

**OPERATION, MAINTENANCE
AND MONITORING MANUAL**

**DUAL PHASE VACUUM EXTRACTION
REMEDATION SYSTEM**

**CHAMPION PRODUCTS, INC.
200 N. MAIN STREET
PERRY, NEW YORK**

DEC Site No. V00018-9

OPERATION, MAINTENANCE AND MONITORING MANUAL

**DUAL PHASE VACUUM EXTRACTION
REMEDIATION SYSTEM**

**CHAMPION PRODUCTS, INC.
200 N. MAIN STREET
PERRY, NEW YORK**

DEC Site No. V00018-9

**DELTA PROJECT NO. S098-009
VOLUNTARY AGREEMENT INDEX NO. B9-0539-98-09**

Prepared by:

DELTA ENVIRONMENTAL CONSULTANTS
4068 Mount Royal Blvd., Suite 225
Allison Park, Pennsylvania 15101
(412) 487-7700

December 2001

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 Access	1
1.2 Remediation System Discharges	1
2.0 PROCESS DESIGN AND TREATMENT PLAN.....	1
2.1 Remediation System Well and Trench Layout	1
2.2 Equipment Design	1
2.3 Control System.....	2
3.0 SYSTEM STARTUP	3
3.1 Prestart	3
3.2 Testing the Ground Water Treatment System	3
3.3 Startup Procedures	3
3.3.1 Background Information	3
3.3.2 System Startup.....	3
3.4 Operational Parameters	3
4.0 EQUIPMENT OPERATION AND MAINTENANCE	4
4.1 Required Tools and Equipment.....	4
4.2 Routine System Observations.....	4
4.3 Remediation System Sampling.....	5
4.3.1 Process Water Sampling.....	5
4.3.2 Vapor Stream Sampling	5
4.3.3 Ground Water and Surface Water Sampling	5
5.0 EMERGENCY PROCEDURES, CONTINGENCY PLAN.....	6
5.1 Response Procedures.....	6
5.1.1 Fire	7
5.1.2 Spills.....	7
5.1.3 Vandalism.....	7
5.1.4 System Auto Dialer	7
5.1.5 Evacuation Plan.....	8
5.1.6 Agreements with Response Officials.....	8
6.0 DATA EVALUATION AND REPORT PREPARATION	8
7.0 QUALITY ASSURANCE / QUALITY CONTROL (QA/QC).....	9
8.0 SIGNATURES	10

FIGURES

- Figure 1: Site Map
- Figure 2: Piping Layout and Extraction Well Locations
- Figure 3: Piping and Instrumentation Diagram

APPENDICES

- Appendix A: Effluent Limitations and Monitoring Requirements
- Appendix B:- Equipment Specification Sheets
- Appendix C: O&M Logsheet
- Appendix D: Remediation Monitoring Report
- Appendix E: Site Health and Safety Plan
- Appendix F: Correspondence with Perry Police Department
- Appendix G: Soil Boring and Well Construction characteristics
- Appendix H: QA/QC manual

OPERATION, MAINTENANCE AND MONITORING MANUAL

DUAL PHASE VACUUM EXTRACTION REMEDATION SYSTEM

**CHAMPION PRODUCTS, INC.
200 NORTH MAIN STREET
PERRY, NEW YORK**

DELTA PROJECT NO. S098-009

1.0 INTRODUCTION

Champion Products, Inc. (Champion) and the New York State Department of Environmental Conservation (NYSDEC) entered into a Remedial Voluntary Cleanup Agreement for Champion to address contaminants at a facility it leases (and formerly owned) in Perry, New York. As part of the Agreement, a dual phase vacuum extraction system (DPVE) was installed to remediate the subsurface soil and ground water. Delta Environmental Consultants, Inc. (Delta) and various subcontractors are performing operation and maintenance (O&M) activities of the DPVE system. This manual describes the system components, equipment specifications, layout of the system and proper O&M procedures. A copy of this manual should remain on-site in the remediation system building at all times.

1.1 Access

The site is accessed via stone driveways adjacent to the main building, as illustrated in Figure 1. The remediation system building is located adjacent to the west side of the main building. Access to the remediation system building is through a two-way swing door on the east wall of the building. This door is locked at all times. Posted on the outside walls of the shelter are the emergency notice and no smoking warning signs. Stated on the emergency signs are:

NOTICE

In case of emergency, Contact:
Delta Environmental Consultants, Inc.
412-487-7700

1.2 Remediation System Discharges

The remediation system discharges treated ground water in accordance with effluent limitations and monitoring requirements from the NYSDEC in Albany, New York. A copy of the requirements is included in Appendix A.

2.0 PROCESS DESIGN AND TREATMENT PLAN

2.1 Remediation System Well and Trench Layout

The site layout, including the remediation system piping trenches, extraction and monitoring wells, and remediation system building are shown on Figures 1 and 2. Total fluids and soil vapors are recovered from dual-phase vapor extraction wells DVE-101 through DVE-107 (as shown on Figure 2) utilizing one rotary vane pump.

2.2 Equipment Design

A piping and instrumentation diagram for the DPVE system is presented as Figure 3. The remediation system uses one 10-horsepower (HP) Rietschle rotary vane pump to provide high vacuum to the subsurface via the seven extraction wells. The pump is capable of producing an air flow rate of 95 cubic feet per minute (cfm) at 26 inches of mercury vacuum.

Vapors from the recovery wells are drawn through vapor-phase granular activated carbon (GAC) units in a series configuration prior to discharging to the atmosphere. A 1.0 HP Moyno pump transfers ground water from the vapor liquid separator (VLS) through two 50-micron sediment filters prior to entering the air stripper. Treated ground water is

discharged from the air stripper through the two 1000-pound GAC units and to an unnamed tributary of the Silver Lake Outlet. The air stripper off-gas is passed through two-vapor phase GAC units in series prior to discharging to the atmosphere.

All equipment located inside the remediation system building and electrical conduit complies with Class I, Division I electrical codes. The equipment within the building is summarized below:

- Seven solenoid switches to control run times of extraction wells.
- One 10 HP rotary vane pump.
- One steel, 120-gallon VLS (separates vapor and ground water extracted from the subsurface).
- One 1-HP electric transfer pump (Moyno) between the VLS and air stripper.
- Two 50-micron sediment filters to remove solids from extracted ground water prior to entering the air stripper.
- One air stripper.
- One 1-HP vertical multistage transfer pump (discharges treated ground water).
- Two 1000-pound liquid-phase GAC units.
- Two 500-pound vapor-phase GAC units connected in series (rotary vane pump air effluent).
- Two 500-pound vapor-phase GAC units connected in series (air stripper effluent).
- One rotation water meter to measure the total gallons of water processed.
- One pitot tube flow-meter.
- Three dual position floats in the VLS (the floats consists of a low and high level sensor to activate/deactivate the Moyno transfer pump and a high-high sensor to deactivate the entire system).
- Three dual position floats in the air stripper sump (the floats consists of a low and high level sensor to activate/deactivate the vertical multistage transfer pump and a high-high sensor to deactivate the entire system).
- One 5-HP electric blower (for the air stripper).
- Sampling ports which have been installed throughout the treatment system to obtain process water and vapor samples for laboratory analysis.

2.3 Control System

The system is equipped with fail-safe devices to insure proper shutdown of the system in the event of the following conditions:

- High temperature of rotary vane pump.
- High vacuum of rotary vane pump.
- High water level in the VLS.
- High vacuum switch on the rotary vane pump.
- High temperature switch on the rotary vane pump.
- High-pressure switch between VLS transfer pump and the bag filters.
- High water level in the air stripper sump.
- Low-pressure fault on the air stripper.

- High-pressure fault on the air stripper blower.

A control panel is installed for operation of the DPVE system. The control panel is mounted to a wall located inside the treatment shelter. A Sensiphone Model 1104 remote monitoring telemetry panel has also been installed inside the control panel. In the event of system deactivation, Delta will be automatically notified via telephone of a system alarm. The telemetry unit will call a preprogrammed telephone number when the system has experienced a shutdown due to alarm conditions controlled by the critical devices. After the system is shut down, manual system activation or a remote activation is required.

3.0 SYSTEM STARTUP

In the event of system shutdown, the following procedures should be followed to restart the system:

3.1 Prestart

Control panels are attached to the wall of the shelter. The system is energized by:

1. Removing tagout devices from the breaker panel and remove the breaker panel cover. Push the main breaker switch to the "On" position.
2. Turning on the power supply to the remediation shelter equipment by switching on the individual equipment breaker switches that are located below the main breaker switch.
3. The system is now ready to start.

3.2 Testing the Ground Water Treatment System

1. Ensure that all valves from the two transfer pumps are open. Turn on each pump by turning the pump switch located on the panel inside the shelter to "Auto". The pump will cycle and remove water until liquid levels reach the low-level sensor in the VLS and air stripper sumps, and then the pumps will automatically deactivate.
2. Monitor ground water levels in the VLS sight glass and the air stripper to ensure that waste is exiting the system.
3. Observe that the pumps deactivate when ground water is lowered to below the low level sensor.
4. Shut down system by turning control panel switches to the "Off" position. Apply tagout devices to the breaker panel.

3.3 Startup Procedures

3.3.1 Background Information

1. Access all monitoring wells and record static water levels. Remove tagout devices from the breaker panel.

3.3.2 System Startup

1. Set all breaker switches inside the breaker panel to the "On" position.
2. Push the reset button before starting all system components. Start the rotary vane pump by switching the system switches marked "Auto". Turn the switch for activation to "Auto". Water should flow from all extraction wells into the system. Ensure that all valves inside the shelter are open.
3. Check flow rates of the transfer pumps.

3.4 Operational Parameters

The rotary vane pump will produce an estimated flow rate of approximately 3-4 gallons per minute (gpm). Optimum flow rate will be approximately 1 gpm from each of the extraction wells. At a minimum, monthly effluent water samples

should be obtained and analyzed for the parameters identified in Appendix A and the additional target compounds of EPA method 8021.

4.0 EQUIPMENT OPERATION AND MAINTENANCE

The remediation system requires the following maintenance:

1. The rotary vane pump is designed to operate continuously. Each month the oil level must be checked for emulsification and the proper level. If oil level is low, fill to mark; if emulsified, drain and replace. ***Prior to performance of any maintenance on equipment receiving electrical power, the main power to the remedial unit must be shut off and the electricity locked out by shutting down the lever on the main breaker box. The main power switch is located in the breaker panel.*** One electrical breaker switch (inside the main breaker box) controls power to the rotary vane pump. The breaker switches are located inside the breaker panel on the inside wall of the remediation building.
2. Two bag filters are located between the VLS transfer pump and the air stripper. The filters are present to minimize sediment from entering and fouling the air stripper and the GAC units. The filters should be checked weekly for sediment accumulation. Remove filter housing and check filter condition. These filters will require periodic replacement when the upstream pressure is more than 40 pounds per square inch (psi). Remove all spent filters and store in a 20-gallon plastic garbage can, properly labeled, to identify its contents as a non-hazardous media (as determined by TCLP analysis). Replace filters after removal.

Additional information for each major component is provided in Appendix B.

4.1 Required Tools and Equipment

During each O&M visit, the following tools will be required: ammeter/voltmeter, water level indicator, photoionization detector, 25-foot electrical extension cord, ground water/system water sample kits, 50-micron bag filters, screw drivers, crescent wrenches, pipe wrench, desiccator, flashlight and batteries and latex gloves.

4.2 Routine System Observations

The extraction well layout for the remediation system is presented on Figure 2. All tasks conducted at the site must be documented in the field logbook and on the O&M logsheet attached in Appendix C. During each site visit, remediation system operation will be observed to determine if any problems exist and/or potential problems are apparent. All wells and piping should be checked for signs of leaks or excessive noise. System checkpoints are:

- Extraction wellhead and overhead piping.
- Piping within the remediation system building.
- Carbon bed inlet and outlet ports.
- Trench line resurface seals.
- Pressure operations inside the shelter.

The most common operational problems are:

- The transfer pumps shut down due to fouling or activation of high-high floats.
- Level switches do not operate due to fouling.
- High-pressure alarm on the bag filter units.
- High-pressure fault on the air stripper (indicating cleaning is needed).

The following are required monthly preventative maintenance tasks that should be conducted while the system is operational. This is considered a minimum list of O&M procedures (developed by Delta) to be completed during each O&M event.

- Check the entire piping network for signs of leaks.
- Check and record pressure gauge and flow readings inside shelter.
- Check the system equipment inlet and outlets for leaks.
- Collect water samples from the sampling ports. If the system is deactivated, restart the system, and do not collect samples until after a minimum of 60 minutes of system operation.
- Check cumulative and instantaneous ground water flow and record observations in project notebook, located in the remediation building.
- Observe outfall location and note appearance of water or any unusual odors.

The following are weekly preventative maintenance tasks that should be conducted while the system is operational:

- Check the entire piping network for signs of leaks.
- Check and record pressure gauge and flow readings inside shelter.
- Check the system equipment inlet and outlets for leaks.
- Collect water samples from the sampling ports. If the system is deactivated, restart the system, and do not collect samples until after a minimum of 60 minutes of system operation.
- Change bag filters.

When the system is temporarily deactivated, conduct the following maintenance: (**REMEMBER to lock out all power/disconnect** switches to the "Off" position located inside of the breaker panel):

- Check filters for fouling.

Restart the system after completing maintenance. Upon startup, check the rotary vane and transfer pumps for proper operation. Listen for unusual noise (some noise may occur during initial system startup). During the site visit, the equipment will only be shut down to perform necessary repairs.

The O&M requirements are designed to allow for carbon bed change outs and correction of system malfunctions that may occur between scheduled maintenance visits, and to promptly (within 24-72 hours of problem notification) address these matters to minimize system down time.

4.3 Remediation System Sampling

Regular monthly O&M visits and system ground water sampling are performed; however, quarterly sampling of the system influent and effluent vapor stream are also performed to track system performance.

4.3.1 Process Water Sampling

Monthly process water samples are collected from three locations (prior to entering the airstripper, after treatment by the air stripper, and after final polishing by the GAC) for analysis in precleaned laboratory supplied containers and shipped overnight to a New York-certified laboratory for analysis.

Process water samples are collected for three purposes: (1) analytical results will be one of the parameters used to determine overall system efficiency in reducing the levels of the target contaminants in-situ the ground water, (2) determine breakthrough of liquid-phase carbon, and (3) to ensure that treated effluent discharge limitations are met.

Sample ports are installed throughout the system for collection of process water samples. System influent, midfluent, carbon, and effluent water samples are collected and analyzed for VOCs by EPA Method 8021. Field pH is obtained on the effluent water sample as required by the effluent limitations and discharge requirements.

4.3.2 Vapor Stream Sampling

Air samples are obtained from the vapor stream on a quarterly basis. An influent vapor sample is obtained prior to the rotary vane pump GACs. Effluent vapor samples are obtained from the rotary vane and air stripper GACs.

4.3.3 Ground Water and Surface Water Sampling

Quarterly ground water and surface water samples are obtained from all monitoring and extraction wells. A discussion of the results and analytical test methods used are presented in Appendix D.

5.0 EMERGENCY PROCEDURES, CONTINGENCY PLAN

The site-specific health and safety plan (SHSP) that documents site conditions and procedures in case of an emergency shall remain inside the remediation shelter at all times for reference. All personnel are required to read, understand, sign, and date the SHSP prior to initiation of any site activity. A copy of the SHSP is included in this document as Appendix E.

To minimize damage to major system components as a result of parts failure, and prevent discharge exceedences, protective devices were designed and installed with the remediation system. The system can effectively be shut down by turning the electricity off at the breaker panel or by turning the system switches to the "Off" position.

In the event of equipment failure, operational problems, or an emergency, contact one of the following people below.

Mr. Stephen A. Zbur, P.G.

CORE Environmental Services, Inc.
(412) 487-7703

Mr. Ron Jenkins

CORE Environmental Services, Inc.
(412) 487-7702
Night and Weekends (724) 785-7679

Mr. Jason Butler

Butler Construction
(716) 237-5940

Ms. Joyce Koker

Delta Environmental Consultants, Inc.
(262) 827-4802

Operation and maintenance personnel will be on-site weekly to maintain the equipment and ensure proper system operation.

5.1 Response Procedures

The purpose of this section is to provide the system operator with the necessary information to properly address and respond to various onsite emergencies such as:

- Fire
- Spills
- Vandalism

5.1.1 Fire

In the event of a fire **IMMEDIATELY CALL 911**. If the fire is localized (very small) within the remediation building, an attempt should be made to extinguish the fire with the onsite fire extinguisher (located just inside to the right of the door).

5.1.2 Spills

In the event of a spill (recovered light non-aqueous phase liquids or oil from the rotary vane pump), recover the spill with the onsite absorbent pads located within the treatment facility. Upon completion of spill clean up, place the used absorbent pads in the properly marked 55-gallon drum located in the fenced-in area near the VLS vapor carbons. Report the spill to one of the site contacts listed above.

If a spill were to result from the break in the piping within the remediation building (prior to the air stripper), immediately shut off the remediation system and call the necessary site contact. Use absorbent booms, present within the remediation system building, to contain the spill and a wet/dry vacuum to recover spilled material. Place the recovered material in the on-site 55-gallon drum located in the fenced in area near the VLS vapor carbons.

Spills resulting from a break in the manifold piping should not require any kind of spill response since the manifold piping is under vacuum and any water remaining in the piping would be recovered by the rotary vane pump. However, any and all breaks, cracks, or leaks that are discovered during weekly inspection of the system piping should be reported to one of the site contacts, listed above, and the system will be shut down until such time that the break or cracked can be properly repaired.

Spills resulting from a break in the liquid carbon vessels should not require spill response since this is final stage of the treatment process. However, the system should be shut down until the break or crack can be properly repaired and the necessary site contact should be informed of the break.

5.1.3 Vandalism

If vandalism were to occur to the remediation system, system enclosure, piping or controls, immediately shut off the remediation system, and call the police department (number is in SHSP). Inform the necessary site contact of the vandalism, providing information such as extent of damage, etc. to the system. Take pictures of the vandalism and begin inspection of the system to determine if the system can continue to operate properly or if it will have to remain off until such a time that it can be repaired for safe operation.

5.1.4 System Auto Dialer

The remediation system is equipped with a Sensiphone 4000 auto dialer that will call out in the event of a system fault. Remediation system faults include:

- High vacuum at the DPVE rotary vane pump (indicating a clogged line).
- High temperature at the DPVE rotary vane pump (indicating a clogged line or malfunction with the DPVE pump).
- High bag filter pressure (indicating the bag filters need to be changed).
- High pressure in the air stripper (indicating the air stripper needs to be cleaned).

- Low pressure in the air stripper (indicating the blower is not operating or piping fittings present between the VLS and the air stripper are cracked).

In response to one of the referenced faults, the auto dialer will call out to the main phone line of CORE Environmental Services, Inc. Each dialing sequence consists of a maximum of five phone calls made every five minutes until the fault is acknowledged. The fault is acknowledged by pressing "555" when prompted and the auto dialer will then discontinue calling.

5.1.5 Evacuation Plan

In the event of an on-site major disaster in which evacuation of the remediation system is necessary, please refer to the SHSP (Appendix E) for emergency telephone number; escape routes and directions to the nearest hospital.

5.1.6 Agreements with Response Officials

Delta contacted the Village of Perry Chief of Police, Mr. Bob Guesno to advise him of possible hazards if an emergency would occur at the site. A copy of a letter submitted to Mr. Guesno is presented in Appendix F.

6.0 DATA EVALUATION AND REPORT PREPARATION

Field and analytical data, collected during monthly O&M visits, and quarterly sampling events are analyzed on a monthly/quarterly basis to evaluate the remedial approach and system performance. A copy of the Remediation Monitoring Report (for the period from July 2000 through September 2001) is presented as Appendix D. This report summarizes the following information:

- Site history.
- Amount of VOC's recovered from the subsurface.
- Remediation system upgrades made during the reporting period.
- Discussion of ground water monitoring, surface water monitoring and ground water flow.
- Results of the ground water and surface water monitoring events.
- Operation and maintenance of the ground water remediation system.
- Sampling results of the remediation influent, midfluent and effluent monthly sampling.
- Mass balance calculations to gauge the removal efficiency of the remediation system.
- Conclusions and recommendations including continued system and ground water sampling/analysis locations.
- Laboratory analytical reports.
- Historical ground water elevations.
- Ground water contour and isoconcentrations maps.

Please refer to Appendix G for soil boring and monitoring /extraction well construction characteristics. The total depth of each monitoring well will assist in determining the minimum amount of water that should be purged during each sampling event.

7.0 QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

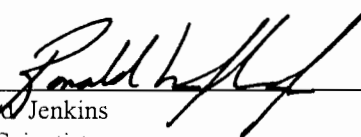
Included in Appendix H is a copy of the QA/QC manual developed specifically for the subject site. The following is a summary of information contained in the QA/QC manual:

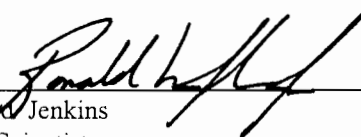
- Upstate Laboratories DEC laboratory certification number;
- Site contacts;
- Protocol for sampling procedures both soil and ground water;
- Decontamination procedures;
- Monitoring Well and Extraction Well installation procedures
- Chain of Custody procedures

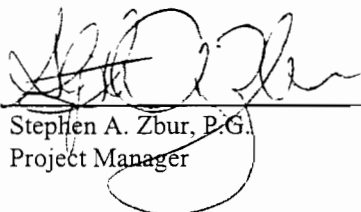
8.0 SIGNATURES

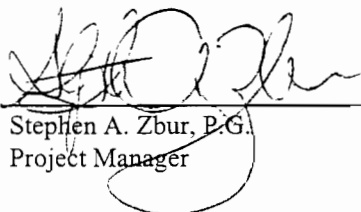
This manual has been prepared by:

DELTA ENVIRONMENTAL CONSULTANTS, INC.


Ronald Jenkins
Staff Scientist


Date 12/20/01


Stephen A. Zbur, P.G.
Project Manager


Date 12/25/01

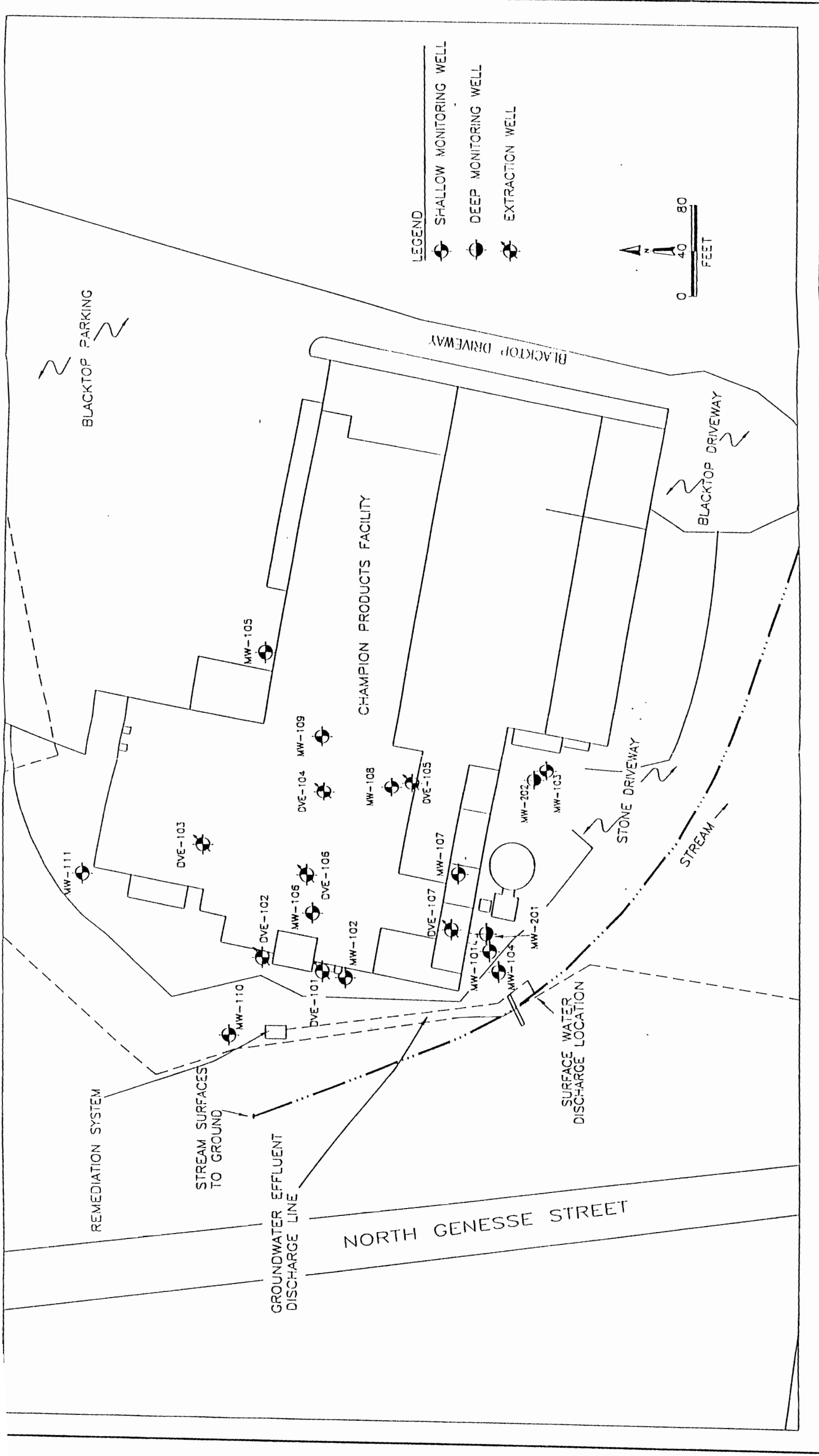
The manual was reviewed by:


Robert Elliott, P.E.
Vice President
Lu Engineers


Date 12/17/01



FIGURES



	TITLE: SITE MAP CHAMPION PRODUCTS COMPANY PERRY, NEW YORK			
	DWN: HLW	DES: S098-009	PROJECT NO.: S098-009	
	CHKD:	APPD:	FIGURE NO.: 1	REV: 2/6/01

APPENDIX A

Effluent Limitations and Monitoring Requirements

91-20-2a (1/89)

Site No.: 000189-9

Part 1, Page 1 of 2

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

OCT 08 1999

During the period beginning Dec 1999

NYSDEC - REG. 9

FOIL
REL UNREL

and lasting until Dec 2004

the discharges from the treatment facility to trib. of Silver Lake Outlet, water index number Ont 117-70-4a, Class C,
RECEIVING WATER shall be limited and monitored by the operator as specified below:

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements		
	Daily Avg.	Daily Max		Measurement Frequency	Sample Type	
Outfall 001 - Treated Groundwater Remediation Discharge:						
Flow	18000	28,800	GPD	Continuous	Meter	
pH (range)	6.0 to 9.0		SU	Monthly	Grab	
METHYLENE CHLORIDE	Monitor	10	µg/l	Monthly	Grab	
NAPHTHALENE	13	50	µg/l	Monthly	Grab	
TETRACHLOROETHYLENE	1	10	µg/l	Monthly	Grab	
TOLUENE	Monitor	5	µg/l	Monthly	Grab	
TRICHLOROETHYLENE	Monitor	10	µg/l	Monthly	Grab	
NYL CHLORIDE	Monitor	10	µg/l	Monthly	Grab	
N-BUTYLBENZENE	Monitor	10	µg/l	Monthly	Grab	
n-PROPYLBENZENE	Monitor	10	µg/l	Monthly	Grab	

GW
Efflim

5

NS

NS

NS

5

2

Additional Conditions:

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

Chief - Operation Maintenance and Support Section
Bureau of Hazardous Site Control
Division of Environmental Remediation
NYSDEC
50 Wolf Road
Albany, N.Y. 12233-7010

With a copy sent to:

John McMahon: RWE, R-9
NYS Dept. of Env. Con.
270 Michigan Ave
Buffalo, New York 14203-2999

copies to:

Original to:

MAURICE MOORE
270 Michigan Ave
Buffalo, NY 14203

Only site generated wastewater is authorized for treatment and discharge.

