCEMENT SHALL BE CLASS B SPLICES AS PER ACI 318-89 LATEST EDITION.
3. PROVIDE FLOAT FINISH FOR ALL FLOOR SURFACES. APPLY TWO COATS OF A CONCRETE SEALER/HARDENER TO FINISHED FLOOR SURFACE.
4. BUILDING FOUNDATIONS SHALL BE VERIFIED WHEN FINAL DESIGN LOADS ARE SUPPLIED BY BUILDING AND EQUIPMENT SUPPLIERS.
5. FOR PENETRATIONS IN FOUNDATION AND/OR FLOOR, SEE DRAWINGS S-201, S-202, P-303, E-402, AND E-404.

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C	6/14/00	FOR BUILDING PERMIT	DEL	MP
B	5/22/00	90% DESIGN	DEL	MP
A	3/22/00	INTERNAL REVIEW	DEL	MP

DRAWN: D LAWRENCE | PROJECT NO: 51870 TASK 2
ENGINEER: M PETERS | SCALE: AS NOTED
CHECKED: . | APPROVED: .
DATE: 02-25-2000 | DATE: .

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ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

STRUCTURAL
TREATMENT BUILDING
BUILDING FOUNDATION, FLOOR SLAB, AND STRUCTURAL

DRAWING NO: S-202
8/15

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VALVE AND ACTUATOR SYMBOLS

GATE VALVE OR ANY IN-LINE BLOCK VALVE NOT IDENTIFIED BY TYPE	VOLUME DAMPER MANUAL OPERATION
GLOBE VALVE	HAND
CHECK VALVE	MODULATING
BALL VALVE	ON / OFF
BALL VALVE (NORMALLY CLOSED)	MOTOR
BUTTERFLY VALVE	SOLENOID
BUTTERFLY VALVE (NORMALLY CLOSED)	
PLUG VALVE	
NEEDLE VALVE	
IN-LINE PRESSURE RELIEF VALVE	
NORMALLY CLOSED VALVE	
PINCH VALVE	
THREE WAY VALVE	
FOUR WAY VALVE	
ANGLE GLOBE VALVE	
PRESSURE RELIEF VALVE	
VACUUM RELIEF VALVE	

FITTING SYMBOLS

- Y-STRAINER
- SHOWER
- SEWER OR DRAIN
- EXPANSION JOINT
- ORIFICE PLATE
- PULSATION DAMPENER
- REDUCER
- STEAM TRAP
- FILTER STRAINER
- RUPTURE DISC
- HOSE COUPLING
- QUICK CONNECT HOSE COUPLING
- HOSE STATION
- SIGHT GLASS
- RUBBER EXPANSION JOINT
- THERMOWELL

INSTRUMENT SYMBOLS

- LOCALLY MOUNTED
- REAR OF PANEL OR RACK MOUNTED
- FRONT OF PANEL MOUNTING
- ANY CONVERTER WITH APPROPRIATE SIGNAL DESIGNATION FOR INPUT/OUTPUT (2)
- PROCESS INTERLOCK (I)
- ALARM ACTIVATED LIGHT
- ALARM ACTIVATED HORN
- PITOT TUBE
- DISTRIBUTED/SHARED DISPLAY FUNCTION (BLIND)
- DISTRIBUTED/SHARED DISPLAY FUNCTION (OPERATOR ACCESS.)
- COMPUTER FUNCTION (BLIND)
- COMPUTER FUNCTION (OPERATOR ACCESS.)
- PROGRAMMABLE LOGIC FUNCTION (BLIND)

EQUIPMENT SYMBOLS

- CENTRIFUGAL PUMP
- SUBMERSIBLE PUMP (M)
- SUBMERSIBLE SUMP PUMP
- AGITATOR
- FAN OR BLOWER
- AIR FILTER
- VACUUM PUMP
- METERING PUMP
- EMERGENCY SHOWER/EYEWASH

DATA SYMBOLS

- SPECIFICATION CHANGE
- PIPING TIE-IN
- VALVE NUMBER
- XX"-XXX — LINE ID.
  - PIPE MATERIAL
  - PIPE SIZE

INSTRUMENT LINE SYMBOLS

- CONNECTION TO PROCESS OR INSTRUMENT IMPULSE LINE
- INSTRUMENT PNEUMATIC SIGNAL LINE (3-15 PSIG UNLESS NOTED OTHERWISE)
- INSTRUMENT ELECTRONIC SIGNAL LINE (CURRENT OR VOLTAGE AS NOTED ON SPEC SHEETS)
- FIELD TUBING OR CAPILLARY FOR THERMAL ELEMENTS AND PRESSURE SEALS
- PLC INTERFACE (SOFTWARE INTERFACE)

PIPING LINE SYMBOLS

- NEW

EQUIPMENT STATUS

- NEW

MISCELLANOUS LINE SYMBOLS

- BUILDING LIMITS
- VENDOR PACKAGE LIMITS

INSTRUMENT DESIGNATIONS

SYMBOL	1ST LETTER	2ND LETTER	3RD/4TH LETTER
A	ANALYSIS (NOTE 1)	ALARMS	
C	CONDUCTIVITY	CONTROL	CONTROL
D	DIFFERENTIAL		
E	VOLTAGE	ELEMENT	
F	FLOW		
H	HAND		HIGH
I	CURRENT	INDICATING	INDICATING
J	POWER		
K	TIMER		
L	LEVEL		LOW
M			MEDIUM
P	PRESSURE	PRESSURE	
Q		TOTALIZING	
R		RECORDING	
S	SPEED	SWITCH	SWITCH
T	TEMPERATURE	TRANSMITTER	TRANSMITTER
V	VIBRATION	VALVE	VALVE
Y		RELAY	
Z	POSITION		

NOTES:

1. SPECIFIC ANALYSIS IS NOTED OUTSIDE SYMBOL CIRCLE:
   EXAMPLE: (AI LEL)

   FUNCTION IDENTIFICATION FOR SPECIAL PROCESS VARIABLES:

COMB.	COMBUSTIBLES
O2	OXYGEN CONCENTRATION
SO2	SULFUR DIOXIDE CONCENTRATION
ORP	OXYGEN REDUCTION POTENTIAL
pH	HYDROGEN ION CONCENTRATION
DO	DISSOLVED OXYGEN
TU	TURBIDITY
H2S	HYDROGEN SULFIDE
OL	MOTOR OVERLOAD TRIP
LEL	LOWER EXPLOSIVE LIMIT

AS-BUILT DRAWINGS

STATE OF NEW YORK — RICKY A. RYAN — 068227 — LICENSED PROFESSIONAL ENGINEER — 3/14/01

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NO	DATE	REVISIONS	BY	CHK
0	02/20/01	AS-BUILT DRAWING	DEL	LB
C	6/30/00	FINAL DESIGN	DEL	WAT
B	5/22/00	90% DESIGN	DEL	REO
A	3/22/00	INTERNAL REVIEW	DEL	REO

DRAWN: D LAWRENCE | PROJECT NO: 51870 TASK 2
ENGINEER: W TAYLOR | SCALE: N.T.S.
CHECKED: . | APPROVED: .
DATE: 02-23-2000 | DATE: .

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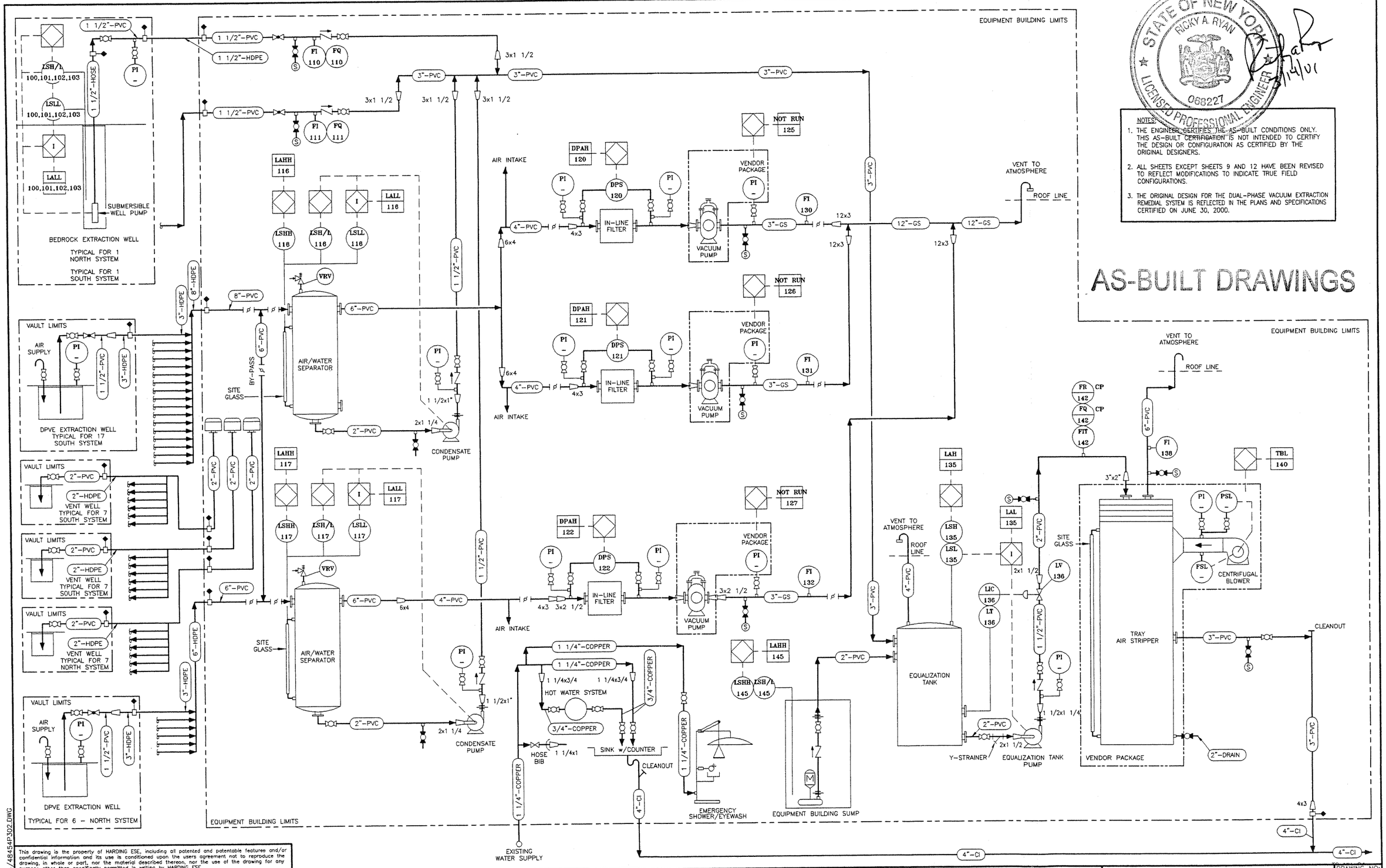
DPVE REMEDIAL CONSTRUCTION
ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

PROCESS

PIPING AND INSTRUMENTATION SYMBOLS

DRAWING NO: P-301
9/15

/CAD/DATA1/48454/48454P301.DWG



STATE OF NEW YORK
RICKY A. RYAN
LICENSED PROFESSIONAL ENGINEER
068227
1/4/01

NOTES:

1. THE ENGINEER CERTIFIES THE AS-BUILT CONDITIONS ONLY. THIS AS-BUILT CERTIFICATION IS NOT INTENDED TO CERTIFY THE DESIGN OR CONFIGURATION AS CERTIFIED BY THE ORIGINAL DESIGNERS.
2. ALL SHEETS EXCEPT SHEETS 9 AND 12 HAVE BEEN REVISED TO REFLECT MODIFICATIONS TO INDICATE TRUE FIELD CONFIGURATIONS.
3. THE ORIGINAL DESIGN FOR THE DUAL-PHASE VACUUM EXTRACTION REMEDIAL SYSTEM IS REFLECTED IN THE PLANS AND SPECIFICATIONS CERTIFIED ON JUNE 30, 2000.

AS-BUILT DRAWINGS

NO	DATE	REVISIONS	BY	CHK
0	02/22/01	AS-BUILT DRAWING	DEL	LB
C	6/30/00	FINAL DESIGN	DEL	REO
B	5/22/00	90% DESIGN	DEL	REO
A	3/22/00	INTERNAL REVIEW	DEL	REO

DRAWN: D LAWRENCE
ENGINEER: W TAYLOR
CHECKED:
DATE: 02-10-2000
PROJECT NO: 51870 TASK 2
SCALE: N.T.S.
APPROVED:
DATE:

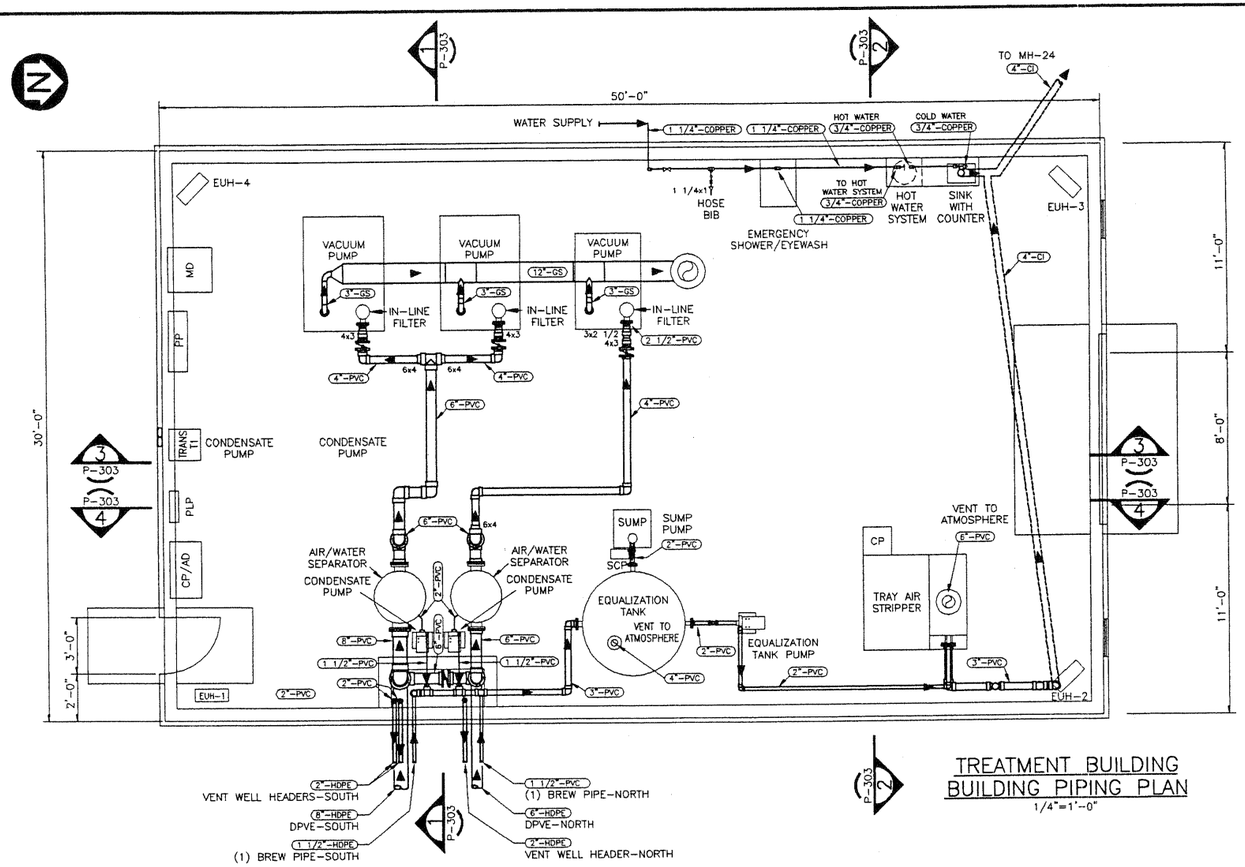
/CAD/DATA1/48454/48454P302.DWG

Harding ESE
A MACTEC COMPANY
1400 Centerpoint Blvd., Suite 158, Knoxville, TN 37932-1968, (865) 531-1922
P.O. Box 7050, 511 Congress Street, Portland, ME 04112-7050, (207) 775-5401

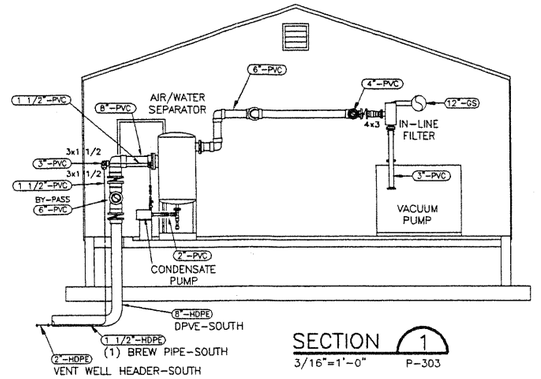
FORMER TAYLOR INSTRUMENT SITE
DPVE REMEDIAL CONSTRUCTION
ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

PROCESS
PIPING AND INSTRUMENTATION DIAGRAM

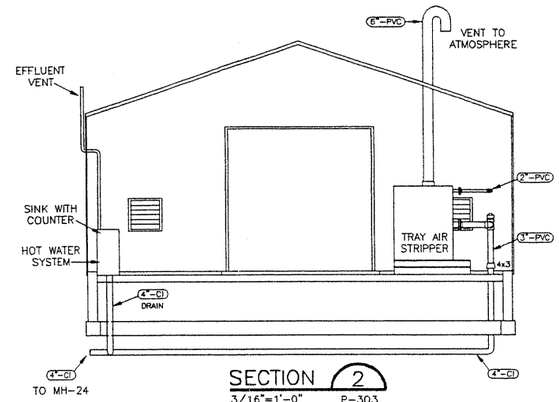
DRAWING NO: P-302
10/15



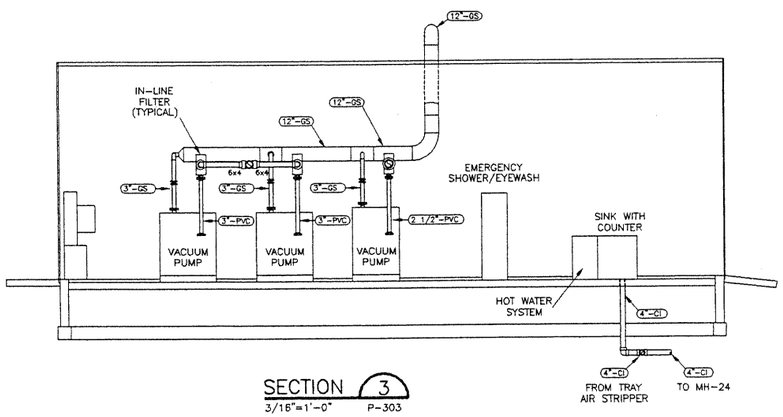
TREATMENT BUILDING
BUILDING PIPING PLAN
1/4"=1'-0"



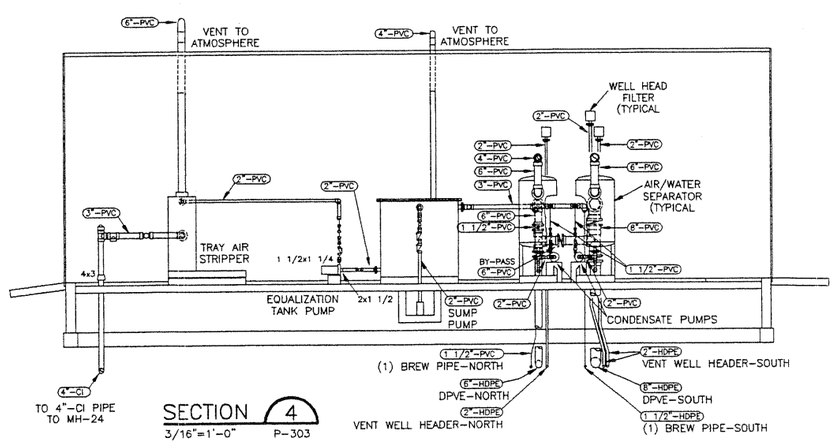
SECTION 1
3/16"=1'-0" P-303



SECTION 2
3/16"=1'-0" P-303



SECTION 3
3/16"=1'-0" P-303



SECTION 4
3/16"=1'-0" P-303

AS-BUILT DRAWINGS

STATE OF NEW YORK
RICKY A. RYAN
LICENSED PROFESSIONAL ENGINEER
068227
3/14/01

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NOTE:
PIPING SUBJECT TO FINAL EQUIPMENT PURCHASE.

NO.	DATE	REVISIONS	BY	CHK
0	02/22/01	AS-BUILT DRAWING	DEL	LB
C	6/30/00	FINAL DESIGN	DEL	REO
B	5/22/00	90% DESIGN	DEL	REO
A	3/22/00	INTERNAL REVIEW	DEL	REO

DRAWN: D LAWRENCE | PROJECT NO: 51870 TASK 2
ENGINEER: W TAYLOR | SCALE: AS NOTED
CHECKED: . | APPROVED: .
DATE: 02-10-2000 | DATE: .

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DPVE REMEDIAL CONSTRUCTION
ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

PROCESS
TREATMENT BUILDING
PIPING PLAN
AND SECTIONS

DRAWING NO: P-303
11
15

Z:/CAD/DATA1/48454/48454PS1.DWG

ONE LINE DIAGRAM

SYMBOL	DESCRIPTION
100 ( ) 2P	THERMAL MAGNETIC CIRCUIT BREAKER 100A TRIP 2P = DOUBLE POLE (ALL OTHERS 3-POLE)
⊠ 1	FULL VOLTAGE, NON REVERSING, MAGNETIC MOTOR STARTER 1 = NEMA SIZE
	DISCONNECTING DEVICE
	SWITCH, FUSE DISCONNECTING TYPE
	SWITCH, DISCONNECTING TYPE
(AM)	METER OR INSTRUMENT : M = METER (KILOWATTS) AM = AMMETER VM = VOLTMETER WHM = WATT HOUR METER (DEMAND TYPE)
AS	SWITCH OR CONTROLLER : AS = AMMETER SWITCH VS = VOLTMETER SWITCH PC = PROGRAMMABLE CONTROLLER
(5)	AC INDUCTION MOTOR 5 = 5 HP
	TRANSFORMER, SIZE & RATING AS INDICATED
PT 2	POTENTIAL TRANSFORMER (2) INDICATES NUMBER REQUIRED
CT 3	CURRENT TRANSFORMER (3) INDICATES NUMBER REQUIRED
(TS) 2	THERMOSTAT (2) INDICATES 2-STAGE
SFL	MCC LOAD CONNECTION LOCATION: 5 = SECTION NUMBER F = UNIT NUMBER L OR R = LEFT OR RIGHT SIDE (OPTIONAL)
VC	CONTROLS, FURNISHED BY VENDOR
◇	EQUIPMENT LOCATED AT MISCELLANEOUS CONTROL PANEL I/O PANEL
	DOUBLE THROW TRANSFER SWITCH
	COMMON ENCLOSURE OR GROUPED EQUIPMENT
V	VARIABLE FREQUENCY DRIVE
LA	LIGHTNING ARRESTER
(60)	SPECIAL PURPOSE RECEPTACLE (60) - INDICATES AMP RATING TWIST LOCK W/GND CONN.

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
$	SINGLE POLE SWITCH 20 AMP UNLESS OTHERWISE NOTED
3 $	THREE WAY SWITCH 20 AMP UNLESS OTHERWISE NOTED
	DUPLEX RECEPTACLE, GROUNDED, MTD 18" AFF. GFI - GROUND FAULT INTERRUPTER: NUMBER INDICATES AMP RATING
(TS) 2	THERMOSTAT - COORDINATE LOCATION WITH HVAC CONTRACTOR. MTD. 60" AFF. (2) INDICATES 2-STAGE
	GROUND ROD, COPPERWELD
AFF	ABOVE FINISHED FLOOR
GFI	GROUND FAULT INTERRUPTER
	CONDUIT RUN BURIED OR CONCEALED
	CONDUIT RUN EXPOSED
	CONDUIT - HASH MARKS INDICATE NO. OF CONDUCTORS
	BARE COPPER GROUND WIRE. SIZE PER NEC. CADWELD ALL CONNECTIONS
	HOMERUN TO PANELS: LP-1 OR 2 = LIGHTING PANEL (LP-1 CKT___) PP-1 = POWER PANEL (PP-1 CKT___) NOTE: MOTOR CONTROL CENTER HOMERUNS PER ONE-LINE.
LP	SURFACE MOUNTED BOX OR PANEL LP - LIGHTING PANEL PP - POWER PANEL J - JUNCTION BOX
	CONDUIT TURNING UP
	CONDUIT TURNING DOWN
	TELEPHONE OUTLET W = WALL D = DESK
	TRINODE, DRIVEN ROD OR PIPE
	GROUND CONNECTION PIGTAIL
	CLOCK RECEPTACLE, MTD. 90" AFF
	SPECIAL PURPOSE OUTLET WEATHERPROOF, TWIST LOCK WITH GROUND

LIGHTING LEGEND

CODE	DESCRIPTION
(C)	OVERHEAD MOUNTED LOW BAY HID FIXTURE, REFER REFER TO DRAWING E5 FOR TYPE, WATTAGE AND MOUNTING METHOD, PROVIDE QUARTZ RESTRIKE EVERY OTHER FIXTURE
F	FLUORESCENT FIXTURE, OVERHEAD MOUNTED 2'x4' 4-BULB
(E)	HIGH PRESSURE SODIUM FIXTURE, WITH PHOTO- ELECTRIC CELL 100 WATT HIGH PRESSURE SODIUM WALL MOUNT
(H)	EXIT LIGHT
S1	EMERGENCY BATTERY OPERATED LIGHT
EUH	ELECTRIC UNIT HEATER

ELEMENTARY WIRING DIAGRAM LEGEND

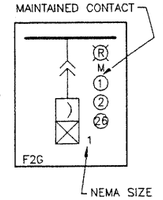
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	FUSE	H O A	HAND-OFF-AUTO SWITCH
ON OFF	ON/OFF SELECTOR SWITCH		
	LIQUID LEVEL SWITCH N.C. OPEN RISING LEVEL	(M)	MOTOR CONTACTOR
	LIQUID LEVEL SWITCH N.C. OPEN FALLING LEVEL		FLOW SWITCH
(M)	RELAY, N.C. CONTACT OR M, N.C. CONTACT (MOTOR STARTER)	(CR)	CONTROL OR AUXILIARY RELAY
(M)	RELAY, N.O. CONTACT OR M, N.C. CONTACT (MOTOR STARTER)	◆	LOCATION POINT
MCC	MOTOR CONTROL CENTER	CP	CONTROL PANEL
L	LOCAL	LSL	LEVEL SWITCH LOW
LSHH	LEVEL SWITCH HIGH HIGH	FSL	FLOW SWITCH LOW
LC	LEVEL CONTROL	●	CONNECTION POINT
H1 H2 X1 X2	CONTROL POWER TRANSFORMER	(R)	PILOT LIGHT G = GREEN R = RED A = AMBER
OL	MOTOR OVERLOAD (OL)		PUSHBUTTON
START STOP	START-STOP PUSHBUTTON MAINTAINED CONTACT		PLC INPUT OR PLC OUTPUT

COMBINATION MAGNETIC STARTER LEGEND

PUSHBUTTON
1 START
2 STOP
3 EMERGENCY STOP
4 FORWARD
5 REVERSE
6 SLOW
7 FAST
8 JOG FWD.
9 JOG REV.
10 OPEN
11 CLOSE

SELECTOR SWITCHES
21 HAND-AUTO
22 TEST-AUTO, JOG-AUTO
23 FAST-SLOW
24 FWD. REV.
25 UP-DOWN
26 ON-OFF
27 STOP-START
30 HAND-OFF-AUTO

INDICATING LIGHTS
R RED
G GREEN
A AMBER



TS TEMPERATURE SWITCH
LC LEVEL CONTROL
PS PRESSURE SWITCH
JB JUNCTION BOX
MCP MAIN CONTROL PANEL
LS LEVEL SWITCH
H HUMIDISTAT

ELECTRICAL ABBREVIATIONS

SYMBOL	DESCRIPTION
KVA	KILOVOLT-AMPERE
CU	COEFFICIENTS OF UTILIZATION
AVE	AVERAGE
MIN	MINIMUM
MAX	MAXIMUM
V	VOLT
ø	PHASE
H.P.S.	HIGH PRESSURE SODIUM
C	CELSIUS
W/	WITH
TYP.	TYPICAL
°	DEGREE
W	WIRE OR WATT
≥	GREATER THAN OR EQUAL TO
I/O	INPUT/OUTPUT
FUT.	FUTURE
CP	CONTROL PANEL
PLC	PROGRAMMABLE CONTROLLER
M	STARTER AUXILIARY CONTACT
OL	MOTOR OVERLOAD
SM	SMOKE DETECTOR
MD	MAIN DISCONNECT
MF	MANUAL FIRE PROTECTION
FH	FIRE HORN & STROBE
TBL	TROUBLE
SCP	SUMP CONTROL PANEL

AS-BUILT DRAWINGS

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4. REFER ALSO TO P & ID LEGEND FOR INSTRUMENT DESIGNATIONS.