APPENDIX B

Equipment Specification Sheets

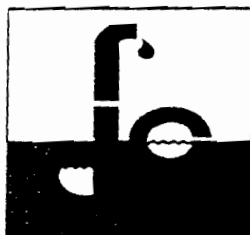
**Installation, Startup, and Maintenance Manual
MaxiVac™ 200 Multi-Phase Extraction System**

Delta Environmental Consultants

Perry, NY

July, 2000

DRC # 6154



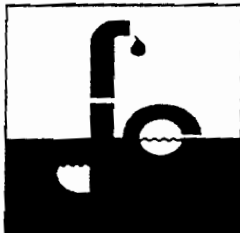
DIVERSIFIED REMEDIATION & CONTROLS

21801 Industrial Blvd. Rogers, MN 55374 Phone (763) 428-3000 Fax (763) 428-3660

ROTARY VANE PUMP

SN 2096847

DRC # 6154



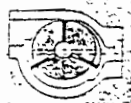
DIVERSIFIED REMEDIATION & CONTROLS

21801 Industrial Blvd. Rogers, MN 55374 Phone (763) 428-3000 Fax (763) 428-3660

Operating instructions

CE

RIETSCHE



Vacuum pumps

VC

VACFOX

VC 200

VC 300

Pump ranges

These operating instructions concern the following oil flooded rotary vane vacuum pumps: VC 200 and VC 300. The nominal vacuum capacities at atmosphere are 200 and 300 m³/hr operating on 50 cycles. The pumping curves showing capacity against vacuum can be seen in data sheet D 232.

Description

VC 200 and VC 300 vacuum pumps are fitted with a mesh filter on the pump inlet. On the exhaust side of the pump an oil mist eliminator is fitted which has the function of re-circulating oil back into the circulation system, as well as providing high efficiency separation on the pump exhaust. Situated between the pump housing and the motor, a high efficiency cooling fan pulls cooling air in through the fan cover. A further fan inside of the oil cooler results in the cooling of the re-circulating oil.

A standard built-in non return valve on the inlet of the pump seals the pump from the process when the pump is stopped. This prevents oil moving into the pumping cylinder when the pump is stationary. Excessive oil in the cylinder could cause an hydraulic lock when the pump is started and hence undue stress on the rotor blades.

The gas ballast valve which is fitted as standard avoids any condensation of a small amount of water vapour inside the pump and hence emulsification of the oil. The gas ballast vapour handling capacity can be increased if required to tolerate higher vapour loads than normal.

All the pumps are driven by a direct flanged three phase, standard TEFV motor via a pin and bush coupling.

Optional extras: The following standard optional extras can be supplied if required: Vacuum regulating valve (ZRV), additional non return valve (ZRK), dust inlet filter (ZFP), high vacuum suction filter (ZVF), direct on line (DOL) motor starter (ZMS) and various vacuum gauges.

Suitability

! The units VC 200 and VC 300 are suitable for the use in the industrial field i.e. the protection equipments corresponds to EN DIN 294 table 4, for people aged 14 and above.

The ultimate vacuum can be user selected at either 0.5 mbar (abs.) for fine vacuum or 10 mbar (abs.) for coarse vacuum (see adjusting bolt (X)).

These models can be used for the evacuation of a closed system or for a permanent vacuum from:

Fine vacuum → 0.5 to 100 mbar (abs.) • Coarse vacuum → 10 to 500 mbar (abs.)

When these pumps are operated permanently outside the ranges listed above, there may be oil seepage at the exhaust port. If closed systems are evacuated from atmospheric pressure down to a suction pressure close to the ultimate vacuum there will be no problem with the oil system, provided the vacuum limit is achieved within a 10 minute pump down time.

! Amounts of water vapour may be handled. Water, other liquids, aggressive or inflammable gases and vapours may not be handled. For water vapour tolerance, see information I 200.

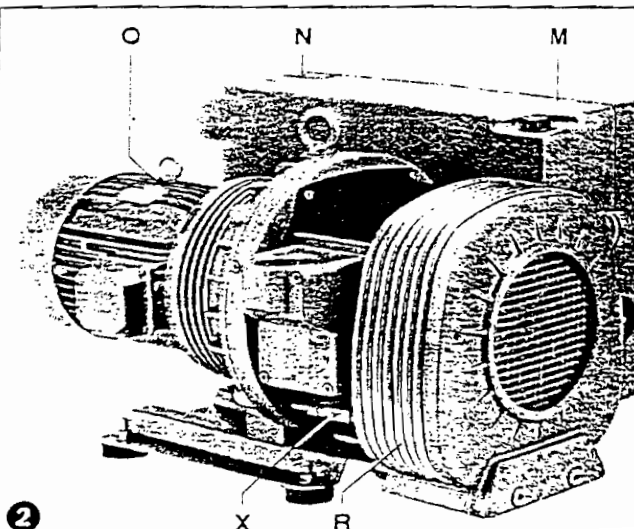
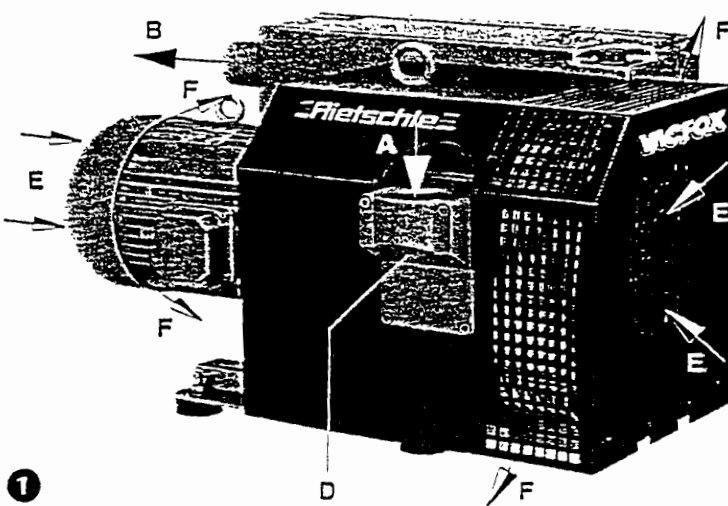
Handling of inflammable or aggressive gases and vapours is only possible with special versions, if the safety instructions XE 2 are noted.

! The ambient and suction temperatures must be between 5 and 40°C. For temperatures outside this range please contact your supplier.

The standard versions may not be used in hazardous areas. Special versions with Ex-proof motors can be supplied.

The back pressure on the exhaust port must not exceed -0.1 bar.

! All applications where an unplanned shut down of the vacuum pump could possibly cause harm to persons or installations, then the corresponding safety backup system must be installed.



BE 232

1 6 99

Werner Rietschle
GmbH + Co. KG

Postfach 1260

D-79642 Schopfheim

☎ 07622/392-0

Fax 07622/392300

e-mail: info@rietschle.de

http://www.rietschle.com

Rietschle (UK) Ltd.

P.W.D.C.

Paddock Wood

Kent TN12 6UU.

☎ 01892/835277

Maintenance and Servicing

⚠ When maintaining these units and having such situations where personnel could be hurt by moving parts or by live electrical parts the pump must be isolated by totally disconnecting the electrical supply. It is imperative that the unit cannot be re-started during the maintenance operation.

Do not work on a pump that is at its normal operating temperature as there is a danger from hot parts or hot lubricant.

1. Air filtration

⚠ The capacity of the pump can become reduced if the air inlet filters are not maintained correctly.

Filters on the suction side: Mesh filter (f₁) must be cleaned regularly depending upon the amount of contamination. Cleaning can be carried out by washing out or by blowing out with compressed air. Replace filters if contaminated completely.

The mesh filter (f₁) can be dismantled by removing screws (s₁) on the filter housing (D) (picture 5).

Filter for Gas ballast: All pumps are equipped with a gas ballast valve (U).

The built in filter cartridge (f₂) must be cleaned regularly depending upon the amount of contamination by blowing out with compressed air. By removing the screw (g₂) and plastic cap (h₂) the filter elements can be removed for cleaning. Re-assemble in reverse order (picture 6).

Filter Cartridge (Optional Extras): The filter cartridge of the vacuum tight suction filter (ZVF) or dust separator (ZFP) must be cleaned regularly again depending upon the amount of contamination. Cleaning can be achieved by washing or by blowing out with compressed air. Replace the filter cartridge if necessary. The cartridge can be removed completely by undoing the relevant retaining clips.

2. Lubrication (picture 3)

Check the oil level regularly depending upon the operating hours.

First oil change after 500 operating hours (see oil drain plug (K)). Further changes every 500-2000 operating hours. The oil change times should be shortened if the application is dusty. Drain the oil also from the oil cooler (R) (see oil drain plug (K)).

Only oils corresponding to DIN 51506 group VC/VCL or a synthetic oil (obtainable from Rietschle) should be used. The viscosity must correspond to ISO-VG 100 according to DIN 51519.

The recommended Rietschle Oil types are: MULTI-LUBE 100 (mineral oil); SUPER-LUBE 100 (synthetic oil) (see oil type plate (M)).

When the oil is under a high thermal load, e.g. ambient or suction temperatures over 30°C, unfavourable cooling or operating with increased speed etc., the oil change time can be extended by using the recommended synthetic oil.

⚠ Old and used oil must be disposed of corresponding with the relevant health, safety and environmental laws.

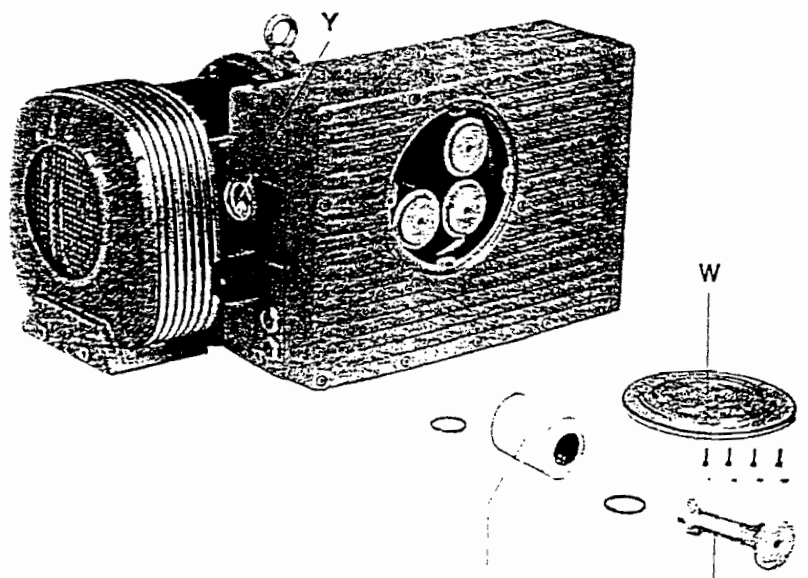
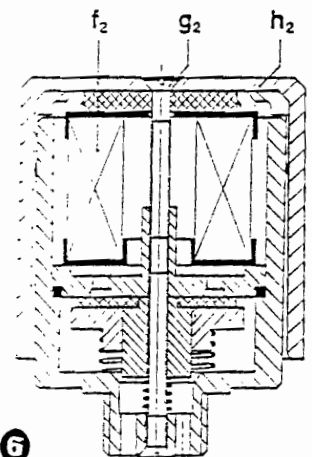
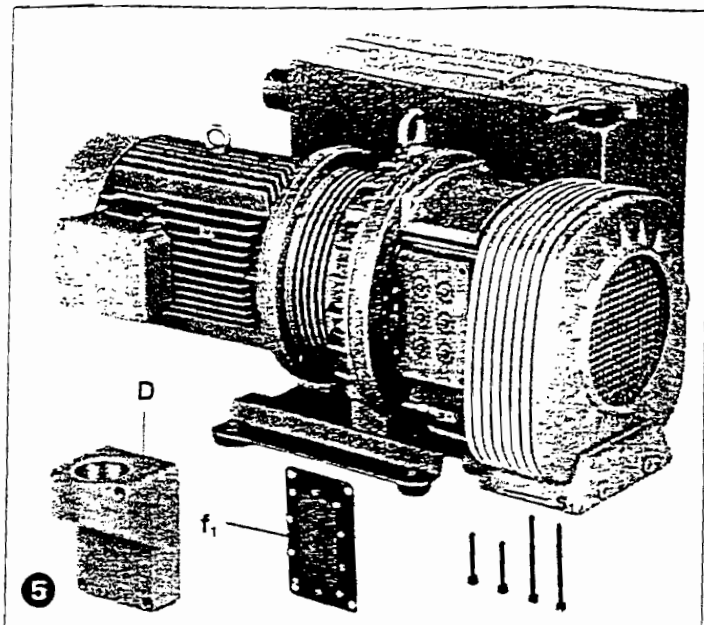
If the oil brand is changed, the old oil must be drained completely from oil separator housing and the oil cooler.

3. Oil separation (picture 7)

⚠ Extremely blocked filter elements will result in an increased pump temperature and will cause discolouration of the lubricant.

The oil separator elements may become contaminated after a long period of operation which can result in high pump temperature and motor overload. We therefore recommend to change the filter elements (L) every 2000 operating hours or when the filter back pressure is in excess of 0.7 bar (see back pressure gauge (Y) → optional extra). It is not possible to clean these elements.

To change filters: Remove maintenance cover (W). Remove plastic fixings (t) and exchange the elements (L). If possible re-use the O-ring for reassembly. Re-assemble in reverse order.



Handling and Setting up (pictures 1 and 2)

 Pumps that have reached operating temperature may have a surface temperature at position (Q) of more than 70°C. **WARNING! Do Not Touch.**

Filter housing (D), oil filler ports (H, H₁), oil sight glass (I), oil drain plugs (K, K₁), gas ballast (U) and oil separator housing (T) must all be easily accessible. The cooling air entries (E) and the cooling air exits (F) must have a minimum distance of 20 cm from any obstruction. The discharged cooling air must not be re-circulated. For maintenance purposes we recommend a space of 0.5 m in front of the filter housing and oil separator.

The VC 200 and VC 300 pumps can only be operated reliably if they are installed horizontally.

 For installations that are higher than 1000 m above sea level there will be a loss in capacity. For further advice please contact your supplier.

When installed on a solid base, the pumps may be installed without fixing down. If the pumps are installed on a base plate we would recommend fitting anti vibration mounts. This range of vacuum pumps are almost vibration free in operation.

Installation (pictures 1 and 2)

 For operating and installation follow any relevant national standards that are in operation.

1. The vacuum connection (A) is situated on the filter housing (D).

The air handled can be emitted into the atmosphere through the exhaust port (B) or by utilising an exhaust pipe.

 Long and/or small bore pipework should be avoided as this tends to reduce the capacity of the pump. The exhaust port (B) must not be obstructed or partly obscured.

2. The lubricating oil (for recommended brands see under servicing) can be put into the pump at the oil filler port (H) of the oil separator housing, until the oil level shows at the upper mark of the oil sight glass (I). After filling, make sure the oil filler port is closed.

3. The electrical data can be found on the data plate (N) or the motor data plate. The motors correspond to DIN VDE 0530 and have IP 54 protection and insulation class B or F. The connection diagram can be found in the terminal box on the motor (unless a special plug connection is fitted). Check the electrical data of the motor for compatibility with your available supply (voltage, frequency, permissible current etc.).

4. Connect the motor via a motor starter. It is advisable to use thermal overload motor starters to protect the motor and wiring. All cabling used on starters should be secured with good quality cable clamps.

We recommend that motor starters should be used that are fitted with a time delayed trip resulting from running beyond the amperage setting.

When the unit is started cold, overamperage may occur for a short time.

 The electrical installation may only be made by a qualified electrician under the observance of EN 60204. The main switch must be provided by the operator.

Initial Operation (pictures 1 and 2)

1. Initially switch the pump on and off for a few seconds to check the direction of rotation against the direction arrow (C).

2. Connect the suction pipe at (A).

3. Run the pump for two minutes using the correct rotation. Stop pump and top up the oil using the oil filler port (H) to the correct level (see sight glass (I)). Repeat this process until the oil cooler is completely full.

On no account open the oil filler port when the pump is operating.

4. The operating range can be adjusted by turning of the adjusting bolt (X) (see picture 4)

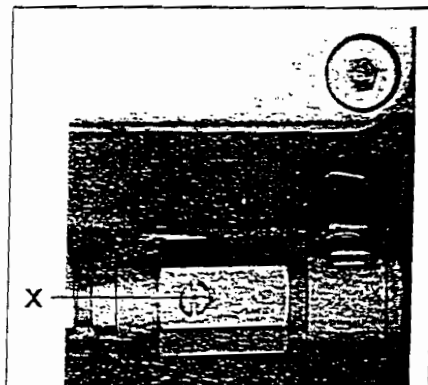
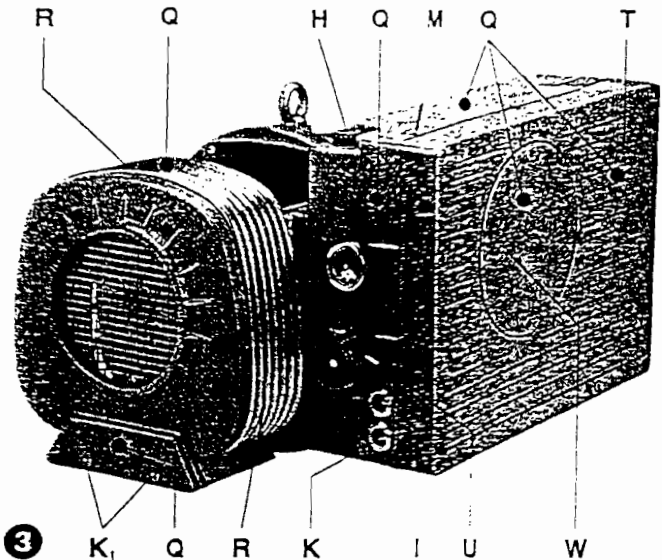
5. Vacuum regulating valve (optional extra):

The vacuum can be adjusted by turning the regulating valve according to the symbols as indicated on the top of the regulating valve.

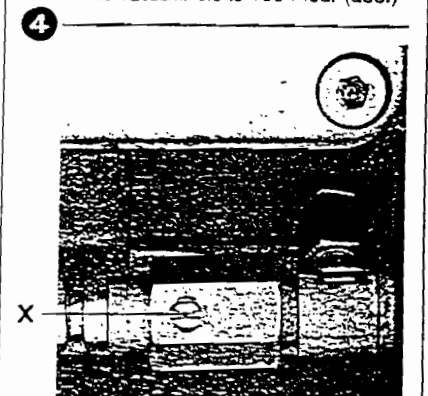
Potential risks for operating personnel

1. **Noise Emission:** The worst noise levels considering direction and intensity measured according to DIN 45635 part 3 (as per 3. GSGV) are shown in the table at the back. When working permanently in the vicinity of an operating pump we recommend wearing ear protection to avoid any damage to hearing.

2. **Oil mist in the Exhaust Stream:** Even with the high efficiency oil mist eliminator the exhausted air could still contain extremely low amounts of oil mist which can occasionally be detected by smell. Permanent inhalation of these mists may result in health problems, therefore it is extremely important to make sure that the installation area is well ventilated.



Fine vacuum: 0.5 to 100 mbar (abs.)



Coarse vacuum: 10 to 100 mbar (abs.)

4. Coupling (picture 8)

The coupling rubbers (k) are wearing parts and should be checked regularly. When the coupling rubbers are worn this can be detected by a knocking sound when the vacuum pump is started.

Defective coupling rubbers can cause extensive damage and even in some extreme cases break the rotor shaft.

To check the coupling, stop the motor (m) and isolate. Remove the screws (s₂). Pull off the motor together with the motor side coupling half (q). If the coupling rubbers (k) are damaged remove the circlips (l) from the coupling bolt (r) and exchange the coupling rubbers (k). Leave the spacer (p) in place, check the coupling bolts (r) for any wear and replace if necessary. To replace remove fan cover (v₁), remove the circlip (l₁), pull off the coupling and fan (v) complete from the pumpshaft, remove the nut (w) with washer (u) and exchange the coupling bolts.

Re-assemble in reverse order.

Trouble Shooting

1. Motor starter cuts out vacuum pump:

1.1 Check that the incoming voltage and frequency corresponds with the motor data plate.

1.2 Check the connections on the motor terminal block.

1.3 Incorrect setting on the motor starter.

1.4 Motor starter trips too fast.

Solution: Use a motor starter with a time delay trip (version as per IEC 947-4).

1.5 The vacuum pump or the lubricating oil is too cold.

1.6 The viscosity of lubricant is too high.

1.7 Oil mist eliminator elements are blocked or contaminated.

1.8 Back pressure on the exhaust pipework is excessive.

2. Insufficient suction capacity:

2.1 Inlet filters or meshes are obscured.

2.2 Suction pipe work is too long or too small.

3. Vacuum pump does not reach ultimate vacuum:

3.1 Check for leaks on the suction side of the pump or on the system.

3.2 Viscosity of lubricant incorrect.

4. Vacuum pump operates at an abnormally high temperature:

4.1 Ambient or suction temperature too high.

4.2 Cooling air flow is restricted.

Problem as per 1.6, 1.7 and 1.8.

Exhausted air contains visible oil mist:

5.1 Oil separator elements are fitted incorrectly.

5.2 Incorrect oil brand is used.

5.3 Problem as per 1.7, 1.8, 4.1 and 4.2.

6. Unit emits abnormal noise:

Note: A knocking noise from the rotor blades is normal when starting from cold, as long as it disappears within two minutes with increasing operating temperature.

6.1 The coupling rubbers are worn (see under "servicing").

6.2 The pump cylinder is worn.

Solution: send your complete unit off for repair to the supplier or approved service agent.

6.3 The vacuum regulating valve is noisy.

Solution: replace valve.

6.4 Blades are damaged.

6.5 Problem as per 1.5 and 1.6.

7. Water in lubricant i.e. Emulsification:

7.1 Pump pulls in water because of the application.

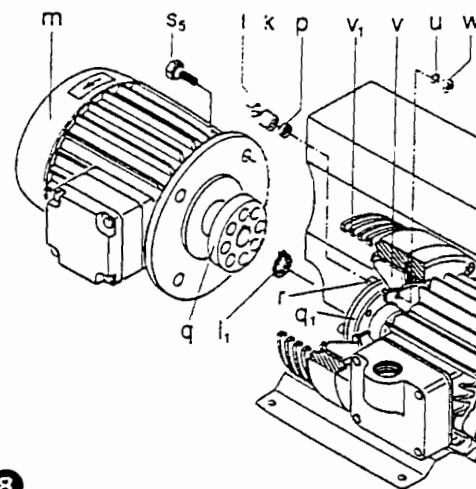
Solution: Fit water separators on to the vacuum side.

7.2 Unit handles more water vapour than the gas ballast is designed for.

Solution: Consult supplier for the provision of an increased gas ballast capability.

7.3 Pump operates only for a short time and does not reach normal operating temperature.

Solution: Run the pump with closed suction until the oil has been cleaned.



8

Appendix:

Repair on Site: For all repairs on site an electrician must disconnect the motor so that an accidental start of the unit cannot happen.

All engineers are recommended to consult the original manufacturer or one of the subsidiaries, agents or service agents. The address of the nearest repair workshop can be obtained from the manufacturer on application.

After a repair or before re-installation, follow the instructions as shown under the headings "Installation and Initial Operation".

Lifting and Transport: To lift and transport the vacuum pump the eye bolts on the pump and motor must be used. If an eye bolt is missing use suitably rated straps. The weight of the pumps is in the accompanying table.

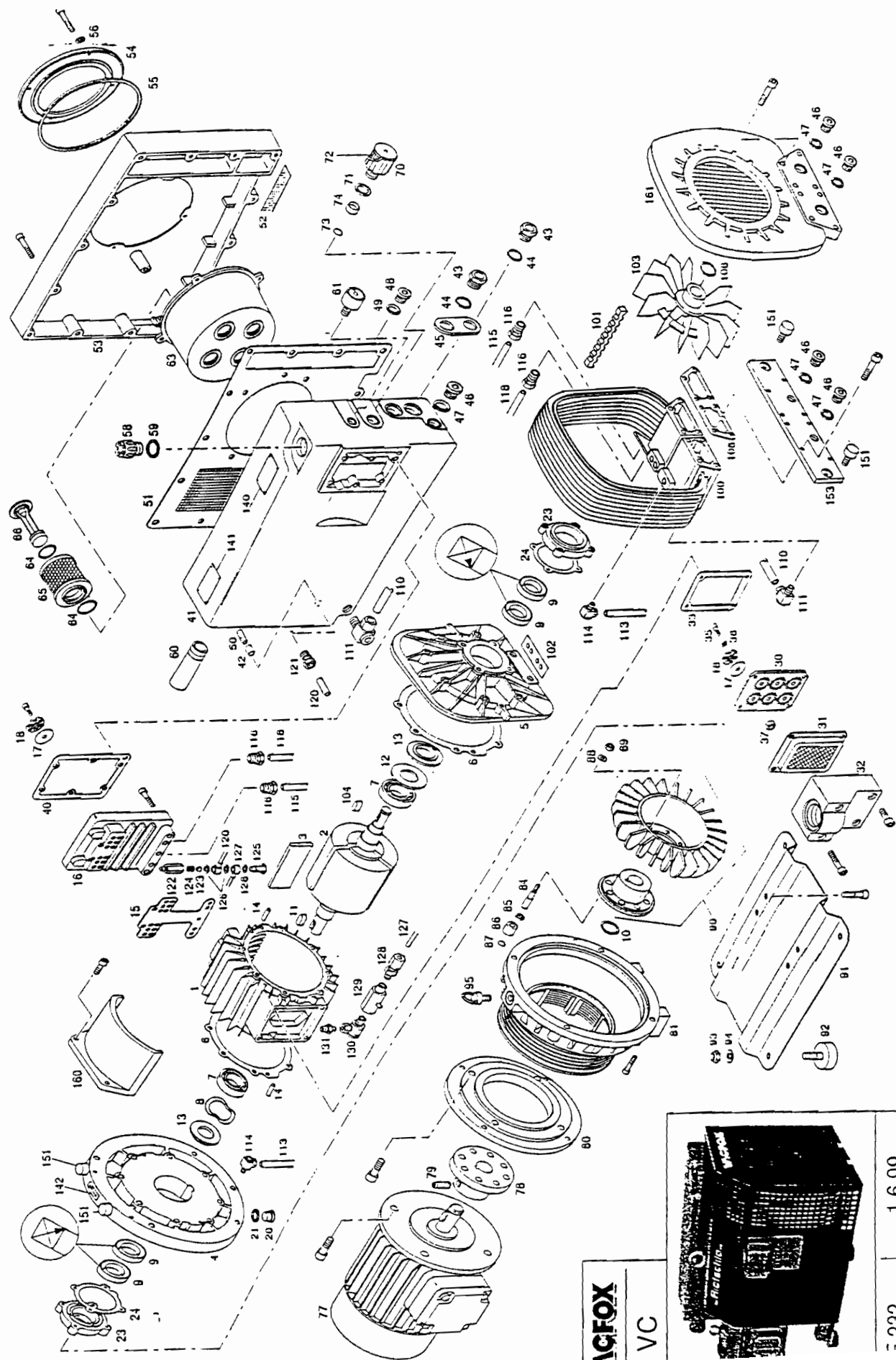
Storage: VCAH and VCEH units must be stored in dry ambient conditions with normal humidity. If a pump needs to be stocked for a period longer than 3 months we would recommend using an anticorrosion oil rather than the normal lubricant.

Disposal: The wearing parts (as listed in the spare parts lists) should be disposed of with due regard to health and safety regulations.

Spare parts lists: E 232 → VC 200 / VC 300

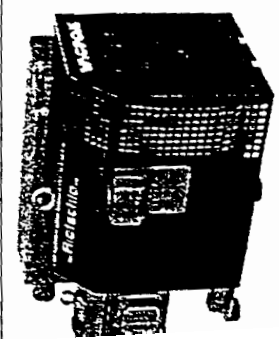
VC		200	300
Noise level (max.)	50 Hz	75	81
	60 Hz	79	83
Weight (max.)	50 Hz	124	204
	60 Hz	161	209
Length	50 Hz	775	950
	60 Hz	880	950
Width	mm	584	632
Height	mm	425	425

VC 200 / VC 300



ACFOX

VC



Transfer Pumps

DRC # 6154



DIVERSIFIED REMEDIATION & CONTROLS

21801 Industrial Blvd. Rogers, MN 55374 Phone (763) 428-3000 Fax (763) 428-3660

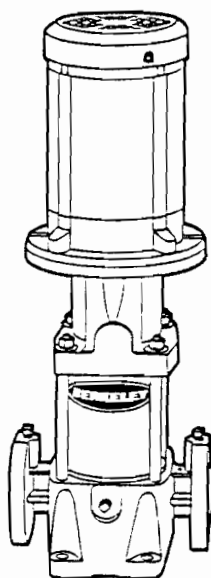


OWNER'S MANUAL

INSTALLATION AND OPERATING INSTRUCTIONS

VERTICAL MULTISTAGE PUMPS

Single and Three Phase 60 Cycle



Record the following information from the motor and pump nameplates for future reference:

Pump Model No. _____

Bill of Material No. _____

Motor Model No. _____

Motor Serial No. _____

H.P. _____ Volts/Hz/Ph _____

Rated Amp Draw _____

United States
Berkeley Pumps, 293 Wright St., Delavan, WI 53115

WICOR Canada Co.
1800 Courtney Park Drive East, Unit 5-7, Mississauga, Ontario, L5T 1W1

TABLE OF CONTENTS

Safety Instructions.....	2
Applications and Operating Ranges.....	2-4
Installation.....	4-5
Electrical.....	5-6
Operation.....	6-7
Maintenance.....	8-11
Repair Parts.....	12-13
Troubleshooting Guide.....	14
Warranty.....	14

Carefully read and follow all safety instructions in this manual or on pump.

⚠ This is the safety-alert. When you see this symbol on your pump or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

⚠ DANGER warns about hazards that will cause serious personal injury, death or major property damage if ignored.

⚠ WARNING warns about hazards that can cause serious personal injury, death or major property damage if ignored.

⚠ CAUTION warns about hazards that will or can cause minor personal injury or property damage if ignored.

The word **NOTICE** indicates special instructions which are important but not related to hazards.

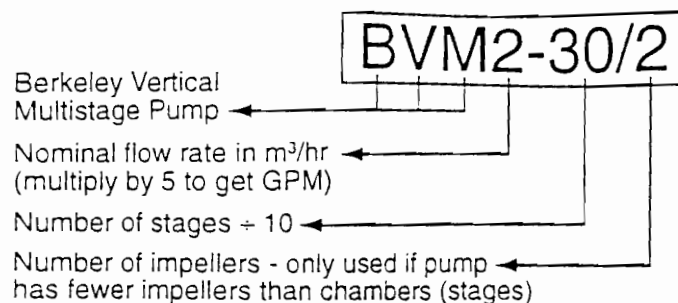
To avoid serious or fatal personal injury and possible property damage, carefully read and follow the safety instructions.

1. Install pump according to all code requirements.
2. Compare pump nameplate data with desired operating range.
3. Pump only liquids compatible with pump component materials (that is, liquids that will not attack the pump).
4. Make sure plumbing is adequate to handle system pressure.
5. Periodically perform maintenance inspection on pump and system components.
6. Wear safety glasses at all times when working on pumps.

INSPECT THE SHIPMENT

The vertical multistage centrifugal inline pump has been carefully inspected and packaged to assure safe delivery. Inspect the pump and fittings and report to the carrier any items which are damaged or missing.

CONFIRM YOU HAVE THE RIGHT PUMP



MODEL #	PART #	MFG. DATE
GPM	FEET	RPM
HP	PRESS. MAX (PSI)	TEMP. MAX (F)
BERKELEY PUMPS, GRAND ISLAND, NE 68801		

FIGURE 1 - Model Plate Information

APPLICATIONS AND OPERATING RANGES

Berkeley multistage in-line centrifugal pumps are designed for liquid transfer, circulation, and pressure boosting of hot or cold clean water or other thin, non-explosive liquids, not containing solid particles or fibers, which will not chemically attack the pump materials.

Typical applications include:

- Municipal water supply and pressure boosting
- Boiler feed and condensate systems
- Cooling water systems
- Irrigation
- Fire fighting

Maximum Ambient Temperature.....104° F(40° C)
 Liquid Temperature Range.....5° F to 250° F
 (-15° C to +121° C)

Maximum Permissible
 Operating Pressure Curves.....See Figure 4
 Maximum Inlet Pressure: Table II shows the maximum permissible inlet pressure. However, the actual inlet pressure plus the pressure when the pump is running against a closed valve must always be lower than the "Maximum Permissible Operating Pressure".

Electrical Data: See Motor Nameplate

Dimensions and Port to

Port Lengths : See Figures 2 and 3, Page 3

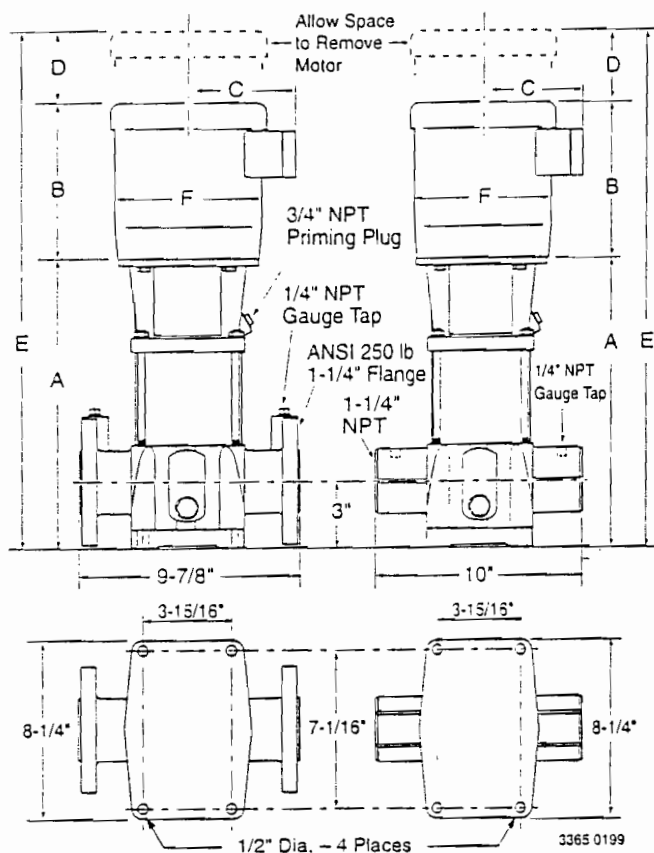


FIGURE 2 - Height, width and baseplate dimensions for BVM2 and BVM4 Series pumps

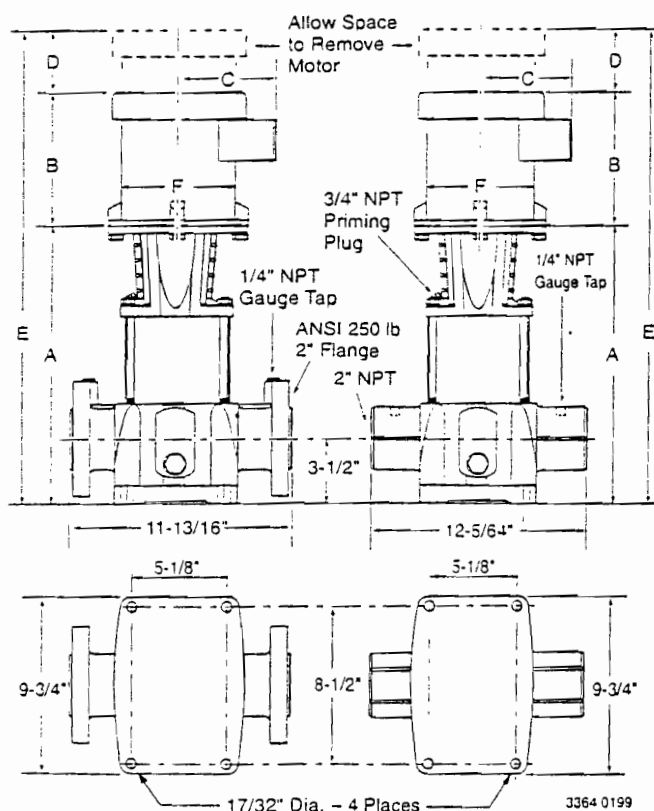


FIGURE 3 - Height, width, and baseplate dimensions for BVM8 and BVM16 Series pumps

TABLE 1 – Maximum Height and Width Dimensions*

Model Number	Dimension in Inches					
	A	B	C	D	E	F
BVM2-30/2	11-3/8	9-1/4	4-7/8	2	22-5/8	6
BVM2-30	11-3/8	9-7/8	4-7/8	2	23-1/4	6
BVM2-40	12	11-1/8	5-1/4	2	25-1/4	7-1/8
BVM2-50	12-3/4	11-1/8	5-3/4	2-1/8	26	7-1/4
BVM2-60	13-1/2	11-1/8	5-3/4	2-1/8	26-5/8	7-1/4
BVM2-70	14-1/8	12-1/8	5-3/4	2-1/8	28-1/4	7-1/4
BVM2-80	14-7/8	12-1/8	5-3/4	2-1/8	29	7-1/4
BVM2-100	16-5/8	13-5/8	6-7/8	2-7/8	33-1/4	8-1/2
BVM2-120	18-1/8	13-5/8	6-7/8	2-7/8	34-5/8	8-1/2
BVM2-150	20-1/4	15-1/4	8	3-3/8	38-7/8	10-5/8
BVM2-180	22-3/8	15-1/4	8	3-3/8	41	10-5/8
BVM4-20/1	11-3/8	9-1/4	4-7/8	2	22-5/8	6
BVM4-20	11-3/8	9-7/8	4-7/8	2	23-1/4	6
BVM4-30	12-3/8	11-1/8	5-1/4	2	25-5/8	7-1/8
BVM4-40	13-1/2	11-1/8	5-3/4	2-1/8	26-5/8	7-1/4
BVM4-50	14-1/2	12	5-3/4	2-1/8	28-5/8	7-1/4
BVM4-60	16	13-5/8	6-7/8	2-7/8	32-1/2	8-1/2
BVM4-80/7	18-1/8	13-5/8	6-7/8	2-7/8	34-5/8	8-1/2
BVM4-80	18-1/8	13-5/8	6-7/8	2-7/8	34-5/8	8-1/2
BVM4-100	20-1/4	15-1/4	8	3-3/8	38-7/8	10-5/8
BVM4-120	22-3/8	15-1/4	8	3-3/8	41	10-5/8
BVM4-140	24-1/2	15-1/4	8	3-3/8	43-1/8	10-5/8
BVM4-160	26-5/8	15-1/4	8	3-3/8	45-1/4	10-5/8
BVM8-20/1	15	9-7/8	4-7/8	2	27	6
BVM8-20	15	11-1/8	5-3/4	2-1/8	28-1/4	7-1/4
BVM8-30	17-3/4	13-5/8	6-7/8	2-7/8	34-1/4	8-1/2
BVM8-40	18-7/8	13-5/8	6-7/8	2-7/8	35-1/2	8-1/2
BVM8-50	20-1/8	15-1/4	8	3-3/8	38-3/4	10-5/8
BVM8-60	21-1/4	15-1/4	8	3-3/8	40	10-5/8
BVM8-80	23-5/8	15-1/4	8	3-3/8	42-1/4	10-5/8
BVM8-100	26	15-1/4	8	3-3/8	44-5/8	10-5/8
BVM8-120	28-3/8	16-1/2	8-3/4	3-3/8	48-1/4	10-5/8
BVM8-140	30-3/4	16-3/8	8-3/4	3-3/8	50-1/2	10-5/8
BVM8-160	33-5/8	19-5/8	9-1/2	4-1/4	57-1/2	13
BVM16-30/2	19-1/2	15-1/4	8	3-3/8	38-1/4	10-5/8
BVM16-30	19-1/2	15-1/4	8	3-3/8	38-1/4	10-5/8
BVM16-40	21-3/8	15-1/4	8	3-3/8	40	10-5/8
BVM16-50	23-1/8	16-3/8	8-3/4	3-3/8	42-7/8	10-5/8
BVM16-60	25-3/8	19-5/8	9-1/2	4-1/4	49-1/4	13
BVM16-70	27-1/8	19-5/8	9-1/2	4-1/4	51	13
BVM16-80	28-7/8	19-5/8	9-1/2	4-1/4	52-7/8	13
BVM16-100	32	21-3/4	9-1/2	4	57-3/4	11-1/2
BVM16-120	35-3/8	21-3/4	9-1/2	3-1/4	60-3/8	13

* Measurements represent the largest number possible for each Model.

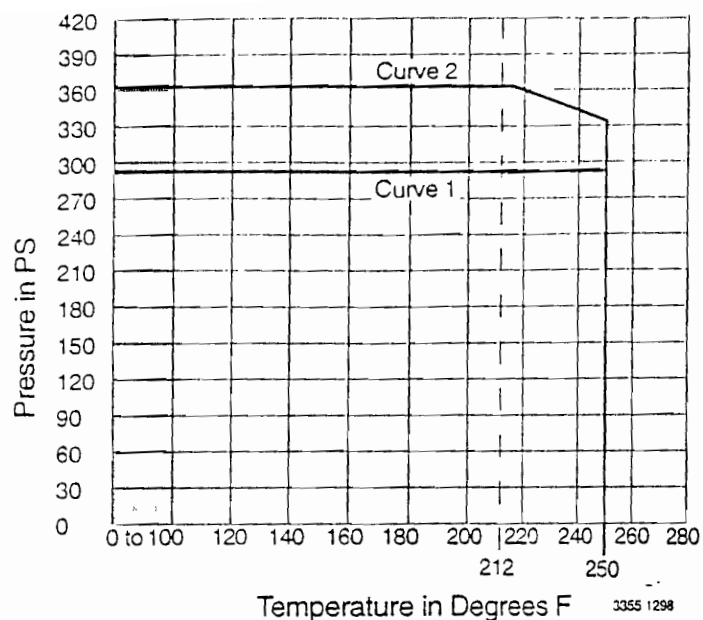


FIGURE 4 - Maximum Inlet Pressure and Maximum Permissible Operating Pressure Curves

TABLE II – Permissible Operating Pressure Curves

Curve 1		Curve 2
BVM2-30/2 to BVM2-130		BVM2-150 to BVM2-180
BVM4-20/1 to BVM4-120		BVM4-140 to BVM4-160
BVM8-20/1 to BVM8-120		BVM8-140 to BVM8-160
BVM16-30/2 to BVM16-80		BVM16-100 to BVM16-120

Model Number		Maximum Inlet Pressure (PSI)
BVM2	30/2 - 60	145
	70 - 80	220
BVM4	20/1 - 20	90
	30 - 80/7	145
	80 - 160	220
BVM8	20/1 - 40	90
	50 - 160	145
BVM16	30/2 - 30	90
	40 - 120	145

INSTALLATION

⚠ WARNING Hazardous voltage. Voltage can shock, burn, or cause death. Ground pump motor correctly before connecting to power supply, per article 250-80 of the National Electrical Code (NEC) in the U.S., or the Canadian Electrical Code (CEC), as applicable.

Location

Locate pump in a dry, well ventilated area, not subject to freezing or extreme variations in temperature.

Mount pump a minimum of 6" from any obstruction or hot surface. Install the pump with the motor shaft vertical. Make sure that an adequate supply of cool air reaches the motor cooling fan. Maximum ambient air temperature is 104° F (40° C).

For open systems requiring suction lift, locate the pump as close to the water source as possible.

TABLE III – Minimum Pumping Rates

Type	Liquid Temperature +3° F to +250° F
BVM2	1 GPM
BVM4	2 GPM
BVM8	4 GPM
BVM16	8 GPM

TABLE IV – Minimum Suction Pipe Sizes

Type	Pipe Size
BVM2	1-1/4" Nominal Diameter, Schedule 40 Pipe
BVM4	1-1/4" Nominal Diameter, Schedule 40 Pipe
BVM8	2" Nominal Diameter, Schedule 40 Pipe
BVM16	2" Nominal Diameter, Schedule 40 Pipe

Field Wiring

All wiring connections and wiring sizes must meet National Electrical Code and local requirements.

Motor Protection

the motor nameplate for electrical connection/wiring diagram.

Berkelev pumps must be used with the proper size and type of motor starter to ensure protection against damage from low voltage, phase failure, current imbalances, and overloads. The overload should be sized to trip at the full-load current rating of the motor.

OPERATION

Priming

⚠ WARNING **Hazardous pressure.** Do not run the pump with the discharge valve closed; the water in the pump may boil, causing risk of explosion and steam burns to anyone nearby.

⚠ WARNING **Hazardous voltage.** Disconnect all power to the pump before servicing or working on the pump. Make sure that the power is locked out and that the pump cannot be accidentally started.

NOTICE: Under no circumstances should the pump be operated without flow through the pump. **Never** operate the pump dry.

Operation of closed systems or open systems with the lid level above the pump priming plug:

1. Close the discharge isolating valve and loosen the priming plug in the pump head (Figure 7).

⚠ WARNING **Risk of water damage and injury.** Watch the direction of the priming plug and make sure that the liquid escaping from it does not injure persons nearby or damage the motor or other components. In hot water installations, pay particular attention to the risk of injury from scalding hot water.

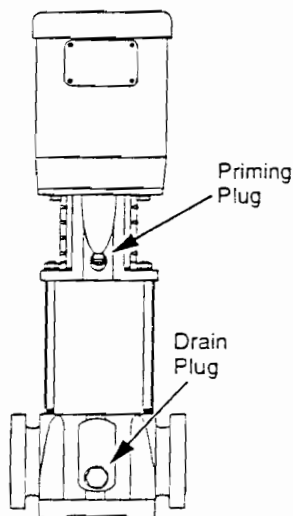


FIGURE 7 - Priming and Drain Plugs

2. Slowly open the isolation valve in the suction pipe until a steady stream of liquid runs out the priming port.
3. Reinstall the priming plug and securely tighten. Completely open isolation valves.

Operation of open systems with the liquid level below the top of the pump:

NOTICE: The suction pipe requires a check valve or isolation valve.

1. Close the discharge isolation valve.
2. Remove the priming plug.
3. Pour liquid through the priming port until the suction pipe and the pump are completely filled with liquid.
4. Replace the priming plug and tighten it securely.
5. Repeat steps 1-4 until the pump is primed.

Checking Direction of Rotation

NOTICE: Do not disconnect the motor from the shaft to check the direction of rotation. If you remove the coupling, then you must adjust the shaft position when you reinstall it. This must be done before starting the pump.

Arrows on the pump head show the correct direction of rotation. When seen from the motor fan, the pump should rotate *counterclockwise* (↺). For pump motors without a fan remove one of the coupling guards and look at the coupling to determine the direction of rotation. Turn off the pump and replace coupling guard.

NOTICE: Do not check the direction of rotation until the pump has been filled with liquid. See "Priming", at left and above.

1. Switch power off.
2. Remove the coupling guard and rotate the pump shaft to be certain it can turn freely. Replace the coupling guard.
3. Verify that the electrical connections are in accordance with the wiring diagram on the motor.
4. If the fan is visible, turn on and off to verify rotation.
5. To reverse the direction of rotation, first switch OFF the power supply.
6. On three-phase motors, switch 2 of the 3 power leads on the load side of the starter. On single-phase motors, see the connection diagram on the motor nameplate. Change the wiring as indicated.

⚠ WARNING **Hazardous voltage.** Voltage can shock, burn or cause death. Ground the pump motor correctly before connecting to power supply per article 250-80 of National Electrical Code (NEC) in the U.S., or the Canadian Electrical Code (CEC), as applicable.