NO.	DATE	REVISIONS	BY	CHK
0	2/20/01	AS-BUILT DRAWING	EJL	LB
C	6/30/00	FINAL DESIGN	EJL	WAT
B	5/22/00	90% DESIGN	EJL	WAT
A	3/22/00	INTERNAL REVIEW	EJL	WAT

DRAWN: E.J.LEDUC | PROJECT NO: 51870 TASK 2
ENGINEER: W TAYLOR | SCALE: N.T.S.
CHECKED: - | APPROVED: -
DATE: 02-10-2000 | DATE: -

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ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

ELECTRICAL
ELECTRICAL LEGEND

DRAWING NO: E-401
12/15

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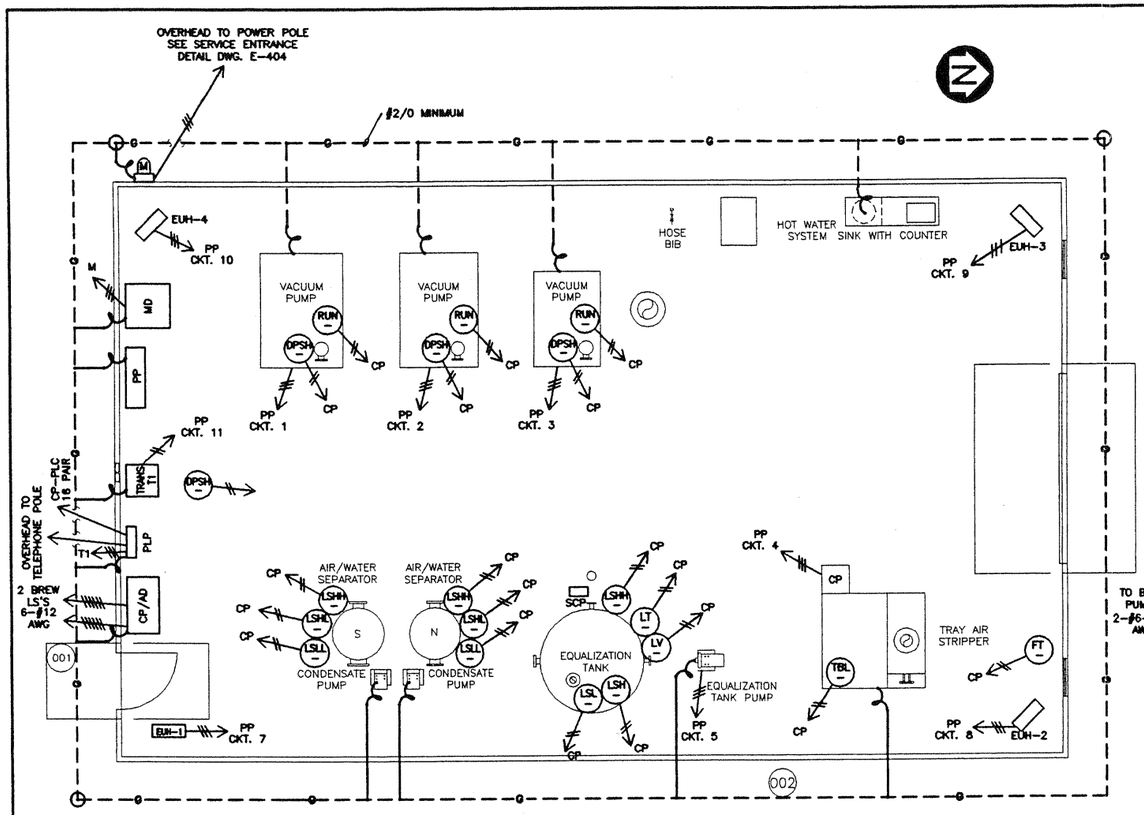
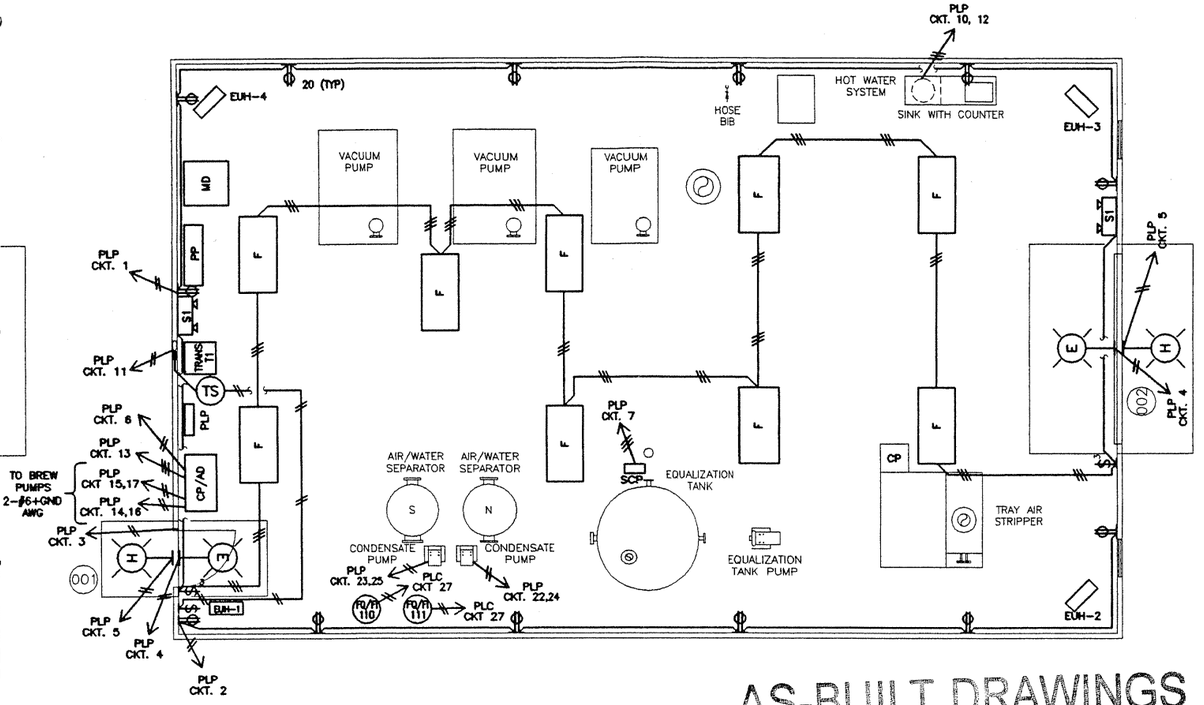


TREATMENT BUILDING
GROUNDING AND INSTRUMENT PLAN, 480V POWER
SCALE: 1/4"=1'-0"



TREATMENT BUILDING
120/240V POWER AND LIGHTING PLAN
SCALE: 1/4"=1'-0"

AS-BUILT DRAWINGS

STATE OF NEW YORK
RICKY A. RYAN
068227
LICENSED PROFESSIONAL ENGINEER
1/14/01

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C	6/30/00	FINAL DESIGN	EJL	WAT
B	5/22/00	90% DESIGN	EJL	WAT
A	3/22/00	INTERNAL REVIEW	EJL	WAT

DRAWN: E.J.LEDUC
ENGINEER: W TAYLOR
CHECKED: -
DATE: 02-23-2000
PROJECT NO: 51870 TASK 2
SCALE: AS NOTED
APPROVED: .
DATE: .

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DPVE REMEDIAL CONSTRUCTION
ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

ELECTRICAL
ELECTRICAL BUILDING PLAN

DRAWING NO: E-402
13/15

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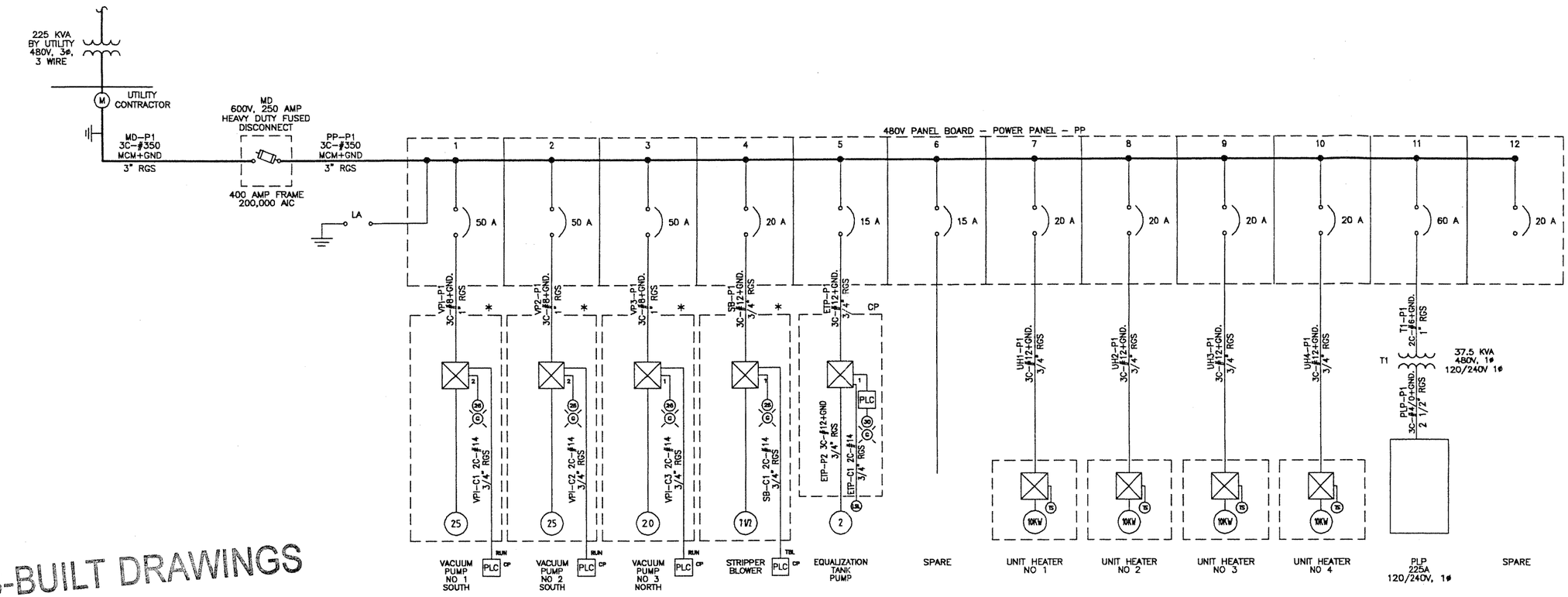
AS-BUILT DRAWINGS



*SKID MOUNTED W/EQUIP

SINGLE LINE DIAGRAM

PANEL: PLP — VOLTAGE- 120/240 — BUS RATING-22,000 AIC

CKT NO.	DESCRIPTION	VA	BKR. SIZE	BKR. SIZE	VA	DESCRIPTION	CKT NO.
1	TREATMENT ROOM RECEPTACLES-GFI	1260	20	20	1260	TREATMENT ROOM RECEPTACLES-GFI	2
3	TREATMENT ROOM LIGHTS	1640	20	20	100	TREATMENT ROOM EXIT LIGHTS	4
5	OUTSIDE LIGHTS	200	20	20	1000	CONTROL PANEL PLUGS, LIGHTS, ECT.	6
7	SUMP PUMP	600	20	20	200	SPACE	8
9	SPARE	-	20	30	4500	HOT WATER HEATER	10
11	EXHAUST FAN	600	20	30	4500	HOT WATER HEATER	12
13	AUTO DIALER	200	20	15	425	BREW PUMP N-1	14
15	BREW PUMP S-1	425	15	15	425	BREW PUMP N-1	16
17	BREW PUMP S-1	425	15	15	-	SPARE	18
19	SPARE	-	15	15	-	SPARE	20
21	SPARE	-	15	15	565	COND PUMP N	22
23	COND PUMP S	565	15	15	565	COND PUMP N	24
25	COND PUMP S	565	15	20	-	SPARE	26
27	FQ/FI-110, 111	200	15	20	-	SPARE	28
29	SPARE	-	20	20	-	SPARE	30
31	SPARE	-	20	20	-	SPARE	32
33							34
35							36
37							38
39							40
41							42

L1 L2 225A — S/N

PANEL LOCATION TREATMENT BUILDING

TRANSFORMER - T1

FEEDER

10,400	TOTAL VA L1
9,820	TOTAL VA L2
20,220	TOTAL LOAD

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DRAWN: E.J.LEDUC | PROJECT NO: 51870 TASK 2
ENGINEER: W TAYLOR | SCALE: N.T.S.
CHECKED: - | APPROVED: .
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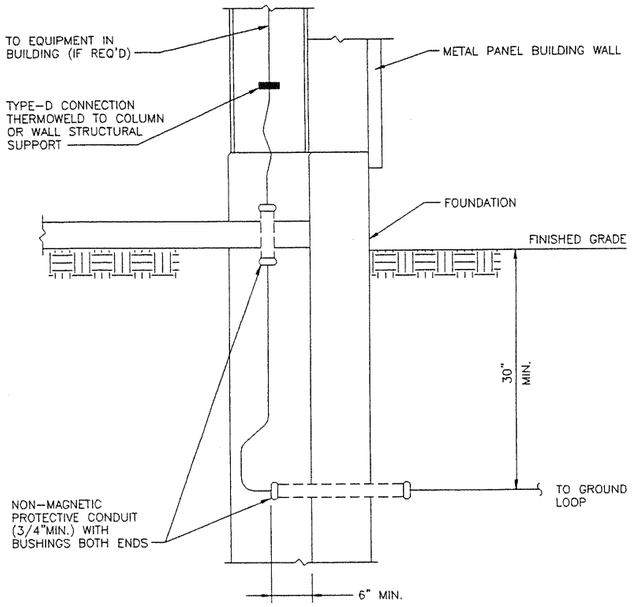
FORMER TAYLOR INSTRUMENT SITE
DPVE REMEDIAL CONSTRUCTION
ABB COMBUSTION ENGINEERING, INC.
ROCHESTER, NEW YORK

ELECTRICAL

ONE LINE DIAGRAM AND PANEL SCHEDULE

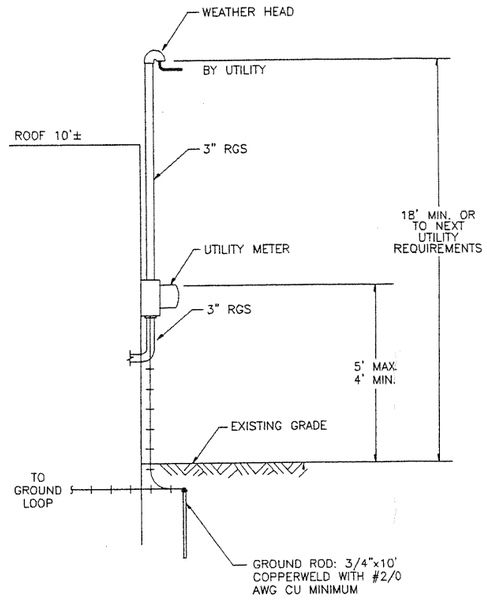
DRAWING NO: E-403
14/15

P:/CAD/DATA1/48454/48454E403.DWG



TYPICAL BUILDING GROUND

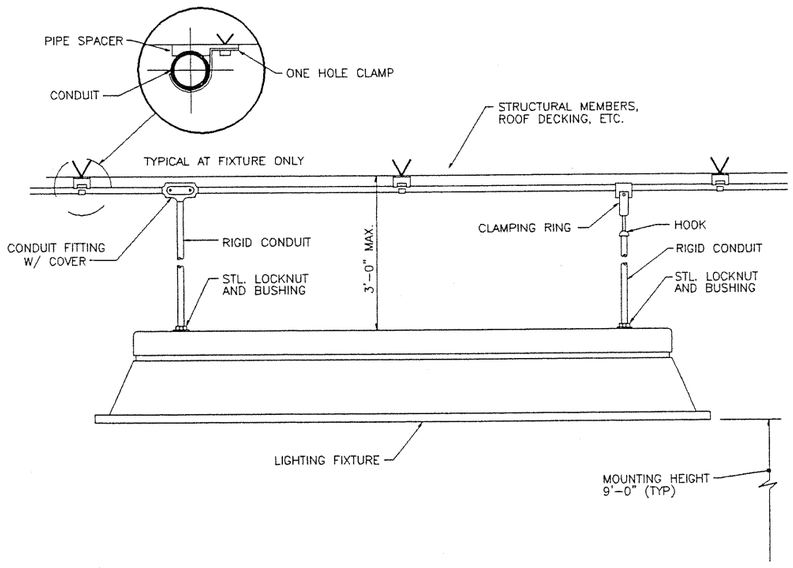
SCALE: N.T.S.



SERVICE ENTRANCE

A
E-101

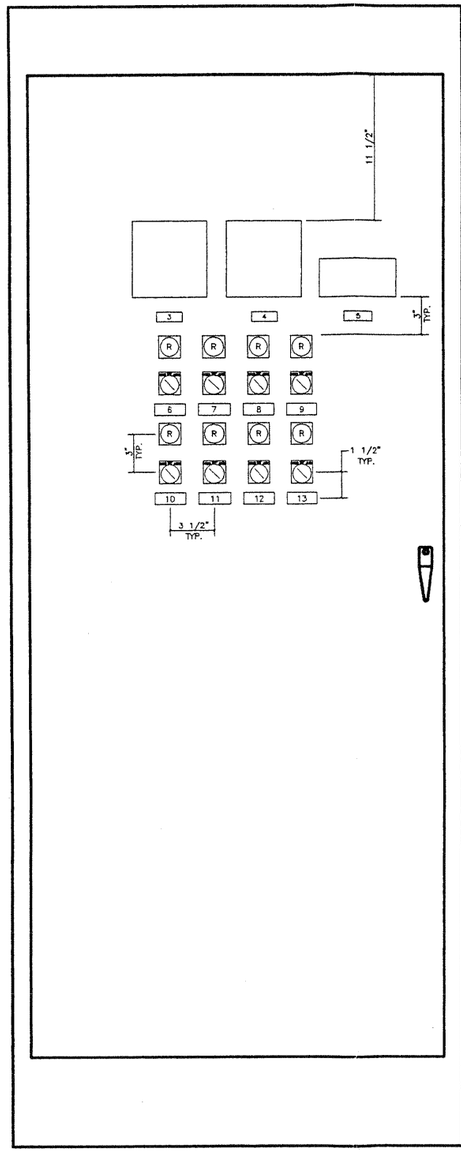
SCALE: N.T.S.



FOR ROOMS WITHOUT DROP CEILINGS

FLUORESCENT FIXTURE MOUNTING

SCALE: N.T.S.



CONTROL PANEL

SCALE: 2" = 1'-0"

AS-BUILT DRAWINGS

STATE OF NEW YORK
RICKY A. RYAN
068227
LICENSED PROFESSIONAL ENGINEER
3/14/01

LEGEND

3. EFFLUENT FLOW RECORDER
4. SCREEN PLC
5. EFFLUENT FLOW TOTALIZER
6. BREW PUMP NORTH HOA SWITCH AND RED LIGHT N1
7. SPARE
8. BREW PUMP NORTH HOA SWITCH AND RED LIGHT S1
9. SPARE
10. CONDENSATE PUMP NORTH HOA SWITCH AND RED LIGHT
11. CONDENSATE PUMP SOUTH NORTH HOA SWITCH AND RED LIGHT
12. EQUALIZATION TANK PUMP SOUTH HOA SWITCH AND RED LIGHT
13. SPARE

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DRAWN: E.J.LEDUC | PROJECT NO: 51870 TASK 2
ENGINEER: W TAYLOR | SCALE: NOTED
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ROCHESTER, NEW YORK

ELECTRICAL

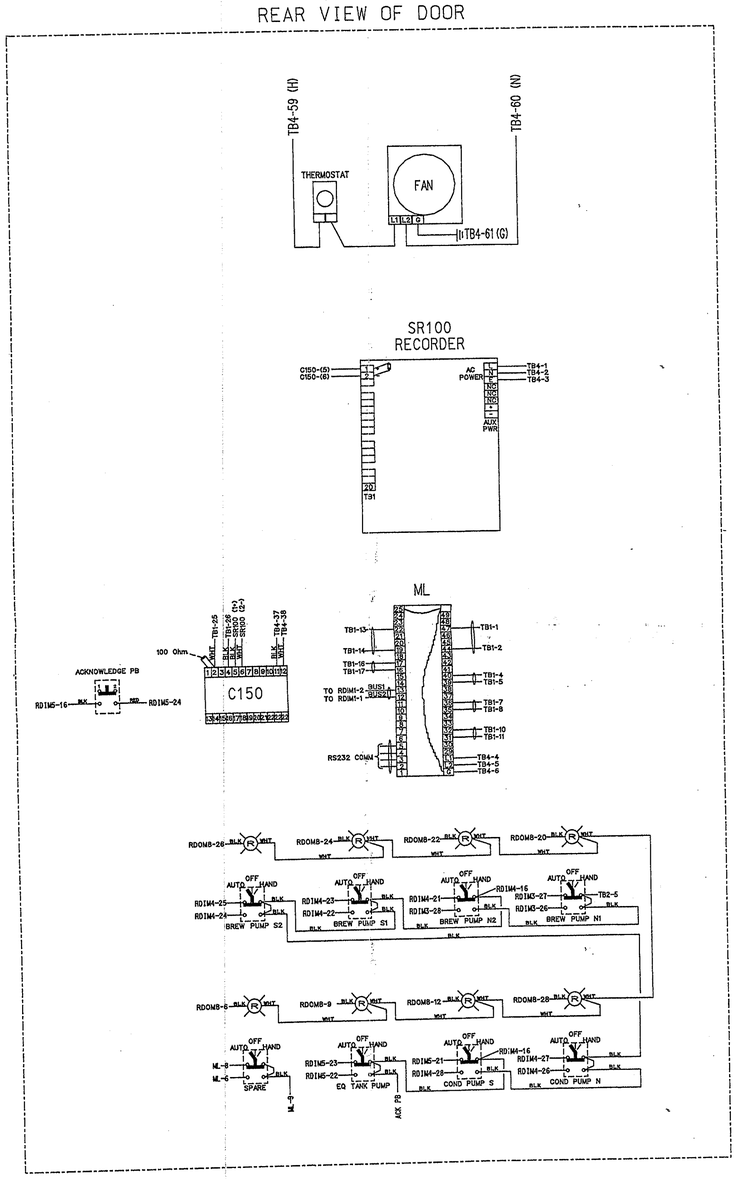
CONTROL PANEL AND MISCELLANEOUS DETAILS

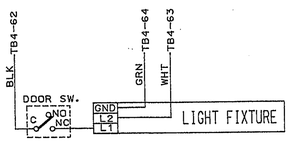
DRAWING NO: E-404
15/15

CAD/DATA1/48454/48454E404.DWG

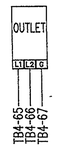
REAR VIEW

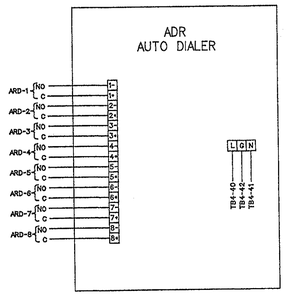
REAR VIEW OF DOOR

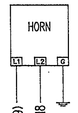


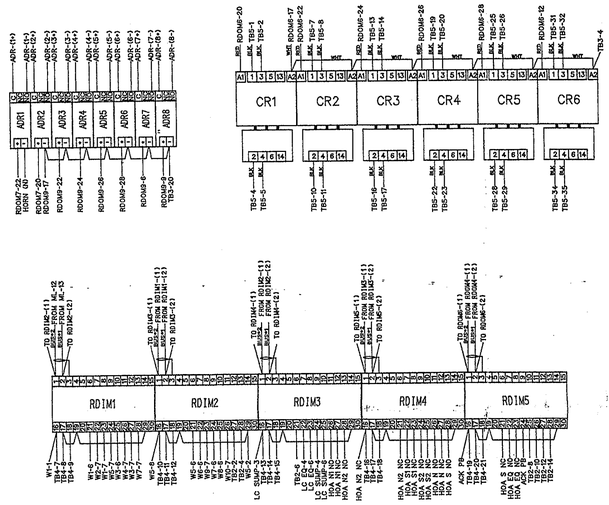


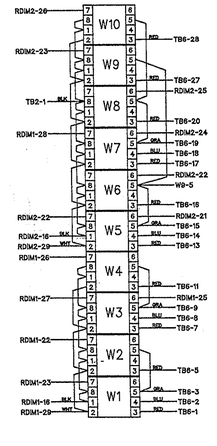
INTERIOR LIGHT

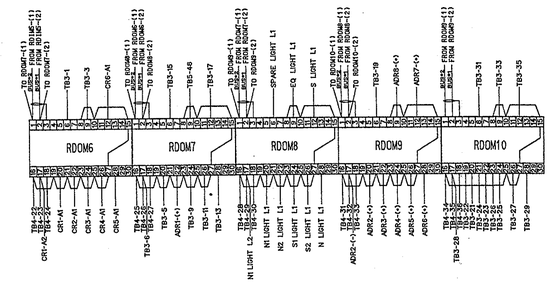




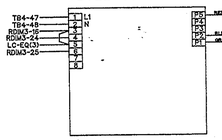




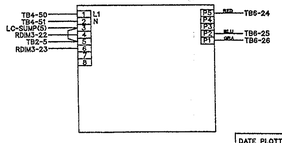




SUMP
LEVEL CONTROLLER



EQ TANK
LEVEL CONTROLLER



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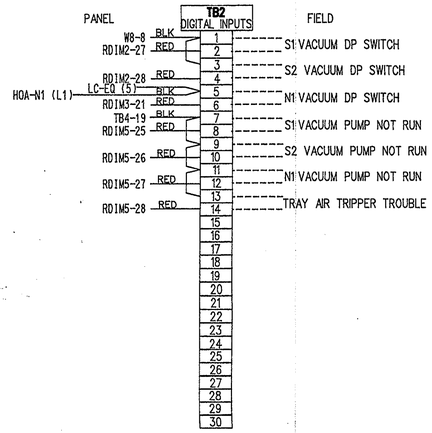
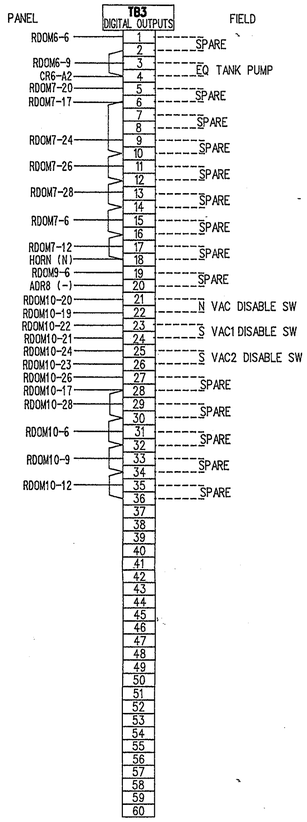
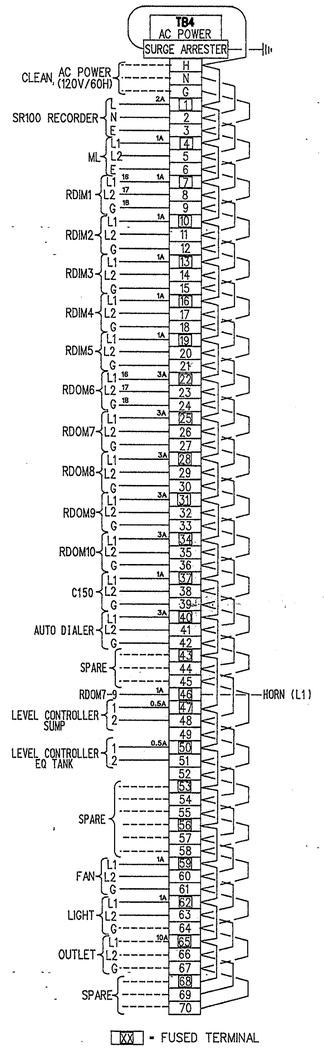
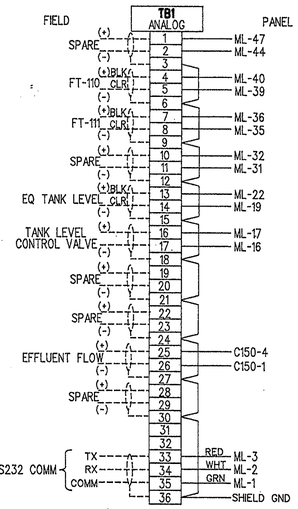
		REVISION	DESCRIPTION	DATE	APPV'D MICRO
THIS DRAWING WAS CREATED USING CAD. DO NOT MANUALLY REVISE OR UPDATE.					
MATERIAL	HARDING & LAWSON				MICRO
SPECIFICATIONS	AMES STREET GROUND TREATMENT PANEL WIRING				
HEAT TREAT					
FINISH	DESIGN	DRAWN RFB	CHECKED	APPROVED	DATE 10-8-00 SCALE
NOTES	PLANT/DEPT.				
ASSEMBLY NO.	CADFILE HARDLAWW.DGN			DRAWING NUMBER	SHEET 1 OF 2
ABB INSTRUMENTATION					HVL3892850-W

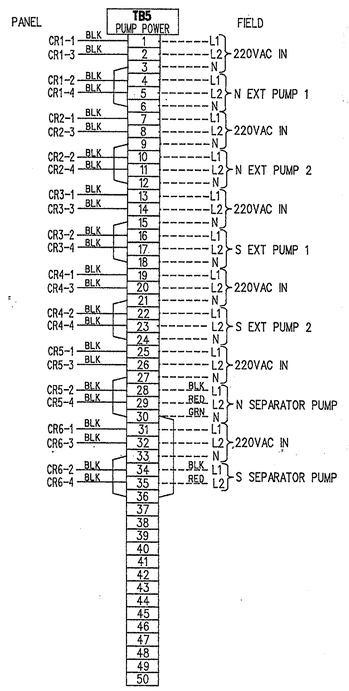
HV&L Industries Inc.
Pro-Sys Solutions Division
PROJECT NO. 3892850

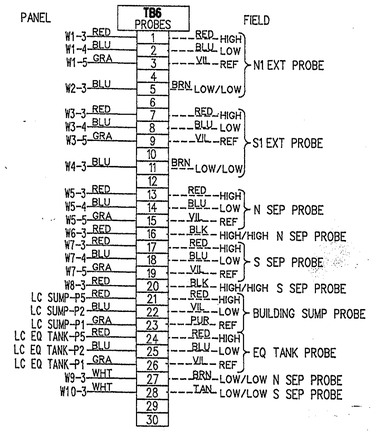












NOTES:

1) ICN - 22AWG 4 WIRE SHIELDED CABLE
2) ANALOG SIGNAL - 18AWG TWISTED PAIR
   BLACK (+)
   WHITE (-)
3) SHIELD WIRE - 16AWG GREEN
4) DIGITAL SIGNAL - 18AWG RED
5) 120V AC POWER - 14AWG
   L1 (H) - BLACK
   L2 (N) - WHITE
   GND (G) - GREEN

HV&L Industries Inc.
Pro-Sys Solutions Division

PROJECT NO. 3892850

DATE PLOTTED 12-18-00	LATEST REVISION 1	1	REVISED AS BUILT	12-18-00	
		REVISION	DESCRIPTION	DATE	APP'D / MICRO

THIS DRAWING WAS CREATED USING CAD. DO NOT MANUALLY REVISE OR UPDATE.