7. Switch on the power supply and recheck the direction of motor rotation.

Starting

1. If a suction line isolation valve has been installed, check to be sure that it is completely opened.
2. For initial starting, the isolation valve in the discharge pipe should be almost closed.

If the system pressure is greater than the pumps maximum inlet pressure the limits of the pump can be exceeded if the discharge pressure backs up to the inlet side of the pump. Installation of a check valve in the discharge pipe is recommended to prevent this condition.

Make sure, especially on the inlet side of the pump, that there are no airlocks in the system. See Figure 5 for correct pipe work to avoid airlocks. The suction pipe should be level or slightly rising.

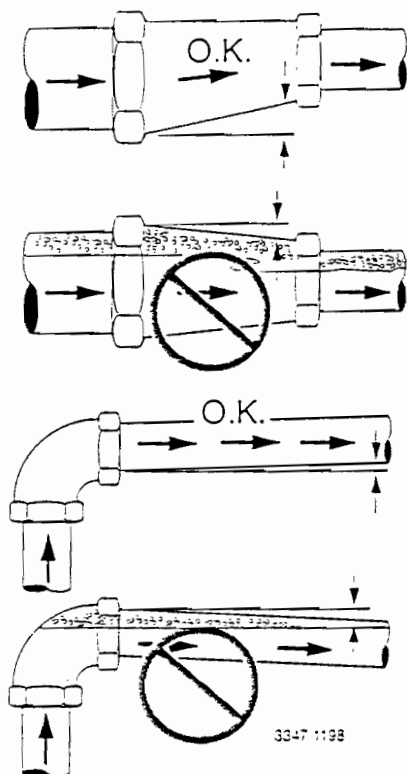


FIGURE 5 - Install Pipe Correctly to Prevent Air Locks

Support all piping independently of the pump so the weight of the piping system does not strain the pump case. Make sure that the expansion and contraction of the piping system from temperature variations cannot put a strain on the pump.

If the system or pump must be drained periodically (especially if the discharge pipe is horizontal or slopes downward away from the pump), install a loop and vacuum valve as shown in Figure 6 to protect the pump against running dry. The highest point of the loop should be at least as high as the lowest point of the motor. This loop/valve combination will allow the pump and the system to be drained independently of one another.

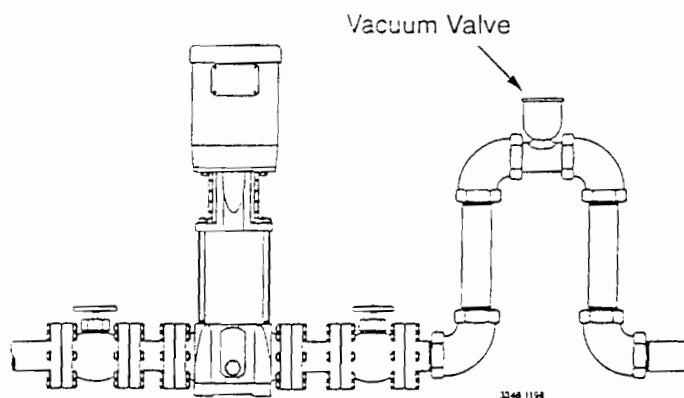


FIGURE 6 - Loop and Vacuum Valve Installation

ELECTRICAL

⚠ WARNING Hazardous voltage. Can shock, burn or cause death. All electrical work should be performed by a qualified electrician in accordance with the National Electrical Code and all local codes and regulations. Make sure that the motor voltage, phase, and frequency match the incoming electrical supply. The proper operating voltage and other electrical information can be found on the motor nameplate. These motors are designed to run up to $\pm 10\%$ of the nameplate-rated voltage. The wiring connection diagram can be found on either a plate attached to the motor or on a diagram inside the terminal box cover.

- If voltage variations are greater than $\pm 10\%$ do not operate the pump.
- Incorrect voltage can cause fire or serious damage to the motor and voids warranty.
- Ground the pump motor correctly before connecting it to the power supply.
- Follow the wiring instructions when connecting the motor to the power lines.

Position of Terminal Box

To turn the motor so that the terminal box faces the right direction, proceed as follows:

1. Disconnect the power to the pump motor.
2. Remove the coupling guards (use a screwdriver).
3. Remove the couplings.
4. Remove the bolts that fasten the motor to the pump.
5. Turn the motor to the required position (in quarter-turn increments).
6. Follow steps 10 - 20 under "Motor Replacement", on Page 8.

3. Start the pump.
4. When the piping system has been filled with liquid, slowly open the discharge isolation valve until it is completely open. Opening the valve too fast may result in water hammer in the discharge pipe. If the pump or system start to rattle, the pump is cavitating; to avoid damage to the pump, reduce the flow through the discharge isolation valve until the rattling stops. If this does not give adequate flow for your installation, call your installer or system designer.
5. Record the voltage and amperage of the motor. Adjust the motor overloads if required.
6. If pressure gauges have been installed, check and record operating pressures.
7. Check all controls for proper operation.

Motor Bearings

For the greasing schedule and greasing procedure of the motor bearings follow the motor manufacturers recommendations.

Calculating Minimum Inlet Pressure:

Minimum inlet pressure is required to avoid cavitation in the pump and is calculated as follows:

$$H = P_b - \text{NPSHR} - H_f - H_v - H_s$$

H = Minimum Inlet Pressure in Feet of Head

P_b = Barometric Pressure in Feet

1 Bar = 29.92 inches of Mercury (Hg)

1 PSI = 2.31 Ft of Head

1 Bar = 33.5 Ft. of Head

NPSHR = Net Positive suction head required. To be read from the NPSHR curve, Figure 8, at the highest flow the pump will be delivering.

H_f = Friction Loss in suction pipe in ft of head

H_v = Vapor pressure in feet of head (See Table V).

H_s = A safety margin of 1.64 ft of head

Example for BVM8:

If: Flow = 60 GPM
P_b = 1 Bar = 29.92 Inches of Mercury*
(Convert from Bar to Feet of Head)
Inches of mercury = 1.33' inches of mercury
T = 100° F
NPSHR = 10' (See Figure 7)
H_f = 10' of 2" Steel Pipe @ 11.9' of loss per 100' of Pipe (H_f = 11.9'/10' = 1.19')
H_v = 2.195' (from Table V)
H_s = 1.64' (safety factor from above)

Then: $H = 33.5' - \text{NPSHR} - H_f - H_v - H_s$
 $H = 33.5' - 10' - 1.19' - 2.195' - 1.64' = 18.475'$
H = 18.475' = Minimum Inlet Pressure

* 1 Bar = 14.5 PSI x 2.31 Ft of Head = 33.5'

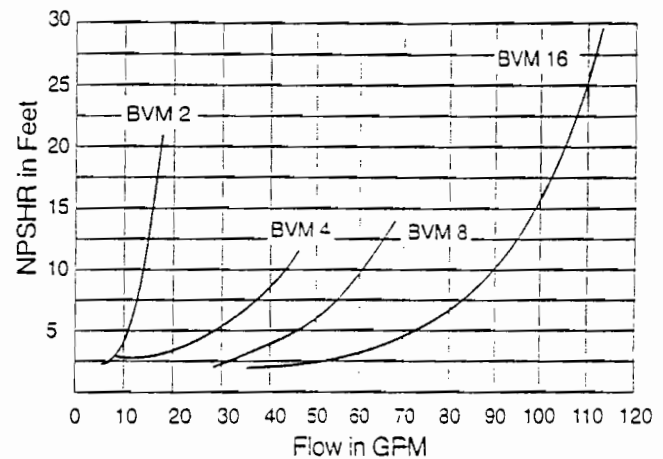


FIGURE 8 - BVM2 through BVM16
Net Positive Suction Head Requirement (NPSHR)

TABLE V – Vapor Pressure of Water

Temperature in °F (°C)	Vapor Pressure in PSIA (kPa)	Absolute Pressure in Feet (M) of Water
32 (0)	0.089 (.61)	0.205 (.062)
40 (4.4)	0.122 (.84)	0.281 (.086)
60 (15.6)	0.256 (1.77)	0.592 (.180)
80 (26.7)	0.507 (3.50)	1.172 (.358)
100 (37.8)	0.95 (6.53)	2.195 (.669)
120 (48.9)	1.695 (11.69)	3.914 (1.193)
140 (60.0)	2.892 (19.94)	6.681 (2.036)
160 (71.1)	4.745 (32.72)	10.961 (3.341)
180 (82.2)	7.515 (51.84)	17.36 (5.291)
200 (93.3)	11.529 (79.49)	26.632 (8.117)
210 (98.9)	14.125 (97.39)	32.629 (9.945)
212 (100)	14.698 (101.34)	33.952 (10.349)
220 (104.4)	17.188 (118.51)	39.704 (12.102)
230 (110.0)	20.78 (143.28)	48.002 (14.631)
240 (115.6)	24.97 (172.17)	57.681 (17.581)
248 (120.0)	28.79 (188.51)	66.505 (20.271)

MAINTENANCE

Motor Replacement

For Key Numbers, refer to the Exploded View, Figure 14, BVM2 and BVM4 Series Models and to Figure 15 for BVM8 and BVM16 Series Models.

⚠ WARNING Hazardous voltage. Disconnect all power to the pump before servicing or working on pump. Make sure that power is locked out and that pump cannot be accidentally started.

1. Disconnect the power to the pump motor.
2. Close the nearest suction and discharge valves.
3. Remove the coupling guards (Key No. 4) by prying them loose with a screw driver.
4. Remove the socket head screws (Key No. 3) and the coupling halves (Key No. 2) from the shaft (Key No. 16A). For additional reference, see Figure 12, Page 9.

NOTICE: Socket head screws are metric. See Table VII on Page 11 for specific metric driver sizes.

5. Remove the shaft pin (Key No. 5).
6. Remove the capscrews (Key No. 12), flatwashers (Key No. 10), and lockwashers (Key No. 11) that hold the motor (Key No. 1) and the motor bracket (Key No. 7) together.
7. Pull the old motor up and off of the motor bracket.
NOTICE: Note the location of the conduit box on the motor.
8. Thoroughly clean the surfaces of the mounting flanges on the new motor and the pump end.
9. Install the new motor on the pump with the conduit box in the desired position.
10. Lubricate the capscrews (Key No. 12) with oil.
11. Reinstall the lockwashers, flatwashers, and capscrews that hold the motor and the motor bracket together, then tighten evenly and diagonally. See Table VII, Page 11 for torque specifications.
12. Reinstall the shaft pin (Key No. 5) in the shaft.
13. Reinstall the coupling halves (Key No. 2) on the pump and motor shaft. Make sure to engage the shaft pin (Key No. 5).
NOTICE: Be sure coupling surfaces are thoroughly clean prior to assembly.
14. Snug up the socket head screws (Key No. 3) until the coupling begins to bind and then loosen 1/2 turn the shaft.
15. Draw up the capscrews evenly so the gap between the coupling halves is equal on both sides (See Figure 9).

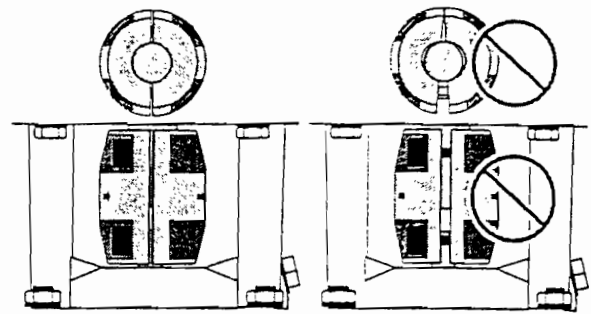


FIGURE 9 - Make Sure that the Coupling Halves are Evenly Tightened

Raise Coupling as far as it will go; then tighten at one-half the height of total axial play.

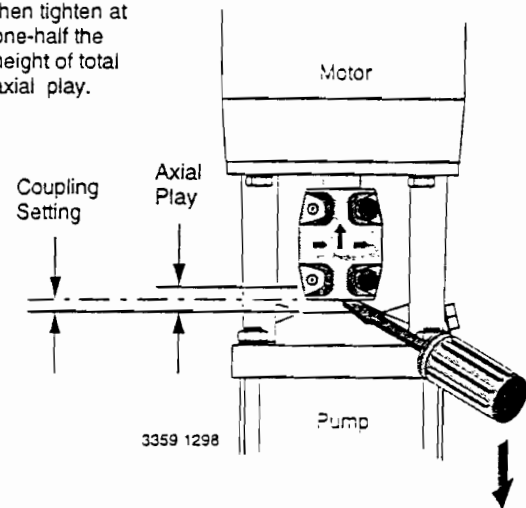


FIGURE 10 - Vertically (axial) Centering the Coupling

16. Insert a screw driver under the coupling (See Figure 10).
17. Raise the pump shaft to its highest point.
18. Lower the shaft halfway back down the distance you just raised it and retighten the capscrews. See Figure 10.

NOTICE: Torque settings are critical to prevent coupling movement. Refer to Table VII, Page 11 for torque specifications.

19. Rotate the shaft to make sure that there is no interference. If rubbing is noted repeat steps 16, 17, and 18 above and readjust pump shaft height.
20. Reinstall the coupling guards by snapping them into place.

NOTICE: The guards should be in place before the unit is run.

21. Open the suction and discharge valves. Turn the power back on.

Replacing Pump Stack

For Key Numbers, refer to the Exploded View, Figure 14 on Page 12, for the BVM2 and BVM4 Series Models and Figure 15 on Page 13 for BVM8 and BVM16 Series Models.

⚠ WARNING **Hazardous pressure.** Do not run pump with discharge valve closed; the water in the pump may boil, causing risk of explosion and steam burns to anyone nearby.

1. Follow steps 1-8 under "Motor Replacement" section on Page 8; then proceed with step 2 below.
2. Remove the four staybolt nuts, flatwashers, and lockwashers (Key Nos. 8, 9A, and 9B) from the staybolts (Key No. 19).

NOTICE: It is not necessary to remove the staybolts when replacing the stack.

3. Lift the motor bracket (Key No. 7) off of the pump body.

NOTICE: Note the position of the priming plug. The priming plug must be returned to its original position during reassembly.

4. Remove and discard upper sleeve gasket (Key No. 17).
5. Clean gasket seat.
6. Remove and replace round spring ring (BVM2 and BVM4) or stack spring (BVM8 and BVM16) (Key No. 13).
7. Pull the old stack (16A through 16L) out of the stainless steel sleeve (Key No. 18) by pulling straight up on the pump shaft (Key No. 16A).
8. Remove the stainless steel sleeve (Key No. 18).
9. Remove and discard the bottom sleeve gasket (Key No. 17).

10. Clean the gasket seat.
11. Remove and discard the O-Ring (Key No. 21A) from the suction/discharge (Key No. 21 BVM2 and BVM4 only).
12. Clean the O-Ring seat and install a new O-Ring (Key No. 21A).
13. Install a new lower sleeve gasket.
14. Install the new stack without the stainless steel sleeve.

NOTICE: Be sure to align either the small priming hole or the suction interconnector pin hole, located on the bottom stage of the stack properly in the base of the Suction/Discharge (Key No. 21). See Figure 11.

15. Use a rubber mallet to tap the stainless steel sleeve (Key No. 18) into place.
16. Install a new mechanical shaft seal (Key Nos. 14A and 14B, or Key Nos 15A through 15G). Refer to "Mechanical Seal Disassembly and Mechanical Seal Reassembly" sections, Page 10.
17. Install a new upper sleeve gasket (Key No. 17).

18. Install a new round spring ring or stack spring (Key No. 13).
19. Reinstall the motor bracket (Key No. 7) on the pump body. Align the priming plug (Key No. 6) to its original position.
20. Oil the threads on the staybolts (Key No. 19).
21. Replace the lockwashers, flatwashers, and staybolt nuts (Key Nos. 8, 9A and 9B, and cross-torque the staybolts. See Table VII, Page 11, for torque specifications.
22. Reinstall the motor (Key No. 1) on the motor bracket (Key No. 7) and turn the motor to the desired terminal box position.
23. Follow steps 10 - 21 under "Motor Replacement", Page 8. You have now finished changing out the impeller stack.

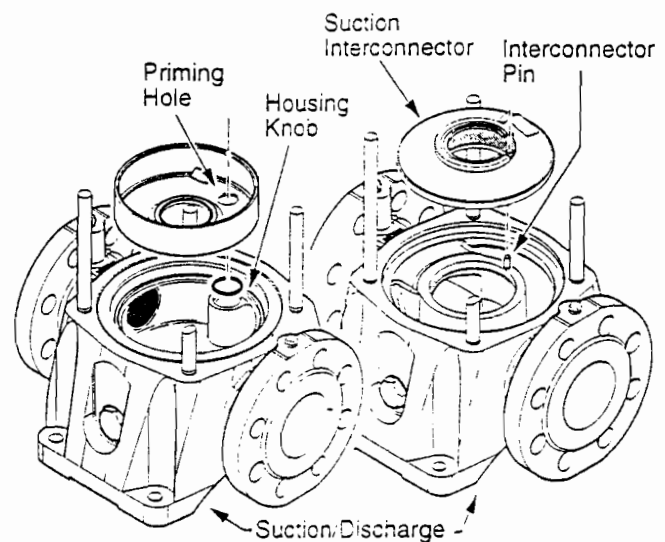


FIGURE 11 - BVM2, BVM4 – Align Small Priming Port. BVM8, BVM16 – Align Interconnector Pin

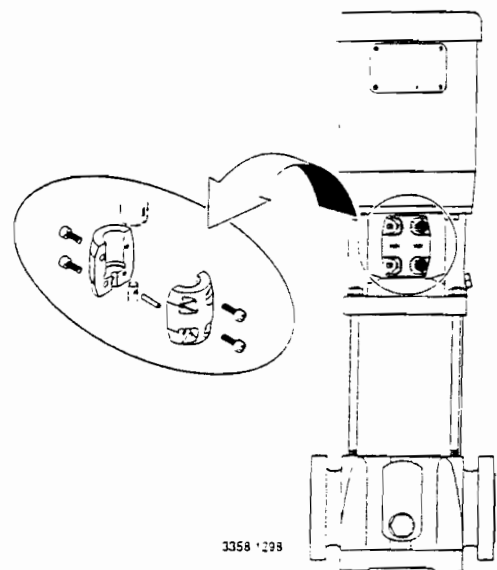


FIGURE 12 - Remove the Socket Head Screws and the Coupling Halves

Two Part Mechanical Seal/Disassembly:

See Table VI to determine which seal your model has.

TABLE VI – Seal Type Identification

2 Part Low Pressure Seal	7 Part High Pressure Seal
B78038	B78039
BVM2-30.2 through BVM2-120 BVM4-20.2 through BVM4-120	BVM2-150, BVM2-180 BVM4-140, BVM4-1606
B78040	B78040
BVM8-20.1 through BVM8-120 BVM16-30.2 through BVM16-80	BVM8-140, BVM8-160 BVM16-100, BVM16-120

See Figure 14 for BVM2 and BVM4 Series Models, and Figure 15 for BVM8 and BVM16 Series Models, for Key Numbers.

NOTICE: The assembly and disassembly procedure for this seal does not require extraordinary force.

⚠ WARNING Hazardous voltage. Can Shock, burn or cause death. Disconnect power to pump before disassembly.

1. Follow Steps 1-8 under “Motor Replacement” Page 8, and proceed with step 2 below.
2. Remove the four nuts, lockwashers, and washers (Key Nos. 8, 9A, and 9B) from the staybolts (Key No. 19).
3. The shaft seal consists of a stationary half (Key No. 14A) and a rotating half (Key No. 14B). Turn the motor bracket upside down and remove the stationary part of the seal (Key No. 14B) from the seal seat in the base of the motor bracket.
NOTICE: Use care not to chip or scratch the seal seat during disassembly and assembly.
4. Clean the seal seat with a wet cloth.
5. Remove and discard the rotating parts of the seal by twisting and pulling up on them until they come off of the shaft.

Two Part Mechanical Seal Reassembly:

NOTICE: Before assembly check and clean all sealing and gasket surfaces with a clean wet cloth. Replace all seals, gaskets and O-Rings.

1. Turn the motor bracket upside down.
2. Moisten the seal seat (in the motor bracket) and the O-ring (cup seal) portion of the stationary half of the mechanical seal (Key No. 14A) with a small amount of water.
3. Press the cup-seal onto the stationary half of the shaft seal and then press the shaft seal into the seal seat of the pump head (Cup-seal portion first), using finger pressure only. **NOTICE:** If a tool is used, protect the seal face from tool with a clean cloth.

NOTICE: The cup-seal must be placed evenly on the seal and the seal must be installed evenly in the seal seat to avoid pinching the cup-seal.

4. Moisten the internal parts of the rotating portion of the mechanical seal (14B).
5. Install the rotating half of the seal onto the shaft. Push and twist the seal onto the shaft to the stop ring.

NOTICE: Use care when installing the new seal on the shaft. Do not to scratch or mar seal on the shaft shoulder.

6. Follow Steps 11 - 23 under “Replacing Pump Stack”, Page 9.

Seven Part Mechanical Seal/Disassembly:

See Figure 14 for BVM2 and BVM4 Series Models, and Figure 15 for BVM8 and BVM16 Series Models, for Key Numbers.

⚠ WARNING Hazardous voltage. Can Shock, burn or cause death. Disconnect power to pump before disassembly.

1. Follow Steps 1-8 under “Motor Replacement” Page 8, and proceed with step 2 below.
2. Remove the four nuts, lockwashers, and washers (Key Nos. 8, 9A, and 9B) from the staybolts (Key No. 19).
3. The shaft seal consists of an O-Ring (Key No. 15A), the stationary half of the mechanical seal (Key No. 15B), the rotating half of the mechanical seal (Key No. 15C), a second O-Ring (Key No. 15D - inside No. 15C), a flat washer (Key No. 15E), a spring (Key No. 15F), and a mechanical drive ring (Key No. 15G), in that order, see Figure 13, below. Turn the pump head upside down and remove the stationary part of the seal (Key No. 15B) from the seal seat in the base of the motor bracket.

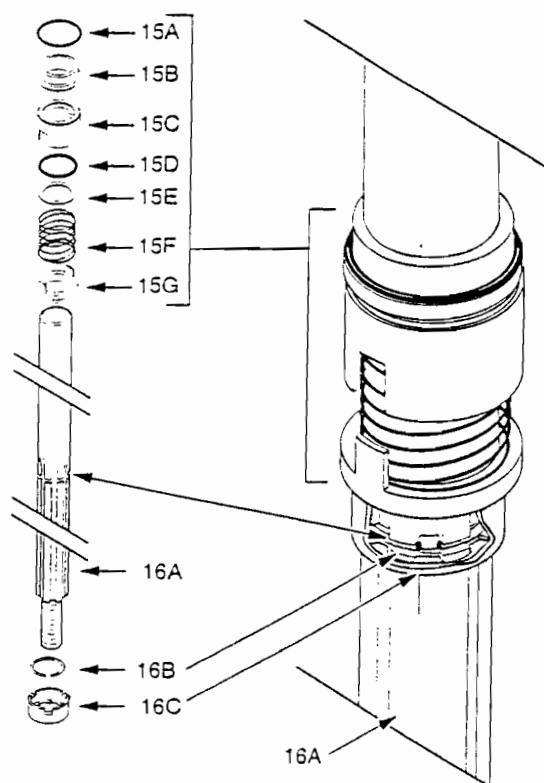


FIGURE 13

NOTICE: Use care not to chip or scratch the seal seat during disassembly and assembly.

4. Clean the seal seat with a wet cloth.
5. Remove the rotating parts of the seal by twisting and pulling up on them until they come off of the shaft (Key Nos. 15C and 15D, 15E, 15F, and 15G). Discard the old seal.

Seven Part Mechanical Seal Reassembly:

NOTICE: Before assembly check and clean all sealing and gasket surfaces with a clean wet cloth. Replace all seals, gaskets, and O-Rings.

1. Turn the motor bracket (Key No. 7) upside down.
2. Moisten the seal seat (in the motor bracket) with a small amount of water.
3. Lubricate the larger diameter O-Ring (Key No. 15A) with a small amount of water and install it on the stationary half of mechanical seal (Key No. 15B).
4. Press the stationary half of the shaft seal (Key No. 15B) with O-Ring (Key Nos. 15A and 15B) into the seal seat of the motor bracket. Use finger pressure only. If a tool is used, protect the seal face from tools with a clean cloth.

NOTICE: Be sure the seal is installed evenly to avoid pinching the O-Ring.

5. Lubricate smaller diameter O-Ring (Key No. 15D) with water and press it into the rotating half of the mechanical seal (Key No. 15C).
6. Install the mechanical drive ring (Key No. 15G) on the shaft (Key No. 16A). Be sure the drive ring butts up against the mechanical seal spacer (Key No. 16C).
7. Install the spring (Key No. 15F) up against the drive ring on the shaft.
8. Install the flatwasher (Key No. 15E) on the shaft, against the spring.
9. Install the rotating half of the mechanical seal (Key No. 15C) on the shaft. Align the grooves on the rotating half of the mechanical seal with the teeth on the mechanical drive ring (Key No. 15G).
10. Follow Steps 11 - 23 under "Replacing Pump Stack", Page 9.

Frequency of Starts and Stops

Check pump cycling frequency and make sure that the pump is not starting more than:

TABLE VIII – Maximum Number of Cycles

Cycles	Motor HP Rating
20 times per hour	1/2 - 5 HP motors
15 times per hour	7- 1/2 - 15 HP motors
10 times per hour	20 and 25 HP motors

Frost Protection

1. If you do not use your pump during seasons of frost, drain it and add a glycol based antifreeze (50/50 mixture) to avoid damage.

CAUTION Risk of water damage and injury. Watch the direction of the priming plug and make sure that liquid escaping from it does not injure persons nearby or damage the motor or other components. In hot water installations, pay particular attention to the risk of injury from scalding hot water.

2. Upon restart dispose of spent antifreeze properly.
3. Do not replace the drain plug or tighten the priming plug until you put the pump back in service again.

Regular Maintenance Checks

The following checks should be made at regular intervals:

1. The pump meets required performance and is operating smoothly and quietly.
2. There are no leaks.
3. The motor is not overheating.
4. Remove and clean all strainers and filters in the system.
5. Verify amp draw – check motor amperage.
6. Pump wear rings and shaft require no regular maintenance.

TABLE VII – Torque Specifications (foot-lbs.)

	Coupling			Motor		Staybolt		Stack Nut	
	Socket Head Screw M6 x 20	Socket Head Screw M8 x 25	Socket Head Screw M10 x 25	Capscrew Hex Head 3/8 x 1-1/2	Capscrew Hex Head 1/2 x 1-1/2	Hex Nut 1/2 - 13	Hex Nut 5/8 - 11	Hex Nut M8	Hex Nut M12
Hardware Part Numbers	M11369	M11398	M11491	S23568	S23623	S26460	S26462	M11385	M11419
Pump Model Number									
8V/M2 Series	20	35	–	30	35	45	–	10	–
8V/M4 Series	20	35	–	30	35	45	–	10	–
8V/M8 Series	20	35	45	30	35	–	75	–	30
8V/M16 Series	–	35	45	–	35	–	75	–	30

BVM2 BVM4

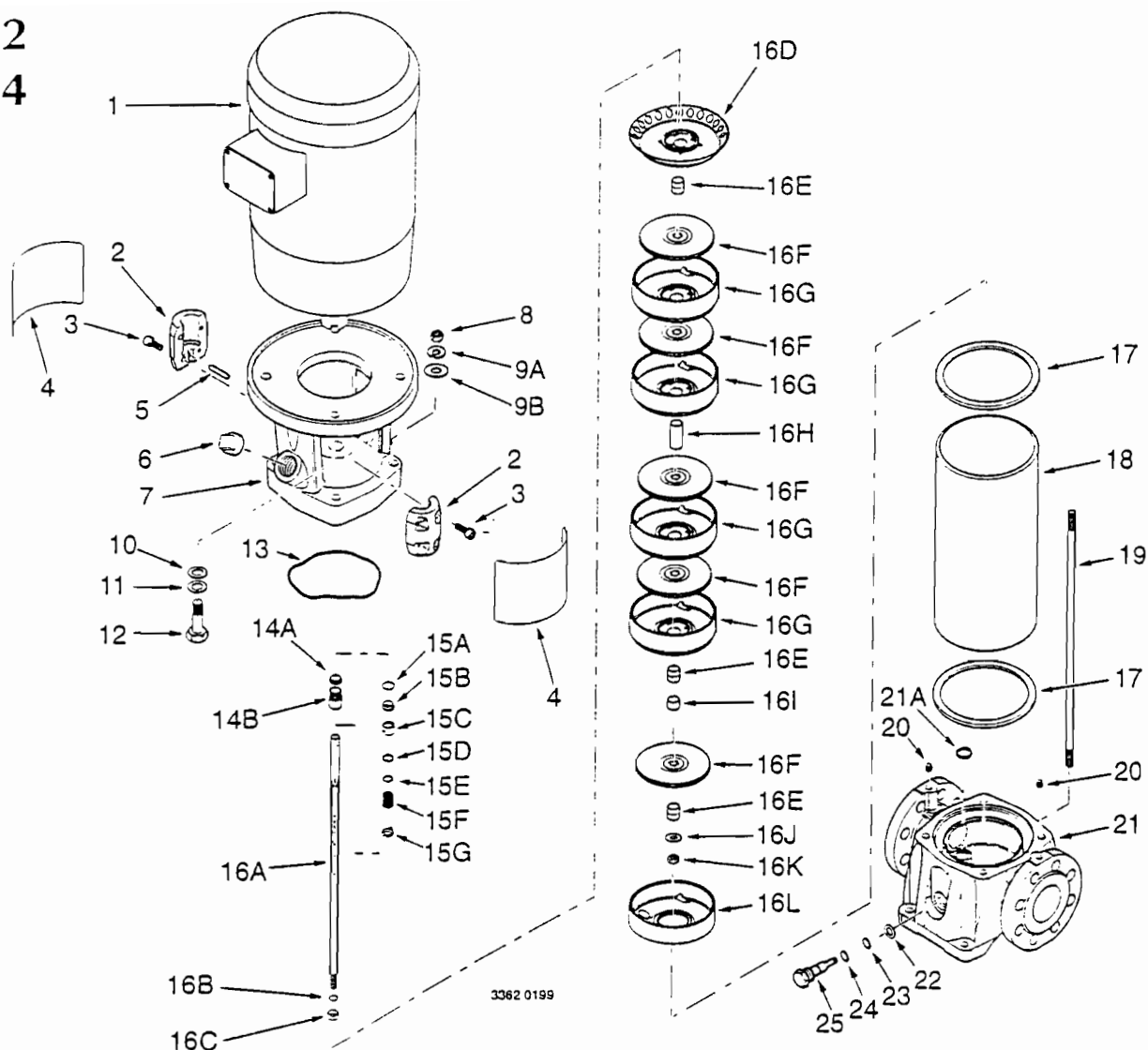


FIGURE 14 - Exploded View BVM2 and BVM4

REPAIR PARTS LIST FOR BVM2 AND BVM4 SERIES MODELS

Key No.	Description	Key No.	Description
1	Motor	15G	Mechanical Drive Ring
2	Coupling Half	16	Replacement Stack Kit (Incl. Key Nos. 16A thru 16L)
3	Socket Head Screw	16A	Shaft
4	Coupling Guard	16B	Stop Ring
5	Coupling Pin	16C	Mechanical Seal Spacer
6	Priming Plug	16D	Upper Intermediate Chamber
7	Motor Bracket	16E	Spacer
8	Staybolt Nut	16F	Impeller
9A	Staybolt Lockwasher	16G	Diffuser
9B	Staybolt Flat Washer	16H	Spacer
10	Flatwasher	16I	Bearing
11	Lockwasher	16J	Shaft Washer
12	Capscrew	16K	Nut
13	Spring Ring	16L	Chamber without Diffuser
14	Two part Mechanical Seal (Includes 14A and 14B)	17	Sleeve Gasket
14A	Stationary Half of Mechanical Seal	18	Stainless Steel Sleeve
14B	Rotating Half of Mechanical Seal	19	Staybolt
15	Seven Part Mechanical Seal (Includes 15A thru 15G)	20	Pipe Plug
15A	O-Ring, Larger Diameter	21	Suction/Discharge
15B	Stationary Half of Mechanical Seal	21A	O-Ring (Bottom Chamber)
15C	Rotating Half of Mechanical Seal	22	Drain Plug Gasket
15D	O-Ring, Smaller Diameter	23	O-Ring
15E	Flat Washer	24	O-Ring
15F	Spring	25	Drain Plug

BVM8 BVM16

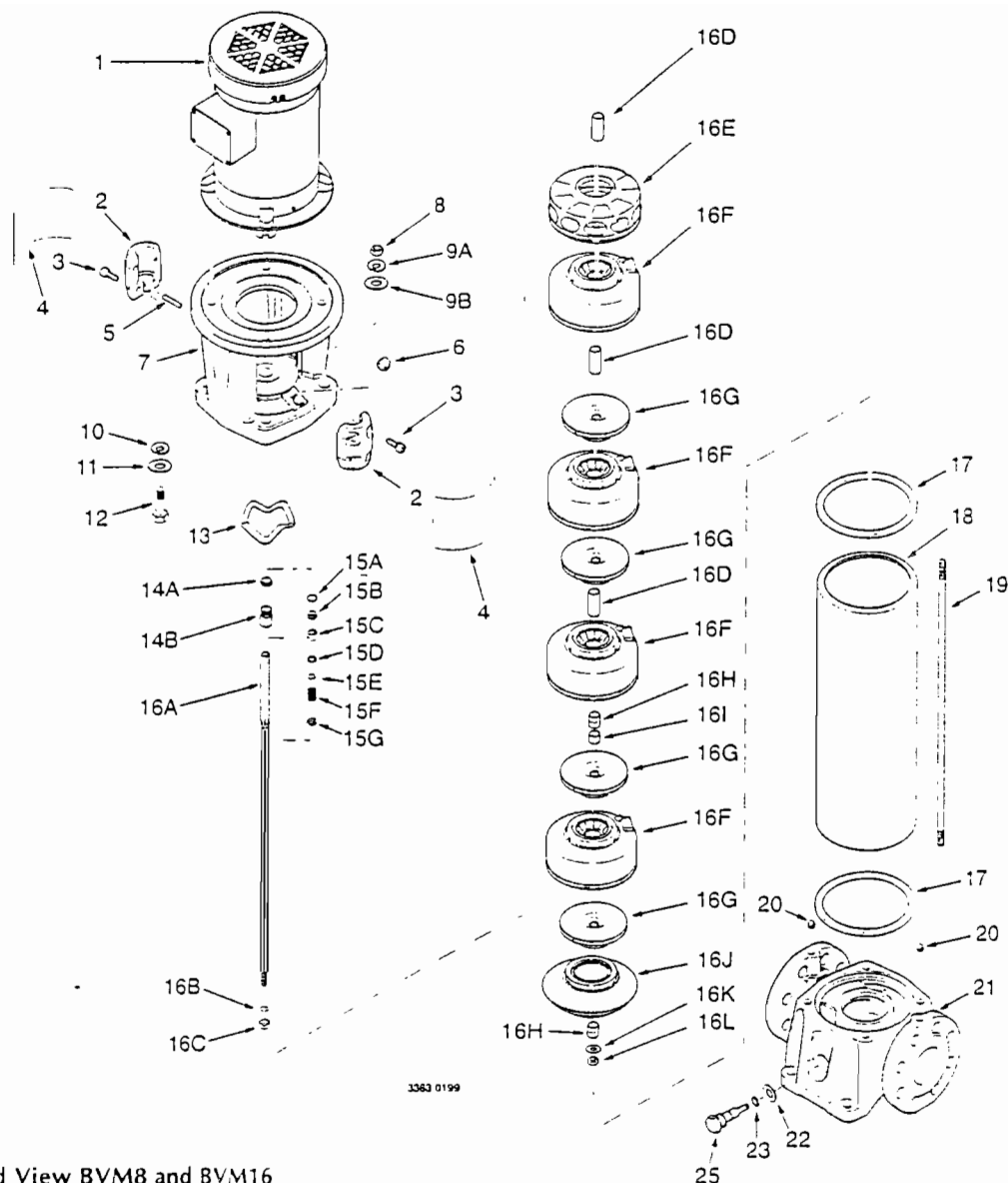


Figure 15 - Exploded View BVM8 and BVM16

REPAIR PARTS LIST FOR BVM8 AND BVM16 SERIES MODELS

Key No.	Description	Key No.	Description
1	Motor	15C	Mechanical Drive Ring
2	Coupling Half	16	Replacement Stack Kit (Incl. 16A thru 16L)
3	Socket Head Screw	16A	Shaft
4	Coupling Guard	16B	Stop Ring
5	Coupling Pin	16C	Mechanical Seal Spacer
6	Priming Plug	16D	Upper Intermediate Chamber
7	Motor Bracket	16E	Spacer
8	Staybolt Nut	16F	Impeller
9A	Staybolt Lockwasher	16G	Diffuser
9B	Staybolt Flat Washer	16H	Spacer
10	Flat Washer	16I	Bearing
11	Lock Washer	16J	Shaft Washer
12	Capscrew	16K	Nut
13	Spring Ring	16L	Chamber without Diffuser
14	Two Part Mechanical Seal (Includes 14A and 14B)	17	Sleeve Gasket
14A	Stationary Half of Shaft Seal	18	Stainless Steel Sleeve
14B	Rotating Half of Shaft Seal	19	Staybolt
15	Seven Part Mechanical Seal (Includes 15A thru 15G)	20	Pipe Plug
15A	O-Ring, Larger Diameter	21	Suction/Discharge
15B	Stationary Half of Mechanical Seal	21A	O-Ring (Bottom Chamber)
15C	Rotating Half of Mechanical Seal	22	Drain Plug Gasket
15D	O-Ring, Smaller Diameter	23	O-Ring
15E	Flat Washer	24	O-Ring
15F	Spring	25	Drain Plug



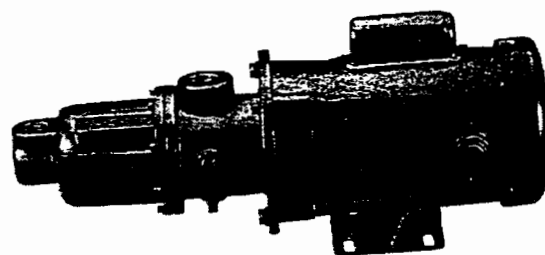
Always the Right Solution™

Section:
MOYNO® 500 PUMPS
Page: 1 of 4
Date: March 1, 1998

SERVICE MANUAL MOYNO® 500 PUMPS 300 SERIES MOTORIZED 331, 332, 333, AND 344 MODELS

DESIGN FEATURES

Housing: Cast iron/316 SS
Pump Rotor: Chrome plated AISI 416 stainless steel/Chrome plated 316 stainless steel
Pump Stator: NBR (Nitrile)
Seal: Mechanical (carbon/ceramic)
Motor Shaft: AISI 416 stainless steel/ANSI 316 stainless steel
Motor: 1/2 HP, 60 Hertz, 1725 rpm, totally enclosed, fan cooled (TEFC) C-Faced, 1 phase 115/230V or 3 phase 230/460V (other motor options available; consult sales representative)



Note: Alternate elastomers available. Refer to Repair/Conversion Kit Numbers, pages 3 and 4.

INSTALLATION

Mounting Position. Pump may be mounted in any position. When mounting vertically, it is necessary to keep bearings above seals to prevent possible seal leakage into bearings.

Pre-Wetting. Prior to connecting pump, wet pump elements and mechanical seal by adding fluid to be pumped into suction and discharge ports. Turn pump over several times in a clockwise direction to work fluid into pump elements.

Piping. Piping to pump should be self-supporting to avoid excessive strain on pump housings. See Table 1 for suction and discharge port sizes of each pump model. Use pipe "dope" or tape to facilitate disassembly and to provide seal on pipe connections.

Electrical. Follow the wiring diagram on the motor nameplate or inside the terminal box for the proper connections. The wiring should be direct and conform to local electrical codes. Check power connections for proper voltage. Voltage variations must not exceed $\pm 10\%$ of nameplate voltage. Motor is provided with internal automatic overload protection.

To prevent damage to pump, pump rotation must be clockwise when facing pump from motor end.

OPERATION

Self-Priming. With wetted pumping elements, the pump is capable of 25 feet of suction lift with pipe size equal to port size. Be sure suction lines are air tight or pump will not self prime. Self-priming capabilities will vary due to fluid viscosity.

DO NOT RUN DRY. Unit depends on liquid pumped for lubrication. For proper lubrication, flow rate should be at least 10% of rated capacity.

Pressure and Temperature Limits. See Table 1 for maximum discharge pressure of each model. Unit is suitable for service at temperatures shown in Table 2.

Storage. Always drain pump for extended storage periods by removing bottom drain plug in pump body.

Caution: Suction pressure should never be greater than discharge pressure.

Table 1. Pump Data

Pump Model	Suction Port (NPT)	Discharge Port (NPT)	Voltage Rating (VAC)	Discharge Pressure (psig)
331	3/4	3/4	See Motor Name Plate For Voltage Ratings	150
332	3/4	3/4	See Motor Name Plate For Voltage Ratings	100
333	3/4	3/4	See Motor Name Plate For Voltage Ratings	50
344	3/4	3/4	See Motor Name Plate For Voltage Ratings	†30

†With 3/4 HP motor, pressure is 40 psig.

Table 2. Temperature Limits

Elastomer	Temperature Limits
*NBR	10°-160°F
*EPDM	10°-210°F
*FPM	10°-240°F

*NBR = Nitrile

EPDM = Ethylene-Propylene-Diene Terpolymer

FPM = Fluoroelastomer

TROUBLESHOOTING

WARNING: Before making adjustments, disconnect power source and thoroughly bleed pressure from system prior to disassembly. Failure to do so could lead to electric shock or serious bodily harm.

Failure To Pump.

1. Motor will not start: Check power supply. Voltage must be $\pm 10\%$ of nameplate rating when motor is in locked rotor condition. Check for faulty capacitor on 1 phase Models.
2. Motor runs and thermally kicks out: Check for excessive discharge pressure. Check for defective centrifugal switch on 1 phase Models. Increase ventilation to motor. Do not use less than #14 wire size.
3. Stator torn; possible excessive pressure: Replace stator, check pressure at discharge port.
4. Flexible joint broken; possible excessive pressure: Replace joint, check pressure at discharge port.
5. Wrong rotation (3 phase only): Rotation must be clockwise when facing pump from motor end. Reverse the connections of any two line leads to the motor.
6. Excessive suction lift or vacuum.

Pump Overloads.

1. Excessive discharge pressure: Check pressure at discharge port for maximum ratings given in Table 1.
2. Fluid viscosity too high: Limit fluid viscosity to 100 CP or 500 SSU.

Noisy Operation.

1. Excessive suction lift or vacuum: Maximum suction lift is 25 feet for water.
2. Suction line too small: Check pipe size. Be sure lines are free from obstructions.
3. Pump cavitates: Pump speed is 1725 rpm. Viscosity of fluid should not exceed 100 CP or 500 SSU.
4. Flexible joint worn: Replace joint. Check pressure at discharge port.
5. Insufficient mounting: Mount securely to a firm base. Vibration induced noise can be reduced by using mount pads and short sections of hose on suction and discharge ports.

Seal Leakage.

1. Leakage at startup: If leakage is slight, allow pump to run several hours to let faces run in.
2. Persistent seal leakage: Faces may be cracked from freezing or thermal shock. Replace seal.

Pump Will Not Prime.

1. Air leak on suction side: Check pipe connections.

PUMP DISASSEMBLY

WARNING: Before disassembling pump, disconnect power source and thoroughly bleed pressure from system. Failure to do so could result in electric shock or serious bodily harm.

1. Remove suction and discharge piping. Drain pump body by removing drain plug (261B).

2. Remove screws (112) holding suction housing (2) to discharge housing (1). Remove suction housing (2) and stator (21).
3. Remove rotor (22) from flexible joint (24) by turning counterclockwise (RH thread). On pinned, 3 phase models, remove rotor pin (45) with suitable punch.
4. Flexible joint (24) can be removed from motor shaft by using a 3/16 allen wrench in end of joint and turning counterclockwise. On 3 phase motors, remove motor pin (46) with suitable punch, then remove joint.
5. Slide mechanical seal (69) off motor shaft.
6. Remove discharge housing (1) from adaptor flange (12) by removing screws (112B).
7. Carefully pry seal seat out of discharge housing (1). If any parts of mechanical seal are worn or broken, the complete seal assembly should be replaced. Seal components are matched parts and are not interchangeable.
8. Remove adapter flange (12) from motor (70) by removing screws (112A).
9. Remove slinger ring (77).

PUMP ASSEMBLY

1. Install slinger ring (77).
2. Attach adaptor flange (12) to motor housing using screws (112A).
3. Attach discharge housing (1) to adaptor flange (12) using screws (112B). Be sure to center seal bore on shaft.
4. Install mechanical seal (69) in discharge housing (1) using the following procedure:
 - a. Clean and oil sealing faces using clean oil (not grease).

Caution: Do not use oil on EPDM parts. Substitute glycerin or soap and water.

- b. Oil outer surfaces of the seal seat, and push assembly over the motor shaft and into the discharge housing (1) seating it firmly and squarely.
 - c. After cleaning and oiling the shaft, slide the seal body along the motor shaft until it meets the seal seat.
 - d. Install seal spring and spring retainer on shaft.
5. Thread flexible joint (24) into motor shaft in a clockwise direction (RH thread). Tighten with 3/16 allen wrench. On 3 phase models, install motor pin (46).
 6. Thread rotor (22) onto flexible joint (24) in a clockwise direction (RH thread). On 3 phase models, install rotor pin (45).
 7. Slide stator (21) on rotor (22). On 331 & 332 models, insert rounded end of stator ring (135) into end of stator prior to installing stator on rotor.
 8. Secure stator (21) and suction housing (2) to discharge housing (1) using screws (112).
 9. Lubricate rotor and stator by filling suction housing and discharge housing with fluid to be pumped.
 10. Connect suction and discharge piping and power source.

PARTS LIST

To determine part numbers for all parts except standard motors, enter table with item number from pump illustration. Then locate part number under applicable model number (first three digits). Parts listed down the center are applicable to all pump models.

To determine part numbers for standard motor (item 70), enter table at item 70 with the last two digits of model number: motor description and part number are on that line.

Item No.	Description	Pump Model Numbers			
		331	332	333	344
1	Discharge Housing	Cast Iron 350-1016-000/Stainless Steel 350-1016-007			
2	Suction Housing	Cast Iron 330-1064-002/Stainless Steel 330-1911-002			
*21	Stator	340-3501-120	340-3502-120	340-3503-120	340-3504-120
*22 □	Rotor (Threaded) 416 SS	320-2729-000	330-0906-000	320-1394-000	320-1841-000
*22	Rotor (Pinned) 416 SS	320-2729-004	320-4559-004	320-1584-002	320-1569-002
24	Flexible Joint (Threaded)	Carbon Steel 320-1511-000/Stainless Steel 320-3759-000			
24	Flexible Joint (Pinned)	Carbon Steel 320-1612-000/Stainless Steel 320-4415-000			
*45 □	Shaft Pin (2 req.)	320-4069-002			
*69	Mechanical Seal	320-2424-000			
70	Standard Motor				
	-59 1PH TEFC 1750 RPM	330-4529-000			
□	-60 3PH TEFC 1750 RPM, Pin	330-4528-100			
	-52 1PH TEFC 1750 RPM	330-4529-100			
□	-50 3PH TEFC 1750 RPM	330-4528-003			
77	Slinger Ring	320-6382-000			
112	Screw, Cap (8 req.)	Carbon Steel 619-1430-103 (10-24 x 5/8)/Stainless Steel 619-1432-120 (10-24 x 3/4)			
112A	Screw, Hex Hd (4 req.)	Carbon Steel 619-1530-161 (3/8-16 x 1)/Stainless Steel 320-6715-005 (3/8-16 x 1)			
135	Stator Ring	Carbon Steel 320-7812-000 /Stainless Steel 362-1774-000			
215	Lock Washer (8 req.)	320-6464-000			
215A	Lock Washer (4 req.)	Carbon Steel 623-0010-411/Stainless Steel 320-6717-002			
261	Pipe Plug, 1/4 NPT	Carbon Steel 610-0120-021/Stainless Steel 610-0420-020			
	Rotor (Threaded) 316 SS	320-2933-000	320-2942-000	320-2936-000	320-2934-000
	Rotor (Pinned) 316 SS	320-2933-002			

* Recommended spare parts.

□ Used on 3 phase models.

REPAIR/CONVERSION KIT NUMBERS

Item No.	Description	All 331 Models (Threaded Only)			All 332 Models (Threaded Only)		
		NBR	EPDM	FPM	NBR	EPDM	FPM
—	Kit No.	311-9026-000	311-9025-000	311-9054-000	311-9027-000	311-9038-000	311-9055-000
21	• Stator	340-3501-120	340-3501-320	340-3501-520	340-3502-120	340-3502-320	340-3502-520
24	• Joint	* 320-1511-000	320-6367-000	320-4670-000	* 320-1511-000	320-6367-000	320-4670-000
69	• Seal	320-2424-000	320-6379-000	320-6501-000	320-2424-000	320-6379-000	320-6501-000
Item No.	Description	All 333 Models (Threaded Only)			All 344 Models (Threaded Only)		
		NBR	EPDM	FPM	NBR	EPDM	FPM
—	Kit No.	311-9029-000	311-9028-000	311-9056-000	311-9031-000	311-9030-000	311-9057-000
21	• Stator	340-3503-120	340-3503-320	340-3503-520	340-3504-120	340-3504-320	340-3504-520
24	• Joint	* 320-1511-000	320-6367-000	320-4670-000	* 320-1511-000	320-6367-000	320-4670-000
69	• Seal	320-2424-000	320-6379-000	320-6501-000	320-2424-000	320-6379-000	320-6501-000

NBR = Nitrile

EPDM = Ethylene-Propylene-Diene Terpolymer

FPM = Fluoroelastomer

*Carbon steel joint, for 316 SS joint use 320-3759-000.

REPAIR/CONVERSION KIT NUMBERS (CONT.)