MATERIAL	HARDING & LAWSON					MICRO
SPECIFICATIONS	AMES STREET GROUND TREATMENT PANEL WIRING					
HEAT TREAT						
FINISH	DESIGN	DRAWN RFB	CHECKED	APPROVED	DATE 11-13-00	SCALE
NOTES	PLANT/DEPT.					
ASSEMBLY NO.	CADFILE HARDLAWW.DGN			DRAWING NUMBER	SHEET 2 OF 2	

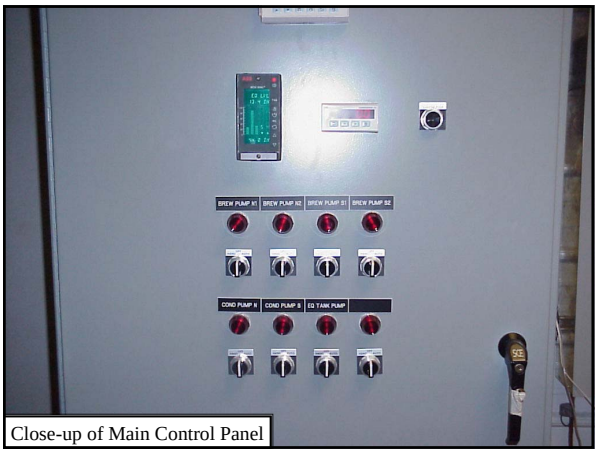
ABB INSTRUMENTATION

HVL3892850-W

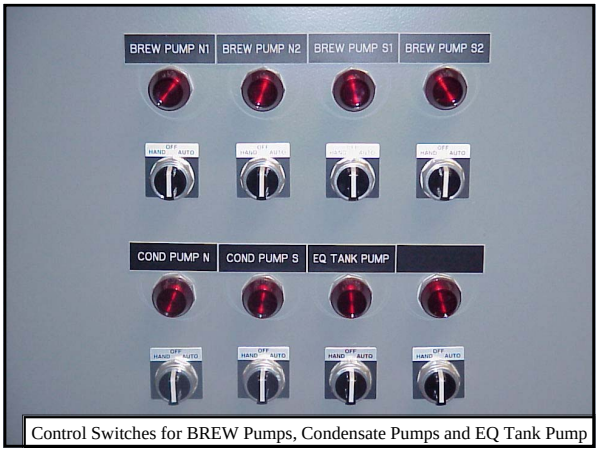
SUBAPPENDIX C

TREATMENT SYSTEM PICTURES

Main Control Panel

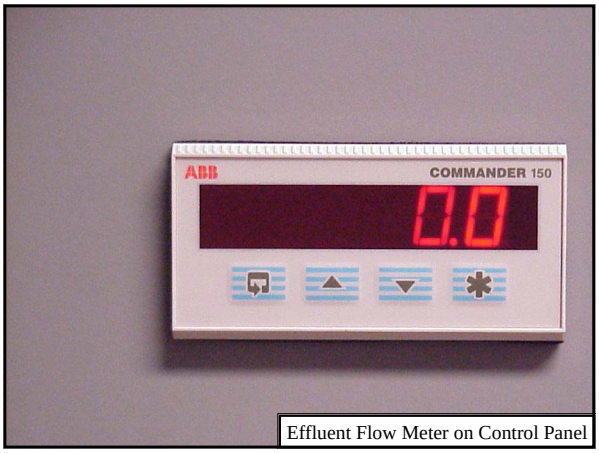


Close-up of Main Control Panel

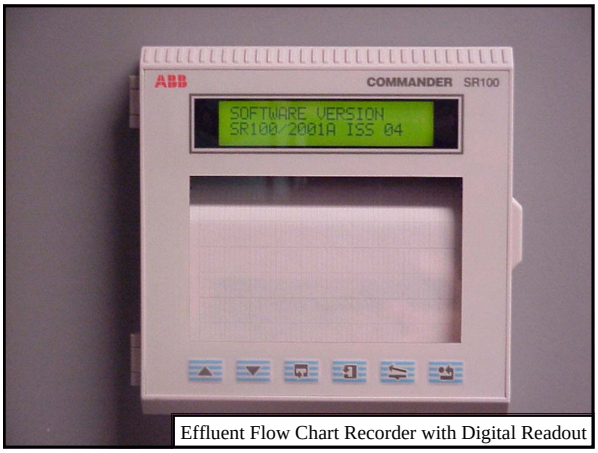


Control Switches for BREW Pumps, Condensate Pumps and EQ Tank Pump

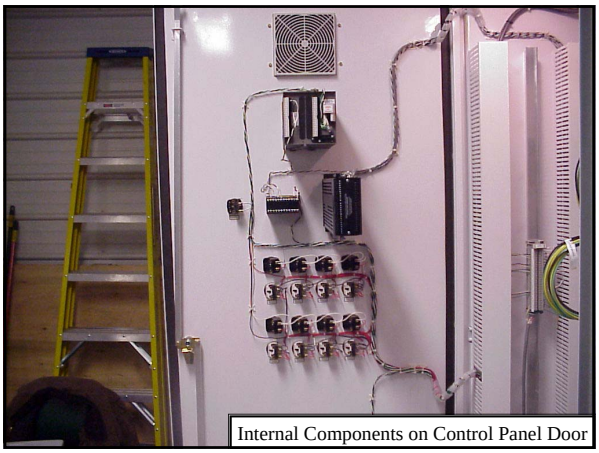
PLC Display



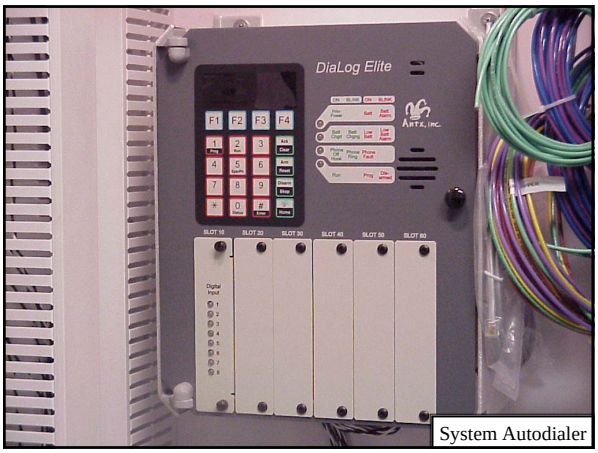
Effluent Flow Meter on Control Panel



Effluent Flow Chart Recorder with Digital Readout

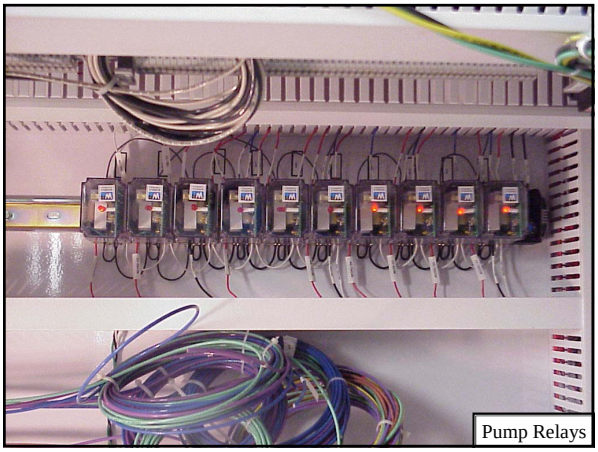


Internal Components on Control Panel Door

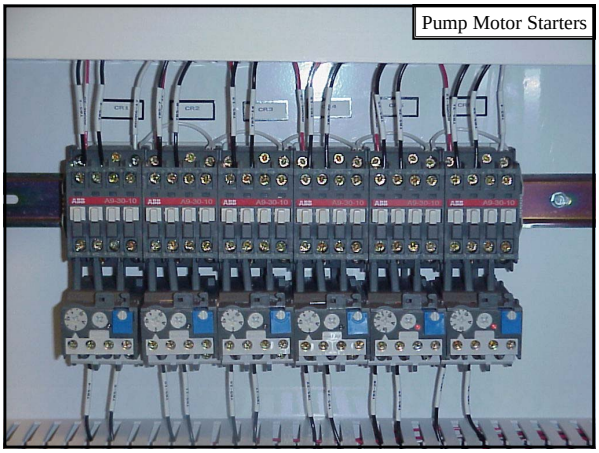


System Autodialer

Autodialer Control Pad

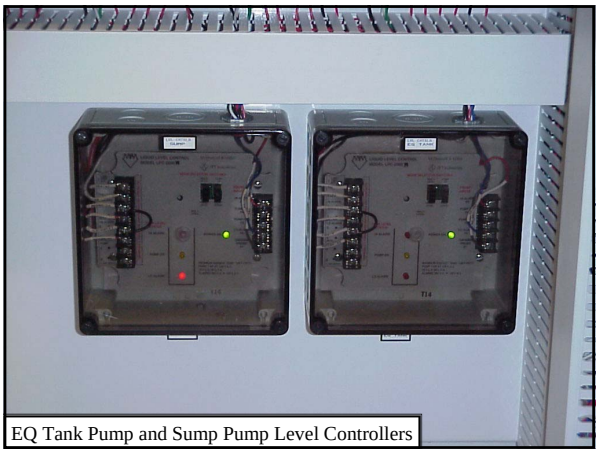


Pump Relays



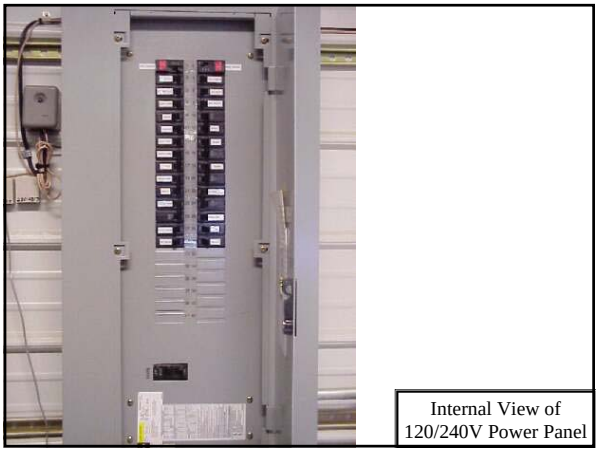
Pump Motor Starters

Equipment Controllers



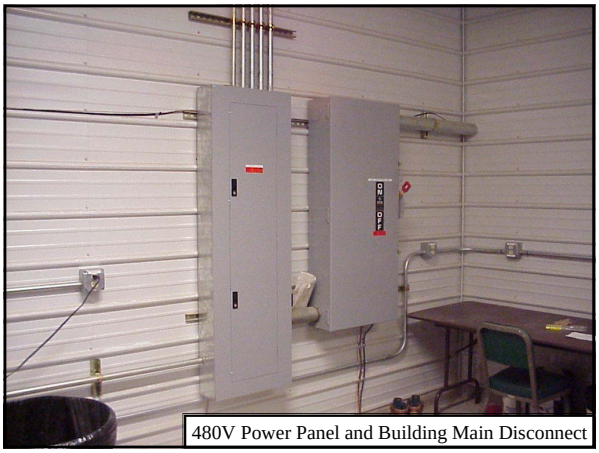
EQ Tank Pump and Sump Pump Level Controllers

120/240V Power Panel

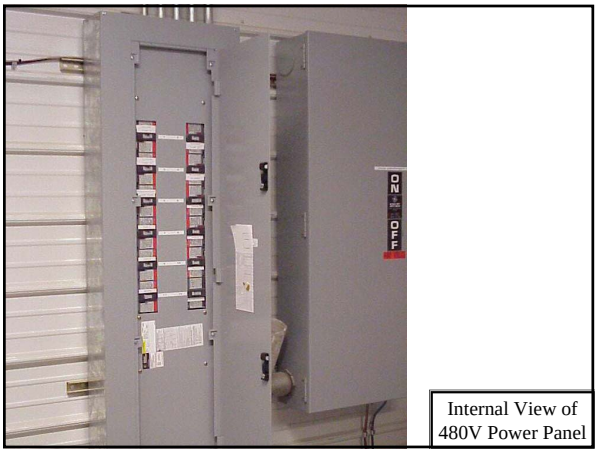


Internal View of 120/240V Power Panel

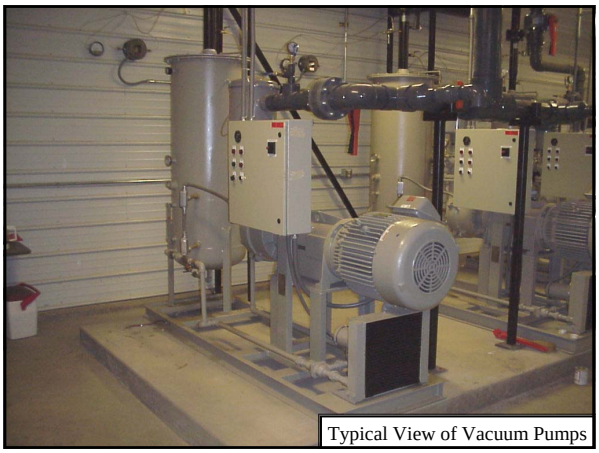
480 to 120/240 Stepdown Transfer



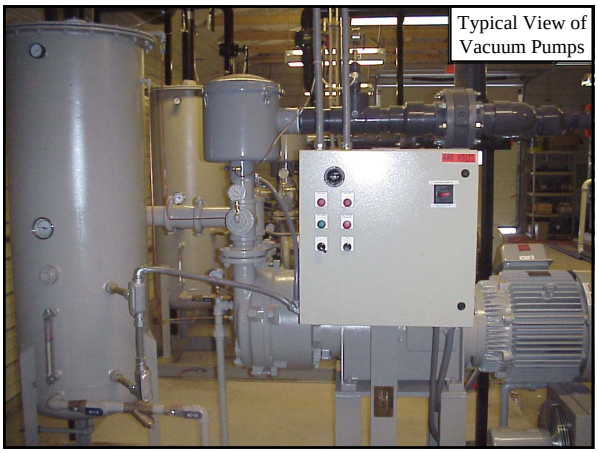
480V Power Panel and Building Main Disconnect



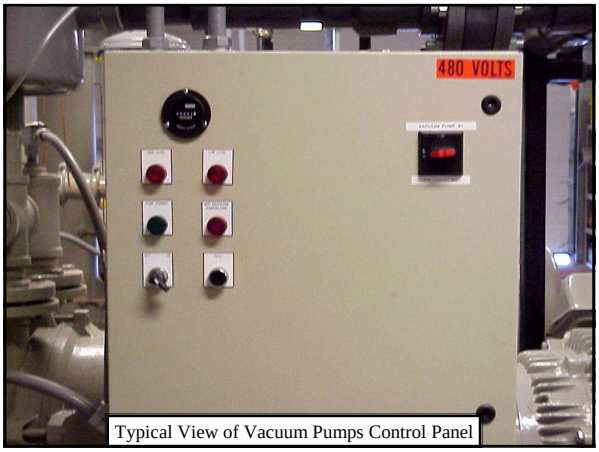
Internal View of 480V Power Panel



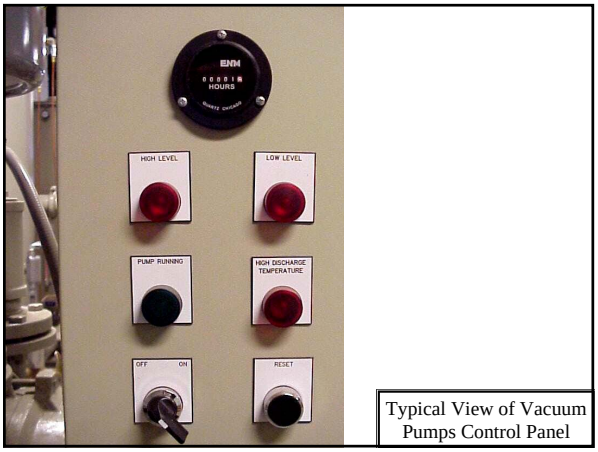
Typical View of Vacuum Pumps



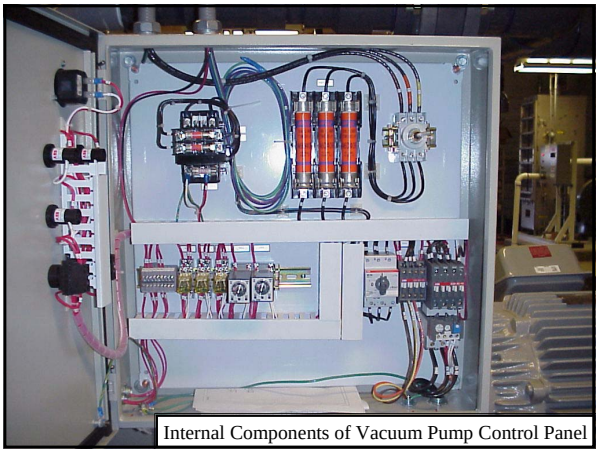
Typical View of Vacuum Pumps



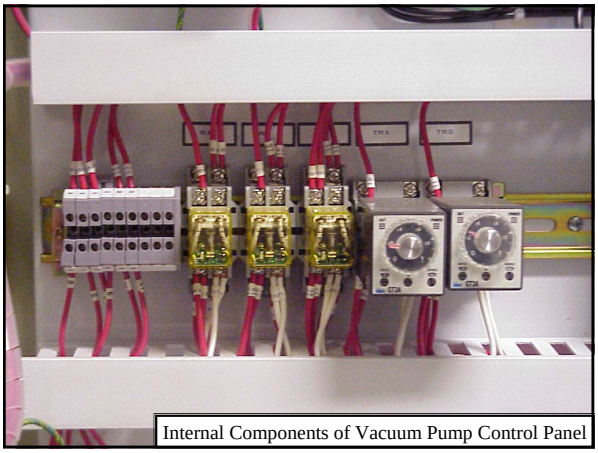
Typical View of Vacuum Pumps Control Panel



Typical View of Vacuum Pumps Control Panel

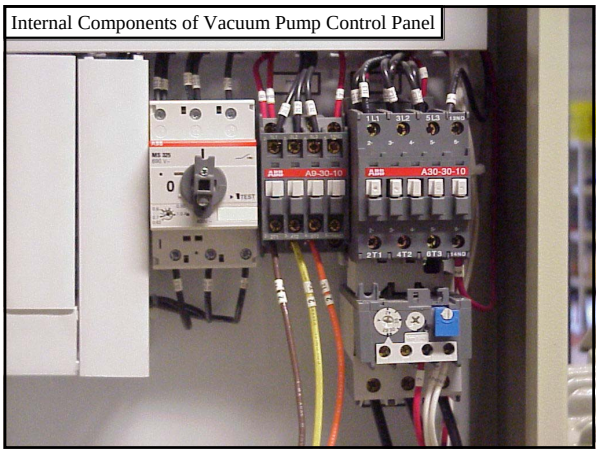


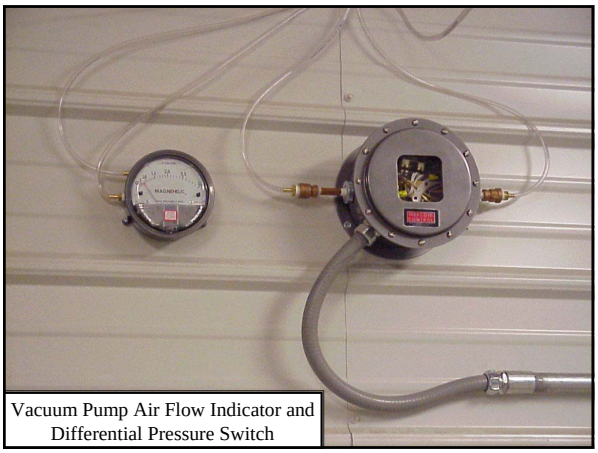
Internal Components of Vacuum Pump Control Panel



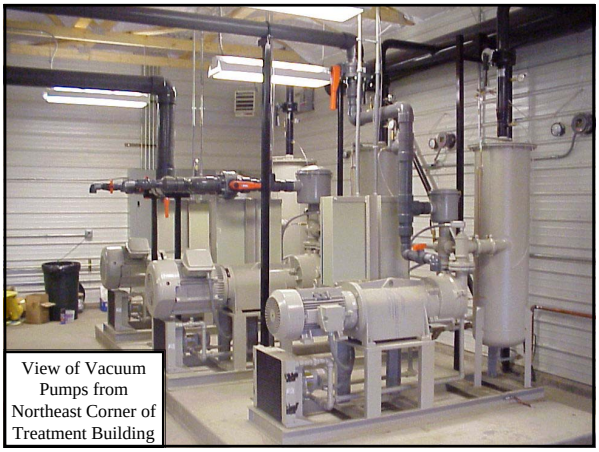
Internal Components of Vacuum Pump Control Panel

Internal Components of Vacuum Pump Control Panel





Vacuum Pump Air Flow Indicator and Differential Pressure Switch

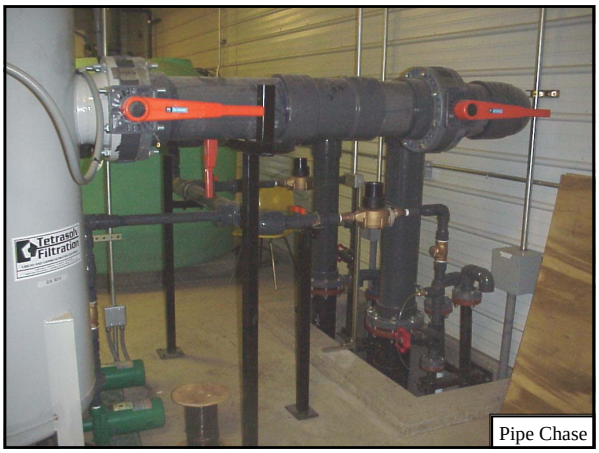


View of Vacuum Pumps from Northeast Corner of Treatment Building

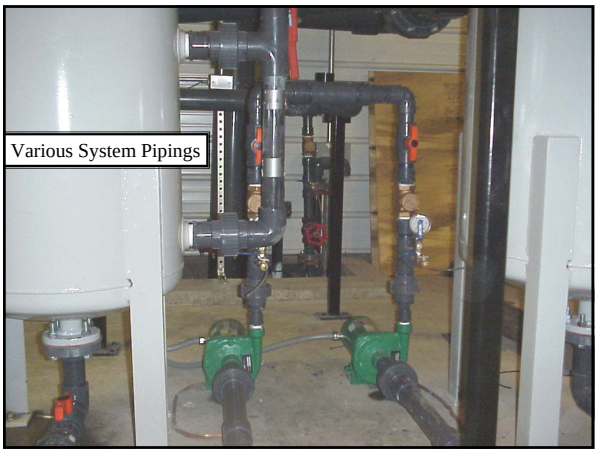
View of Treatment System Components from the North Side of Building