Item No.	Description	All 331 Models (Pinned Only)			All 332 Models (Pinned Only)		
		NBR	EPDM	FPM	NBR	EPDM	FPM
—	Kit No.	311-9104-000	311-9108-000	311-9112-000	311-9105-000	311-9109-000	311-9113-000
21	• Stator	340-3501-120	340-3501-320	340-3501-520	340-3502-120	340-3502-320	340-3502-520
24	• Joint	• 320-1612-000	320-6973-000	320-6984-000	• 320-1612-000	320-6973-000	320-6984-000
69	• Seal	320-2424-000	320-6379-000	320-6501-000	320-2424-000	320-6379-000	320-6501-000
45	• Pin (2 req.)	320-4069-002			320-4069-002		
Item No.	Description	All 333 Models (Pinned Only)			All 344 Models (Pinned Only)		
		NBR	EPDM	FPM	NBR	EPDM	FPM
—	• Kit No.	311-9106-000	311-9110-000	311-9114-000	311-9107-000	311-9111-000	311-9115-000
21	• Stator	340-3503-120	340-3503-320	340-3503-520	340-3504-120	340-3504-320	340-3504-520
24	• Joint	• 320-1612-000	320-6973-000	320-6984-000	• 320-1612-000	320-6973-000	320-6984-000
69	• Seal	320-2424-000	320-6379-000	320-6501-000	320-2424-000	320-6379-000	320-6501-000
45	Pin (2 req.)	320-4069-002			320-4069-002		

ABRASION RESISTANT SEALS

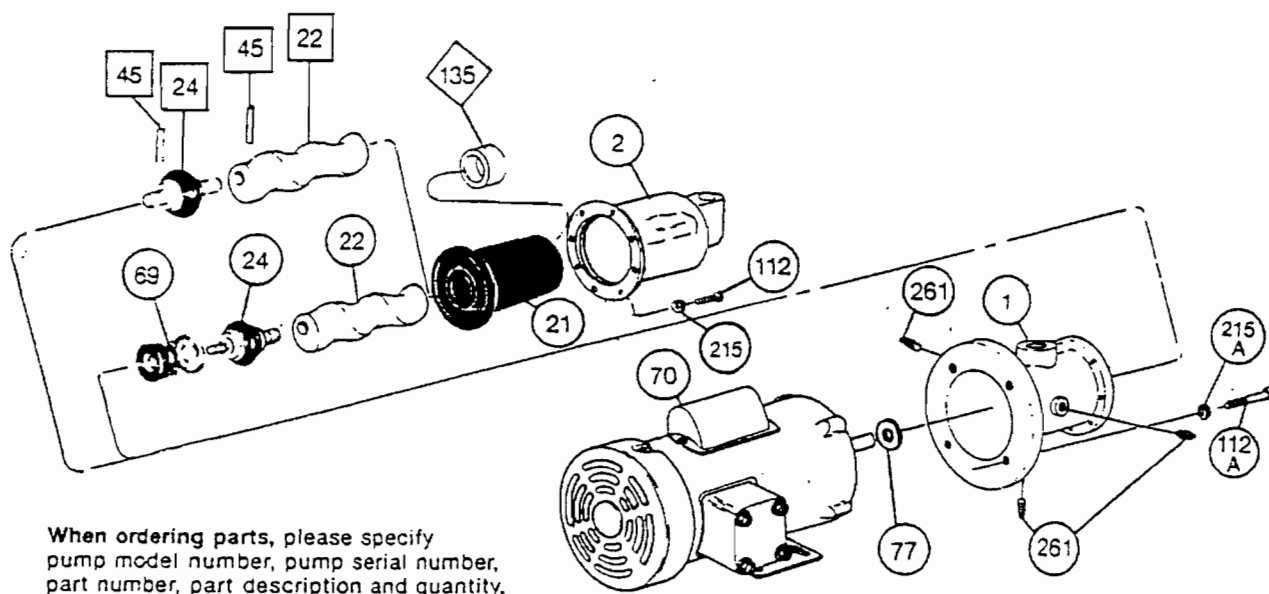
Elastomer	All 331 – 334 Models
NBR	320-6460-000
EPDM	320-6502-000
FPM	320-6503-000

NBR = Nitrile

EPDM = Ethylene-Propylene-Diene Terpolymer

FPM = Fluoroelastomer

*Carbon steel joint, for 316 SS joint use 320-4415-000.



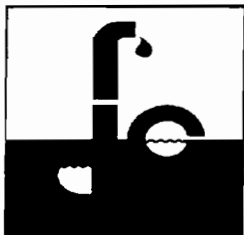
Used only on 331 & 332 Models.



Used on 3 Phase Models

FLOW METERS

DRC # 6154



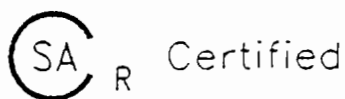
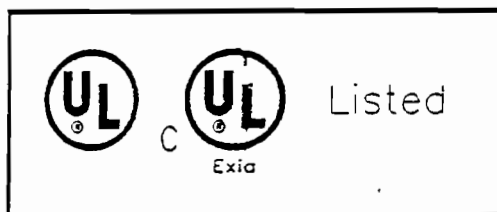
DIVERSIFIED REMEDIATION & CONTROLS

21801 Industrial Blvd. Rogers, MN 55374 Phone (763) 428-3000 Fax (763) 428-3660



Fluid Flow Meters

**INSTALLATION & OPERATION MANUAL
MODEL 1100 TURBINE FLOW METER
WITH MODEL B2200 FLOW MONITOR
Rev A**



Intrinsically Safe for use
in Hazardous Locations
Class I, Division 1, Groups: A,B,C and D

PART No. 228900

OPERATING LIMITATIONS OF FLOW METERS AND MONITOR

1. U.L., C.U.L. and C.S.A. Intrinsically Safe Approval: The Model 1100 fluid flow turbine meter and B-2200 flow monitor are intrinsically safe and approved for hazardous location by U.L., C.U.L. and C.S.A. (Class I, Division 1, Groups: A,B,C and D) when installed per this Installation Instruction (part no. 228900) and Installation Drawing BEP48-06 (see Appendix D)

WARNING: Any alterations to the circuitry will nullify the intrinsically safe rating.

2. TEMPERATURE: Do not subject the meter to temperatures above 325° F (163° C), or below -150° F (-101° C) or the freezing point of the metered liquid. Higher temperatures will damage the pick-up, and lower temperatures will limit the rotation of the rotor.

3. PRESSURE: Part numbers: B110-375, B110-500, B110-750, B110-875, B111-110, B111-115, B111-121 and B111-120: **5,000 psi max.**

Part numbers: B111-130, B111-140, B111-160, B111-180 and B111-200: **800 psi max.**

WARNING: Pressure in excess of allowable rating may cause the housing to burst and cause serious personal injury.

4. CORROSION: The internal parts of the meter are constructed of stainless steel and tungsten carbide. Be sure that the operating fluid is compatible with these materials. Incompatible fluids will deteriorate internal parts, and cause the meter to read inaccurately.

5. PULSATION: Severe pulsation will affect accuracy, and shorten the life of the meter.

6. VIBRATION AND SHOCK: Severe mechanical vibration may decrease service life of the meter.

7. FILTRATION: A strainer should be installed upstream of the meter if small particles are present (see Table 1 for filtration requirements).

8. LITHIUM BATTERY DISPOSAL: For proper disposal of lithium batteries, consult local authorities.

GENERAL DESCRIPTION: MODEL B2200 FLOW MONITOR

The B-2200 flow monitor can be directly mounted on a model 1100 turbine meter or remotely located. The monitor provides continuous digital display of flow rate and totalization. The electronic circuit of the monitor processes the turbine meter's input in a signal conditioning circuit, where it is shaped and amplified. This input circuit is protected from high voltage transients by a diode network. The battery powered unit utilizes low power CMOS integrated circuits with liquid crystal displays, that enables it to operate 3 to 5 years on two lithium batteries. The unit has the ability to display almost any desired volumetric units. The monitor comes factory adjusted to match its companion turbine flow meter, which makes field calibration unnecessary. However, if calibration adjustment is required, it can be performed on the job site. The field calibration process is described in Appendix A.

SPECIFICATIONS:

Enclosure: Fiber glass reinforced polyester (light gray color).

Size: 6.75 in. (171 mm) wide X 6.50 in. (165 mm) high X 4.25 in. (108 mm) deep.

Power Supply: Two (2) 3.6 volt lithium batteries (supplied with instrument).

Accuracy: ±1% of actual and totalized flow.

Digital Displays: Six (6) digits (customer set decimal point on flow rate), 0.35 inch (9 mm) high.

Temperature: -35°F (-37°C) to 160° F (71°C).

Mounting: Standard - Enclosure mounts directly to Turbine Meter.
Optional - Remote, according to customer specifications.

Electronics Approvals: U.L., C.U.L. and C.S.A. Intrinsically Safe

Optional Cables for Remote Output: Standard length 10 ft, or as specified.

GENERAL DESCRIPTION: TURBINE FLOW METER

The Model 1100 turbine flow meter is designed with wear resistant moving parts to provide trouble free operation and long service life. The model 1100 Turbine Meter Repair Kit is designed for easy field service of a damaged flow meter, rather than replacing the entire flow meter. Repair parts are constructed of stainless steel alloy and tungsten carbide.

Fluid moving through the turbine flow meter causes the rotor to turn at a speed proportional to the flow rate. The rotor blade cuts the magnetic field of the magnetic pick-up, which in turn generates a frequency output signal that is directly proportional to the speed. This signal is used to represent flow rate and/or totalization of fluid passing through the turbine flow meter and is always expressed as the number of electric pulses that the meter produces per US gallon. This value is constant over each flow meter's range and is unique to the meter.

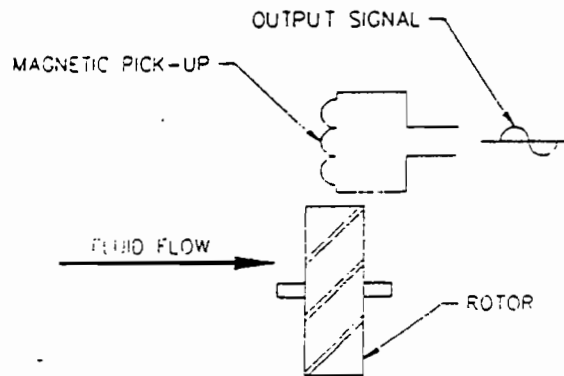
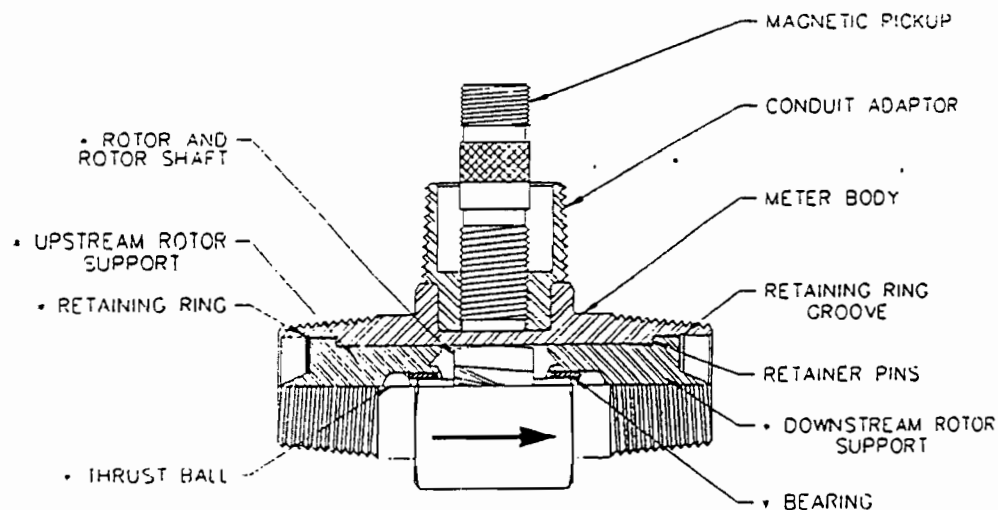


Fig. 1 Schematic illustration of electric signal generated by rotor movement.



NOTE: * INDICATES PARTS
CONTAINED IN REPAIR KITS

Fig. 2 Typical cross-section of B110-375 through B111-121 turbine flow meter.

INSTALLATION INSTRUCTIONS: TURBINE FLOW METER

Before installation, the flow meter should be checked internally for foreign material and to be sure that the rotor spins freely. Fluid lines should also be cleared of all debris. The flow meter must be installed with the flow indication arrow, etched on the exterior of the meter body, pointing in the correct direction of flow. The preferred mounting orientation is to have the meter installed in horizontal piping, with the pick-up facing upward. However, the meter will function in any position.

The liquid that is to be measured must be free from any large particles that may obstruct rotation of the rotor. If particles are present, a mesh strainer should be installed upstream before operation of the flow meter. (See Table 1)

TABLE 1

MODEL NUMBER	PART NUMBER	STRAINER MESH	CLEARANCE
W11.375	B110-375	60 X 60	.0092
W11.500	B110-500	60 X 60	.0092
W11.750	B110-750	60 X 60	.0092
W11.875	B110-875	60 X 60	.0092
W1110	B111-110	60 X 60	.0092
W1115	B111-115	20 X 20	.0340
W1120	- B111-120	10 X 10	.0650
W1121	B111-121	20 X 20	.0340
W1130	B111-130	8 X 8	.0900
W1140	B111-140	10 X 10	.0650
W1160	B111-160	4 X 4	.1875
W1180	B111-180	8 X 8	.0900
W1200	B111-200	4 X 4	.1875

The preferred plumbing setup is one containing a by-pass line (Fig. 3) that allows meter inspection and repair without interrupting flow. If a by-pass line is not utilized, it is important that all control valves be located down-stream of the flow meter (Fig. 4).

CAUTION: Damage can be caused by striking an empty meter with a high velocity flow stream.

This is true with any restriction in the flow line that may cause the liquid to flash. If necessary, air eliminators should be installed to ensure that the meter is not incorrectly measuring entrained air or gas.

It is recommended that a minimum length, equal to ten (10) pipe diameters of straight pipe, be installed on the up-stream side and five (5) diameters on the down-stream side of the flow meter. Otherwise meter accuracy may be affected. Piping should be the same size as the meter bore or threaded port size.

Do not locate the flow meter or connection cable close to electric motors, transformers, sparking devices, high voltage lines, or place connecting cable in conduit with wires furnishing power for such devices. These devices can induce false signals in the flow meter coil or cable, causing the meter to read inaccurately.

If problems arise with the flow meter and monitor consult Appendix B (Trouble Shooting Guide). If further problems arise, consult the factory. Turbine Meter Repair Kits are also available, see Appendix C. If the internal components of the turbine flow meter are damaged beyond repair, these repair kits are available. Information pertaining the turbine meter repair kits are referenced in Appendix C.

OPERATIONAL START UP: TURBINE FLOW METER

The following practices should be observed when installing and starting the meter.

WARNING: Make sure that fluid flow has been shut off and pressure in the line released before attempting to install the meter in an existing system.

1. After meter installation, close the isolation valves, and open the by-pass valve. Flow liquid through the by-pass valve for sufficient time to eliminate any air or gas in the flow line.

CAUTION: High velocity air or gas may damage the internal components of the meter.

2. Open up-stream isolating valve slowly to eliminate hydraulic shock while charging the meter with the liquid. Open the valve to full open.

3. Open down-stream isolating valve to permit meter to operate.

4. Close the bypass valve to a full closed position.

5. Adjust the downstream valve to provide the required flow rate through the meter. Note: The downstream valve may be used as a control valve.

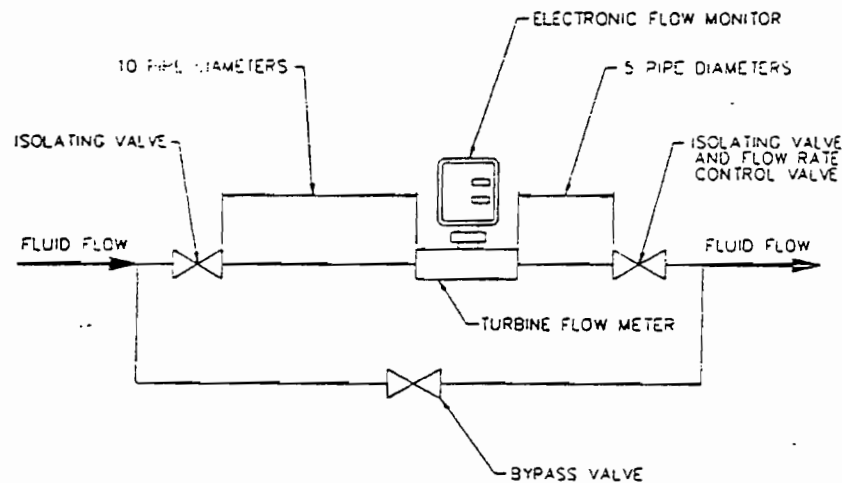


Fig. 3 Meter installation utilizing a bypass line

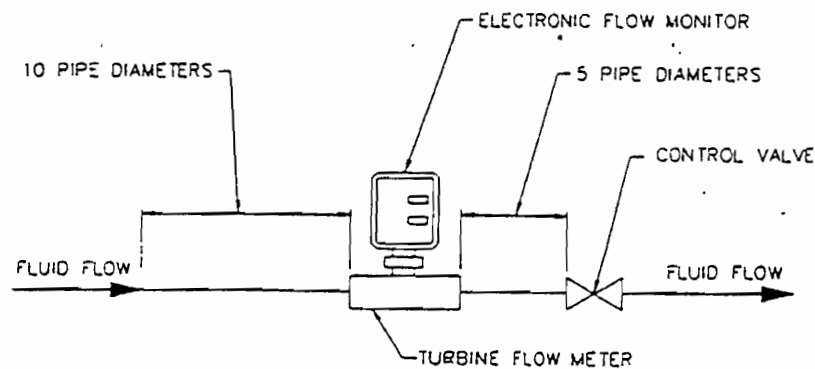


Fig. 4 Meter installation without utilizing a bypass line

APPENDIX A

FLOW RATE AND TOTALIZATION CALIBRATION

The monitor comes from the factory set to the purchaser's specification. However, recalibration would be required when the flow meter is repaired, or when the monitor is used with a different flow meter, or a change in the units of measure is required. Flow rate and totalizer displays do not have to be set in the same units of measure. Recalibration is accomplished by calculating a totalizing time base and then setting 17 binary DIP switches located on the printed circuit board (Fig. 5). The calculated time base is referred to as the scaler, or divisor. The value of the number depends on both the desired totalizing units of measure, e.g. barrels, gallons, liters, cubic meters, etc. and the K-factor of the turbine meter selected for use with the monitor. Once set, this circuit updates the totalizer each time it receives a quantity of input pulses equal to the scaler number. These output pulses increment the totalizer one unit. Thus, the totalizer may represent any unit of measure for any turbine meter. Since the 17 binary DIP switches are binary encoders, the maximum count cannot exceed 131,071 ($\sim 2^{17}$).

Step 1: The scaler is calculated using two factors. They are the turbine meter's K-factor, which is always expressed in the number of pulses it produces per US gallon of water flowing through it, and the volumetric relationship between US gallons and the desired units of measure for the totalizer display. These factors are used to determine the DIP switch settings. Sample calculations are set forth in the following examples in the event that the factory calibration needs to be changed.

Calculate Scaler

Given: A model B111-115, 1-1/2 inch turbine flow meter with a K-factor of 309.2 per US gallon.

Find: The scaler needed to increment the totalizing counter in 42 US gallon barrels.

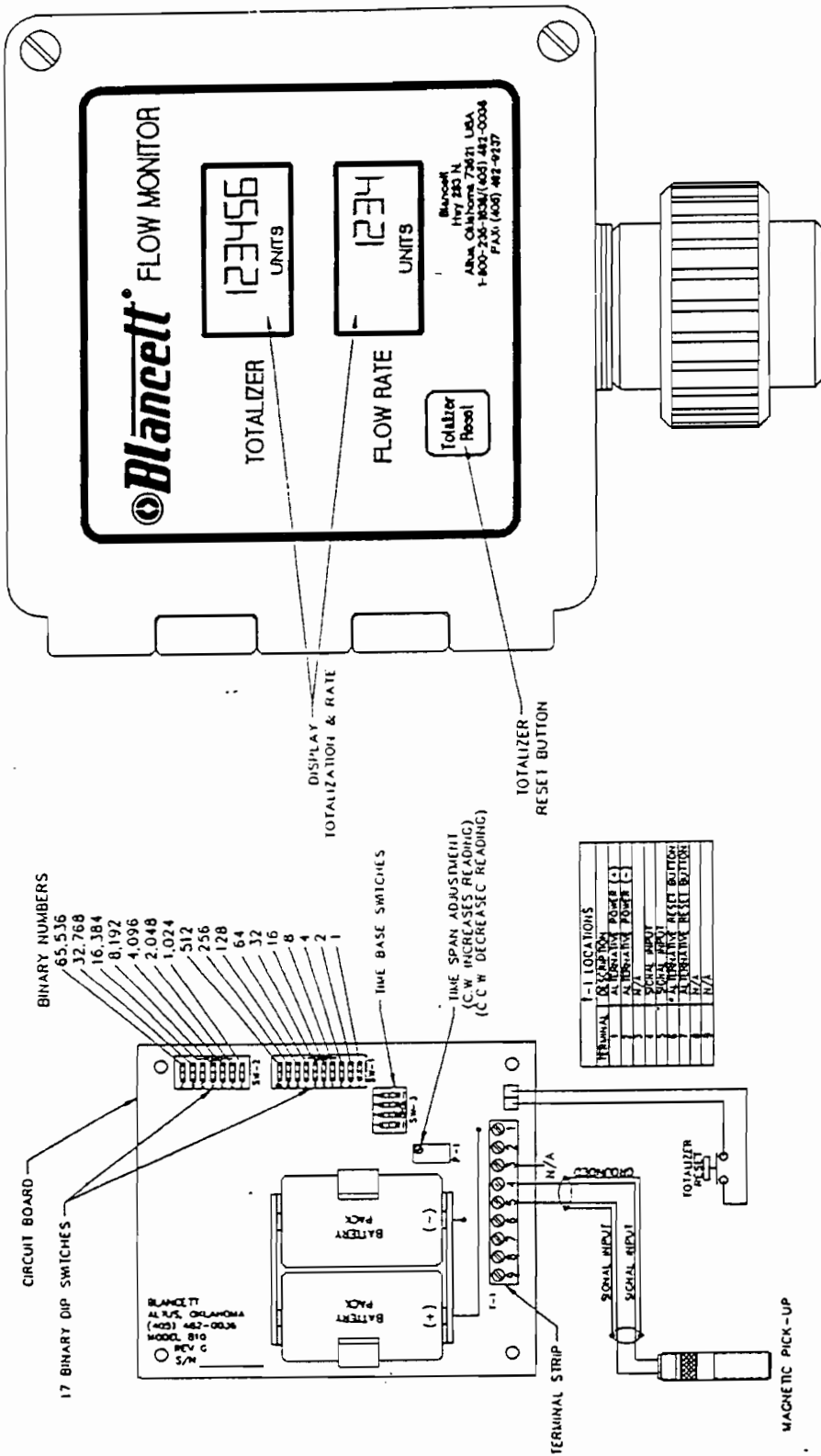
Calculation: $309.2 \text{ pulses / US gallon} \times 42 \text{ US gallons / barrel} = 12,986.4 \text{ pulses per barrel}$, which is rounded off to 12,986 pulses per barrel.

Scalers for other units of measure are calculated in the same manner. The following table contains multipliers for the most common fluid measures.

FLOW UNITS	MULTIPLIER
Barrels, Oil	42
Cubic Feet	7.48052
Cubic Meters	264.17
Imperial Gallons	1.20095
Liters	0.26417
US Gallons	1

Step 2: The scaler is set by opening or closing the 17 binary DIP switches in a predetermined order. The switches are located on the left hand side of the circuit board shown in Fig. 5. They are arranged in two groups, one containing a ten (10) switch bank (SW-1) and the other containing a seven (7) switch bank (SW-2). Individual switch positions are respectively numbered 1 through 10 and 1 through 7 on the switch body. The open position is labeled on the switch, and is open when depressed toward that side. A switch is closed when it is depressed toward the number side.

To set the scaler, each switch must be individually opened or closed in a certain pattern. The sum of the binary number selected by the closed switch order equals the desired scaler. Fig. 5 shows which binary number is associated with each rocker switch. To determine which switches to close, locate the largest binary number corresponding to a switch that is equal to or less than the required divisor. Subtract that number from the divisor and locate the next largest binary number that is equal to or less than the remainder. Subtract the second number from the remainder and repeat this process until the remainder is zero. The following example demonstrates the method of selecting which switches are to be closed



FRONT VIEW OF MONITOR

INSIDE VIEW OF MONITOR
SHOWING ELECTRONIC CONNECTIONS

Fig. 5 Inside view of monitor PCB and front view of monitor box

Setting 17 Position Binary DIP Switches

Find: Switch positions for the divisor of 12,986 calculated in Example 1.

12,986	desired divisor
- 8,192	largest binary number equal or less than divisor - Switch 4 of the 7 switch bank.
4,794	
4,794	remainder
- 4,096	largest binary number equal or less than divisor - Switch 3 of the 7 switch bank
698	
698	remainder
- 512	largest binary number equal or less than divisor - Switch 10 of the 10 switch bank
186	
186	remainder
- 128	largest binary number equal or less than divisor - Switch 8 of the 10 switch bank
58	
58	remainder
- 32	largest binary number equal or less than divisor - Switch 6 of the 10 switch bank
26	
26	remainder
- 16	largest binary number equal or less than divisor - Switch 5 of the 10 switch bank
10	
10	remainder
- 8	largest binary number equal or less than divisor - Switch 4 of the 10 switch bank
2	
2	remainder
- 2	largest binary number equal or less than divisor - Switch 2 of the 10 switch bank
0	

The sum of the binary numbers selected should equal the divisor.

$$8,192 + 4,096 + 512 + 128 + 32 + 16 + 8 + 2 = 12,986$$

Close the switch corresponding to each of the binary numbers selected. All the remaining switches must be set to the open position.

Step 3 The four (4) bank DIP switch, identified as SW-3 in Fig. 5, is used to set the time span range over which the flow pulses are counted for the flow rate display. It also determines if the time base measure will be minutes, hours or days. The switch positions have been predetermined for US gallons per minute (GPM), barrels (42 US gallons) per hour (BPH), barrels (42 US gallons) per day (BPD), cubic meters per day (M³PD) and liters per minute (LPM). These values are shown in Table 2 and Table 3.

Setting DIP Switch SW-3

Find: The switch positions for SW-3 that will set the flow rate in barrels per hour (BPH) for the model B111-115 flow meter described in Step 1.

Enter Table 2 for BPH and follow down the SW-3 column until the row for flow meter W1115 is reached. The table indicates that switches 2 and 3 are closed and 1 and 4 are open.

Step 4 The time span range set in Step 3 must now be more closely adjusted. The initial setting is made by adjusting potentiometer P-1 according to the data in Table 2. The potentiometer has an total adjusting range of 25 turns. P-1 must be reset by turning clockwise (cw) until a pop is heard or felt through the screw driver. If it is difficult to determine the fully closed point, then turn the screw at least 25 turns cw. The potentiometer cannot be damaged by over-rotation.

Set Potentiometer P-1

Find: The number of counter clockwise (ccw) turns that should be made to P-1 for the model B111-115 flow meter from Step 1, set to monitor flow in BPH.

Enter the table for BPH and follow down the P-1 column until the row for flow meter W1115 is reached. The table specifies 5 turns. Turn the P-1 adjusting screw cw. until a pop is heard or felt. Turn a full 25 turns if there is any question regarding whether the pop was heard or felt. The adjusting screw must now be turned counter-clockwise (ccw) 5 turns. Count the number of turns carefully. This will position P-1 adjustment within a few turns of its final position. This final adjustment is described in Step 5.

Step 5 Final calibration of the flow rate is accomplished by further adjustment to P-1. A stop watch or other time piece that produces a reliable, accurate reading and a calculator are needed for this step. The procedure requires that the flow rate be reasonably stable and flowing within the range shown in Table 2. Stable flow is achieved if the flow rate display is constant for 10 seconds. An adjustment to the control valve or downstream isolating valve may be necessary to stabilize flow. The time it takes for the totalizing display to increment one unit is measured to the nearest second. This value, measured in seconds, is then divided into the time base: 60 seconds for a minute; 3,600 seconds for a hour or 86,400 seconds for a day. The result is the actual flow rate through the meter. The flow rate display must now be made to agree with the calculated value. If they do not agree, further fine adjustment to P-1 must be made as described below.

Final Adjustment of P-1

Find: The time, in seconds, for one additional unit to increment on the totalizer display, calculate the actual flow rate and make final adjustment to P-1 so that displayed flow rate is correct. Assume that the time measured between counts on the totalizer display was 31.36 seconds. The flow meter is the model B111-115 flow meter described in Step 1, monitoring flow in barrels per hour (BPH).

The 31.36 second interval must be converted to a flow rate. Since the time span selected in Step 3 was BPH, the number of seconds in an hour (3,600) is divided by the 31.36 second interval:

$$\frac{3,600 \text{ sec./min.}}{31.36 \text{ sec/barrel}} = 114.796 \text{ the flow rate display should be set to read 114.80}$$

Assume that the display actually reads 111.3. Since the calculated, actual value is larger than the display value, P-1 should be turned 1/2 turn cw. Wait at least ten seconds and read the flow rate display again. If the flow rate is still high, turn the adjusting screw another 1/2 turn cw. Repeat as necessary until the display reads exactly the same as the calculated value. A very small rotation of the screw may be required for fine tuning. If the desired flow is passed by, then turn the screw in the opposite direction. Allow at least 10 seconds for the display to stabilize after each adjustment.

If the calculated, actual value is smaller than the display value, P-1 should be turned 1/2 turn counter clockwise (ccw). Continue as previously described until the display reads correctly.

Table 2. PCB switch and potentiometer settings for non-metric units of measure.

Flow Meter		Gallons per Minute					Barrels per Hour					Barrels per Day								
Model	Nominal Range GPM	Display GPM	SW-3 *				P-1 ccw	Display BPH	SW-3 *				P-1 ccw	Display BPD	SW-3 *				P-1 ccw	
			1	2	3	4			1	2	3	4				1	2	3	4	
B110-375	.3 - 3	.30 - 3.00	☐	☒	☐	☐	24	.40 - 4.00	☐	☒	☐	☐	24	10.0 - 100.0	☐	☐	☒	☐	21	
B110500	.75 - 7.5	.75 - 7.50	☐	☒	☐	☐	23	1.00 - 10.00	☐	☒	☐	☐	17	25.0 - 250.0	☐	☐	☒	☐	11	
B110-750	2 - 15	2.00 - 15.00	☐	☒	☒	☐	14	2.85 - 21.42	☒	☐	☐	☐	15	68 - 514	☐	☒	☐	☐	12	
B110-875	3 -30	3.00 - 30.00	☒	☐	☐	☐	22	4.28 - 42.85	☒	☐	☐	☐	14	102 - 1028	☐	☐	☒	☐	11	
B111-110	5 - 50	5.0 - 50.0	☐	☒	☐	☐	14	7.0 - 70.0	☐	☐	☒	☐	17	170 - 1700	☐	☒	☒	☐	7	
B111-116 B111-121	15 - 180	15.0 - 180.0	☐	☒	☒	☐	16	21.0 - 250.0	☐	☒	☒	☐	5	51 - 600 <u>X10</u>	☐	☒	☐	☐	13	
B111-120	40 - 400	40 - 400	☐	☐	☒	☐	18	54 - 540	☐	☒	☒	☐	16	130 - 1300 <u>X10</u>	☒	☐	☒	☐	14	
B111-130	60 - 600	60 - 600	☐	☐	☒	☐	20	88 - 880	☐	☐	☒	☐	7	210 - 2100 <u>X10</u>	☒	☒	☐	☐	10	
B111-140	100 - 1200	100 - 1200	☒	☐	☐	☐	23	142 - 1708	☒	☐	☐	☐	11	34 - 410 <u>X100</u>	☐	☒	☐	☐	9	
B111-160	200 - 2500	20 - 250 <u>X10</u>	☐	☐	☒	☐	23	28 - 357 <u>X10</u>	☐	☐	☒	☐	13	68 - 860 <u>X100</u>	☒	☐	☐	☐	11	
B111-180	350 - 3500	35 - 350 <u>X10</u>	☒	☐	☐	☐	21	50 - 500 <u>X10</u>	☒	☐	☐	☐	12	12 - 120 <u>X1000</u>	☐	☒	☐	☐	10	
B111-200	500-5000	50 - 500 <u>X10</u>	☒	☐	☐	☐	5	71 - 714 <u>X10</u>	☒	☒	☒	☐	12	17 - 272 <u>X1000</u>	☐	☐	☒	☐	13	

* ☒ Closed ☐ Open

Table 3. PCB switch and potentiometer settings for metric flow units of measure.

Flow Meter		Cubic Meters per Day					Liters per Minute							
Model	Nominal Flow Range GPM	Display M ³ PD	SW-3 *				P-1 ccw	Display LPM	SW-3 *				P-1 ccw	
			1	2	3	4				1	2	3	4	
B110-375	.3 - 3	1.60 - 16.00	☐	☐	☒	☐	10	1.13 - 11.35	☐	☐	☒	☐		16
B110-500	.75 - 7.5	4.0 - 40.0	☒	☐	☐	☐	19	2.83 - 28.38	☐	☐	☒	☐		6
B110-750	2 - 15	10.9 - 81.7	☐	☐	☒	☐	19	7.6 - 56.7	☐	☒	☐	☐		6
B110-875	3 - 30	16.0 - 160.0	☐	☐	☐	☐	18	11.3 - 113.5	☐	☐	☒	☐		19
B111-110	5 - 50	27 - 270	☐	☒	☐	☐	21	18.9 - 189.2	☐	☒	☒	☐		8
B111-116 B111-121	15 - 180	80 - 1000	☐	☐	☒	☐	17	56 - 681	☐	☒	☐	☐		11
B111-120	40 - 400	21 - 210 <u>X10</u>	☐	☒	☐	☐	12	151 - 1514	☒	☐	☒	☐		13
B111-130	60 - 600	33 - 330 <u>X10</u>	☐	☒	☐	☐	13	227 - 2271	☒	☒	☐	☐		15
B111-140	100 - 1200	54 - 650 <u>X10</u>	☐	☐	☒	☐	15	38 - 454	☐	☒	☐	☐		7
B111-160	200 - 2500	10 - 140 <u>X100</u>	☐	☒	☐	☐	17	76 - 946 <u>X10</u>	☒	☐	☐	☐		11
B111-180	350 - 3500	19 - 190 <u>X100</u>	☐	☐	☒	☐	19	13 - 132 <u>X100</u>	☒	☐	☐	☐		7
B111-200	500-5000	27 - 272 <u>X100</u>	☒	☐	☐	☐	16	19 - 189 <u>X100</u>	☐	☐	☒	☐		11

* ☒ Closed ☐ Open

APPENDIX B

TROUBLE SHOOTING GUIDE

TROUBLE	POSSIBLE CAUSE	REMEDY
Meter indicates higher than actual flow rate	Cavitation Debris on rotor support Build up of foreign material on meter bore. Gas in liquid	Increase back pressure Clean meter Clean meter Install gas eliminator ahead of meter
Meter indicates lower than actual flow rate	Debris on rotor Worn bearing Viscosity higher than calibrated	Clean meter and add filter Clean meter and add filter Recalibrate monitor (Appendix A)
Erratic system indication, meter alone works well (remote monitor application only)	Ground loop in shielding	Ground shield one place only. Look for internal electronic instrument ground. Reroute cables away from electrical noise.
Indicator shows flow when shut off.	Mechanical vibration causes rotor to oscillate without turning	Isolate meter
No flow indication. Full or partial open position	Fluid shock, full flow into dry meter or impact caused bearing separation or broken rotor shaft.	Rebuild meter with repair kit and recalibrate monitor. Move to location where meter is full on start-up or add downstream flow control valve.
Erratic indication at low flow, good indication at high flow	Rotor has foreign material wrapped around it.	Clean meter and add filter
No flow indication	Faulty pick-up	Replace pick-up.
System works perfect, except indicates lower flow over entire range	Bypass flow, leak	Repair or replace bypass valves, or faulty solenoid valves.
Meter indicating high flow, upstream piping at meter smaller than meter bore	Fluid Jet Impingement on rotor.	Change piping.

APPENDIX C

REPAIR KIT INFORMATION

Flow Meter Size	Repair Kit Fits Meter Model No.	Repair Kit Fits Meter Part No.	Repair Kit Part Number
3/8"	W11.375	B110-375	B251-103
1/2"	W11.500	B110-500	B251-105
3/4"	W11.750	B110-750	B251-108
7/8"	W11.875	B110-875	B251-109
1"	W1110	B111-110	B251-112
1-1/2"	W1115	B111-115	B251-116
2" Low	W1121	B111-121	B251-116
2"	W1120	B111-120	B251-120
3"	W1130	B111-130	B251-131
4"	W1140	B111-140	B251-141
6"	W1160	B111-160	B251-161
8"	W1180	B111-180	B251-181
10"	W1200	B111-200	B251-200
Standard Magnetic Pick-up	All Meter Sizes	All Meter Sizes	B111109

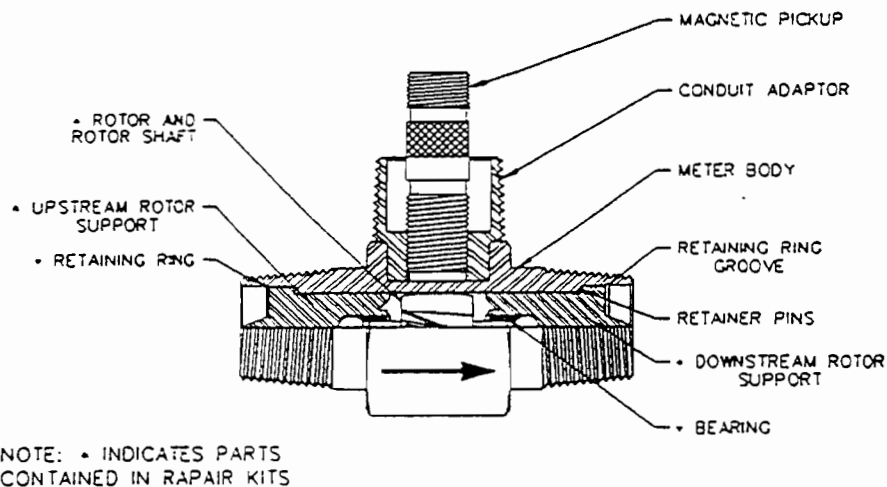


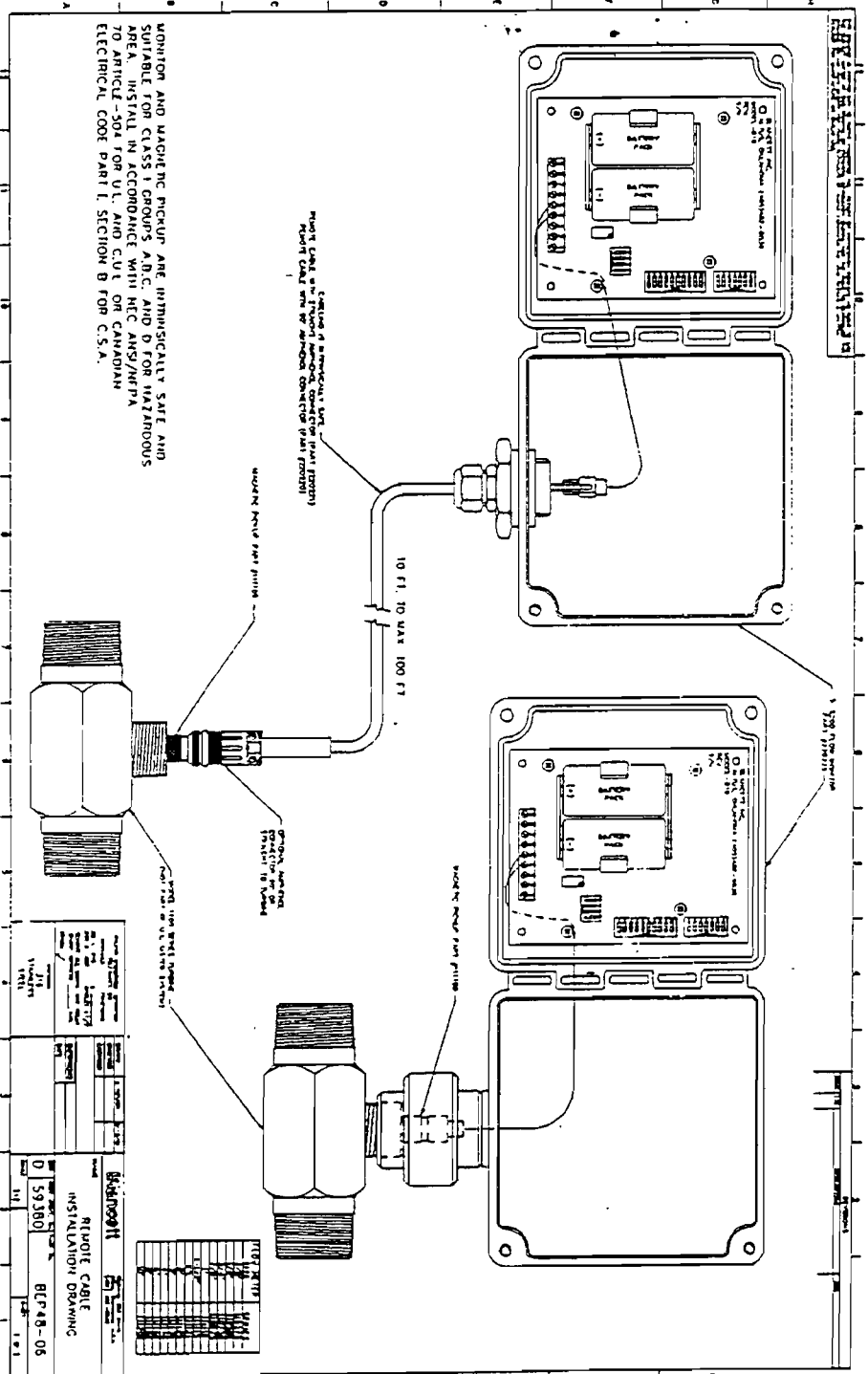
Fig. 6 Cross sectional view of a typical turbine flow meter

CAUTION: Always reassemble rotor supports, rotor, and meter body are all marked with flow arrows, which must all point in the same direction.

Note:

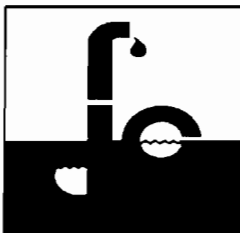
UL is a registered trademark of Underwriters Laboratories
Blancett is a registered trademark of Racine Federated Inc.

Appendix D



Instrumentation

DRC # 6154



DIVERSIFIED REMEDIATION & CONTROLS

21801 Industrial Blvd. Rogers, MN 55374 Phone (763) 428-3000 Fax (763) 428-3660

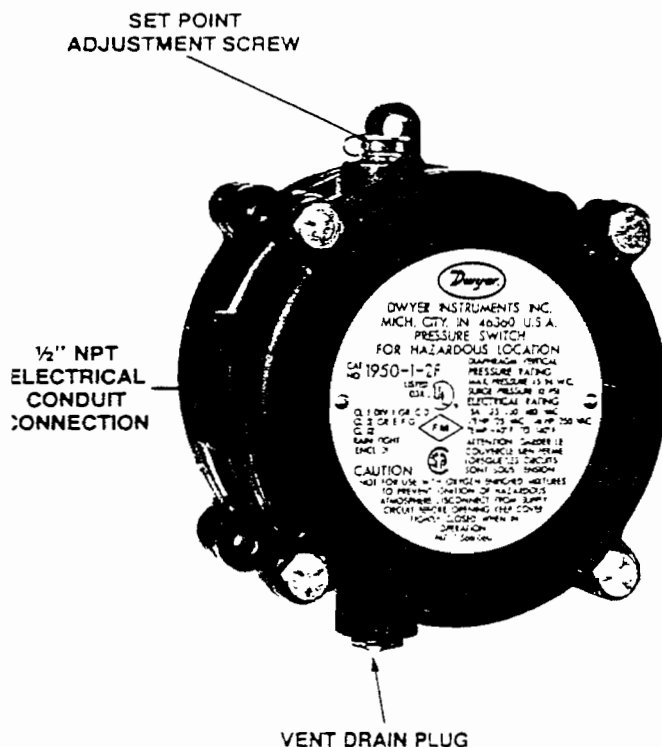


SERIES 1950

INTEGRAL EXPLOSION-PROOF PRESSURE SWITCHES

Specifications - Installation and Operating Instructions

UL and CSA Listed, FM Approved For
CL I GR. C,D - CL II GR. E,F,G - CL III



Model 1950 Switches: Operating ranges and dead bands.

To order specify Model Number	Operating Range Inches, W.C.	Approximate Dead Band	
		At Min. Set Point	At Max. Set Point
1950-02	0.03 to 0.10	0.025	0.05
1950-00	0.07 to 0.15	0.04	0.05
1950-0	0.15 to 0.5	0.10	0.15
1950-1	0.4 to 1.6	0.15	0.20
1950-5	1.4 to 5.5	0.3	0.4
1950-10	3.0 to 11.0	0.4	0.5
1950-20	4.0 to 20.0	0.4	0.6

Model Number	Operating Range PSI	Approximate Dead Band	
		Min. Set Point	Max. Set Point
1950P-2	.5 to 2.0	0.3 PSI	0.3 PSI
1950P-8	1.5 to 8.0	1.0 PSI	1.0 PSI
1950P-15	3.0 to 15.0	0.9 PSI	0.9 PSI
1950P-25	4.0 to 25.0	0.7 PSI	0.7 PSI
1950P-50	15.0 to 50	1.0 PSI	1.5 PSI

PHYSICAL DATA

Temperature Limits: -40° to 140°F (-40° to 60°C), 1950P-8, 15, 25 & 50: 0° to 140°F (-17.8° to 60°C), 1950-02: -30° to 130°F (-34.4° to 54.4°C).

Rated Pressure: 1950 — 45 IN. W.C., 1950P — 35 PSI, 1950P-50 only — 70 PSI.

Maximum surge pressure: 1950 — 10 PSI, 1950P — 50 PSI, 1950P-50 only — 90 PSI.

Pressure Connections: 1/8" NPT.

Electrical Rating: 15 amps, 125, 250, 480 volts, 60 Hz. A.C. Resistive 1/8 H.P. @ 125 volts, 1/4 H.P. @ 250 volts, 60 Hz. A.C.

Wiring connections: 3 screw type; common, norm. open and norm. closed.

Conduit connections: 1/2" NPT.

Set point adjustment: Screw type on top of housing. Field adjustable.

Housing: Anodized cast aluminum.

Diaphragm: Molded fluorosilicone rubber. 02 model, silicone on nylon.

Calibration Spring: Stainless Steel.

Installation: Mount with diaphragm in vertical position.

Weight: 3 1/4 lbs. 02 model, 4 lbs., 7 oz.

Response Time: Because of restrictive effect of flame arrestors, switch response time may be as much as 10-15 seconds where applied pressures are near set point.

NOTE: The last number-letter combination in the 1950 model number identifies the switch electrical rating (number) and diaphragm material (letter). The 2F combination is standard as described in the physical data above. In the case of special models, a number 1 rating is the same as 2; a number 3 or 4 rating is 10A 125, 250, 480 VAC - 1/8 HP 125 VAC, 1/4 HP 250 VAC; and a number 5 or 6 rating is 1A 125 VAC. A letter B indicates a Buna-N diaphragm, N; Neoprene, S; Silicone, and V; Viton.

The New Model 1950 Explosion-Proof Switch combines the best features of the popular Dwyer Series 1900 Pressure Switch with a compact explosion-proof housing.

The unit is U.L. and CSA listed, FM approved for use in Class I, Groups C & D, Class II, Groups E, F & G and Class III atmospheres. It is also totally rain-tight for outdoor installations. Twelve models allow set-points from .03 to 20 inches W.C. and from .5 to 50 PSI.

Easy access to the SPDT switch for electrical hook-up is provided by removing the top plate of the three-part aluminum housing. Adjustment to the set point of the switch can be made without disassembly of the housing. The unit is very compact, about half the weight and bulk of equivalent conventional explosion-proof switches.

CAUTION: For use only with air or compatible gases. Use of the Model 1950 switch with explosive media connected to the Low pressure port (including differential pressure applications in such media) is not recommended. Switch contact arcing can cause an explosion inside the switch housing which, while contained, may render the switch inoperative. If switch is being used to sense a single positive pressure relative to atmosphere, run a line from the low pressure port to a non-hazardous area free of combustible gases. This may increase response time on -0 and -00 models.

DWYER INSTRUMENTS, INC.

P.O. BOX 373 • MICHIGAN CITY, INDIANA 46340 U.S.A.

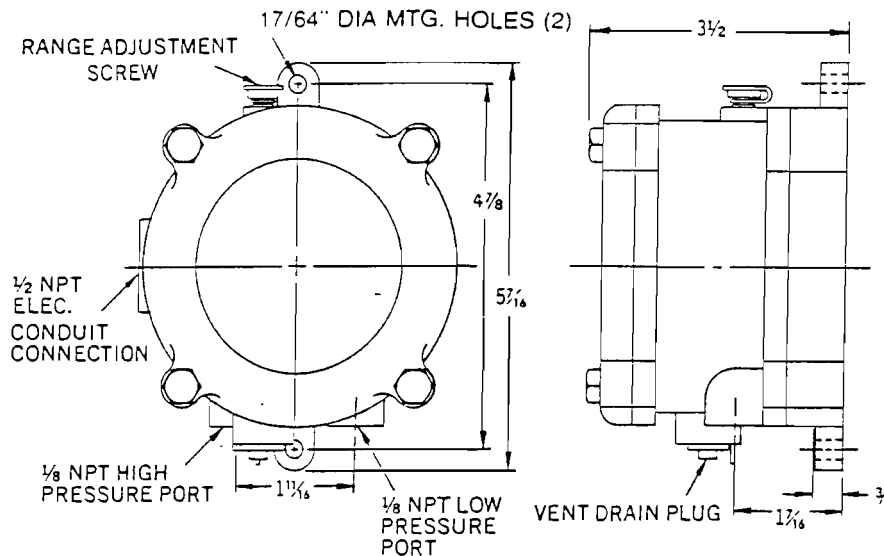
Telephone 219/678-6000

Telex 9872305

SERIES 1950

INTEGRAL EXPLOSION-PROOF PRESSURE SWITCHES

Installation and Operating Instructions



1950 SWITCH OUTLINE DIMENSIONS

INSTALLATION

1. Select a location free from excess vibration and corrosive atmospheres where temperatures will be within the limits noted under Physical Data on page 1. Switch may be installed outdoors or in areas where the hazard of explosion exists. See page 1 for specific types of hazardous service.
2. Mount standard switches with the diaphragm in a vertical plane and with switch lettering and Dwyer nameplate in an upright position. Some switches are position sensitive and may not reset properly unless they are mounted with the diaphragm vertical. Special units can be furnished for other than vertical mounting arrangements if required.
3. Connect switch to source of pressure, vacuum or differential pressure. Metal tubing with 1/4" O.D. is recommended, but any tubing which will not restrict the air flow can be used. Connect to the two 1/8" NPT female pressure ports as noted below:
 - A. Differential pressures - connect pipes or tubes from source of greater pressure to high pressure port marked HIGH PRESS. and from source of lower pressure to low pressure port marked LOW PRESS.
 - B. Pressure only (above atmospheric) - connect tube from source of pressure to high pressure port. The low pressure port is left open to atmosphere. See CAUTION on page 1.
 - C. Vacuum only (below atmospheric pressure) - connect tube from source of vacuum to low pressure port. The high pressure port is left open to atmosphere.
4. To make electrical connections, remove the three hex head screws from the cover and after loosening the fourth captive screw, swing the cover aside. Electrical connections to the standard single pole, double throw snap switch are provided by means of screw terminals marked "common," "norm open," and "norm closed." The normally open contacts close and the normally closed contacts open when pressure increases beyond the setpoint. Switch loads for standard models should not

exceed the maximum specified current rating of 15 amps resistive. Switch capabilities decrease with an increase in ambient temperature, load inductance, or cycling rate. Whenever an application involves one or more of these factors, the user may find it desirable to limit the switched current to 10 amps or less in the interest of prolonging switch life.