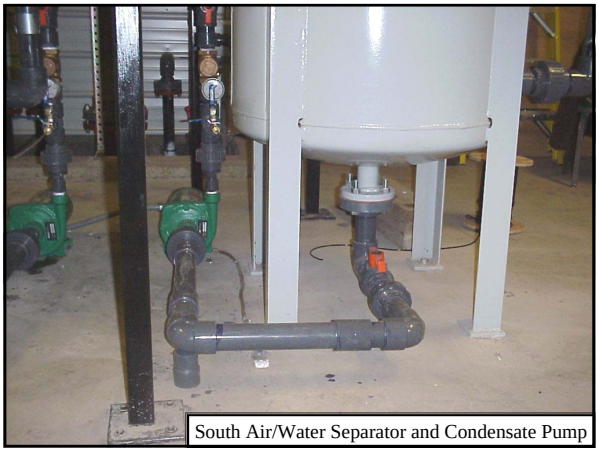
1,000-Gallon EQ Tank

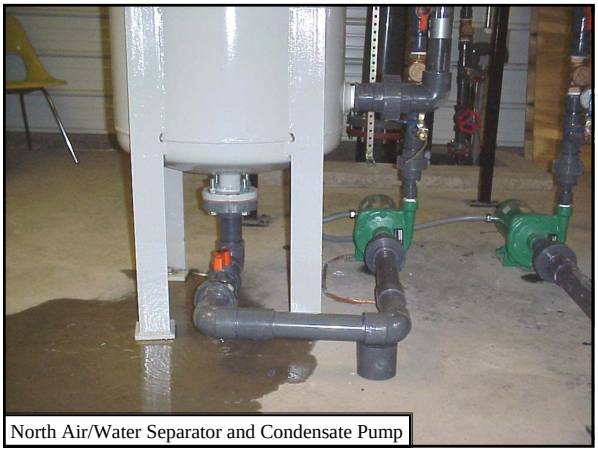
Tray Air Stripper

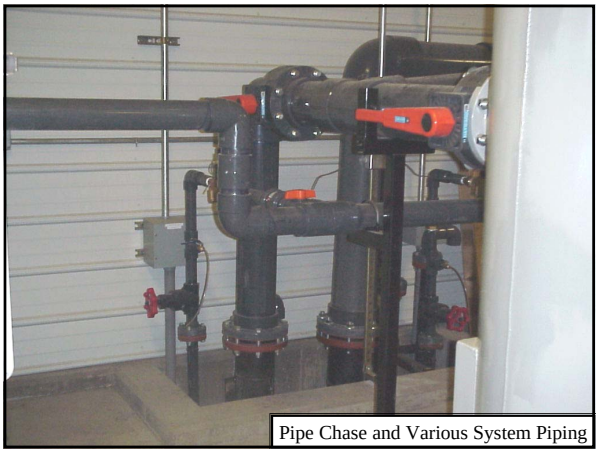


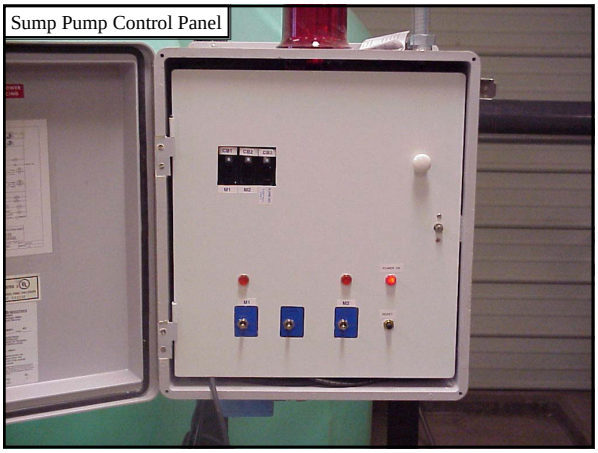
Pipe Chase

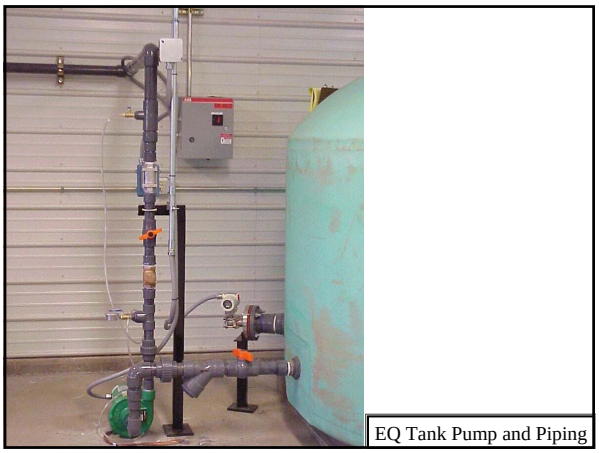

Various System Pipings


South Air/Water Separator and Condensate Pump

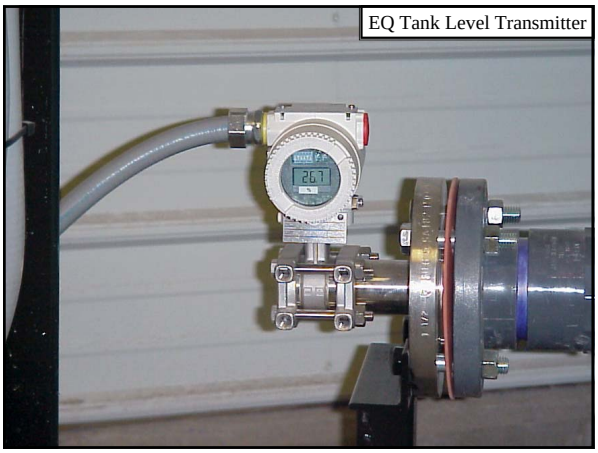

North Air/Water Separator and Condensate Pump


Pipe Chase and Various System Piping

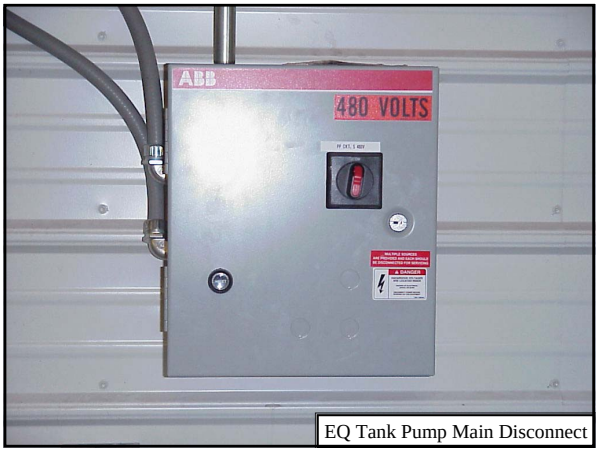
Sump Pump Control Panel




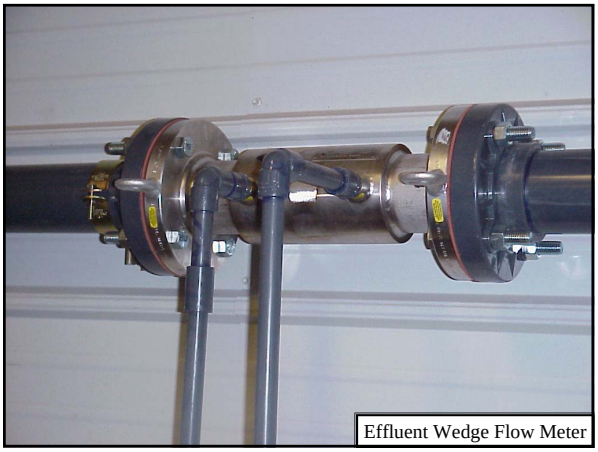
EQ Tank Pump and Piping



EQ Tank Level Transmitter



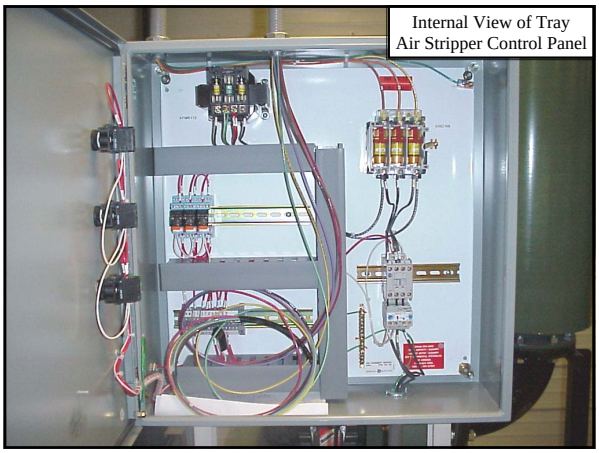
EQ Tank Pump Main Disconnect



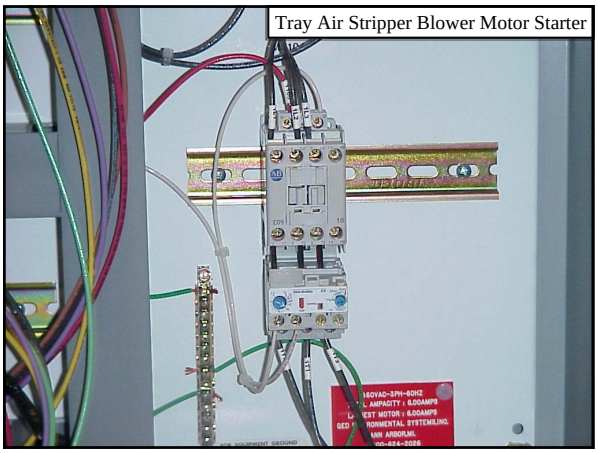
Effluent Wedge Flow Meter

System Effluent Piping

Tray Air Stripper Control Panel



Internal View of Tray Air Stripper Control Panel



Tray Air Stripper Blower Motor Starter

Front View of Tray Air Stripper

System Effluent Piping

SUBAPPENDIX D

LEGAL DOCUMENTS

Legal Documents

1. Monroe County Pure Waters (MCPW) Industrial Sewer Use Permit
2. New York State Department of Health Approval of Completed Works

MONROE COUNTY

Department of Environmental Services

Division of Pure Waters

Jack Doyle
County Executive

John E. Graham, P.E.
Director

November 1, 2000

Mr. M. Louis Barrentine, III
HARDING ESE
1400 Centerpoint Boulevard, Suite 158
Knoxville, TN
37932

Re: Monroe County Sewer Use Permit Enclosure (#827)

Dear Mr. Barrentine:

Please find enclosed a modified Monroe County Sewer Use Permit enclosure (#827) for the Harding ESE project located at 95 Ames Street in Rochester, New York.

As you note, the proposed ground water treatment system has been added to the site permit enclosure.

Should you have any questions, please feel free to call our office.

Yours truly,

Michael Kirchgessner

Michael Kirchgessner
Industrial Waste Engineer

xc: Harry Reiter, Pretreatment Coordinator
file (H:\IW\HARDING)

716-C14-01.

INITIAL INDUSTRIAL SEWER USE PERMIT

County of Monroe Pure Waters District No. 8520 Permit No: 827

Expires: 4/01

Fee: $40.00

Ck 464611
4/14/00

Firm Name Harding Lawson Associates

Address 1400 Center-Point Blvd, #150
Knoxville, TN 37905

Type of Business or Service _____

I. The above-named applicant is permitted to discharge wastes into the Pure Waters Sewer system or Tributary thereto as applied for by an application dated _____ and verified by the applicant except the Director of Pure Waters requires the following terms and conditions to govern the permitted discharge:

A. _____
B. _____
C. _____

II. The applicant further agrees to:

1. Accept and abide by all provisions of the Sewer Use Law of Monroe County and of all pertinent rules or regulations now in force or shall be adopted in the future.

2. Notify the Director of Pure Waters in writing of any revision to the plant sewer system or any change in industrial wastes discharge to the public sewers listed in Exhibit "B". The latter encompasses either (1) an increase or decrease in average daily volume or strength of wastes listed in Exhibit "B" or (2) new wastes that were not listed in Exhibit "B".

3. Furnish the Director of Pure Waters upon request any additional information related to the installation or use of sewer or drain for which this permit is sought.

4. Operate and maintain any waste pretreatment facilities, as may be required as a condition of the acceptance into the public sewer of the industrial wastes involved, in an efficient manner at all times, and at no expense to the County.

5. Cooperate with the Director of Pure Waters or his representatives in their inspecting, sampling, and study of wastes, or the facilities provided for pretreatment.

6. Notify the Director of Pure Waters immediately of any accident, negligence, breakdown of pretreating equipment, or other occurrence that occasions discharge to the public sewers of any wastes or process waters not covered by this permit.

Applicant's Signature J.R. Date 4/17/00

Applicant's Title Senior Engineer

Emergency Contact Ricky Ryan Phone 423/531/1922

Permit Approved by John E Graham PE Date APR 19 20

Director of Pure Waters

TOTAL P.01

TERMS AND CONDITIONS

GENERAL REQUIREMENTS:

A. The permittee agrees to accept and abide by all provisions of the Sewer Use Law of Monroe County and of all pertinent rules or regulations now in force or shall be adopted in the future.

B.1. In addition to the parameters/limits outlined, the total facility discharge shall meet all other concentration values as described in Article II, Section 10e of the Monroe County Pure Waters Districts, Rules and Regulations-Sewer Use Law of the County of Monroe.

B.2. Included in Article II, Section 10e, is the definition of "Normal Sewage". "Normal Sewage" may be discharged to the sewer system in excess of the concentrations outlined in the Joint Rules and Regulations, however, the facility will be subject to the imposition of a sewer surcharge and possible self monitoring requirements as a result. Surcharging procedures are outlined in Article X of the MCSUL.

B.3. Regulatory sampling for analytes not specified under "required monitoring" shall be conducted by the Industrial Waste Section at a minimum frequency of once every three (3) years.

C. This permit is not assignable or transferable.
The permit is issued to a specific user and location.

D. Per Article VIII, Section 8.11 of the MCSUL, a violation by the permittee of the permit conditions may be cause for revocation or suspension of the permit after a Hearing by the Administrative Board, or if the violation is found to be within the emergency powers of the Director under Sections 4.5 or 5.5.
The revocation is immediate upon receipt of notice to the Industrial User; however a Hearing shall be held as soon as possible.

E. As provided under Article VIII, Section 8.1, the Director and his duly authorized representatives shall gain entry on to private lands by permission or duly issued warrant for the purpose of inspection, observation, measurement, sampling and testing in accordance with the provisions of this law and its implementing Rules and Regulations. The Director or his representatives shall not have authority to inquire into any processes used in any industrial operation beyond that information having a direct bearing on the kind and source of discharge to the sewers or the on-site facilities for waste treatment. While performing the necessary work on private lands, referred to above, the Director or his duly authorized representative shall observe all safety rules applicable to the premises as established by the owner and/or occupant.

SPECIAL CONDITION:

A. The pH range for this permit is 5.0 - 12.0 su. This range is specifically permitted by the Director as allowed under Article IV Section 4.2 of the Monroe County Sewer Use Law.

REPORTING REQUIREMENTS:

A. Per the requirements of 40 CFR Part 403.5., Significant Industrial Users must submit Periodic Reports on Continued Compliance to the Control Authority on a biannual (2/yr) basis. Deadline dates of submission for these reports will be August 15 and February 15 respectively.

B. Discharge monitoring reports shall be submitted to the Control Authority upon receipt from the permittee's testing laboratory.
C. Any Industrial User subject to the reporting requirements of the General Pretreatment Regulations shall maintain records of all information resulting from any monitoring activities required by 403.12 for a minimum of three (3) years. These records shall be available for inspection and copying by the Control Authority. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Industrial User or the operation of the POTW Pretreatment Program or when requested by the Director or the Regional Administrator.

NOTIFICATION REQUIREMENTS:

A. Pursuant to Article VIII, Section 8.4k, the permittee shall notify the Department within 24 hours of becoming aware that discharge monitoring is in violation of any permit limit. This notification shall be directed to the Industrial Waste Section at 760-7600. The User shall also repeat sampling and analysis for the analyte in non-compliance and submit the results of the repeat analysis to Monroe County within 30 days after becoming aware of the violation.
B. Notify the Director in writing when considering a revision to the plant sewer system or any change in industrial waste discharges to the public sewers. The latter encompasses either an increase or decrease in average daily volume or strength of waste or new wastes.
C. Notify the Director immediately of any accident, negligence, breakdown of pretreating equipment or other occurrence that occasions discharge to the public sewer of any waste or process waters not covered by this permit.

SLUG CONTROL:

An Industrial User shall be required to report any/all slug discharges to the Monroe County sewer system. For the purpose of this permit enclosure, a slug discharge shall be defined as any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge. Following a review process, the control authority (Monroe County) shall determine the applicability of a facility slug control plan. If the Control Authority decides that a slug control plan is needed, the plan shall contain, at a minimum, the following elements:

1. Description of discharge practices, including non-routine batch discharges.
2. Description of stored chemicals.
3. Procedures for immediately notifying the Control Authority of slug discharges, including any discharge that would violate a prohibition under 40 CFR 403.5 (b), with procedures for follow-up written notification within five (5) days.
4. If necessary, procedures to prevent adverse impact from accidental spills, including, but not limited to, inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site run-off, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants (including solvents) and/or measures and equipment for emergency purposes.

SNC DEFINITION:
In accordance with 40 CFR 403.8 (f) (vii), an industrial user is in significant noncompliance (SNC) if its violations meet one or more of the following criteria:

1. Chronic violations of wastewater discharge limits - defined as those which 66% or more of all the measurements taken during a six month period exceed (by any magnitude) the daily maximum limit or the average limit for the same pollutant parameter. This criteria does NOT apply to the following Monroe County surchargeable parameters: Biochemical Oxygen Demand, Total Suspended Solids, Chlorine Demand and Total Phosphorus (ref. Article X-Monroe County Sewer Use Law).
2. Technical review criteria (TRC) violations - defined as those in which 33% or more of all the measurements for each pollutant parameter taken during a six month period equal or exceed the product of the daily maximum limit or the average limit times the applicable TRC. This criteria does NOT apply to the following Monroe County surchargeable parameters: Biochemical Oxygen Demand, Total Suspended Solids, Chlorine Demand, and Total Phosphorus (ref. Article X-Monroe County Sewer Use Law).
3. Any other violation of a pretreatment effluent limit (daily maximum or longer-term average) that the Control Authority had caused, alone or in combination with other discharges, interference or pass-through (including endangering the health or POTW personnel or the general public).
4. Any discharge of a pollutant that has: caused imminent endangerment to human health, welfare or the environment or has resulted in the POTW's exercise of its emergency authority under paragraph (t) (1) (vi) (8) of 40 CFR part 403 to prevent such a discharge.
5. Failure to meet, within 90 days after the scheduled date, a compliance schedule milestone contained in a local control mechanism or enforcement order, for starting construction, completing construction, or attaining final compliance.
6. Failure to provide, within 30 days after the due date required reports such as BMR's, 90 day compliance reports, periodic reports on continued compliance.
7. Failure to accurately report noncompliance.
8. Any other violation or group of violations which the Control Authority determines will adversely affect the operation and implementation of the local pretreatment program.

PENALTIES:
Should the facility be considered in Significant Non-Compliance (SNC), based on the above-mentioned criteria, the minimum enforcement response by Monroe County will be the publication of the company name in the Gannett Rochester newspaper. The company will be published as an Industrial User in Significant Non-Compliance (SNC). Fines and criminal penalties may follow this publication (ref. Article XII - Monroe County Sewer Use Law).

Nothing in this permit shall be construed to relieve the permittee from civil/criminal penalties for noncompliance under Article XII, Section 12.1 (D) of the Sewer Use Law of the County of Monroe. Article XII, Section 12.1(D) provides that any person who violates a permit condition is subject to a civil penalty not to exceed $10,000 for any one case and an additional penalty not to exceed $10,000 for each day of a continuing violation.

COUNTY OF MONROE
SEWER USE PERMIT ENCLOSURE

Harding Lawson Associates
1400 Centerpoint Blvd.
Knoxville, TN
Site Address: 95 Ames Street
Rochester, New York

PERMIT NUMBER: 827
DISTRICT NUMBER: 8520

TYPE OF BUSINESS: Groundwater Remediation
SIC CODE: N/A
SAMPLE POINT:
1. Property perimeter MH - 6
2. Property perimeter MH - 22
3. Property perimeter MH - 23
4. Property perimeter MH - 24
(refer as-built plan 01/27/00)

REQUIRED MONITORING

SELF MONITORING FREQUENCY: Quarterly

SAMPLING PROTOCOL: Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto. In the absence of 40 CFR Part 136 testing methodology, a New York State Department of Health, approved method is acceptable. A grab sample, collected from the above noted sample points shall be analyzed for the following:

Parameter	MC Limit
Mercury	50 ppb
* Total VOC's	2.13 ppm

* The Total VOC limit is the summation of all volatile organic compounds detected above 10 ug/l.

REQUIRED MONITORING

SAMPLE POINT: Ground Water Treatment System
Valve - located in effluent piping

SELF-MONITORING FREQUENCY:

1. Initial performance sample (treat,hold,obtain approval).
2. One sample per week for the first month of operation.
3. Monthly samples thereafter.

SAMPLING PROTOCOL: Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto. In the absence of 40 CFR Part 136 testing methodology, a New York State Department of Health, **approved** method is acceptable. A grab sample, collected from the above noted sample points shall be analyzed for the following:

Parameter	**MC Limit**
Mercury	50 ppb
* Total VOC's	2.13 ppm

* The Total VOC limit is the summation of all volatile organic compounds detected above 10 ug/l.

11/01/00

NEW YORK STATE DEPARTMENT OF HEALTH

APPROVAL OF COMPLETED WORKS

FOR

PUBLIC WATER SUPPLY IMPROVEMENT
MONROE COUNTY, NEW YORK

This approval is issued under the provisions of 10 NYCRR, Part 5:

1. Applicant/Facility	2. Location of Works	3. Water District
Andy Karlsbergs ABB, Inc.	**95 Ames Street Rochester (C)**	**Monroe County Water Authority**

Plans for the construction of this project were approved on July 25, 2000. Your design engineer certified to the Monroe County Department of Health that the following backflow prevention device(s) was installed in accordance with the approved plans:

One (1), 1-inch Watts Model No. 909, Serial No. 503755 reduced pressure principle (zone) assembly.

This approval for completed works is issued subject to the following conditions:

THAT any connection made prior to the backflow prevention device(s) shall render this approval void.

That a New York State Department of Health Certified Backflow Prevention Device Tester inspect and test the above referenced containment backflow prevention device(s) at least yearly and report the results to the Supplier of Water and to the Monroe County Department of Health.

ISSUED FOR THE STATE COMMISSIONER OF HEALTH

January 23, 2001

Designated Representative
John J. Fr[illegible], P.E.

DOH-1032
xc: Thomas Palumbo
Ray Zahn, RWB

SUBAPPENDIX E

SYSTEM EQUIPMENT INFORMATION

FORMER TAYLOR INSTRUMENTS SITE
95 AMES STREET
ROCHESTER, NY
SYSTEM EQUIPMENT

VACUUM PUMP #1

Pump

Manufacturer	SIEMENS
PN:	AV21610KK017PZ144
Total Weight	1900 lbs.
Manufacturer Date	Sep-00
I.D	Gustavo/HLA (TAG 6933)
S.O. NO.	8016601-A

Pump Motor

Manufacturer	Marathon Electric
Model	7VH324TTFS6076ATR101R115L
Frame	324T
Type	TFS
DES	B
Phase	3
Insulation Class	F3
Duty	Continuous
Max Amb	40
Enclosure	TEFC
Horsepower	25
Volts	230/460
Hertz	60
Safety Factor	1.15
RPM	1180
FL Amps	64/32
Code	G
NEMA Nom Efficiency	92.4
Nom PF	80
Shaft End BRG	312
ORP	311

Oil Cooler

Manufacturer	BALDOR
Model	33E175-042561
Serial #	W0300
I.E.C Frame	D71C
DES	B
Phase	3
Max Amb	40
Horsepower	0.5
Volts	208-230/460
Hertz	60
Amps	1.3-1.2/0.6
Safety Factor	1.15
RPM	3450
Code	B
Nom Efficiency	72
I.P.	54

FORMER TAYLOR INSTRUMENTS SITE
95 AMES STREET
ROCHESTER, NY
SYSTEM EQUIPMENT

VACUUM PUMP #2

Pump

Manufacturer	SIEMENS
PN:	AV21610KK017PZ144
Total Weight	1900 lbs.
Manufacturer Date	Sep-00
I.D	Gustavo/HLA (TAG 6933)
S.O. NO.	8016601-B

Pump Motor

Manufacturer	Marathon Electric
Model	7VH324TTFS6076ATR101R115L
Frame	324T
Type	TFS
DES	B
Phase	3
Insulation Class	F3
Duty	Continuous
Max Amb	40
Enclosure	TEFC
Horsepower	25
Volts	230/460
Hertz	60
Safety Factor	1.15
RPM	1180
FL Amps	64/32
Code	G
NEMA Nom Efficiency	92.4
Nom PF	80
Shaft End BRG	312
ORP	311

Oil Cooler

Manufacturer	BALDOR
Model	33E175-042561
Serial #	W0300
I.E.C Frame	D71C
DES	B
Phase	3
Max Amb	40
Horsepower	0.5
Volts	208-230/460
Hertz	60
Amps	1.3-1.2/0.6
Safety Factor	1.15
RPM	3450
Code	B
Nom Efficiency	72
I.P.	54

FORMER TAYLOR INSTRUMENTS SITE
95 AMES STREET
ROCHESTER, NY
SYSTEM EQUIPMENT

VACUUM PUMP #3

Pump

Manufacturer	SIEMENS
PN:	AV21310KK017PZ144
Total Weight	1400 lbs.
Manufacturer Date	Sep-00
I.D	None
S.O. NO.	8016601

Pump Motor

Manufacturer	Marathon Electric
Serial #	M98TESP.876
Part #	1LA0256-4FP27
Frame	256TC
Type	RGZP
Weight	274 lbs
Phase	3
Insulation Class	F
Duty	Continuous
Max Amb	40
Temp Rise	Class B
Enclosure	TEFC
Horsepower	20
Volts	230YY/460Y
Hertz	60
Safety Factor	1.15
RPM	1755
FL Amps	51/25.5
Code	B
NEMA Nom Efficiency	91
Shaft End BRG	45BC02JP3
ORP	40BC02JP3

Oil Cooler

Manufacturer	BALDOR
Model	33E175-042561
Serial #	W0300
I.E.C Frame	D71C
DES	B
Phase	3
Max Amb	40
Horsepower	0.5
Volts	208-230/460
Hertz	60
Amps	1.3-1.2/0.6
Safety Factor	1.15
RPM	3450
Code	B
Nom Efficiency	72
I.P.	54

FORMER TAYLOR INSTRUMENTS SITE
95 AMES STREET
ROCHESTER, NY
SYSTEM EQUIPMENT

CONDENSATE PUMPS

SOUTH CONDENSATE PUMP

Pump

Manufacturer	Myers
Catalog #	CT20
Serial #	100

Pump Motor

Manufacturer	A.O. Smith
Model #	C48863B86
Serial #	8D97
Horsepower	2
Volts	115/230
RPM	3450
Amps	24/12
Hertz	60
Service Factor	1.1
Frame	48Y
Phase	1
Thermally Protected	BRT47ABO
Max Amb	50
Type	UC
Duty	Continuous
Code	H
Insulation Class	B

NORTH CONDENSATE PUMP

Pump

Manufacturer	Myers
Model #	C48B54B86
Serial #	7100
Horsepower	1
Volts	115/230
RPM	3450
Amps	14.8/7.4
Hertz	60
Service Factor	1.25
Frame	48Y
Phase	1
Thermally Protected	T
Max Amb	50
Type	UC
Duty	Continuous
Code	G
Insulation Class	B

FORMER TAYLOR INSTRUMENTS SITE
95 AMES STREET
ROCHESTER, NY
SYSTEM EQUIPMENT

EQ TANK PUMP

Pump

Manufacturer	Myers
Catalog #	CT203
Serial #	1000

Pump Motor

Manufacturer	A.O. Smith
Model #	P48A40B86
Serial #	7F98
Horsepower	2
Volts	230/460
RPM	3450
Amps	6.8/3.4
Hertz	60
Service Factor	1.1
Frame	48Y
Phase	3
Max Amb	40
Type	P
Duty	Continuous
Code	L
Insulation Class	B
Enclosure Type	P

FORMER TAYLOR INSTRUMENTS SITE
95 AMES STREET
ROCHESTER, NY
SYSTEM EQUIPMENT

TRAY AIR STRIPPER

Stripper Unit

Manufacturer	QED
I.D. #	DOT-27531

Blower Motor

Manufacturer	BALDOR
Catalog #	M3663T
Serial #	F500
SPEC	06C101W396H1
Frame	184T
Horsepower	5
Volts	230/460
Amps	12/6
RPM	3460
Hertz	60
Enclosure	TEFC
Phase	3
Class	F
DES	B
Code	K
NEMA Nom. Effiency	87.5
PF	92
Max Amb	40
Bearings	DE6206
ODE	6205

SUBAPPENDIX F

OPERATION AND MAINTENANCE DATA COLLECTION FORMS

DATA COLLECTION SHEET: TREATMENT BUILDING
FORMER TAYLOR INSTRUMENTS SITE
95 AMES STREET
ROCHESTER, NY

Date
Time
Temp/Conditions

System Operational Data

BREW-S-1 (Meter)		Gallons		gpm
BREW-N-1 (Meter)		Gallons		gpm
A/W Sep. - S		psi		
A/W Sep. - N		psi		

Vacuum Pumps	**Pump # 1**	**Pump # 2**	**Pump # 3**	
Hour Meter				Hours
Filter Pressure - Inlet				Inches of Hg
Filter Pressure - outlet				Inches of Hg
Pump Casing Pressure				Inches of Hg
Oil Level				
Pump Temperature				^{o}F
Oil Reservoir Pressure				psi
Effluent Flow Rate				CFM

EQ Tank H_2O Level		Gallons		
EQ Tank Pump Pressure		psi		
Air Stripper Sump Pressure		Inches of H_2O		
Air Stripper Effluent Flow		CFM	gauge	malfunction
Chart Recorder		Gallons		

PLC Readings

BREW-S-1 Flow		gpm
BREW-S-1 Totalizer		Gallons
BREW-N-1 Flow		gpm
BREW-N-1 Totalizer		Gallons
System Effluent Flow		gpm
System Effluent Totalizer		Gallons

DATA COLLECTION SHEET: SYSTEM WELL DATA
FORMER TAYLOR INSTRUMENTS SITE
95 AMES STREET
ROCHESTER, NY

Extraction Well I.D	Inches of Hg
South	
EW-1D	
EW-2	
EW-3	
EW-4	
EW-5	
EW-6	
EW-7	
EW-8	
EW-9	
EW-10	
EW-11	
EW-12	
EW-13	
EW-14	
EW-15	
EW-16	

Extraction Well I.D	Inches of Hg
North	
EW-1	
EW-2	
EW-3	
EW-4	
EW-5	
EW-6	

WATER LEVEL DATA: GROUNDWATER MONITORING WELLS
FORMER TAYLOR INSTRUMENTS SITE
95 AMES STREET
ROCHESTER, NY

Well ID	PID Reading (PPM)	Time Measured	Depth to Water (ft, BTOC)
BR-01			
BR-02			
BR-03			
BR-04			
BR-05			
BR-06			
BR-07			
BR-08			
BR-09			
BR-10			
BR-11			
BR-12			
BR-13			
BR-14			
BR-15			
BR-16			
BR-17			
OB-04			
OB-05			
OB-06			
OB-07			
OB-08			
OB-09			
W-1			
W-2			
W-3			
W-4			
W-5			
TW-01			
TW-04			
TW-07			
TW-09			
TW-13			
TW-17			
TW-20			
TW-74			

SUBAPPENDIX G

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SUBAPPENDIX G

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SUBAPPENDIX H

ORIGINAL HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN
ON-SITE REMEDIAL PROGRAM

FORMER TAYLOR INSTRUMENTS FACILITY
95 AMES STREET
ROCHESTER, NEW YORK

Prepared for:

Combustion Engineering
501 Merritt 7
Norwalk, CT 06851

Prepared by:

Harding Lawson Associates
1400 Centerpoint Boulevard, Suite 158
Knoxville, TN 37932

FEBRUARY 2000

Harding Lawson Associates
1400 Centerpoint Blvd., Suite 158
Knoxville, TN 37932
(865) 531-1922

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On-Site Remedial Program
Former Taylor Instruments Facility
Rochester, New York

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Rochester, New York

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Former Taylor Instruments Facility
Rochester, New York

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LIST OF ACRONYMS

CFR	Code of Federal Regulations
DOT	Department of Transportation
HASP	Health and Safety Plan
HLA	Harding Lawson Associates
HSD	Health and Safety Designee
HSO	Health and Safety Officer
HSSF	Health and Safety Short Form
IDLH	Immediately Dangerous to Life or Health
MCDOH	Monroe County Department of Health
mg/m^3	milligrams per cubic meter
MSDS	material safety data sheet
MVA	Mercury Vapor Analyzer
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
PM	project manager
PPE	personal protective equipment
ppm	parts per million
RSHO	Regional Safety and Health Officer
RWP	Remedial Work Plan
SCBA	self-contained breathing apparatus
SCS	Site Construction Supervisor
TAF	Task Analysis Form
TCE	trichloroethene

1.0 GENERAL

1.1 SCOPE AND PURPOSE

This Health and Safety Plan (HASP) has been prepared in conformance with the Harding Lawson Associates (HLA) Health and Safety Program and is intended to meet the requirements of 29 Code of Federal Regulations (CFR) 1910.120 and 29 CFR 1926. As such, the HASP addresses those activities associated with field and other operations for this project. Compliance with this HASP is required for all HLA personnel. Contractor personnel entering the site will be shown a copy of this HASP for informational purposes. A short form task-specific version of this HASP is also available and will be used by field personnel at the Site. The long-form HASP will be kept in the Construction Trailer for reference.

1.2 PROJECT PERSONNEL

1.2.1 Project Manager

The project manager (PM) is the individual with overall project management responsibilities. Those responsibilities as they relate to health and safety include provision for the development of this site-specific HASP; the necessary resources to meet requirements of this HASP; the coordination of staff assignments to ensure that personnel assigned to the project meet medical and training requirements; and the means and materials necessary to resolve any health and safety issues that are identified or that developed on the project.

The PM is Ricky Ryan, from HLA's Knoxville, Tennessee, office.

1.2.2 Site Construction Supervisor

The Site Construction Supervisor (SCS) is the PM's designee who is on site and vested with the authority by the PM to carry out day-to-day site operations, including interfacing with the Site Health and Safety Officer (HSO). Steve Rose, Ronny Fields, Tim Pringle, and Louis Barrentine from HLA's Knoxville office, have been designated SCSs.

1.2.3 Health and Safety Officer

The HSO for each field activity is designated by the PM. The HSO is responsible for implementing this site-specific HASP and any activity-specific procedures in accordance with the HLA Health and Safety Program. The HSO will investigate any accidents, illnesses, and incidents occurring on-site. The HSO will also conduct safety briefings and site-specific training for on-site personnel as well as perform the required monitoring. The HSO, in consultation with the PM, Regional Safety and Health Officer (RSHO), and SCS is responsible for updating and modifying this HASP as site or environmental conditions change. The HSO's authority and responsibility is outlined in Appendix A.

1.2.4 Other HLA Personnel

Depending on the specific activity being conducted (e.g., monitoring and recovery well installation, soil excavation, remedial system installation, sewer cleaning, or regulatory agency tour), different HLA personnel may visit or work at the Former Taylor Instruments Facility on a one-time, occasional or frequent basis. Regardless of the activity, all HLA personnel entering the site are subject to the provisions of this HASP.

When a particular site activity required or may potentially require greater than Level D protection, and for any activity involving sample collection, the "Medical Data Sheet" forms found in Appendix B of this HASP must be completed. Site visits, tours or other activities by HLA personnel for which only Level D protection is required does not require the completion of this form. Prior to each visit, however, the PM or HSO will brief these persons on the HASP components as they may apply to the specific activity as described in Section 3.

1.2.5 HLA Subcontractor Personnel

HLA subcontractors are generally required under their contract terms to devise a health and safety program for their employees who will enter or work at the site. This program, at a minimum, must comply with local, state, and federal requirements (particularly 29 CFR 1910.120) and utilize measures, which are at least as protective as those in HLA's HASP.

Unless specified in the subcontract agreement, HLA is not responsible for monitoring a subcontractor's compliance with the subcontractor's or HLA's HASP or local, state, or federal requirements. HLA does, however, have the contractual right to control subcontractors whom they believe may not be in compliance, through such measures as denying site access, issuing stop work orders, etc. Such measures will be applied at the discretion of the SCS, HSO, PM, and other responsible HLA personnel.

1.2.6 Other Site Visitors

Visitors to the Former Taylor Instruments Facility other than HLA personnel and subcontractors may include:

- Representatives of Combustion Engineering (HLA's client and the site owner).
- Combustion Engineering Legal Representatives (e.g., Nixon-Peabody LLP [environmental attorneys]).
- Potential vendors invited to job walks, etc.
- Regulatory agency, City and State government, and local utility personnel.
- Other unspecified project stakeholders.

Although HLA is not solely responsible for the health and safety of visitors, as agents of Combustion Engineering and professionals knowledgeable of site conditions HLA personnel have a responsibility to provide for the health and safety of visitors. As described in Section 3.0, a set of procedures has been devised in order to provide information and guidance to site visitors.

1.3 TRAINING

Training is defined under the HLA Health and Safety Program, and all HLA personnel entering potentially contaminated areas of this site must meet the requirements of 29 CFR 1910.120. Personnel without the required training will not be permitted in any area with potential for exposure to toxic substances or harmful physical agents (i.e., downrange).

1.4 MEDICAL SURVEILLANCE

All HLA personnel entering potentially contaminated areas of this site will be medically qualified for site assignment through a medical surveillance program outlined in the HLA Health and Safety Program. Personnel who have not received medical clearance will not be permitted in any area with potential for exposure to toxic substances or harmful physical agents (i.e., downrange).

2.0 SITE CHARACTERIZATION AND ANALYSIS

2.1 SITE NAME, LOCATION, AND SIZE

The Former Taylor Instruments Facility, the subject of the remedial action, is located at 95 Ames Street in Rochester, New York (Figure 2-1). The Site is currently undeveloped property covered with asphalt on approximately 14 acres of land (Figure 2-2).

2.2 SITE HISTORY AND LAYOUT

The Former Taylor Instruments Facility was part of the Rochester operations of ABB Kent-Taylor. Taylor Brothers Company (a predecessor purchased the property to ABB KENT-TAYLOR) in 1904; the company occupied the site in 1905 or 1906. Industrial operations at the site, conducted by ABB Kent-Taylor or its predecessor companies, have included the manufacture of thermometers, barometers, compasses, altimeters, process automation equipment, and other related products. The property is currently held under the Combustion Engineering name, with site closure activities being coordinated by the ABB, Inc., Real Estate Director in Stamford, Connecticut. As of April 1994, utilities throughout most of the site have been shut off.

2.3 REMEDIAL WORK PLAN SCOPE OF WORK

HLA will be performing a number of tasks at the site in accordance with the Remedial Work Plan (RWP) (HLA, 2000). Some of these tasks are expected to last several years. For the most part, HLA's activates will fall into one of the following categories:

CATEGORY	ACTIVITIES
A	Excavation, staging, and loading of mercury and trichloroethene (TCE) contaminated soil, installation of recovery and monitoring wells, and remedial system installation, groundwater monitoring, and remedial system operation and maintenance. These activities may result in personnel being exposed to soil contaminated with mercury and/or lead and groundwater contaminated with TCE.
B	Attending and/or leading site tours and meetings involving the client, client subcontractors, regulatory agencies, government officials, community members, etc.

The Task Analysis section of this HASP (Section 3.0) analyzes each of the above Task Categories, which provides general information regarding potential health and safety hazards and protective measures. Because of the wide variety of activities likely to occur at this site, analysis of specific tasks within each class is not provided. Instead, the SCS/HSO for each field activity will undertake a specific task analysis, prior to fieldwork using the following process:

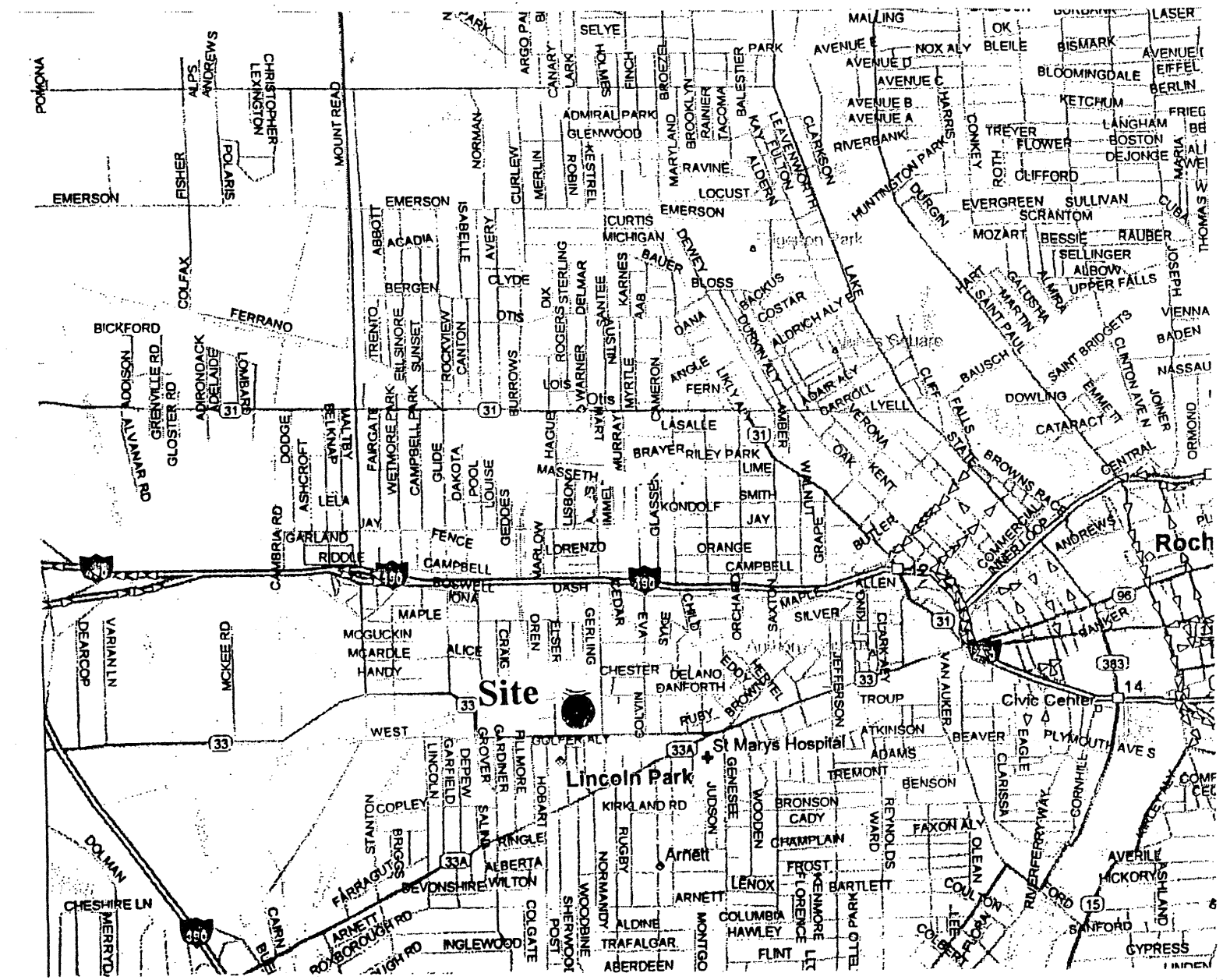

FIGURE 2-1

Harding Lawson Associates
Engineering and Environmental Services

SITE LOCATION
TAYLOR INSTRUMENTS SITE
ROCHESTER, NEW YORK

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RE	48454		2/15/00	00/00/00

1. Review this entire HASP.

2. Using the forms on the following pages, analyze all contemplated field activities likely for the particular task. The general information in Section 3.0 of this HASP will in many cases provide sufficient information to complete the analysis and select protective measures. The task analysis is to be approved by the PM and HSO.

3. Provide the HASP and completed task analysis forms to the field team for review and signature.

4. Submit a copy of the approved task analysis to the PM. It will be added to the site HASP "library", where it can be readily referred to for future task analyses.

The Task Analysis Form (TAF) is contained in Appendix C and the Health and Safety Short Form (HSSF) is contained in Appendix D. All workers involved in Category A activities will be given copies of the completed TAF and HSSF.

3.0 TASK ANALYSIS

The following sections provide a general analysis of each task category.

It is important to remember that every individual task analysis should also consider the impact of other tasks or operations being simultaneously conducted. Particularly with respect to Category A, which are generally conducted at Level D protection, the presence of other operations on the site may restrict both work in or even access to particular areas.

3.1 CATEGORY A

This category clearly has the highest risk potential of the two categories. All contemplated tasks within this category must be carefully analyzed and planned for.

3.1.1 Hazardous Substances

Field construction and monitoring activities all have a potential for site personnel to be exposed to low concentrations of organic and inorganic compounds.

Table 3-1 identifies the compounds that are known to be present on site, along with the established exposure limits for those substances.

Table 3-1 Chemicals of Concern

Former Taylor Instruments Facility
Rochester, New York

Compound	Exposure Limits PEL/TWA or TLV/TWA	STEL/CEIL
Mercury	0.05 mg/m^3 [skin]	---
Lead	0.05 ppm	
Trichloroethylene	50 ppm	200 ppm
Perchloroethylene	25 ppm	---
1,1,1 - Trichloroethane	350 ppm	450 ppm
Volatile Organic Compounds	5 ppm	---

Note: Material safety data sheets are contained in Appendix E.

PEL/TWA = Permissible Exposure Limit - Time Weighted Average

TLV/TWA = Threshold Limit Value - Time Weighted Average

STEL = Short-term Exposure Limit - The 15-minute time - weighted average which should not be exceeded at any time during the working day.

CEIL = The concentration that should not be exceeded during any part of the working exposure.

ppm = parts per million

[skin] = The potential significant contribution to the overall exposure by the cutaneous route, by direct skin contact with the substance.

mg/m^3 = milligrams per cubic meter

3.1.2 Site Risks

Health Hazards

Mercury vapors: Contractor operations, which involve removal of mercury, lead, or TCE contaminated soil, clearly pose potential risks to oversight personnel from vapors and dust. Risk will probably be dependant primarily on proximity to the work area, and whether significant dust is produced. Mercury vapor levels both in ambient air, and during environmental sampling, have been relatively low. Remediation or removal operations in mercury-contaminated areas must be considered to potentially produce vapor concentrations. Continuous air monitoring during these activities will ensure the appropriate level of personal protective equipment (PPE) required.

Solvents and hydrocarbons: Similar to mercury, disturbing these areas during remediation/removal may produce vapor levels requiring respiratory protection, and are also likely to produce dust. Continuous air monitoring during these activities will ensure the appropriate level of PPE required.

Safety Hazards

Category A activities pose potentially significant safety hazards due to the heavy equipment typically utilized, and the expected nature of the activity (e.g., excavation). Vehicle/equipment traffic, falling objects, "slip, trip and fall", loud/sustained noise, high-intensity light (e.g., metal cutting) and other hazards associated with heavy construction activity can be expected. Heat stress is likely to be a problem and will be monitored accordingly during the summer. Appendix F contains specific information related to heat stress. Soil excavation will be conducted that requires a worker to take samples from within the excavation. Currently, the plan is for the excavation to be no more than 4 feet deep. If soil excavation activities result in a depth of greater than 4 feet, sufficient ladders will be provided so that workers entering the excavation have a travel distance of nor more than 25 feet to each the nearest ladder. If the excavation is greater than 5 feet, the sides of the excavation will be sloped or shored (see Appendix G, Excavation, and 29 CFR 1926 Subpart P).

Conclusion/Risk Assessment

In general, the overall health and safety risks for Category A activities will be moderate. Although contaminant disturbance and construction-related safety hazards may be present, HLA personnel in an oversight/observation role will often be able to reduce the level of hazard without significant effect on their job performance (e.g., by simply moving away).

3.1.3 Protective Measures

Protective measures will be undertaken to minimize the potential health and safety risks for field personnel engaged in Category A activities.

Engineering Controls

Fans or blowers may be useful for vapor control in some instances. Use of water to control dust will be carefully evaluated, due to the potential need to containerize runoff. The simplest method of controlling hazard exposure to HLA personnel is to simply design and conduct activities in order to minimize it. For some operations, it may not be necessary for HLA to be in the active work area or exclusion zone in order to provide adequate general oversight.

Levels of Protection

The following paragraphs describe the anticipated levels of protection utilized for various Category A activities, for each type of known contaminant.

Mercury: To prevent dermal exposure inside the exclusion zone during excavation and where significant concentrations are known to exist, these areas should not be entered unless, at a minimum, boot covers, polycoated Tyvek, and nitrile gloves are worn. A minimum modified Level D, protection. Dust and vapor monitoring will be performed to ensure worker protection.

Solvents: For soil/groundwater sampling, modified Level D protection will likely be necessary.

The anticipated levels of personal protection for Category A activities are as follows:

Activity	**Typical Level Of Protection**
Excavation Wall Sampling	Level D
Drilling Activities	Level D/Modified Level D
Well Sampling	Modified Level D
Remedial System Installation	Level D/Modified Level D

Level D personal protective equipment will consist of Latex boot covers, hardhat, and polycoated Tyvek coveralls. Uncoated Tyveks may be used in contaminated areas where solvents and mercury contamination are not present (e.g., lead contamination only). Levels of protection may be changed at the discretion of the HSO, as warranted by a change in site conditions.

If Level C becomes necessary, cartridge respirators with organic vapor cartridges (e.g., MAS GMC with a N100 prefilter – or equivalent) will be used for high tetrachloroethene (PCE) and TCE levels. High mercury vapor concentrations will require the use of cartridges capable of filtering mercury vapors (e.g., MSA Mersorb). If high concentrations of both organic and mercury vapors are present, Level B PPE will be required (e.g., self-contained breathing apparatus [SCBA]). Refer to Appendix D for details of protection. Task activities may require upgrade per assigned action levels in Section 3.1.4.

3.1.4 Monitoring

Monitoring of the work environment will be undertaken to ensure that Immediately Dangerous to Life or Health (IDLH) or other dangerous conditions are identified. At a minimum, this monitoring will include evaluations for combustible atmospheres and hazardous concentrations of airborne contaminants.

Air Sampling

To the extent feasible, the presence of airborne contaminants will be evaluated through the use of direct reading instrumentation. Information gathered will be used to ensure the adequacy of the levels of protection being used and may be used as the basis for upgrading or downgrading the levels of protection in conformance with action levels provided in this HASP and at the direction of the task HSO.

In general, due to the prevalence of mercury at the Former Taylor Instruments Facility, the Jerome analyzer should be used to monitor for mercury vapors during the excavation activities at any location at the Former Taylor Instruments Facility. Subsequent use of the analyzer can depend on the initial readings, visual observations, and the specific area being investigated.

Depending on the task, the following sampling equipment will be used.

1. Jerome Mercury Vapor Analyzer
2. Photoionization Detector (PID)
3. Respirable Dust Meter

For solvents/hydrocarbons: Monitor continuously with the PID and upgrade accordingly.

For Dust: Monitor continuously with the Dust Meter and upgrade accordingly.

For mercury vapors: Monitor continuously with the Jerome Mercury Vapor Analyzer (MVA) and upgrade accordingly.

The manual describing the air monitoring instrument calibration and general maintenance is to be kept in the HLA site trailer and is the responsibility of the HSO. Information on air respiratory personal protective equipment is contained in Appendix H. A description of the air monitoring instruments is contained in Appendix I.

The action levels for upgrade are as follows:

Level D/Modified Level D acceptable if:

- PID reads <5 parts per million (ppm);
- MVA reads <0.0125 milligrams per cubic meter (mg/m^3); and
- Dust Meter reads <0.75 mg/m^3.

Level C required if:

- PID reads between 5 ppm and 12 ppm;
- MVA reads between 0.0125 mg/m^3 and 0.125 mg/m^3; and/or
- Dust Meter reads $\geq$0.75 mg/m^3.

Level B required if:

- PID reads >5 ppm and MVA >0.0125 ppm; and/or
- PID reads >125 ppm; or
- MVA >0.125 mg/m^3; and/or
- Dust Meter reads $\geq$7.5 mg/m^3.

Personal Monitoring

Urine monitoring for mercury should be considered for Category A activities, which involve sampling or working in suspect or known mercury-containing areas for extended periods. The need for this type of personal monitoring should be discussed with the RHSO on a task-by-task basis.

3.2 CATEGORY B - VISITOR TOURS AND MEETINGS

The health and safety risk potential for HLA personnel engaged in Category B activities is low and is largely based on the presence of concurrent site operations which visitors may want to observe. Nevertheless, Category B activities require a significant focus on health and safety for another reason:

based on HLA's position as responsible for all site operations and most knowledgeable of site conditions, HLA personnel have a duty to inform visitors of site hazards and assist in avoiding them.

Procedures designed to ensure visitors are duly informed of potential hazards are presented following the Category B hazard analysis. HLA personnel must be careful, however, to evaluate the activity visitors are to engage in. For purposes of this HASP, Category B is intended to cover walking tours for general observation, potential subcontractor job walks, and other activities which do not involve observation, inspection or other direct involvement with site operations.

3.2.1 Site Risks

Health Hazards

Dust: Upwind areas outside the exclusion zone may be visited during site tours. These areas present a minimal dermal exposure hazard, primarily to hands and feet.

Safety Hazards

Category B activities will pose few safety hazards to HLA personnel not already covered in previous sections. Again, "slip, trip and fall" hazards are of greatest concern. Because visits will generally be planned to avoid active site operations, these operations should pose little hazard.

Conclusion/Risk Assessment

In general, the overall health and safety risks to HLA personnel for Category B activities will be low.

Protective Measures

Protective measures will be undertaken to minimize the potential health and safety risks for field personnel engaged in Category B activities.

Engineering Controls

Engineering controls will rarely be necessary.

Levels of Protection

The typical level of personal protection for Category B is modified Level D. Modified Level D will consist of work boots and a hard hat. Category B activities include walking tours, meetings, and other activities in which areas containing hazardous materials are not entered.

3.2.2 Monitoring

Monitoring of the work environment is not necessary, based on the site knowledge developed to date and the nature of Category B activities. Because Category B activities are frequently of very short duration, personal monitoring is not necessary.

3.3 COMMUNITY HEALTH AND SAFETY PLAN

Real-time continuous air monitoring, for volatile compounds and particulate levels at the perimeter of the work area is to be performed. The plan must include the following:

- Volatile organic compounds must be monitored at the downwind perimeter of the property on a continuous basis. If total organic vapor levels exceed 5 ppm and or mercury vapors exceed 0.0125 ppm above background, work activities must be halted and monitoring continuously under the provisions of a Vapor Emission Response Plan. All readings must be recorded and be available for New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), and Monroe County Department of Health (MCDOH) personnel to review.

- Particulates should be continuously monitored upwind, downwind, and within the work area at temporary particulate monitoring stations. If the upwind particulate concentration is greater than the 1.5 mg/m^3 level, then dust suppression techniques must be employed. All readings must be recorded and be available for NYSDEC, NYSDOH, and MCDOH personnel to review.

3.3.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm or mercury exceeds 0.0125 ppm above background at the perimeter of the exclusion zone, activities will be halted and monitoring continued as outlined above. If the organic vapor level decreases below 5 ppm or mercury decreases below 0.0125 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume with the appropriate PPE provided. The organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the HSO will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Section 3.4.

3.4 MAJOR VAPOR EMISSION

If any organic levels greater than 5 ppm or mercury exceeds 0.0125 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm background or mercury exceeds 0.0125 ppm 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and if the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect if organic vapor levels are approaching 5 ppm above background or mercury exceeds 0.0125 ppm.

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background at the site perimeter.

3.5 MAJOR VAPOR EMISSION RESPONSE PLAN

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts in Appendix D will go into effect.

2. The local police authorities will immediately be contacted by the HSO and advised of the situation.

3. Frequent air monitoring will be conducted at 30 minutes intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO.

3.6 SPECIAL PROCEDURES FOR SITE VISITORS

This section describes administrative procedures established for site visitors which Combustion Engineering, HLA and their subcontractors should implement.

3.6.1 Visitor Entry Forms

The following pages contain forms on which visitor-related procedures are based. HLA personnel should utilize these forms as follows.

"Safety Information and Procedures for Visitors to the Former Taylor Instruments Facility"

This form is intended to provide visitors with basic information about potential health and safety hazards at the site, and provide rules/procedures that visitors are to follow.

It is preferable that visitors review this form prior to arrival at the site. HLA personnel inviting or scheduling visitors (e.g., potential vendors or subcontractors) should ensure the two-page form is sent/Faxed to them in advance.

Because HLA personnel will often lead site tours or walkthroughs of specific areas, it is important that the Safety Procedures are known and understood. Of particular importance are rules regarding safety equipment (hard hat and sturdy shoes) and the need for escort at all times.

"Visitor Log and Signature Form"

This form serves as a permanent record that visitors were informed of potential hazards, and should be completed and signed by anyone entering the site who is not an HLA or Combustion Engineering employee or subcontractor. Visitors to the site must fill out a Visitor Log and Signature Form (Appendix J).

3.6.2 Visitor Entry Procedures

Specific procedures for bringing visitors to the site are described below. Compliance with procedures can be verified through use of the "Site Visitor Checklist".

1. Notify visitors in advance of the requirements for site entry, i.e., personal protective gear, attending the safety briefing, traveling with an escort. Send or Fax the "Safety Information..." form (2 pages) prior to their visit.

As representative of the site owner, HLA may deny entry to persons who are unauthorized, uninvited, or who cannot or refuse to follow safety procedures. If there are any questions whether to allow entry, the PM, SCS, or HSO should be contacted.

2. Upon arrival, confirm visitors have reviewed the "Safety Information..." and have brought their own personal protective gear.

3. Deliver a safety briefing to the visitor(s):

   a) *Briefly review the "Safety Information..." sheet*, with particular emphasis on the Safety Procedures.

   b) *Describe health and safety hazards specific to the area(s) which will be visited*. Using the site plan, show the exclusion zone areas that will be avoided, noting any physical hazards (dim lighting, water, etc.) Describe hazardous materials which may be present.

   c) *Review the material safety data sheets (MSDSs) for chemicals of concern (the MSDS for mercury should ALWAYS be reviewed.)* Point out the health hazards and appropriate protective measures.

   d) *Describe current site operations, locations and potential hazards*. Emphasize that visitors must not interfere in any way with these operations.

   e) *Review any additional protective measures which will be used*. If measures or equipment (e.g., booties, gloves) beyond the standard hard hat/safety shoes/flashlight are needed to access certain areas, describe their use. Include how to don, how to remove, where to dispose of.

5. Have all visitors complete and sign the "Visitor Log and Signature Form".

6. Escort visitors at all times. [NOTE: Under certain conditions, visitors can be allowed into the site without an escort. Unescorted visitors must be approved by the PM, SCS, or HSO.]

4.0 SITE CONTROL

4.1 ZONATION

Exclusion Zone: area within a 15-foot radius of each drilling/sampling/excavation location during digging, drilling or sampling (when a borehole or well is open).

Contaminant Reduction Zone: area beyond the 15-foot exclusion zone at each drilling/sampling/excavation location where equipment and personnel decontamination will occur, not to occur beyond 50-feet in any area from the drilling/sampling/excavation locations.

Support Zone: all areas beyond the contaminant reduction zone.

4.2 COMMUNICATIONS

When radio communication is not used, the following air horn signals will be employed:

Help	Evacuation	All Clear
Three Short Blasts (. . .)	Three Long Blasts (_ _ _)	Alternating Long and Short Blasts (_ . _ .)

4.3 WORK PRACTICES

All HLA personnel, subcontractors, or third party representatives should be aware of the previously detected presence of mercury. These personnel should also be aware of the potential for the contaminants to exist in airborne form.

5.0 DECONTAMINATION/DISPOSAL

All personnel and/or equipment leaving contaminated areas of the site will be subject to decontamination, which will take place in the contamination reduction zone. Based on HLA's extensive site experience, it is anticipated that levels of PPE will be either Level D or C. In the event Level B is required, HLA anticipates stopping work until concentrations decrease to restart work at Level C or D.

5.1 PERSONNEL DECONTAMINATION

Decontamination procedures are followed by all personnel leaving hazardous waste sites. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the exclusion and contaminant reduction zones prior to decontamination. A typical personnel decontamination procedure is listed in Appendix K. Generalized procedures for removal of protective clothing are as follows:

1. Drop tools, monitors, samples, and trash at designated drop stations (i.e., plastic containers or drop sheets).

2. Step into the designated shuffle pit area and scuff feet to remove gross amounts of dirt from outer boots.

3. Scrub outer boots and outer gloves with decon solution or detergent and water. Rinse with water.

4. Remove tape from outer boots and remove boots; discard tape and boots in disposal container.

5. Remove tape from outer gloves and remove gloves; discard tape and gloves in disposal container.

6. If the worker has left the Exclusion Zone to change the air tank on the SCBA or the canister on the air-purifying respirator, this will be the last step in the decontamination procedure. The tank or cartridge should be exchanged, new outer gloves and boot covers donned, and the joints taped; the worker then returns to duty.

7. Remove outer garments and discard in disposal container.

8. Remove respirator and place or hang in the designated area.

9. Remove inner gloves and discard in disposal container.

NOTE: Disposable items (i.e., Tyvek coveralls, inner gloves, and latex overboots) will be changed daily unless there is reason to change sooner. Dual respirator canisters will be changed daily, unless more frequent changes are deemed appropriate by site surveillance data or personnel assessment.

Maximum and minimum decontamination procedures for PPE Levels B through D are listed in Appendix K.

Pressurized sprayers or other designated equipment will be available at the decontamination pad for washdown and cleaning of and equipment.

Respirators will be decontaminated daily and taken from the drop area. The masks will be disassembled, the cartridges set aside, and all other parts placed in a cleansing solution. Parts will be pre-coded (e.g., #1 on all parts of Mask #1). After an appropriate time in the solution, the parts will be removed and rinsed

with tap water. Old cartridges will be discarded in the contaminated trash container for disposal. In the morning, the masks will be reassembled and new cartridges installed. Personnel will inspect their own masks and readjust the straps for proper fit.

5.2 SMALL EQUIPMENT DECONTAMINATION

Small equipment will be protected from contamination as much as possible by draping, masking, or otherwise covering the instruments with plastic (to the extent feasible), without hindering operation of the unit.

The contaminated equipment will be taken from the drop area and the protective coverings will be removed and disposed of in appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe. The units can then be taken inside in a clean plastic tub, wiped off with damp disposable wipes, and dried. The units will be checked, standardized, and recharged as necessary for the next day's operation, and then prepared with new protective coverings.

5.3 HEAVY EQUIPMENT DECONTAMINATION

It is anticipated that drilling rigs and backhoes will become contaminated during borehole and excavation activities. They will be cleaned with water at the Decontamination Pad. Loose material will be removed. The person performing this activity will usually be at least at the level of protection used during the personnel and monitoring equipment decontamination.

5.4 DISPOSAL OF DECONTAMINATED MATERIALS

All protective gear, decontamination fluids (for both personnel and equipment), and other disposable materials will be disposed of at each site.

Decontamination fluids identified to be contaminated by site contaminants (i.e., Liqui-nox, used to decontaminate sampling equipment such as split spoons and groundwater sampling pumps) will be stored in Department of Transportation- (DOT)-approved 55-gallon drums or rolloff boxes. Contaminated disposable materials (e.g., gloves and Tyveks) will be double-bagged and stored as is, or placed in DOT-approved 55-gallon drums.

6.0 EMERGENCY/CONTINGENCY PLAN

This section identifies emergency contingency plan that has been developed for operations at this site. Other sections provide further information to be used under emergency conditions. Refer to Appendix D for emergency telephone numbers, routes to emergency medical facilities, and emergency signals.

6.1 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATION

The site HSO is the primary authority for directing operations under emergency conditions. All communications both on- and off-site will be directed through the HSO. Should the HSO be injured, the Health and Safety Designee (HSD) will assume HSO responsibilities. These responsibilities include:

- Investigate all accidents, illnesses, and incidents occurring on an assigned site and report the findings to the RHSO or the HSO.
- Assume the role of on-site coordinator during emergency response activities.
- Accompany all Occupational Safety and Health Administration (OSHA) and other government agency, and client personnel visiting an assigned site in response to health and safety issues.
- The HSO or HSD will immediately notify the RSHO after a stop work order is executed. Authorization to resume work, after such a stoppage, will only be issued by the HSO after consultation and approval from the RSHO.

6.2 EVACUATION

6.2.1 Withdrawal Upwind

The work party will continually note general wind directions while on-site. If conditions warrant moving away from the work site, the crew will relocate upwind a distance of approximately 100 feet or farther, as indicated by site monitoring instruments. Donning an SCBA and a safety harness and line, the HSO and a member of the crew (the buddy system must be used) may return to the work site to determine if the condition noted was transient or persistent. If persistent, an alarm should be raised to notify on-site personnel of the situation and the need to leave the site. An attempt to decrease emissions should be made only if greater respiratory protection is donned. The HSO and client will be notified of conditions. When site access is restricted, thus hindering escape, the crew may be instructed to evacuate the site rather than move upwind, especially if withdrawal upwind moves the crew away from escape routes.

6.2.2 Site Evacuation

When conditions warrant site evacuation, the work party will proceed upwind of the work site and notify the HSO and field office of site conditions. If the decontamination area is upwind and greater than 500 feet from the work site, the crew will pass quickly through decontamination to remove contaminated outer suits. If the hazard is toxic gas, respirators will be retained. The crew will proceed to the field office to assess the situation. If instrumentation indicates an acceptable condition, respirators may be removed. As more information is received from the field crew, it will be relayed to the appropriate agencies. The advisability and type of further response action will be coordinated and carried out by the HSO.

6.2.3 Evacuation of Surrounding Area

If the HSO determines that conditions warrant evacuation of downwind residences and commercial operations, local agencies will be notified and assistance requested. Designated on-site personnel will initiate evacuation of the immediate off-site area without delay.

6.3 EMERGENCY MEDICAL TREATMENT/FIRST AID

Any personnel injured on-site will be rendered first aid as appropriate and transported to competent medical facilities for further examination and/or treatment. The preferred method of transport would be through professional emergency transportation means; however, when this is not readily available or would result in excessive delay, other transport will be authorized. Under no circumstances will injured persons transport themselves to a medical facility for emergency treatment.

7.0 ADMINISTRATION

7.1 PERSONNEL AUTHORIZED DOWNRANGE

Personnel authorized to participate in downrange activities at this site have been reviewed and certified for site operations by the PM/SCS and the HSO. Certification involves the completion of appropriate training, a medical examination, and a review of this site-specific HASP. All persons entering the site must use the buddy system, and check in with the Field Team Leader and/or HSO before going downrange.

For each field activity, the HSO will complete the "Authorized Personnel" section of the "Task Analysis" form.

7.2 MEDICAL DATA SHEET

The Medical Data Sheet will be completed by all on-site personnel and kept in the Support Zone during site operations. It is not a substitute for the Medical Surveillance Program requirements consistent with the HLA Corporate Health and Safety Program for Hazardous Waste Sites. This data sheet will accompany any personnel when medical assistance or transport to hospital facilities is required. If more space is required, use the back of this sheet. Medical Data Sheets are contained in Appendix B.

7.3 ROUTES TO EMERGENCY MEDICAL FACILITIES

The primary source of medical assistance for the site is:

The Genesee Hospital, 224 Alexander Street, Rochester, New York (general telephone number: 716-922-6000, emergency telephone number: 716-922-6400). See Figure 7-1.

DIRECTIONS TO GENESEE:

- Start out going South on AMES ST towards DANFORTH ST by turning right.
- Turn LEFT onto STATE HIGHWAY 33 and continue East.
- Continue East on MAIN STREET WEST.
- Turn RIGHT onto STATE HIGHWAY 96 / EAST AVENUE and continue East.
- Turn RIGHT on ALEXANDER STREET and continue South.
- Continue to 224 ALEXANDER STREET.

The alternate source of medical assistance for the site is:

Strong Memorial Hospital, 601 Elmwood Avenue, Rochester, New York (general telephone number: 716-275-2100, emergency telephone number: 716-275-4551). See Figure 7-1.

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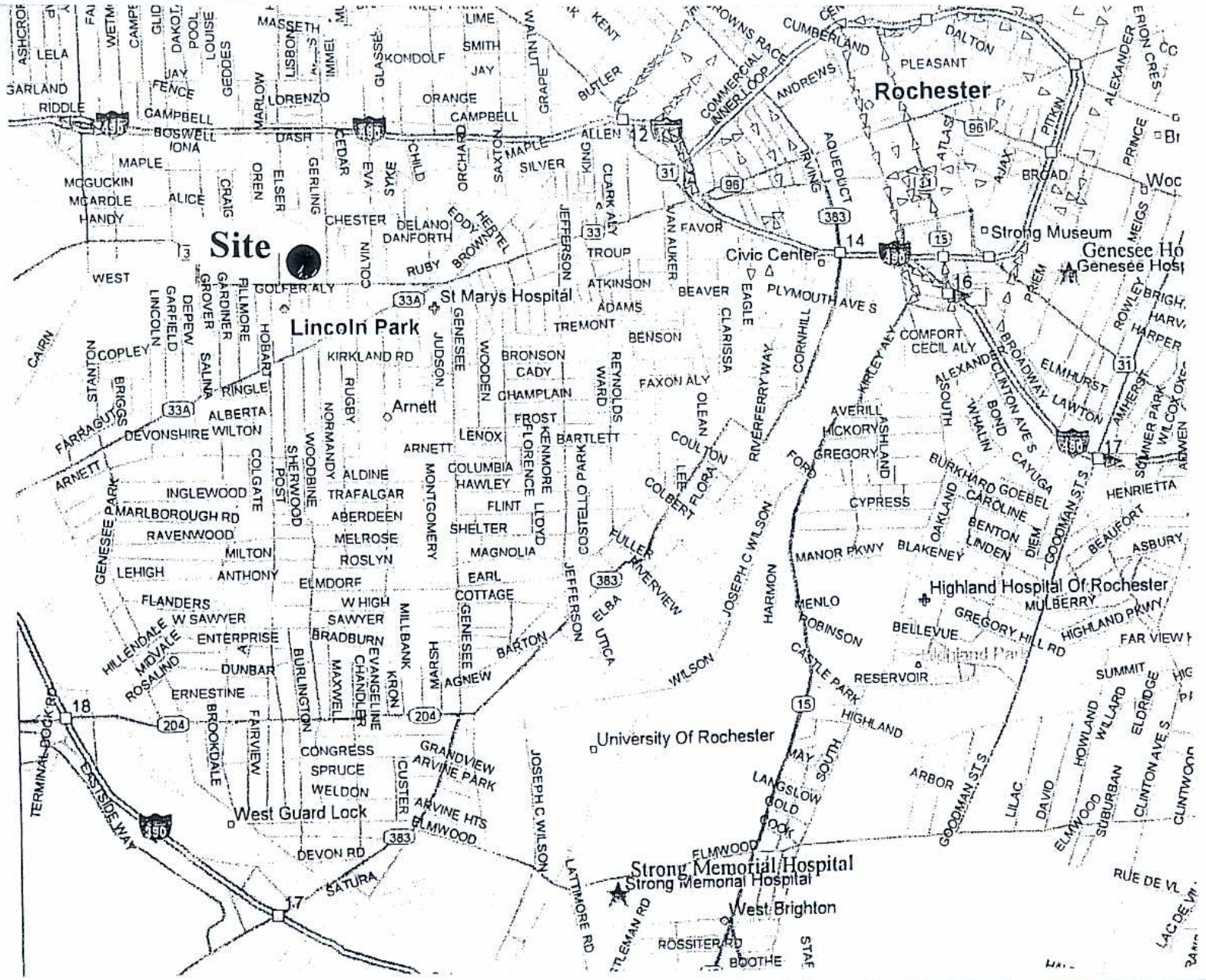

FIGURE

Harding Lawson Associates
Engineering and Environmental Services

HLA

HOSPITAL LOCATION
TAYLOR INSTRUMENTS SITE
ROCHESTER, NEW YORK

7-1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RE	8454		2/15/00	0/00/00

DIRECTIONS TO STRONG MEMORIAL:

- Start out going South on AMES ST towards DANFORTH STREET by turning RIGHT.
- Turn LEFT onto STATE HIGHWAY 33 and continue East.
- Turn RIGHT on GENESEE STREET and continue South.
- Turn LEFT onto STATE HIGHWAY 383 / BROOKS AVENUE and continue East.
- Turn RIGHT on PLYMOUTH AVE SOUTH and continue South.
- Turn LEFT on ELMWOOD AVENUE and continue East.
- Continue to 601 ELMWOOD AVENUE.

APPENDIX A

AUTHORITY AND RESPONSIBILITY OF HEALTH AND SAFETY PERSONNEL

APPENDIX A

AUTHORITY AND RESPONSIBILITY OF HEALTH AND SAFETY PERSONNEL

This section describes the health and safety designations and general responsibilities that will be employed for the project.

A.1 HEALTH AND SAFETY MANAGER

The Health and Safety Manager (HSM), Harding Lawson Associates (HLA) is Ms. Cynthia Sundquist. Ms. Sundquist can be reached by telephone at (207) 775-5401 in Portland, Maine. The HSM has final authority over health and safety issues that are not resolved at the site and has overall responsibility for ensuring that the policies and procedures of this Health and Safety Plan (HASP) are implemented by the Health and Safety Officer (HSO).

A.2 HEALTH AND SAFETY SUPERVISOR

The Health and Safety Officer (HSO) is the health and safety professional serving as the HLA's designee for this project. As such, the HSO will be responsible for (1) oversight of the daily efforts of site personnel; and (2) implementation of the HASP during site activities. The HSO will notify the PM and HSM of any Stop Work Orders issued by an HSO.

APPENDIX B

MEDICAL DATA SHEET

MEDICAL DATA SHEET

Task/Activity: _____

Name: _____

Address: _____

Home Telephone: Area Code ( ) _____

Age: _____ Height: _____ Weight: _____

In Case of Emergency contact: _____

Address: _____

Telephone: Area Code ( ) _____

Do you wear contact lenses: Yes ( ) No ( ) _____

Allergies: _____

List medication(s) taken regularly: _____

Particular sensitivities: _____

Previous/current medical conditions or exposures to hazardous chemicals:

_____

Name of Personal Physician: _____

Telephone: Area Code ( ) _____

APPENDIX C

TASK ANALYSIS FORM

APPENDIX C
TASK ANALYSIS
HARDING LAWSON ASSOCIATES
FORMER TAYLOR INSTRUMENTS FACILITY

NOTE: *Review Former Taylor Instruments Facility HASP before completing this form.*

GENERAL TASK INFORMATION

Task Title: _____ PAN # _____

SCS (name): _____ HSO (name): _____

Form prepared by: _____ Date: _____

HSO Approval: _____ Date: _____

SCS Approval: _____ Date: _____

Planned activity(s):

Activity/Description: _____

Activity/Description: _____

Activity/Description: _____

Activity/Description: _____

Overall Task Category (from HASP): _____

Other concurrent site activities/tasks:

Activity/Task: _____ Task Category: _____

Activity/Task: _____ Task Category: _____

Activity/Task: _____ Task Category: _____

Will these activities / tasks impact this task? (describe):

_____

AUTHORIZED PERSONNEL:

_____ _____

_____ _____

_____ _____

* Current First-aid Certification
\+ Current CPR Certification

_____

End of General Information. For each of this task's activities, complete a separate "Activity Analysis" form.

TASK ANALYSIS
HARDING LAWSON ASSOCIATES
FORMER TAYLOR INSTRUMENTS FACILITY

NOTE: *Review Former Taylor Instruments Facility HASP before completing this form.*

ACTIVITY ANALYSIS
(Page 1)

Activity: _____

Known or suspected chemical/material hazards (list): _____

_____

Chemical/material location(s) (circle): Surface soil Subsurface soil Groundwater Building Materials

Other (list): _____

Primary exposure route(s) (circle): Dermal Inhalation Ingestion Puncture

Safety hazard(s) (circle): Height Equipment Cold Stress Noise Eye Overhead
Confined Spaces Heat Stress Machinery Burns Lifting Slips/Falls

Other (list): _____

Overall Hazard Estimation: Serious Moderate Low Unknown None

ENGINEERING CONTROLS SELECTED (specify)

Initial Level of Personal Protection: _____

PPE:
- Cartridge Respirator
  - Cartridge Type: _____
- Safety Boots/Shoes
- Chemical Resistant Boots
- Disposable Boot Covers
- Face Shield
- Safety Glasses
- Hard Hat
- Ear Protection
- Gloves
  - . inner
  - . outer
- Coveralls
- Tyveks
  - . regulars
  - . coated

Other (list): _____

_____

_____

_____

_____

TASK ANALYSIS
HARDING LAWSON ASSOCIATES
FORMER TAYLOR INSTRUMENTS FACILITY

NOTE: *Review Former Taylor Instruments Facility HASP before completing this form.*

ACTIVITY ANALYSIS
(Page 2)

Monitoring Equipment (circle):

Jerome Mercury Vapor Analyzer Draeger Tubes (specify type): _____

_____

Other (list): _____

Emergency Equipment (circle): First Aid Kit Fire Extinguisher Eye Wash

Other (list): _____

Contaminated levels for modifying protection equipment: Refer to HASP Section 3.0

Decontamination: All personnel and/or equipment leaving contaminated sites are subject to decontamination. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the site prior to decontamination. The decontamination procedures to be used at the site are as follows: _____

_____

_____

_____

Waste Disposal: Waste is to be placed into plastic bags and then into DOT drums located: _____

_____

_____

APPENDIX D

HEALTH AND SAFETY SHORT FORM

Harding Lawson Associates
Health and Safety Plan

Site: Former Taylor Instruments Facility Job Number: 48454/00001 Contact: Rick Ryan, P.E.
Street Address: 95 Ames Street, Rochester, New York
Proposed Date(s) of Investigation: May 2000 - October 2000
Prepared by: Sylvia Cresswell Date: 12/20/99
*Approved by:_____ Date:_____
Proposed Activity(s): Soil and groundwater remediation includes drilling, excavating, sampling, field monitoring and construction oversight.
Known or Suspected Chemicals (include PELs): Mercury (0.0125 mg/m^3), TCE (50 ppm), PCE (25 ppm), Lead (0.05 mg/m3), VOCs (5 ppm)
*Approval also serves as certification of a Hazard Assessment as required by 29 CFR 1910.132

HAZARD EVALUATION (Check all that apply):

Hazard Estimation:		Serious		Moderate	X	Low		Unknown		None
Exposure Route(s):	X	Dermal	X	Inhalation		Ingestion		Puncture		
Contaminant Location(s):		Surface	X	Underground	X	Soil		Sediment	X	Water
		Tank		Other (list):_____						
Health Hazard(s):	X	Liquid	X	Solid		Sludge		Corrosive		Ignitable
	X	Volatile		Radioactive		Reactive		Unknown		
Safety Hazard(s):		Height		Equipment		Cold Stress	X	Noise	X	Eye
		Near Water		Confined Space	X	Heat Stress	X	Machinery		Burns
		Lifting	X	Slips/Falls		Other (list):_____				

EQUIPMENT (check all that apply): Initial Level of Personal Protection: **Level D**

X = Required for initial Level of PPE, # = Required for Upgrade only

PPE Selected:	#	Cartridge Respirator		Coveralls	X	Inner Gloves
		type: OV w/N100 or Mersorb	X	Safety Glasses		type: Nitrile or Vinyl
		Escape Respirator		Safety Goggles	X	Outer Gloves
	X	Safety Boots/Shoes		Face Shield		type: Nitrile
		Chemical Resistant Boots	X	Hard Hat	X	Tyveks
	#	Disposible Boot Covers		Ear Protection		type: Polycoated
		type: Vinyl		Other (list):_____		type: Uncoated
Monitoring Equipment:	X	PID	X	Respirable Dust Meter		Dosimeter Badge
		FID		Draeger Tubes		Radiation Alert Meter
		LEL/Oxygen Meter		list:_____		
		Hydrogen Sulfide Meter	X	Other (list): Jerome Mercury Vapor Analyzer		
Emergency Equipment:	X	First Aid Kit	X	Fire Extinguisher	X	Eye Wash
		Other (list):_____				

CONTAMINANT LEVELS FOR MODIFICATION OF PROTECTIVE EQUIPMENT: Upgrade to level C protection if PID reads ≥5 ppm or MVA reads ≥0.0125 mg/m^3 and/or Dust Monitor ≥ 0.75 mg/m^3. Upgrade to Level B PPE (backoff and reassess) if both PID is greater than 5 ppm and MVA > 0.0125 mg/m^3, or if PID alone is ≥125 ppm, or MVA alone is ≥ 0.125 mg/m^3 and/or if Respirable dust meter is ≥ 7.5 mg/m^3. Polycoated Tyveks are required when Mercury, TCE or PCE is present, otherwise uncoated Tyveks may be used.

DECONTAMINATION/DISPOSAL: All personnel and/or equipment leaving contaminated sites are subject to decontamination. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the site prior to decontamination. The decontamination procedures to be used at the site are as follows: _____
See Feb, 2000 Health and Safety Plan

EMERGENCY MEDICAL TREATMENT/FIRST AID: First aid will be rendered to any person injured on-site, as appropriate. The injured person will then be transported to a medical facility for further examination and/or treatment. An ambulance will be used to transport the injured person to the hospital unless one is not readily available or could result in excessive delay. In this case, other transport is authorized. Under no circumstances will injured persons transport themselves to a medical facility for for emergency treatment.

EMERGENCY EVACUATION: In the event of an emergency requiring evacuation, the HSO assumes the role of on-site coordinator. Evacuation responses will occur at three levels: (1) withdraw from the immediate work area (100+ feet upwind); (2) site evacuation; and (3) evacuation of surrounding area. If the residences and commercial operations require evacuation, the local agencies will be notified and assistance requested. Designated on-site personnel will initiate evacuation of the immediate off-site area without delay.

EMERGENCY TELEPHONE NUMBERS:

Local Police Department	911
Local Fire Department	911
Local Rescue Service	911
Primary Hospital: Genesee Hospital	(716) 922-6400
Secondary Hospital: Strong Memorial Hospital	(716) 275-4551
Continuum Health Care (Dr. Winters)	(800) 350-4511
Pager (leave area code and telephone number)	(800)455-0964
National Poison Control Center	(800) 492-2414
Chemical Manufacturing Association-Chemical Referral Center	(800) 262-8200
Regional Safety and Health Officer: Cindy Sundquist	(207) 775-5401 (w)
	(207) 892-4402 (h)

AUTHORIZED PERSONNEL:

Tim Pringle *+	Ronny Fields *+
Sylvia Creswell *+	Rick Ryan *+
Louis Barrentine *+	Kurt Sichelstiel *+
Deven Carigan *+	Paul Edmondsl *+
Rob Ellis *+	Steve Rose *+

* Current First-aid Certification

FIELD TEAM REVIEW: I have read and reviewed the health and safety information in the HASP. I understand the information and will comply with the requirements of the HASP.

Name:_____ Date:_____
Name:_____ Date:_____
Name:_____ Date:_____
Name:_____ Date:_____
Name:_____ Date:_____

ROUTES TO EMERGENCY MEDICAL FACILITIES

PRIMARY HOSPITAL:

Facility Name: The Genesee Hospital
Address: 224 Alexander Street, Rochester, NY 14607
Telephone Number: (Gen) 716-922-6000 (Emergency) 716-922-6400

DIRECTIONS TO PRIMARY HOSPITAL (see attached map):

Start out going South on AMES ST towards DANFORTH ST by turning right.
Turn LEFT onto STATE HIGHWAY 33 and continue East.
Continue East on MAIN STREET WEST
Turn RIGHT onto STATE HIGHWAY 96 / EAST AVENUE and continue East.
Turn RIGHT on ALEXANDER STREET and continue South.
Continue to 224 ALEXANDER STREET.

ALTERNATE HOSPITAL:

Facility Name: Strong Memorial Hospital
Address: 601 Elmwood Avenue, Rochester, New York 14642
Telephone Number: (Gen) 716-275-2100 (Emergency) 716-275-4551

DIRECTIONS TO ALTERNATE HOSPITAL (see attached map):

Start out going South on AMES ST towards DANFORTH STREET by turning RIGHT.
Turn LEFT onto STATE HIGHWAY 33 and continue East.
Turn RIGHT on GENESEE STREET and continue South.
Turn LEFT onto STATE HIGHWAY 383 / BROOKS AVENUE and continue East.
Turn RIGHT on PLYMOUTH AVE SOUTH and continue South.
Turn LEFT on ELMWOOD AVENUE and continue East.
Continue to 601 ELMWOOD AVENUE.

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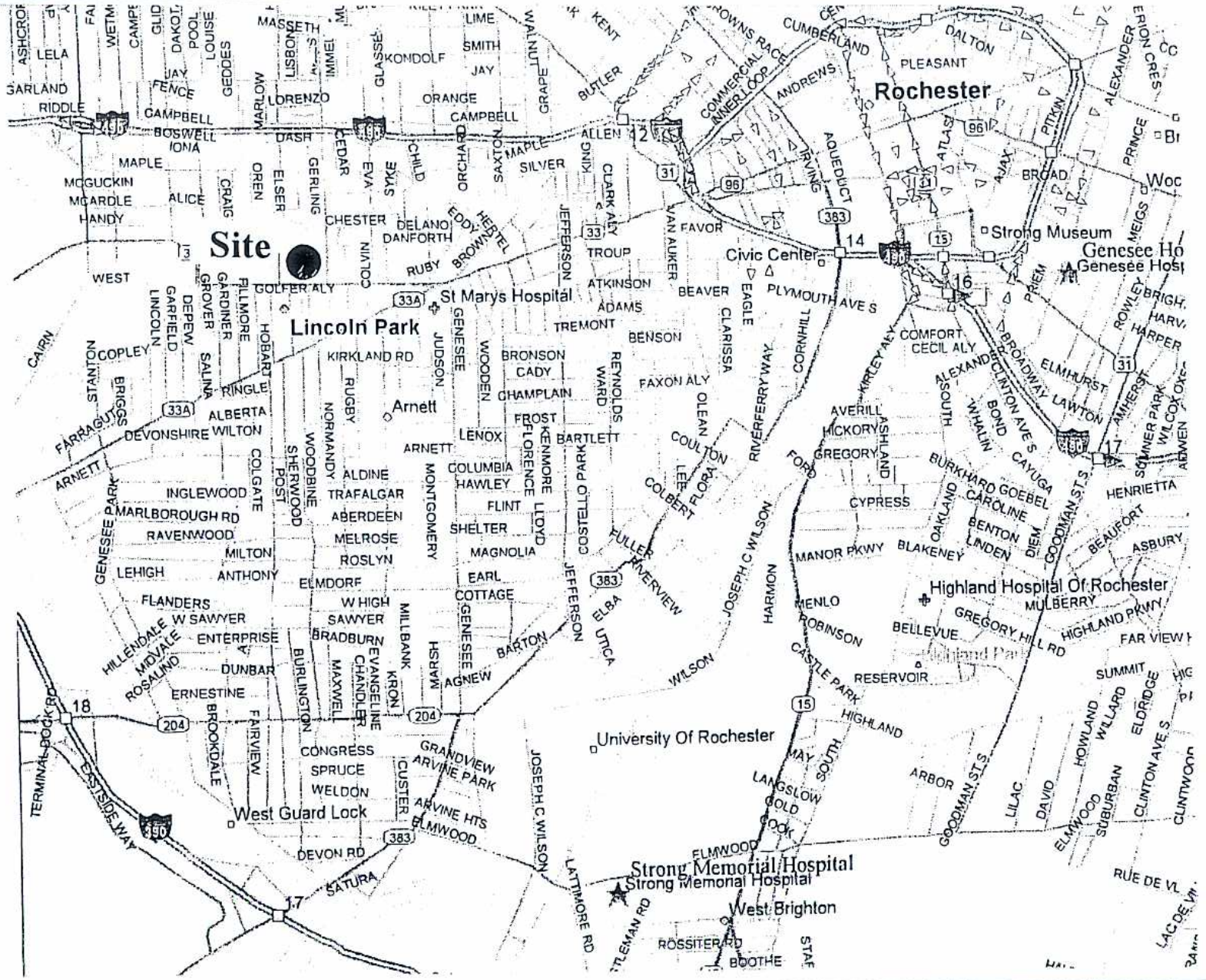

FIGURE

Harding Lawson Associates
Engineering and Environmental Services

HLA

HOSPITAL LOCATION
TAYLOR INSTRUMENTS SITE
ROCHESTER, NEW YORK

7-1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RE	8454		2/15/00	0/00/00

APPENDIX E

MATERIAL SAFETY DATA SHEETS

TR METALS -- LEAD
MATERIAL SAFETY DATA SHEET
NSN: 681000N084293
Manufacturer's CAGE: 04MC9
Part No. Indicator: A
Part Number/Trade Name: LEAD

General Information

Company's Name: TR METALS
Company's Street: 1 PAVILION AVE
Company's City: RIVERSIDE
Company's State: NJ
Company's Country: US
Company's Zip Code: 08075
Company's Emerg Ph #: 800-424-9300(CHEMTREC)
Company's Info Ph #: 609-461-9000
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 01JAN93
Safety Data Review Date: 25MAR98
MSDS Serial Number: CGSQQ

Ingredients/Identity Information

Proprietary: NO
Ingredient: LEAD (SARA 313) (CERCLA)
Ingredient Sequence Number: 01
Percent: 99.99
NIOSH (RTECS) Number: OF7525000
CAS Number: 7439-92-1
OSHA PEL: N/K (FP N)
ACGIH TLV: 0.15 MG/M3 DUST

Proprietary: NO
Ingredient: SUPDAT: NERVOUS SYS DAMAGE RESULTING IN SEVERE HDCHS, CONVULSIONS, COMA, DELIRIUM & DEATH. ALCOHOL & PHYSICAL (ING 3)
Ingredient Sequence Number: 02
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 2: EXERTION CAN BRING ON SYMPTOMS. OTHER EFFECTS OF LONG TERM EXPOSURE CAN RESULT IN DECREASED FERTILITY, (ING 4)
Ingredient Sequence Number: 03
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 3: MISCARRIAGE & BIRTH DEFECTS.
Ingredient Sequence Number: 04
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: HYGIENE PRACTS: HYGIENE IE, WASH HANDS & FACE BEFORE EATING, DRINKING, PUTTING ON MAKE-UP OR SMOKING. SHOWERING (ING 6)
Ingredient Sequence Number: 05
NIOSH (RTECS) Number: 9999999ZZ

OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 5: IS REQUIRED BEFORE PUTTING ON STREET CLOTHES.
Ingredient Sequence Number: 06
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Physical/Chemical Characteristics

Appearance And Odor: HEAVY, DUCTILE, SOFT, BLUISH-GRAY METAL.
Boiling Point: 3164F,1740C
Melting Point: 621F,327C
Vapor Pressure (MM Hg/70 F): 1 @ 973C
Vapor Density (Air=1): N/A
Specific Gravity: 11.34 (H*2O=1)
Evaporation Rate And Ref: N/A
Solubility In Water: INSOLUBLE
Percent Volatiles By Volume: N/A

Fire and Explosion Hazard Data

Flash Point: N/A
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: CLASS D EXTINGUISHERS: DRY POWDER TYPE.
Special Fire Fighting Proc: USE NIOSH APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: NONCOMBUSTIBLE IN SOLID METAL FORM. FLAMMABLE IN THE FORM OF DUST WHEN EXPOSED TO HEAT OR FLAME.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): EXCESSIVE HEAT (IE, ABOVE MELTING POINT). SEE MATERIALS TO AVOID.
Materials To Avoid: REACTS VIOLENTLY W/HYDROGEN PEROXIDE, CHLORINE TRIFLUORIDE, AMMONIUM NITRATE, POTASSIUM. INCOMPAT WITH NAN*3, (SUPDAT)
Hazardous Decomp Products: WHEN HEATED TO ABOVE MELTING POINT (IE, DECOMPOSITION) EMITS HIGHLY TOXIC FUMES OF LEAD.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: LEAD APPEARS ON THE NAVY LIST OF OCCUP CHEM REPRO HAZS. SEEK CONSULTATION FROM APPROP HEALTH PROFESSIONALS CONCERNING LATEST HAZ LIST INFO & SAFE HANDLING & EXPOSURE INFO (FP N). SKIN: MAY CAUSE IRRIT. EYES: MAY CAUSE IRRIT. NORMAL HANDLING OR PROCESSING OF LEAD MAY RESULT IN GENERATION OF LEAD DUST (EFTS OF OVEREXP)
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT
Signs/Symptoms Of Overexp: HLTH HAZ: &/OR FUME. LEAD IS CUMULATIVE TOXIN, EFTS OF PB EXPOS MAY NOT DEVELOP QUICKLY. SYMPS INCL DECREASED PHYSICAL FITNESS, LOSS OF APPETITE, ABDOMINAL PAINS, CONSTIPATION, FATIGUE, SLEEP DISTURBS, HEADACHE, ANEMIA, IRRITABILITY, TREMORS, HALLUCINATIONS &

DISTORTED PERCEPTION, MUSCLE & JOINT PAIN, MUSCLE (SUPDAT)
Med Cond Aggravated By Exp: DISEASES OF THE BLOOD AND BLOOD FORMING ORGANS, KIDNEYS, NERVOUS SYSTEM AND REPRODUCTIVE SYSTEM.
Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. GET IMMEDIATE MEDICAL ATTENTION. EYES: FLUSH WELL WITH WATER FOR AT LEAST 15 MINUTES. IF IRRITATION PERSISTS SEEK MEDICAL ATTENTION. SKIN: WASH AREA THOROUGHLY WITH SOAP AND WATER. INGESTION: GIVE WATER. SEEK IMMEDIATE MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: LEAD IN DUST FORM; MINIMIZE EXPOSURE. WEAR FULL PROTECTIVE CLOTHING INCLUDING NIOSH APPROVED RESPIRATORS. CLEAN UP USING DUSTLESS METHODS (IE, VACUUM, DO NOT USE COMPRESSED AIR). PLACE IN CLOSED LABELED CONTAINERS FOR RECYCLING OR PROPER DISPOSAL.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSE OF IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS. MAY HAVE VALUE ON A RECYCLED BASIS.
Precautions-Handling/Storing: STRICT CONTROL OF ATMOSPHERIC CONCENTRATION IN PROCESSING AND WORK AREAS. KEEP MATERIAL DRY. AVOID STORAGE NEAR INCOMPATIBLE MATERIALS.
Other Precautions: NOT APPLICABLE.

Control Measures

Respiratory Protection: NIOSH APPROVED HIGH EFFICIENCY RESPIRATOR FOR DUST AND LEAD FUME. USE AND PROCESS IN A WELL VENTILATED AREA.
Ventilation: LOCAL EXHAUST: AS REQUIRED FOR LEAD DUST & FUME. MECHANICAL (GEN): AS REQUIRED TO MAINTAIN APPROP OSHA PEL/TLV LEVELS.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: ANSI APPRVD CHEM WORKERS GOGGLES (FP N).
Other Protective Equipment: ANSI APPRVD EYE WASH & DELUGE SHOWER (FP N). FULL PROT CLTHG & SHOES, INCLUDING HARD HATS, REQD FOR WORK W/MOLTEN METAL.
Work Hygienic Practices: NO EATING, DRINKING OR SMOKING WHILE PROCESSING OR HANDLING LEAD OR IN LEAD AREAS. PRACTICE GOOD PERSONAL (ING 5)
Suppl. Safety & Health Data: MATL TO AVOID: ZR, DISODIUM ACETYLIDE & OXIDANTS. CAN REACT STRONGLY W/OXIDIZING MATLS. EFTS OF OVEREXP: WEAK. INHAL OF LARGE AMTS OF LEAD MAY LEAD TO SEIZURES, COMA & PALE SKIN, BLUE LINE AT GUM MARGIN, DECREASED HAND-GRIP & PARALYSIS OF WRIST JOINTS. PRLNGD VERY HIGH EXPOS CAN ALSO RSLT IN KIDNEY DMG & (ING 2)

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 25MAR98
Label Date: 23MAR98
Label Status: G
Common Name: LEAD
Chronic Hazard: YES
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE: EYES/SKIN: IRRITATION. CHRONIC: LEAD APPEARS ON THE NAVY OCCUPATIONAL CHEMICAL REPRODUCTIVE HAZARDS LIST (FP N). SYMPTOMS OF LEAD OVEREXPOSURE INCLUDE DECREASED PHYSICAL FITNESS, LOSS OF APPETITE, ABDOMINAL PAINS, CONSTIPATION, FATIGUE, SLEEP DISTURBANCES, HEADACHE, ANEMIA, IRRITABILITY, TREMORS, HALLUCINATIONS AND DISTORTED

PERCEPTION, MUSCLE AND JOINT PAIN, MUSCLE WEAKNESS, SEIZURES, COMA & DEATH. ANEMIA, PALE SKIN, BLUE LINE AT GUM MARGIN, DECREASED HAND-GRIP STRENGTH, ABDOMINAL PAIN, NAUSEA, VOMITING, AND PARALYSIS OF WRIST JOINTS. KIDNEY AND NERVOUS SYSTEM DAMAGE.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: TR METALS
Label Street: 1 PAVILION AVE
Label City: RIVERSIDE
Label State: NJ
Label Zip Code: 08075
Label Country: US
Label Emergency Number: 800-424-9300(CHEMTREC)

TRICHLOROETHYLENE

TCL

Common Synonyms	Watery liquid	Colorless	Sweet odor
Trichloroethylene Trichlene; Algylen Chlorylen Germalgene Trethylene Trichloran; Trilene	Sinks in water. Irritating vapor is produced.		

Stop discharge if possible. Keep people away.
Avoid contact with liquid and vapor.
Call fire department.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
POISONOUS GASES ARE PRODUCED IN FIRE.
Wear goggles and self-contained breathing apparatus.
Extinguish with dry chemical, carbon dioxide, or foam.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose and throat.
If inhaled, will cause nausea, vomiting, difficult breathing, or loss of consciousness.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Irritating to skin and eyes.
If swallowed, will cause nausea, vomiting, difficult breathing, or loss of consciousness.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

Water Pollution

Effect of low concentrations on aquatic life is unknown.
May be dangerous if it enters water intakes.
Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Halogenated hydrocarbon
3.2 Formula: $CHCl=CCl_2$
3.3 IMO/UN Designation: 9.0/1710
3.4 DOT ID No.: 1710
3.5 CAS Registry No.: 79-01-6

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Colorless
4.3 Odor: Chloroform-like; ethereal

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Organic vapor-acid gas canister; self-contained breathing apparatus for emergencies; neoprene or vinyl gloves; chemical safety goggles; face-shield; neoprene safety shoes; neoprene suit or apron for splash protection.

5.2 Symptoms Following Exposure: INHALATION: symptoms range from irritation of the nose and throat to nausea, an attitude of irresponsibility, blurred vision, and finally disturbance of central nervous system resulting in cardiac failure. Chronic exposure may cause organic injury. INGESTION: symptoms similar to inhalation. SKIN: defatting action can cause dermatitis. EYES: slightly irritating sensation and lachrymation.

5.3 Treatment of Exposure: Do NOT administer adrenalin or epinephrine; get medical attention for all cases of overexposure. INHALATION: remove victim to fresh air; if necessary, apply artificial respiration and/or administer oxygen. INGESTION: have victim drink water and induce vomiting; repeat three times; then give 1 tablespoon epsom salts in water. EYES: flush thoroughly with water. SKIN: wash thoroughly with soap and warm water.

5.4 Threshold Limit Value: 50 ppm
5.5 Short Term Inhalation Limits: 200 ppm for 30 min.
5.6 Toxicity by Ingestion: Grade 3; LD_{50} = 50 to 500 mg/kg
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 Odor Threshold: 50 ppm
5.11 IDLH Value: 1,000 ppm

6. FIRE HAZARDS

6.1 Flash Point: 90°F C.C.; practically nonflammable
6.2 Flammable Limits in Air: 8.0%-10.5%
6.3 Fire Extinguishing Agents: Water fog
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion Products: Toxic and irritating gases are produced in fire situations.
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: 770°F
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: Not pertinent
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 36

8. WATER POLLUTION

8.1 Aquatic Toxicity: 660 mg/l/40 hr/daphnia/kill/fresh water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Technical; dry cleaning; degreasing; extraction
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Pressure-vacuum

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-X-Y

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: ORM-A

11.2 NAS Hazard Rating for Bulk Water Transportation:

Category	Rating
Fire	1
Health	
Vapor Irritant	1
Liquid or Solid Irritant	1
Poisons	2
Water Pollution	
Human Toxicity	1
Aquatic Toxicity	2
Aesthetic Effect	2
Reactivity	
Other Chemicals	1
Water	0
Self Reaction	1

11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	2
Flammability (Red)	1
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: 131.39
12.3 Boiling Point at 1 atm: 189°F = 87°C = 360°K
12.4 Freezing Point: −123.5°F = −86.4°C = 186.8°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 1.46 at 20°C (liquid)
12.8 Liquid Surface Tension: 29.3 dynes/cm = 0.0293 N/m at 20°C
12.9 Liquid Water Interfacial Tension: 34.5 dynes/cm = 0.0345 N/m at 24°C
12.10 Vapor (Gas) Specific Gravity: 4.5
12.11 Ratio of Specific Heats of Vapor (Gas): 1.116
12.12 Latent Heat of Vaporization: 103 Btu/lb = 57.2 cal/g = 2.4×10^5 J/kg
12.13 Heat of Combustion: Not pertinent
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: 2.5 psia

NOTES

MERCURY

MCR

Common Synonyms	Liquid	Silver	Odorless
Quicksilver	Sinks in water.		

AVOID CONTACT WITH LIQUID. Keep people away.
Stop discharge if possible.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Not flammable.

Exposure

CALL FOR MEDICAL AID.

LIQUID
Effects of exposure may be delayed.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.
Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Not listed
3.2 Formula: Hg
3.3 IMO/UN Designation: Not listed
3.4 DOT ID No.: 2809
3.5 CAS Registry No.: 7439-97-6

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Silvery
4.3 Odor: None

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Avoid contact of liquid with skin. For vapor use chemical cartridge (Hopcalite) respirator.
5.2 Symptoms Following Exposure: No immediate symptoms. As poisoning becomes established, slight muscular tremor, loss of appetite, nausea, and diarrhea are observed. Psychic, kidney, and cardiovascular disturbances may occur.
5.3 Treatment of Exposure: Consult a doctor.
5.4 Threshold Limit Value: 0.05 mg/m^3
5.5 Short Term Inhalation Limits: Data not available
5.6 Toxicity by Ingestion: No immediate toxicity
5.7 Late Toxicity: Development of mercury poisoning
5.8 Vapor (Gas) Irritant Characteristics: None
5.9 Liquid or Solid Irritant Characteristics: None
5.10 Odor Threshold: Not pertinent
5.11 IDLH Value: 28 mg/m^3

6. FIRE HAZARDS

6.1 Flash Point: Not flammable
6.2 Flammable Limits in Air: Not flammable
6.3 Fire Extinguishing Agents: Not pertinent
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Not flammable
6.7 Ignition Temperature: Not flammable
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: Not flammable
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: Data not available

8. WATER POLLUTION

8.1 Aquatic Toxicity:
0.5-1 ppm/48 hr/caragius ardium/TL_m/fresh water
0.29 ppm/48 hr/marine fish/TL_m/salt water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): None
8.4 Food Chain Concentration Potential: Mercury concentrates in liver and kidneys of ducks and geese to levels above FDA limit of 0.5 ppm. Muscle tissue usually well below the limit.

9. SHIPPING INFORMATION

9.1 Grades of Purity: Pure
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-X

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: ORM-B
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification: Not listed

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: 200.59
12.3 Boiling Point at 1 atm: 675°F = 357°C = 630°K
12.4 Freezing Point: −38.0°F = −38.9°C = 234°K
12.5 Critical Temperature: 2664°F = 1462°C = 1735°K
12.6 Critical Pressure: 23,300 psia = 1587 atm = 160.8 MN/m^2
12.7 Specific Gravity: 13.55 at 20°C (liquid)
12.8 Liquid Surface Tension: 470 dynes/cm = 0.470 N/m at 20°C
12.9 Liquid Water Interfacial Tension: 375 dynes/cm = 0.375 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: Not pertinent
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: 2.7 cal/g
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

NOTES

TRICHLOROETHANE

TCE

Common Synonyms	Watery liquid	Colorless	Sweet odor
1,1,1-Trichloroethane Methylchloroform Aerothene Chlorothene	Sinks in water. Irritating vapor is produced.		

Stop discharge if possible. Keep people away.
Avoid contact with liquid and vapor.
Call fire department.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
POISONOUS GASES ARE PRODUCED IN FIRE.
Wear goggles and self-contained breathing apparatus.
Extinguish with dry chemical, carbon dioxide, or foam.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose and throat.
If inhaled, will cause dizziness or difficult breathing.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Irritating to skin and eyes.
If swallowed, may produce nausea.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting.
IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.

Water Pollution

Effect of low concentrations on aquatic life is unknown.
May be dangerous if it enters water intakes.
Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Halogenated hydrocarbon
3.2 Formula: CH_3CCl_3
3.3 IMO/UN Designation: Not listed
3.4 DOT ID No.: 2831
3.5 CAS Registry No.: 71-55-6

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Colorless
4.3 Odor: Chloroform-like; sweetish

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Organic vapor-acid gas canister; self-contained breathing apparatus for emergencies; neoprene or polyvinyl-alcohol-type gloves; chemical safety goggles and face shield; neoprene safety shoes (or leather safety shoes plus neoprene footwear); neoprene or polyvinyl alcohol suit or apron for splash protection.

5.2 Symptoms Following Exposure: INHALATION: symptoms range from loss of equilibrium and incoordination to loss of consciousness; high concentration can be fatal due to simple asphyxiation combined with loss of consciousness. INGESTION: produces effects similar to inhalation and may cause some feeling of nausea. EYES: slightly irritating and lachrymatory. SKIN: defatting action may cause dermatitis.

5.3 Treatment of Exposure: Get medical attention for all eye exposures and any other serious overexposures. Do NOT administer adrenalin or epinephrine; otherwise, treatment is symptomatic. INHALATION: remove victim to fresh air; if necessary, apply artificial respiration and/or administer oxygen. INGESTION: have victim drink water and induce vomiting. EYES: flush thoroughly with water. SKIN: remove contaminated clothing and wash exposed area thoroughly with soap and warm water.

5.4 Threshold Limit Value: 350 ppm
5.5 Short Term Inhalation Limits: 1,000 ppm for 60 min. in man
5.6 Toxicity by Ingestion: Grade 1; LD_{50} = 5 to 15 g/kg (rat, mouse, rabbit, guinea pig)
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 Odor Threshold: 100 ppm
5.11 IDLH Value: 1,000 ppm

6. FIRE HAZARDS

6.1 Flash Point: Data not available
6.2 Flammable Limits in Air: 7%-16%
6.3 Fire Extinguishing Agents: Dry chemical, foam, or carbon dioxide
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion Products: Toxic and irritating gases are generated in fires.
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: 932°F
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: (est.) 2.9 mm/min.
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: Reacts slowly, releasing corrosive hydrochloric acid.
7.2 Reactivity with Common Materials: Corrodes aluminum, but reaction is not hazardous.
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 36

8. WATER POLLUTION

8.1 Aquatic Toxicity: 75-150 ppm/*/pinfish/TL_m/salt water
*Time period not specified.
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Uninhibited; inhibited; industrial inhibited; white room; cold cleaning
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Pressure-vacuum

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-X-Y

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: ORM-A

11.2 NAS Hazard Rating for Bulk Water Transportation:

Category	Rating
Fire	1
Health	
Vapor Irritant	1
Liquid or Solid Irritant	1
Poisons	2
Water Pollution	
Human Toxicity	1
Aquatic Toxicity	3
Aesthetic Effect	2
Reactivity	
Other Chemicals	1
Water	0
Self Reaction	0

11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	2
Flammability (Red)	1
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: 133.41
12.3 Boiling Point at 1 atm: 165°F = 74°C = 347°K
12.4 Freezing Point: <—38°F = <—39°C = <234°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 1.31 at 20°C (liquid)
12.8 Liquid Surface Tension: 25.4 dynes/cm = 0.0254 N/m at 20°C
12.9 Liquid Water Interfacial Tension: (est.) 45 dynes/cm = 0.045 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: 4.6
12.11 Ratio of Specific Heats of Vapor (Gas): 1.104
12.12 Latent Heat of Vaporization: 100 Btu/lb = 56 cal/g = 2.4 X 10^4 J/kg
12.13 Heat of Combustion: (est.) 4700 Btu/lb = 2600 cal/g = 110 X 10^4 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: 4.0 psia

NOTES

TETRACHLOROETHYLENE

Common Synonyms	Watery liquid	Colorless	Sweet odor
Tetracap Perclene Perchloroethylene Perk	Sinks in water. Irritating vapor is produced.		

Stop discharge if possible.
Avoid contact with liquid and vapor.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Not flammable.
Poisonous gases are produced when heated.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose and throat.
If inhaled, will cause difficult breathing, or loss of consciousness.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Irritating to skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.

Water Pollution

Effect of low concentrations on aquatic life is unknown.
May be dangerous if it enters water intakes.
Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Not listed
3.2 Formula: $Cl_2C{=}CCl_2$
3.3 IMO/UN Designation: 9.0/1897
3.4 DOT ID No.: 1897
3.5 CAS Registry No.: 127-18-4

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Colorless
4.3 Odor: Ethereal; like chloroform; mildly sweet

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: For high vapor concentrations use approved canister or air-supplied mask; chemical goggles or face shield; plastic gloves.
5.2 Symptoms Following Exposure: Vapor can affect central nervous system and cause anesthesia. Liquid may irritate skin after prolonged contact. May irritate eyes but causes no injury.
5.3 Treatment of Exposure: INHALATION: If illness occurs, remove patient to fresh air, keep him warm and quiet, and get medical attention. INGESTION: induce vomiting only on physician's recommendation. EYES AND SKIN: flush with plenty of water and get medical attention if irritation or injury occurs.
5.4 Threshold Limit Value: 50 ppm
5.5 Short Term Inhalation Limits: 100 ppm for 60 min.
5.6 Toxicity by Ingestion: Grade 2; LD_{50} = 0.5 to 5 g/kg
5.7 Late Toxicity: None
5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or throat if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 Odor Threshold: 5 ppm
5.11 IDLH Value: 500 ppm

6. FIRE HAZARDS

6.1 Flash Point: Not flammable
6.2 Flammable Limits in Air: Not flammable
6.3 Fire Extinguishing Agents: Not pertinent
6.4 Fire Extinguishing Agents Not to be Used: Not pertinent
6.5 Special Hazards of Combustion Products: Toxic, irritating gases may be generated in fires.
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: Not flammable
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: Not flammable
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: Data not available

8. WATER POLLUTION

8.1 Aquatic Toxicity: Data not available
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): None
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Dry cleaning and industrial grades: 95+ %
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Pressure-vacuum

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment H)

A-X

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: ORM-A
11.2 NAS Hazard Rating for Bulk Water Transportation:

Category	Rating
Fire	0
Health	
Vapor Irritant	1
Liquid or Solid Irritant	1
Poisons	2
Water Pollution	
Human Toxicity	1
Aquatic Toxicity	3
Aesthetic Effect	2
Reactivity	
Other Chemicals	1
Water	0
Self Reaction	1

11.3 NFPA Hazard Classification: Not listed

12. PHYSICAL AND CHEMICAL PROPERTI

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: 165.83
12.3 Boiling Point at 1 atm: 250°F = 121°C = 394°K
12.4 Freezing Point: —8.3°F = —22.4°C
12.5 Critical Temperature: 657°F = 347°C = 62
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 1.63 at 20°C (liquid)
12.8 Liquid Surface Tension: 31.3 dynes/cm = 0.0313 N/m at 2
12.9 Liquid Water Interfacial Tension: 44.4 dynes/cm = 0.0444 N/m at 2
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (G 1.116
12.12 Latent Heat of Vaporization: 90.2 Btu/lb = 50.1 cal/g = 2.10 X 10^5 J/kg
12.13 Heat of Combustion: Not pertinent
12.14 Heat of Decomposition: Not pertinen
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinen
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not avail

NOTES

APPENDIX F

TEMPERATURE EXTREMES

F. TEMPERATURE EXTREMES

F.1 HEAT STRESS

Due to the increase in ambient air temperatures and the effects of protective outer wear decreasing body ventilation, there is increased potential for injury, specifically heat casualties. Site personnel will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim, and the prevention of heat stress casualties.

F.1.1 Identification and Treatment

F.1.1.1 Heat Exhaustion

Symptoms. Heat exhaustion usually begins with muscular weakness, dizziness, nausea, and a staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, the skin is clammy, and he or she may perspire profusely. The pulse is weak and fast; breathing is shallow. The victim may faint unless he or she lies down. This may pass; however, sometimes it persists and, while heat exhaustion is generally not considered life threatening, death could occur.

First Aid. Immediately remove the victim to the CRZ in a shady or cool area with good air circulation. Remove all protective outer wear. Call a physician. Treat the victim for shock (i.e., have the victim lie down, raise the feet 6 to 12 inches, and maintain body temperature but loosen all clothing). If the victim is conscious, it may be helpful to give sips of water. Transport the victim to a medical facility.

F.1.1.2 Heat Stroke

Symptoms. This is the most serious of heat casualties because the body excessively overheats. Body temperatures often are between 107 and 110°F. The victim will have a red face and will not be sweating. First there is often pain in the head, dizziness, nausea, oppression, and dryness of the skin and mouth. Unconsciousness follows quickly and death is imminent if exposure continues. The attack will usually occur suddenly. Heat stroke is always serious.

First Aid. Immediately evacuate the victim to a cool and shady area in the CRZ. Remove all protective outer wear and all personal clothing. Lay the victim on his or her back with the head and shoulders slightly elevated. It is imperative that the body temperature be lowered immediately. This can be accomplished by applying cold wet towels or ice bags to the head and groin. Sponge off the bare skin with cool water or rubbing alcohol, if available, or even place the victim in a tub of cool water. The main objective is to cool without chilling. Do not give stimulants. Transport the victim to a medical facility as soon as possible.

F.1.2 Prevention of Heat Stress

One of the major causes of heat casualties is the depletion of body fluids and salts through sweating. Fluids should be maintained in the Support Zone. Salts can be replaced by either a 0.1 percent salt solution, more heavily salted foods, or commercial mixes such as Gatorade. The commercial mixes are advised for personnel on low-sodium diets.
During warm weather, a work schedule will be established that allows most work to be conducted during the morning hours, before ambient air temperature levels reach highs.

A work/rest schedule will be implemented for personnel required to wear Level B or C protection (i.e., an impervious outer garment) with sufficient time allowed for personnel to "cool down" (this may require working in shifts). Two hours is the maximum time between breaks at Level B or C, regardless of temperature. At elevated temperatures, breaks should be scheduled as follows:

Ambient Temperatures	Maximum Time Between Cool Down Breaks
Above 90°F	¼ hour
85° to 90°F	½ hour
80° to 85°F	1 hour
70° to 80°F	1½ hours

F.1.3 Heat Stress Monitoring

Monitoring of personnel wearing impervious clothing should commence when the ambient temperature reaches 70°F, with increased frequency if ambient temperature increases or as slow recovery rates are indicated. When temperatures exceed 85°F, workers should be monitored for heat stress after every work period. As a screening mechanism of the body's recuperative ability to excess heat, one or more of the following techniques should be used.

1. Measure the heart rate (HR) for 30 seconds, by radial pulse, as early in the resting period as possible. At the beginning of the rest period, the HR should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 10 minutes (or 33 percent), with the length of the rest period staying the same. If the pulse rate is still above 110 beats per minute at the beginning of the next rest period, the following work cycle should again be shortened by 33 percent.

2. Measure oral body temperature with a clinical thermometer, as early as possible in the resting period. At the beginning of the rest period, oral temperature (OT) should not exceed 99°F. If OT exceeds 99°F, the next work period should be shortened by 10 minutes (or 33 percent), with the length of the rest period staying the same. If the OT again exceeds 99°F at the beginning of the next period, the following work cycle should be further shortened by 33 percent. OT should also be measured at the end of the rest period to ensure that it has dropped below 99°F.

3. Maintain good hygienic standards by changing clothes frequently, showering daily, and allowing clothing to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

APPENDIX G

EXCAVATION

G EXCAVATION AND TRENCHING

G.1 EXCAVATION PROCEDURES

Because excavations and trenches pose a hazard to employees, structures, and equipment, all excavations created during site operations will be done in accordance with 29 CFR 1926 Subpart P. The following steps summarize the excavation procedures that will be followed by all HLA personnel:

- Prior to excavating or trenching, all surface encumbrances located so as to create a hazard to the employees will be removed or supported, and all underground utilities will be determined and located.
- Under no circumstances will site personnel enter excavations that are not adequately protected from cave-ins by shoring or sloping.
- Stairways, ladders, or ramps will be located in trenches deeper than 4 feet.
- All equipment will be kept at least 2 feet from the edge of the excavation.

G.2 SLOPING

Acceptable options for sloping or benching include the following:

Option 1. A slope of 1½ horizontal to 1 vertical (34 degrees measured from the horizontal).

Option 2. Determination of the maximum allowable slope based on soil conditions and in accordance with the conditions and requirements set forth in 1926 Subpart P, Appendix A and B (located in HLA Construction Trailer).

G.3 SHORING

Acceptable options for shoring include the following:

Option 1. Designs using Subpart P of 1910.126 (located in HLA Construction Trailer).

APPENDIX H

RESPIRATORY PROTECTION PROGRAM

H. RESPIRATORY PREOTECTION PROGRAM

H.1 INTRODUCTION

This program was developed to govern the selection and use of respiratory protective devices by Harding Lawson Associates (HLA) personnel. The program is intended to comply with OSHA requirements as set forth in 29 CFR 1910.134(b). The scope of this program is limited to activities related to field investigations of potentially hazardous waste disposal sites.

H.2 PERSONNEL REQUIREMENTS

All personnel assigned to field activities at hazardous or potentially hazardous locations are currently required by HLA's health and safety policies to be enrolled in the corporate health monitoring program. Part of this program involves spirometry, a measure of the respiratory system status. No personnel may be assigned to the use of or may withdraw from stock any respiratory protective device without a physician's certification that use of the device will not be injurious to health. Psychological limitations (e.g., claustrophobia) are also considered in personnel assignments. Training in the use of the selected device and fit testing, as described herein, are also required.

Personnel will not be assigned duties that require a respirator when facial hair, skullcaps, or eyeglasses will interfere with a proper fit. Contact lenses may not be worn with any respiratory protective device. Eyeglass frames that fit inside the respirator facepiece are provided as necessary.

H.3 APPLICABLE EQUIPMENT

HLA maintains the following respiratory protective equipment:

- full-face chemical/mechanical air-purifying respirators,
- SCBA,
- full-face airline-supplied breathing apparatus, and
- 5-minute escape air supply.

This equipment is intended for use on an as-needed basis, to be determined by an evaluation of on-site conditions. Respiratory protective equipment should not be used arbitrarily by any HLA personnel. Selection criteria are presented separately; training is required in the use of <u>each</u> type of equipment before drawing from stock.

H.4 PERSONNEL TRAINING

Training of personnel in the proper use and care of respiratory protective equipment is considered essential to the success of the program. Training encompasses the following topics:

- respiratory protection principles,
- selection of appropriate equipment,
- use of equipment,
- maintenance of equipment, and
- fit testing.

Information regarding each topic is presented as standard respiratory protection procedures in the corporate health and safety program manual.

H.5 PROGRAM ADMINISTRATION AND DOCUMENTATION

Administration of the HLA Respiratory Protection Program is the responsibility of the HSM, and includes the following:

- respirator selection,
- personnel training,
- fit testing,
- respirator maintenance,
- documentation,
- program evaluation and improvements, and
- personnel pulmonary testing and certification.

Fit testing and respirator maintenance is performed by the equipment manager of HLA's Sample Control and Staging Center in Portland, Maine, and designated, trained employees at the other offices. All fit-testing and respirator maintenance is conducted under the administration of the HSM. Major maintenance is performed by manufacturer-certified technicians only. Personnel training in respiratory protection is one aspect of the HSM's ongoing personnel training programs. Program evaluation is a dynamic process, occurring each time a project HASP is prepared.

Medical supervision of personnel occurs as part of the HLA health monitoring program, also administered by the HSM's ongoing personnel training programs. Program evaluation is a dynamic process, occurring each time a project HASP is prepared.

Documentation of the various elements of the HLA respiratory protection program is achieved through several media, as follows:

- Documentation of respirator selection is included in the hazard assessment of each site's HASP.

- Documentation of personnel training is maintained in both hardcopy and computerized files.

- Documentation of medical surveillance is achieved indirectly by maintaining a list of enrolled employees in the health monitoring program, and directly through physician certification of personnel allowed to be assigned respiratory protective devices.

- Using the appropriate form, documentation of fit-testing is maintained on file with the equipment manager of the Sample Control and Staging Center and with the HSM or designee.

- Documentation of site surveillance is required both by this program and by the HASP for each site. Records of site surveillance are created by the HSO and maintained in project files.

- Respirator inspection and maintenance records are created and maintained by the equipment manager for each respirator, SCBA, and escape respirator.

Inspection and documentation occur either before each unit is removed from stock and when it is returned, or monthly.

H.6 INSPECTION, MAINTENANCE, AND STORAGE

H.6.1 Introduction

Respirator maintenance is an integral part of the overall respirator program. Wearing a poorly maintained or malfunctioning respirator, in one sense, is more dangerous than not wearing a respirator at all. Personnel wearing defective devices think they are protected when, in reality, they are not. Emergency escape and rescue devices are particularly vulnerable to poor maintenance because they generally are used infrequently, and then in the most hazardous and demanding circumstances. Serious injury or death can result from wearing a defective device during an emergency escape or rescue. The respirator program includes the following components:

- inspection for defects (including a leak check),
- cleaning and disinfecting,
- repair as required, and
- proper and sanitary storage of equipment.

H.6.2 Inspection for Defects

The most important part of a respirator maintenance program is continual inspection of the devices. If properly performed, inspections will identify damaged or malfunctioning respirators before they can be used. Two types of inspections will be performed: (1) while the respirator is in use, and (2) while it is being cleaned. Because the use and cleaning will be performed primarily by the same personnel, these inspections may become concurrent.

H.6.3 Frequency of Inspection

OSHA requires that "All respirators be inspected before and after each use," and that those not used routinely (i.e., emergency escape and rescue devices) "shall be inspected after each use and at least monthly...." Obviously, emergency escape and rescue devices do not require inspection before each use.

H.6.4 Inspection Procedures

Respirator inspection will include checking of the following:

- tightness of the connections;
- facepiece;
- valves;
- connecting tubes; and
- canisters, filters, or cartridges.

In addition, the regulator and warning devices on a SCBA will be check for proper functions.

H.6.5 Field Inspection of Air-purifying Respirators

Routinely used air-purifying respirators will be checked as follows before and after each use:

1. Examine the facepiece for:

- excessive dirt;
- cracks, tears, holes, or physical distortion of shape from improper storage;
- inflexibility of rubber facepiece (stretch and knead to restore flexibility);
- cracked or badly scratched lenses in full facepieces;
- incorrectly mounted full facepiece lenses, or broken or missing mounting clips; and
- cracked or broken air-purifying element holder(s), badly worn threads, or missing gasket(s).

2. Examine the head straps or head harness for:

- breaks;
- loss of elasticity;
- broken or malfunctioning buckles and attachments; and
- excessively worn serration on head harness, which might permit slippage (full facepieces only).

3. Examine the exhalation valve for the following after removing the cover:

- foreign material (e.g., detergent residue, dust particles, or human hair under valve seat);
- cracks, tears, or distortion in the valve material
- improper insertion of the valve body in the facepiece;
- cracks, breaks, or chips in the valve body, particularly the sealing surface;
- missing or defective valve cover; and
- improper installation of the valve in the valve body.

4. Examine the air-purifying element(s) for:

- incorrect cartridge, canister, or filter for the hazard;
- incorrect installation, loose connections, missing or worn gasket, or cross-threading in the holder;
- expired shelf-life date on the cartridge or canister;
- cracks or dents in the outside case of the filter, cartridge, or canister indicated by the absence of sealing material, tape, or foil over the inlet; and
- identical cartridges if more than one are used.

H.6.6 Care and Cleaning of Self-contained Breathing Apparatus

The proper care of SCBAs involve the following:

- inspection for defects,
- cleaning and disinfecting,
- repair, and
- storage.

The following checklist is to be used by personnel whenever they check out a SCBA. (Note: Any discrepancy found should be cause to set the unit aside until it can be repaired by a certified repairperson.)

1. Preliminary Inspection. Check to ensure that:

   - high-pressure hose connector is tight on cylinder fitting,
   - bypass valve is closed,
   - mainline valve is closed,
   - there is no cover or obstruction on regulator outlet, and
   - pressure in the tank is at least 1,800 psi.

2. Backpack and Harness Assembly.

   - Straps
     - visually inspect for complete set
     - visually inspect for frayed or damaged straps that may break during use
   - Buckles
     - visually inspect for mating ends
     - check locking function
   - Backplate and Cylinder Lock
     - visually inspect backplate for cracks and for missing rivets or screws
     - visually inspect cylinder hold-down strap and physically check strap tightener and lock to ensure that it is fully engaged

3. Cylinder and Cylinder Valve Assembly.

   - Cylinder
     - physically check cylinder to ensure that it is tightly fastened to backplate
     - check hydrostatic test date to ensure that it is current
     - visually inspect cylinder for large dents or gouges in metal
   - Head and Valve Assembly
     - visually inspect cylinder for presence of valve lock
     - visually inspect cylinder gauge for conditions of face, needle, and lens
     - open cylinder valve and listen or feel for leakage around packing (if leakage is noted, do not use until repaired); note function of valve lock

4. Regulator and High-pressure Hose.

   - High-pressure Hose and Connector. Listen or feel for leakage in hose or at hose-to-cylinder connector. (Bubble in outer hose covering may be caused by seepage of air through hose when stored under pressure. This does not necessarily mean a faulty hose.)
   - Regulator and Low-pressure Alarm

- Cover outlet of regulator with palm of hand. Open mainline valve and read regulator gauge (must read at least 1,800 psi and not more than rated cylinder pressure).

- Close cylinder valve and slowly move hand from regulator outlet to allow slow flow of air. Gauge should begin to show immediate loss of pressure as air flows. Low-pressure alarm should sound between 650 and 550 psi. Remove hand completely from outlet and close mainline valve.

- Place mouth onto or over regulator outlet and blow. A positive pressure should be created and maintained for 5 to 10 seconds without any loss of air. Next, establish a slight negative pressure in regulator and hold for 5 to 10 seconds. Vacuum should remain constant. This tests the integrity of the diaphragm. Any loss of pressure or vacuum during this test indicates a leak in the apparatus.

- Open cylinder valve.

- Place hand over regulator outlet and open mainline valve. Remove hand from outlet and replace in rapid movement. Repeat twice. Air should escape when hand is removed each time, indicating a positive pressure in chamber. Close mainline valve and remove hand from outlet.

- Ascertain that no obstruction is in or over the regulator outlet. Open and close the bypass valve momentarily to ensure flow of air through bypass system.

5. Facepiece and Corrugated Breathing Tube.

- Facepiece

  - Visually inspect head harness for damaged serration and deteriorated rubber. Visually inspect rubber facepiece body for signs of deterioration or extreme distortion.

  - Retaining clamp properly in place, visually inspect lens for proper seal in rubber facepiece, and for cracks or large scratches.

  - Visually inspect exhalation valve for visible deterioration or foreign materials buildup.

- Breathing Tube and Connector

  - Stretch breathing tube and visually inspect for deterioration and holes.

  - Visually inspect connector to ensure good condition of threads and for presence and proper condition of "O" ring or rubber gasket seal.

  - Perform a negative pressure test on facepiece.

    a. Don backpack and facepiece.

    b. With facepiece held tightly to face or facepiece properly donned, stretch breathing tube to open corrugations and place thumb or hand over end of connector.

c. Inhale. Negative pressure should be created inside mask, causing it to pull tightly to face. This negative pressure should be maintained for 5 to 10 seconds. If negative pressure leaks down, the facepiece assembly is not adequate and should not be worn.

6. Storage of Unit. Check that:

- cylinder is refilled as necessary and unit is cleaned and inspected;
- cylinder valve is closed;
- high-pressure hose connector is tight on cylinder;
- pressure is bled off high-pressure hose and regulator;
- bypass valve is closed;
- mainline valve is closed;
- all straps are completely loosened and laid straight; and
- facepiece is properly stored to protect against dust, sunlight, heat, extreme cold, excess moisture, and damaging chemicals.

H.6.7 Cleaning and Sanitizing

Any good detergent may be used, followed by a disinfecting rinse or a combination disinfectant-detergent for a one-step operation. Reliable, effective disinfectants can be made from readily available household solutions, including the following:

- Hypochlorite solution (50 ppm of chlorine) can be made by adding approximately 2 milliliters of bleach (e.g., Clorox™) to 1 liter of water, or 2 tablespoons of bleach per gallon of water. A 2-minute immersion disinfects the respirators.
- Aqueous solution of iodine (50 ppm of iodine) can be made by adding approximately 0.8 milliliter of tincture of iodine per liter of water, or 1 teaspoon of tincture of iodine per gallon of water. A 2-minute immersion is sufficient to disinfect the respirators.

To prevent damaging the rubber and plastic in the respirator facepieces, the cleaning water should not exceed 140 ºF; however, to ensure adequate cleaning, it should not be less than 120 ºF.

H.6.8 Rinsing

The cleaned and disinfected respirators should be rinsed thoroughly in water (140 ºF maximum) to remove all traces of detergent and disinfectant. This is important for preventing dermatitis.

H.6.9 Drying

The respirators may be allowed to dry in room air on a clean surface. They may also be hung from a horizontal wire, like drying clothes; however, care must be taken not to damage or distort the facepieces.

H.6.10 Reassembly and Inspection

To avoid contamination, the clean, dry respirator facepieces should be reassembled and inspected in an area separate from the disassembly area. The inspection procedures were discussed previously; special emphasis should be given to inspecting the respirators for detergent or soap residue left by inadequate rinsing. This appears most often under the seat of the exhalation valve and can cause valve leakage or sticking. The respirator should be thoroughly inspected and all defects corrected. New or retested cartridges and canisters should be installed, and the completely reassembled respirator should be tested for leaks. For SCBA devices, the facepiece should be combined with the tested regulator and the fully charged cylinder, and an operation check should be performed.

H.6.11 Maintenance and Repair

Replacement or repair should be done by trained, experienced persons using parts designed for the respirator. Besides being contrary to OSHA requirements, substitution of parts from a different brand or type of respirator invalidates approval of the device. This restriction applies particularly to maintenance of the more complicated devices, especially SCBA, and more specifically, regulator valves and low-pressure warning devices. These devices should be returned to the manufacturer or to a trained technician for adjustment or repair. No problems are anticipate in repairing and maintaining most simple respirators, particularly the commonly used air-purifying type.

H.6.12 Respirator Storage

Respirators must be stored properly to protect against the following:

- dust,
- sunlight,
- heat,
- extreme cold,
- excessive moisture,
- damaging chemicals, and
- mechanical damage.

Damage and contamination of respirators may occur if they are stored on a workbench; in a tool cabinet or toolbox among heavy tools, greases, and dirt; or in a vehicle.

APPENDIX I

MONITORING EQUIPMENT

I MONITORING EQUIPMENT

The work environment will be monitored to ensure that IDLH or other dangerous conditions are identified. At a minimum, monitoring will include evaluations for mercury and organic vapor and dust.

I.1 AIR SAMPLING: EQUIPMENT, CALIBRATION, AND MAINTENANCE

To the extent feasible, the presence of airborne contaminants will be evaluated through the use of direct-reading instrumentation. Information gathered will be used to ensure the adequacy of the levels of protection being used at the site, and may be used as the basis for upgrading or downgrading levels of protection, at the discretion of the site HSO.

I.1.1 Jerome Vapor Analyzer

The instrument utilizes a patented, stable gold film sensor, which is highly selective to the measured compound: Thereby, eliminating interferences common to other instruments. The gold film sensor reacts with mercury vapors and creates an electrical response that correlates to a mercury vapor concentration given in mg/m^3. The calibration and routine maintenance instructions are included in the manufacturer's instructions.

I.1.2 RAE Systems Mini Rae 2000 PID

Like the OVA, the photoionization detector (PID) operates on the basis of ionization of the contaminant, which results in a meter deflection proportional to the concentration of the contaminant. In the PID, ionization is caused by a UV light source. The strength of the UV, measured in electron volts (eV), determines which contaminants can be ionized.

I.1.3 Data RAM – Model PDR-1000

This instrument measures concentrations of dust, smoke, mist, and fumes in applications such as remediation-site worker and personal exposure monitoring. The unit's range is 0.001 to 400 mg/m^3, and in addition calculates average, maximum, and STEL values. Calibration and maintenance will be performed in accordance with the manufacturer's instructions.

I.1.4 Calibration Information

MiniRAE 2000

- The detection limits for the calibrated instrument are going to be 0.0 ppm to 100.0 ppm.
- The calibration gas to be used is 100 ppm Isobutylene.
- The lamp for this unit is a 10.6 eV Lamp.
- The calibration method will be a two-point process using "fresh air" and the Isobutylene 100 ppm gas (span gas). First a "fresh air" calibration, which contains no detectable VOC (0.0 ppm), is used to set the zero point for the sensor. Then a standard reference gas (Isobutylene) that contains a known concentration of a given gas is used to set the second point of reference.
- Calibrate daily with a calibration check twice daily and recalibration if out of calibration.

Jerome 411 MVA

- Detection limits are 0.000 ppm to 0.999 ppm.
- Stable gold film sensor, which is highly selective to the compound measured.
- Perform self calibration per manufacturers instructions.
- Calibrate daily with a calibration check twice daily and recalibration if out of calibration.

DataRAM Model PDR-1000

- Detection limits are 0.001 to 400 mg/m^3.
- Perform self calibration per manufacturer's instructions.
- Calibrate daily with a calibration check twice daily and recalibration if out of calibration.

APPENDIX J

VISITORS LOG AND SIGNATURE FORM

VISITOR LOG AND SIGNATURE FORM
FORMER TAYLOR INSTRUMENTS FACILITY

NOTICE: The purpose of this form is to ensure that visitors to the Former Taylor Instruments Facility property are aware that construction and other activities are taking place and as a result, health and safety hazards potentially exist at the site. The primary methods used to inform visitors of potential hazards are: 1) each visitor must review the *Safety Information and Procedures for Visitors to the Former Taylor Instruments Facility* and, 2) an HLA representative or contractor familiar with the site and potential hazards will deliver a short safety briefing prior to your entering the site. To ensure this is done for your visit, please complete this form and return it to your escort.

General Information

Name: _____

Affiliation: _____

Date(s) of visit: _____

Purpose of visit: _____

Site area(s) to be visited: _____

Planned activities: _____

Escort's name: _____

Additional Hazard Information

Nature/locations of active operations:

Summary of other potential hazards not discussed in *Safety Information and Procedures*:

Signature

"I have read and understand the Safety Information and Procedures for Visitors to the Former Taylor Instruments Facility, and have been briefed by Harding Lawson Associates representative on potential health and safety hazards. During my visit I agree to abide by the Safety Procedures and will follow direction provided by my escort".

Signature: _____ Date: _____

SAFETY INFORMATION AND PROCEDURES FOR VISITORS TO FORMER TAYLOR INSTRUMENTS FACILITY

Welcome to the Former Taylor Instruments Facility. You must be aware that this site may contain potential health and safety hazards related to general site conditions, construction activities, or chemicals. The information and procedures provided herein are designed to ensure your visit to the site is a safe one.

Potential Health and Safety Hazards:

1. Ongoing activities such as contaminated soil excavation or environmental sampling may present hazards. Active work areas may or may not be marked with caution tape or other devices.

Safety Procedures:

The following must be observed by all visitors to the Former Taylor Instruments Facility.

1. Personal protective equipment is required when entering or touring the site for any reason:

   - Hard hat
   - Suitable footwear (no open-toed shoes, no sneakers or tennis shoes; steel-toed shoes are preferred)

   Based on your specific activity while at the site, other safety equipment may be required.

2. Before entering the site, you must be briefed by an HLA representative or contractor on the hazards specific to the areas you will visit or your planned activities. The briefing will include a description of hazards in the areas you will visit; review of Material Safety Data Sheets (MSDSs) for chemicals of concern; a discussion of current activities occurring on the site; and instructions on how to avoid potential health and safety hazards. **It is critical that you pay close attention to the information and instructions provided during this briefing**. The individual providing the briefing will be happy to respond to any questions or concerns you may have.

3. Each visitor or group will be provided with an escort who is familiar with the site and potential hazards. **Visitors must remain with the escort's sight and follow his/her instructions at all times, unless specifically authorized otherwise**. Do not enter any room or area of the site or otherwise move about on your own unless authorized to do so.

4. Do not approach or interfere with site operations or the persons engaged in them (including talking) **for any reason**, unless specifically authorized to do so by your escort. Doing so may pose a hazard to you, or them.

5. In the event you encounter whap appears to an abnormal or dangerous situation, report it immediately to your escort or other HLA representative or contractor. Do not attempt to take corrective action on your own.

6. Do not operate or attempt to operate any equipment or machinery of any type.

7. Do not handle or attempt to handle chemicals or potentially hazardous materials of any type, or handle building materials or other substances from areas which your escort indicates may contain hazardous materials.

8. Smoking, eating and drinking are permitted only in the vicinity of the field trailers.

9. Small children or pets are not allowed on the site.

APPENDIX K

DECONTAMINATION

K DECONTAMINATION

K.1 PERSONNEL DECONTAMINATION

Decontamination procedures are followed by all personnel leaving hazardous waste sites. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the exclusion and contaminant reduction zones prior to decontamination. Generalized procedures for removal of Levels B, C, and D PPE are as follows:

Level B Decontamination		
Station 1	Equipment drop	Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboard, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool-down station may be set up within this area.
Station 2	Outer garment, boots, and gloves wash and rinse	Scrub outer boots, outer gloves and chemical-resistant splash suit with decontamination solution or detergent water. Rinse off using copious amounts of water.
Station 3	Outer boot and glove removal	Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4	Tank change	If worker leaves EZ to change air tank, this is the last step in the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5	Boots, gloves, and outer garment removal	Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6	SCBA removal	SCBA backpack and facepiece are removed. Avoid touching face with fingers. SCBA deposited on plastic sheets.
Station 7	Field wash	Hands and face are thoroughly washed. Shower as soon as possible.

Level C Decontamination		
Station 1	Equipment drop	Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboard, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool-down station may be set up within this area.
Station 2	Outer garment, boots, and gloves wash and rinse	Scrub outer boots, outer gloves, and chemical-resistant splash suit with decontamination solution or detergent water. Rinse off using copious amounts of water.
Station 3	Outer boot and glove removal	Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4	Tank change	If worker leaves EZ to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5	Boots, gloves, and outer garment removal	Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6	SCBA removal	Facepiece are removed. Avoid touching face with fingers. Facepiece deposited on plastic sheets.
Station 7	Field wash	Hands and face are thoroughly washed. Shower as soon as possible.

Level D Decontamination		
Station 1	Equipment drop	Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboard, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool-down station may be set up within this area.
Station 2	Outer garment, boots, and gloves wash and rinse	Scrub outer boots, outer gloves, and chemical-resistant splash suit with decontamination solution or detergent water. Rinse off using copious amounts of water.
Station 3	Outer boot and glove removal	Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4	Boots, gloves, and outer garment removal	Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 5	Field wash	Hands and face are thoroughly washed. Shower as soon as possible.

K.2 RESPIRATOR DECONTAMINATION

Respirators will be decontaminated daily and taken from the drop area. The masks will be disassembled, the cartridges set aside, and all other parts placed in a cleansing solution. Parts will be pre-coded (e.g., #1 on all parts of Mask #1). After an appropriate time in the solution, the parts will be removed and rinsed with tap water. Old cartridges will be marked to indicate length of use (i.e., if it is possible to evaluate the remaining utility of the cartridge), or discarded in the contaminated trash container for disposal. In the morning, the masks will be reassembled and new cartridges installed, if appropriate. Personnel will inspect their own masks and readjust the straps for proper fit.

K.3 SMALL EQUIPMENT DECONTAMINATION

Small equipment will be protected from contamination as much as possible by draping, masking, or otherwise covering the instruments with plastic (to the extent feasible), without hindering operation of the unit. For example, the PI meter can be placed in a clear plastic bag to allow for reading the scale and operating the knobs. The PI meter can be partially wrapped, keeping the sensor tip and discharge port clear.

The contaminated equipment will be taken from the drop area and the protective coverings will be removed and disposed of in appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe. The units can then be taken inside in a clean plastic tub, wiped off with damp disposable wipes, and dried. The units will be checked, standardized, and recharged as necessary for the next day's operation, and then prepared with new protective coverings.

K.4 HEAVY EQUIPMENT DECONTAMINATION

It is anticipated that drilling rigs and backhoes will become contaminated during borehole and test-pitting activities. They will be cleaned with high-pressure water or steam, followed by a soap and water wash and rinse. Loose material will be removed with a brush. The person performing this activity will usually be at least at the level of protection used during the personnel and monitoring equipment decontamination.

K.5 DISPOSAL OF DECONTAMINATED MATERIALS

All protective gear, decontamination fluids (for both personnel and equipment), and other disposable materials will be disposed of at each site.

Decontamination fluids identified to be contaminated by site contaminants (i.e., Liqui-nox, used to decontaminate sampling equipment such as split spoons and groundwater sampling pumps) will be stored in DOT-approved 55-gallon drums. Contaminated disposable materials (e.g., gloves and Tyveks) will be double-bagged and stored as is, or placed in DOT-approved 55-gallon drums.

SUBAPPENDIX I

FIELD SAMPLING FORM

HARDING LAWSON ASSOCIATES

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT | DATE

SITE ID | SITE TYPE: WELL

SITE ACTIVITY: START END | JOB NUMBER

WATER LEVEL / PUMP SETTINGS

MEASUREMENT POINT
- ☐ TOP OF WELL RISER
- ☐ TOP OF PROTECTIVE CASING
- ☐ OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): ____ FT

PROTECTIVE CASING / WELL DIFFERENCE: ____ FT

INITIAL DEPTH TO WATER	FT	WELL DEPTH	FT	PID AMBIENT AIR	PPM	WELL DIAMETER	IN
FINAL DEPTH TO WATER	FT	SCREEN LENGTH	FT	PID WELL MOUTH	PPM		
DRAWDOWN	FT	DRAWDOWN VOLUME	GAL	PRODUCT THICKNESS	FT		

WELL INTEGRITY:

	YES	NO	N/A
CAP			
CASING			
LOCKED			
COLLAR			

((initial - final) x 0.16 {2-inch} or x 0.65 {4-inch} or x 1.5 {6-inch})

PURGE RATE: ____ L/MIN | BEGIN PURGING: ____ | END PURGING: ____ | TOTAL VOL. PURGED: ____ GAL

(purge rate (L/min) x duration (min) x 0.26 gal/L)

PURGE DATA

Time	VOLUME PURGED (L)	pH (units)	SpC (cond) (mS/cm)	TURBIDITY (NTU)	DISSOLVED O_2 (mg/L)	TEMPERATURE (°C)	REDOX POTENTIAL (mV)	Comments

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL (if applicable)
☐ PERISTALTIC	☐ TEFLON OR TEFLON LINED	☐ POLYVINYL CHLORIDE	☐ TEFLON
☐ SUBMERSIBLE	☐ HIGH DENSITY POLYETHYLENE	☐ STAINLESS STEEL	☐ OTHER _____
☐ OTHER _____	☐ OTHER _____	☐ OTHER _____	

NOTES

SIGNATURE: _____

SUBAPPENDIX J

VOC CONSTITUENT LIST

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VOC CONSTITUENT LIST

Analytes Tested by the 8260B Method

Acetone	Dibromochloromethane	Methylene chloride
Benzene	1,1-Dichloroethane	4-Methyl-2-pentanone (MIBK)
Bromodichloromethane	1,2-Dichloroethane	Styrene
Bromoform	1,1-Dichloroethene	1,1,2,2-Tetrachloroethane
Bromomethane	cis-1,2-Dichloroethene	Tetrachloroethene
2-Butanone (MEK)	trans-1,2-Dichloroethene	Toluene
Carbon disulfide	1,2-Dichloropropane	1,1,1-Trichloroethane
Carbon tetrachloride	cis-1,3-Dichloropropene	1,1,2-Trichloroethane
Chlorobenzene	trans-1,3-Dichloropropene	Trichloroethene
Chloroethane	Ethylbenzene	Vinyl chloride
Chloroform	Freon 113	o-Xylene
Chloromethane	2-Hexanone	m+p-Xylene

Analytes Tested by the 601/602 Method

Benzene	1,2-Dichlorobenzene	Ethylbenzene
Bromodichloromethane	1,3-Dichlorobenzene	Freon 113
Bromoform	1,4-Dichlorobenzene	Methylene Chloride
Bromomethane	1,1-Dichloroethane	1,1,2,2-Tetrachloroethane
Carbon tetrachloride	1,2-Dichloroethane	Tetrachloroethene
Chlorobenzene	1,1-Dichloroethene	Toluene
Chloroethane	trans-1,2-Dichloroethene	1,1,1-Trichloroethane
2-Chloroethylvinyl ether	cis-1,2-Dichloroethene	1,1,2-Trichloroethane
Chloroform	1,2-Dichloropropane	Trichloroethene
Chloromethane	cis-1,3-Dichloropropene	Trichlorofluoromethane
Dibromochloromethane	trans-1,3-Dichloropropene	Vinyl chloride