ADJUSTMENT

To change the setpoint:

- A. Remove the plastic cap and turn the slotted Adjustment Screw at the top of the housing clockwise to raise the setpoint pressure and counter-clockwise to lower the setpoint. After calibration, replace the plastic cap and re-check the setpoint.
- B. The recommended procedure for calibrating or checking calibration is to use a "T" assembly with three rubber tubing leads, all as short as possible and the entire assembly offering minimum flow restriction. Run one lead to the pressure switch, another to a manometer of known accuracy and appropriate range, and apply pressure through the third tube. Make final approach to the setpoint very slowly. Note that manometer and pressure switch will have different response times due to different internal volumes, lengths of tubing, fluid drainage, etc. Be certain the switch is checked in the position it will assume in use, i.e. with diaphragm in a vertical plane and switch lettering and Dwyer nameplate in an upright position.
- C. For highly critical applications check the setpoint adjustment and if necessary, reset it as noted in step A.

MAINTENANCE

The moving parts of these switches need no maintenance or lubrication. The only adjustment is that of the setpoint. Care should be taken to keep the switch reasonably clean. Periodically the vent drain plug should be rotated then returned to its original position. This will dislodge deposits which could accumulate in applications where there is excessive condensation within the switch.



Dwyer Instruments Inc.

P.O. Box 100, Hickory, NC 28601, U.S.A.

Phone: (704) 344-1000 Fax: (704) 344-1001

Installation & Maintenance Sheet Supplement for CE mark on Ashcroft® switches Low Voltage Directive 73/23/EEC

Installation requirements

- To minimize the risk of injury, the switch enclosure must be selected according to the area classification and installed according to the required safety and electrical codes.
- Before operating the switch all conduit entries and/or junction boxes need to be closed according to the required safety and electrical codes.
- To attain the degree of protection listed on the switch it may be necessary to add required conduit fittings.
- The switch must be protected from moisture, shock and/or extreme vibration.
- The ambient temperature limits for switches are -20 to 150°F, (-28 to 65°C).

Cautions

- Always install the cover after wiring the switch and before power is supplied.
- Before removing the cover in hazardous areas be sure there is no explosive atmosphere present and the power supply is turned off.
- For CENELEC approved switches all safety locking devices and electrical earthing must be installed or connected before operating.
- Never carry a temperature switch by holding only the stem, bulb or capillary.
- Do not exceed ranges, current and/or voltage limits.
- The protection degree of the switch is only valid when the switch is installed in accordance with all safety and electrical codes and regulations.

Cleaning

- Never use aggressive solvents.
- Do not use high pressure water to clean the switch.

Maintenance / Trouble shooting

- All Ashcroft switches require little or no maintenance.
- Be sure that the case is closed at all times.
- When the switch is exposed to process media that may harden and/or build up in the pressure port, the switch should be removed and cleaned as needed.
- If the switch does not function, only trained and skilled personnel should check on the wiring, power supply and/or mounting.
- If the problem can not be solved, please contact one of the Dresser affiliates or distributors.

Electrical connections

- Only trained and skilled personnel are allowed to install the wires to the electrical terminals of the switch.
- Cable couplers, glands and conduit connectors must have the correct electrical approvals.
- Always follow safety and electrical regulations when connecting these devices.
- The system ground of the device is marked with a green colored screw and/or by the ground symbol.
- CENELEC approved switches have an external ground screw that must be connected.
- Micro switch terminals and wire color codes:
 - NO (Normally Open), blue
 - NC (Normally Closed), red
 - C (Common), white
 - Ground, green (F-Series only)

Table 1: Micro switch electrical ratings

Micro Switch Code				Electrical Rating	
Single	Dual	Single	Dual	Vac	Vdc
K	KK	20	61	15A, 250V	0.4A, 120V
W	WW	21	65	5A, 250V	
P	PP	22	67	5A, 250V	2.5A, 28V
C	n/a	23	n/a	22A, 250V	
G	GG	24	64	15A, 480V	0.25A, 250V
S	N/A	25	n/a	10A, 250V	10A, 250V
F	FF	26	62	15A, 250V	0.4A, 120V
Y	YY	27	63	15A, 250V	
U	UU	28	n/a	15A, 250V	
E	EE	29	n/a	15A, 250V	
M	MM	31	70	1A, 250V	50mA, 60V
J	JJ	32	68	11A, 250V	5A, 30V
L	LL	42	71	1A, 125V	
n/a	n/a	50	n/a	15A, 250V	
H	HH	35	n/a	10A, 250V	0.3A, 250V



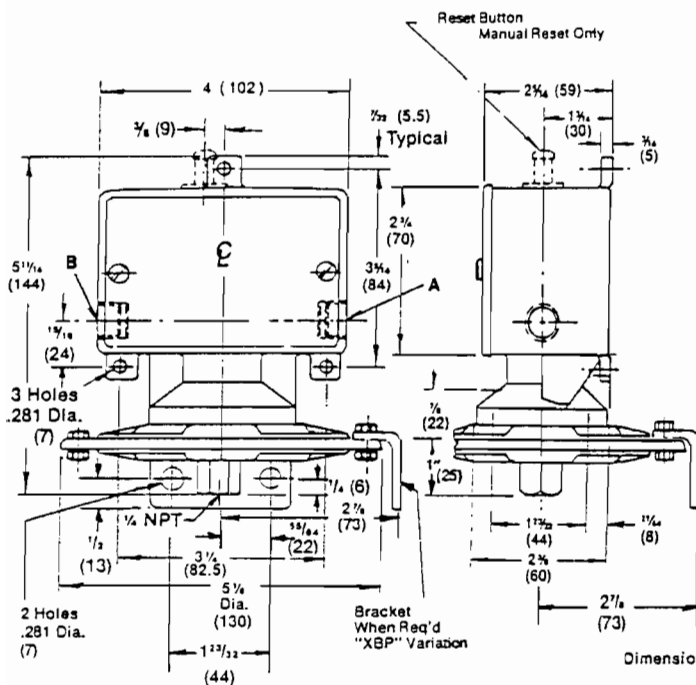
210 Old Gate Lane Milford, CT 06460
V - 203-878-5641 F - 203-877-8519

I & M_sht.doc
Copyright 5/97

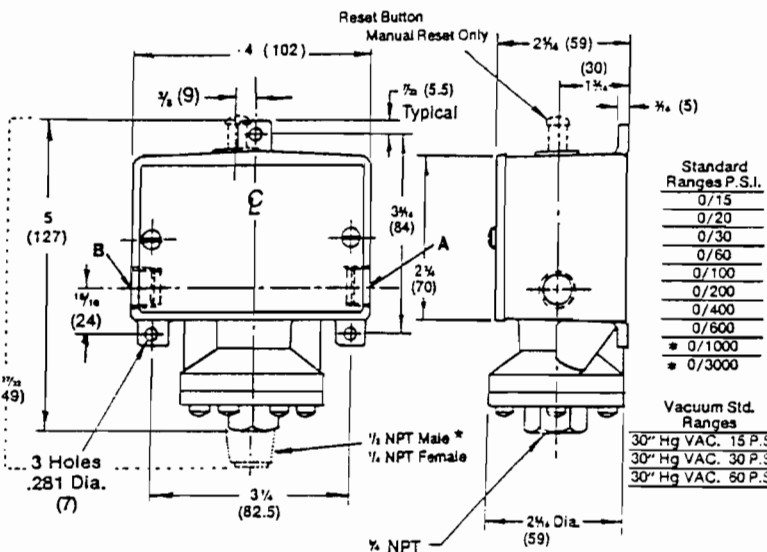
INSTALLATION AND MAINTENANCE B400 & B700 SERIES ASHCROFT[®] SNAP ACTION SWITCHES FOR PRESSURE CONTROL

HOLE	TYPE	
	STANDARD B400	VARIATION XJK
A	¾ NPT	¾ NPT
B	OMIT	¾ NPT

B400



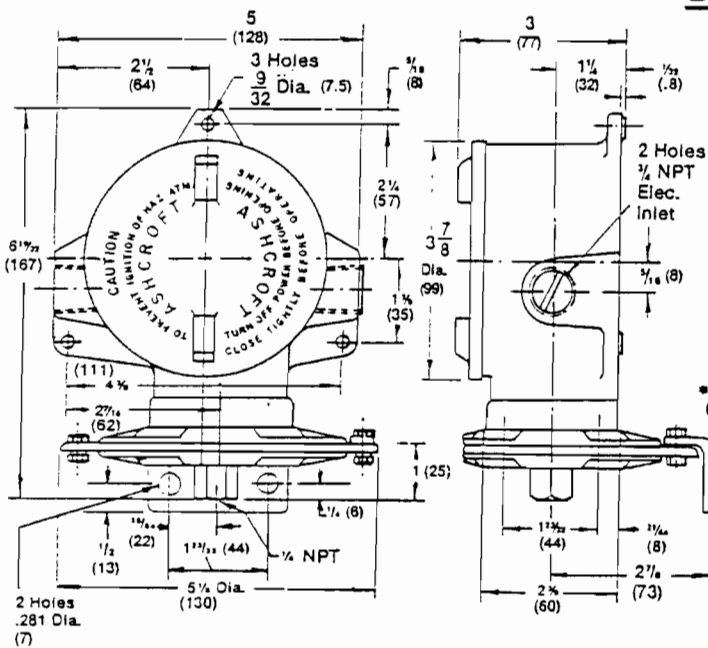
Ranges: 10, 30, 60, 100 & 150" Water



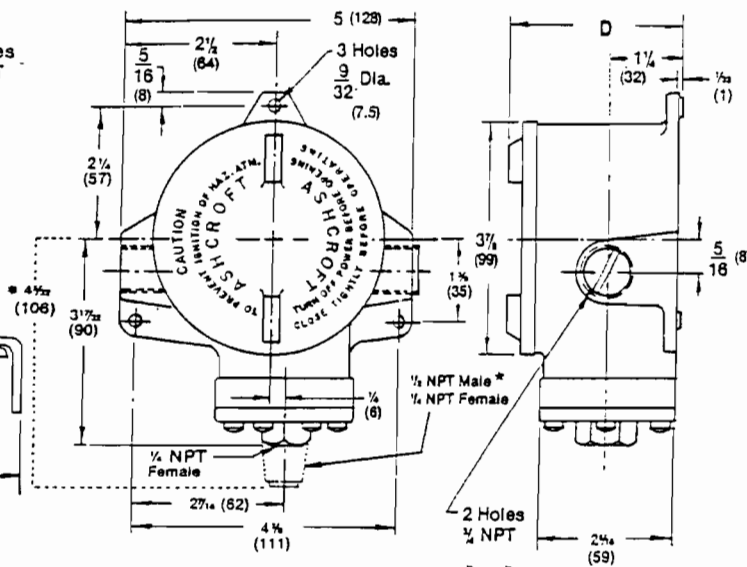
Dimensions in () are in millimeters.

B700

TYPE	"D" DIM.
SPDT	3 (76)
2-SPDT	3 7/8 (99)



Ranges: 10, 30, 60, 100 & 150' Water



Ranges-Vacuum 15, 30, 60, 100, 200, 400, 600, 1000, 3000

Dimensions in () are in millimeters.

INTRODUCTION

The Ashcroft pressure switch is a precision built U.L. and F.M. approved control device which features a mechanical snap action switch. Controllers are available for operation on pressure or vacuum with fixed or variable differential. Also manual reset types for operation on increasing or decreasing pressure. The manual reset types remain tripped until reset by pressing a button on top of the enclosure. Standard electrical switch is SPDT, available

with various electrical characteristics. Two SPDT switch elements mounted together are available except on variable Deadband and manual reset types. Various wetted material constructions for compatibility with a range of pressure media may be obtained.

The Ashcroft snap action pressure switch is furnished in the standard NEMA 4 and explosion-proof NEMA 7 & 9 enclosure styles. Both enclosures are epoxy coated aluminum castings.

INSTALLATION

These controls are precision instruments and should never be left with internal components exposed. During installation insure that covers are in place and conduit openings are closed except when actually working on the control.

MOUNTING B400 AND B700 SERIES

Three holes external to the enclosure for surface mounting. Location of these holes is shown on the general dimension drawing. They may also be mounted directly on pressure line using the pressure connection. **When tightening control to pressure line, always use the wrench flats or hex on the lower housing.**

ELECTRICAL CONNECTIONS

Remove cover

B400 Series — two screws hold cover to enclosure

B700 Series — cover unscrews

CONDUIT CONNECTIONS

NOTE — It is recommended that Teflon tape or other sealant be used on conduit, bushing or plug threads to ensure integrity of the enclosure.

B400 series standard — one $\frac{3}{4}$ " NPT conduit hole right side.

B700 series standard — two $\frac{3}{4}$ " NPT conduit holes with one permanent plug. NEMA 7 & 9 enclosures require proper conduit seals and breathers as per the National Electrical Code.

B400 & B700 series — XJL variation — two $\frac{3}{4}$ " NPT conduit holes with two $\frac{3}{4}$ " to $\frac{1}{2}$ " NPT reducing bushings.

B400 series — XJK variation — two $\frac{3}{4}$ " NPT conduit holes.

B400 SERIES

SPDT — Wire directly to the switch according to circuit requirements. On controls with pilot lights wire lights according to circuit diagram on inside of cover. See special wiring instruction tag for single switches with two pilot lights and dual switches with one or more lights.

2-SPDT — Dual switching elements consist of two SPDT switches mounted together in a bracket. Switches are calibrated to have simultaneous operation within 1% of range either on increasing or decreasing pressure but not in both directions. Wire directly to the front and rear switch according to circuit requirements. Leads are provided on rear switch color coded as follows:

Common	— White
Normally Closed	— Red
Normally Open	— Blue

See SPDT instructions for pilot light hook-up.

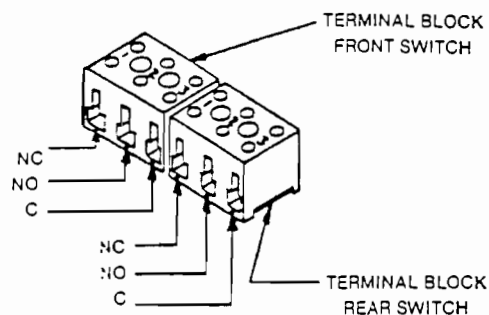
When hermetically sealed switch element(s) are supplied, the lead color coding is as follows:

Common	— White
Normally Closed	— Red
Normally Open	— Blue

B700 SERIES

SPDT — Wire directly to the switch according to circuit requirements.

2-SPDT — Wire to front switch terminal block (left) and rear switch terminal block (right) as marked. Strip insulation $\frac{3}{16}$ ", insert in proper terminal connector and tighten clamping screw to secure.



ADJUSTMENT OF SET POINT

B400 & B700 Series — A single set point adjustment nut ($\frac{1}{4}$ ") is located centrally at the bottom on the inside of the enclosure.

For accurate set point calibration, mount the switch on a calibration stand, a pump or catalog No. 1305 deadweight gauge tester. A suitable reference standard such as an Ashcroft Duragauge or Test Gauge is necessary to observe convenient changes in pressure.

As received, the pressure switch will normally be set to approximately 90% of the indicated range. Pressurize the system to required set point and turn the adjustment nut until switch changes mode. Direction of turning is indicated on a label affixed to the inside of the control enclosure. When set point has been achieved raise and lower pressure to insure that set point is correct.

After installation of the control replace cover to insure electrical safety and to protect internal parts from the environment.

B450 and B750 VARIABLE DEADBAND SWITCHES

Deadband is varied by rotating the wheel on the precision switch. When viewed from the front of the enclosure, rotation to the left increases deadband—rotation to the right decreases deadband. Letters on the wheel may be used as a reference. Deadbands obtainable will vary from 0.5% to 9% of pressure range depending on range segment and type of diaphragm.

ADJUSTMENT OF SET POINT

As received, the pressure switch will normally be set to approximately 90% of range. Rotate the wheel on the MICRO SWITCH all the way to the right; this will provide smallest deadband. Pressurize the system to the required set point and turn the adjustment nut until the switch changes mode. Lower the pressure to reset the switch. Rotate the wheel on the MICRO SWITCH until the desired deadband is obtained. The upper set point will be changing upward with this adjustment. Lower the pressure to reset the switch. Then increase the pressure to the desired set point and turn the adjusting nut until the switch changes mode. Lower the pressure and check reset point and deadband.

NOTE—As indicated above, adjustment of set point is made by use of $\frac{1}{4}$ " nut. Precision switch element mounting screws and bracket adjusting screw are factory sealed and should not be tampered with.



INSTRUMENT DIVISION
DRESSER EQUIPMENT GROUP, INC.
MILFORD, CONNECTICUT 06460
PHONE: 203-878-5641 • FAX: 203-877-8519

Installation & Maintenance Instructions

SERIES

8215

2-WAY INTERNAL PILOT-OPERATED SOLENOID VALVES
NORMALLY CLOSED OPERATION - 3/4", 1", 1-1/4", 1-1/2" OR 2" NPT

Form No.V5996F

IMPORTANT: See separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Causes of Improper Operation, and Coil Replacement.

DESCRIPTION

Series 8215 valves are 2-way normally closed internal pilot-operated solenoid valves. Valve bodies are made of rugged aluminum with trim and internal parts made of steel and stainless steel. Series 8215 valves may be provided with a general purpose or explosionproof solenoid enclosure.

OPERATION

Normally Closed: Valve is closed when solenoid is de-energized; open when energized.

Note: No minimum operating pressure differential required.

INSTALLATION

▲ CAUTION: Not all valves are approved for fuel gas service. Check nameplate for correct catalog number, pressure, voltage, frequency, and service. Never apply incompatible fluids or exceed pressure rating of the valve. Installation and valve maintenance to be performed by qualified personnel.

Future Service Considerations

Provision should be made for performing seat leakage, external leakage, and operational tests on the valve with a nonhazardous, noncombustible fluid after disassembly and reassembly.

Temperature Limitations

For maximum valve ambient and fluid temperatures, refer to chart below. Check catalog number prefix on nameplate to determine maximum temperatures.

Construction	Coil Class	Catalog Number Prefix	Max. Ambient Temp°F	Max. Fluid Temp°F
AC Construction	F	FT	125	125
	H	HT	140	140
DC Construction	B	None	77	77
	H	HT		

*Dupont's Registered Trademark

•Automatic Switch Co. MCMXCI All Rights Reserved

Page 1 of 4

ASCO Valves

Automatic Switch Co. 50-60 Hanover Road, Florham Park, New Jersey 07932

Positioning

Valve must be mounted with solenoid vertical and upright.

Piping

Connect piping to valve according to markings on valve body. Apply pipe compound sparingly to male pipe threads only. If applied to valve threads the compound may enter the valve and cause operational difficulty. Avoid pipe strain by properly supporting and aligning piping. When tightening the pipe, do not use valve or solenoid as a lever. Locate wrenches applied to valve body or piping as close as possible to connection point.

▲ CAUTION: To avoid damage to the valve body, DO NOT OVERTIGHTEN PIPE CONNECTIONS. If Teflon* tape, paste, spray or similar lubricant is used, use extra care when tightening due to reduced friction.

IMPORTANT: To protect the solenoid valve, install a strainer or filter, suitable for the service involved, in the inlet side as close to the valve as possible. Clean periodically depending on service conditions. See ASCO Series 8600, 8601 and 8602 for strainers.

MAINTENANCE

▲ WARNING: To prevent the possibility of severe personal injury or property damage, turn off electrical power, depressurize valve, extinguish all open flames and avoid any type of sparking or ignition. Vent hazardous or combustible fluid to a safe area before servicing the valve.

NOTE: It is not necessary to remove the valve from the pipeline for repairs.

Cleaning

All solenoid valves should be cleaned periodically. The time between cleanings will vary depending on the medium and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise or leakage will indicate that cleaning is required. In the extreme case, faulty valve operation will occur and the valve may fail to open or close. Clean valve strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep the medium flowing through the valve as free from dirt and foreign material as possible.
- While in service, the valve should be operated at least once a month to insure proper opening and closing.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Causes of Improper Operation

- **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
- **Excessive Leakage:** Disassemble valve and clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Valve Disassembly

▲ WARNING: To prevent the possibility of severe personal injury or property damage, turn off electrical power, depressurize valve, extinguish all open flames and avoid any type of sparking or ignition. Vent hazardous or combustible fluid to a safe area before servicing the valve.

NOTE: Determine valve construction AC (Figure 1 on page 3) or DC (Figure 2 on page 4) then proceed as follows:

1. Remove solenoid enclosure, see separate installation and maintenance instructions.
2. For AC Construction, unscrew solenoid base sub-assembly. For DC Construction, unscrew solenoid base sub-assembly with special wrench adapter provided in ASCO Rebuild Kit. For wrench adapter only, order kit No.K218-949. NOTE: For alternate type open end wrench, order kit No.K168-146-1 which is available for solenoid base sub-assembly removal or replacement.
3. Remove bonnet screws, valve bonnet, bonnet gasket, core/diaphragm sub-assembly and body gasket.
4. All parts are now accessible to clean or replace. If parts are worn or damaged, install a complete ASCO Rebuild kit.

Valve Reassembly

1. Lubricate bonnet gasket and body gasket with a light coat of DOW CORNING® 200 Fluid lubricant or an equivalent high-grade silicone fluid.
2. Apply a light coat of RemGrit TFL 50® Dry Lubricant to:
 - Valve seat
 - Valve body flange where diaphragm assembly contacts the valve body and body gasket.
 - Internal surface of valve bonnet where diaphragm assembly contacts bonnet when valve is in the energized (open position).

IMPORTANT: If valve has been disassembled for inspection and cleaning only and a Rebuild Kit is not being installed, lubricate the following with RemGrit TFL 50® Dry Lubricant:

- Diaphragm assembly on both sides.
- Main disc at base of core/diaphragm sub-assembly.
- Pilot disc at base of core assembly.

▲ CAUTION: Do not distort hanger spring between core assembly and diaphragm assembly when lubricating pilot disc.

3. Replace body gasket and core/diaphragm sub-assembly with closing spring attached. Locate bleed hole in core/diaphragm sub-assembly approximately 30° from the valve inlet.
4. Replace valve bonnet and bonnet screws (6). Torque screws in a crisscross manner to 100 ± 10 in-lbs [$11,3 \pm 1,1$ Nm].
5. For AC construction, replace bonnet gasket and solenoid base sub-assembly. For DC construction refer to separate "Solenoid Installation and Maintenance Instructions" for lubrication instructions; then install bonnet gasket, housing and solenoid base sub-assembly. Torque solenoid base sub-assembly to 175 ± 25 in-lbs [$19,8 \pm 2,8$ Nm].
6. Replace solenoid (see separate instructions) and make electrical hookup.

▲ WARNING: To prevent the possibility of severe personal injury or property damage, check valve for proper operation before returning to service. Also perform internal seat and external leakage tests with a nonhazardous, noncombustible fluid.

7. Restore line pressure and electrical power supply to valve.
8. After maintenance is completed, operate the valve a few times to be sure of proper operation. A metallic *click* signifies the solenoid is operating.

ORDERING INFORMATION FOR ASCO REBUILD KITS

Parts marked with an asterisk (*) in the exploded views are supplied in Rebuild Kits.

- When Ordering Rebuild Kits for ASCO Valves, order the Rebuild Kit number stamped on the valve nameplate. +

+ If the number of the kit is not visible, order by indicating the number of kits required, and the Catalog Number and Serial Number of the valve(s) for which they are intended.

Torque Chart

Part Name	Torque Value In Inch-Pounds	Torque Value In Newton-Meters
Solenoid Base Sub-Assembly	175 ± 25	19,8 ± 2,8
Bonnet Screws	100 ± 10	11,3 ± 1,1

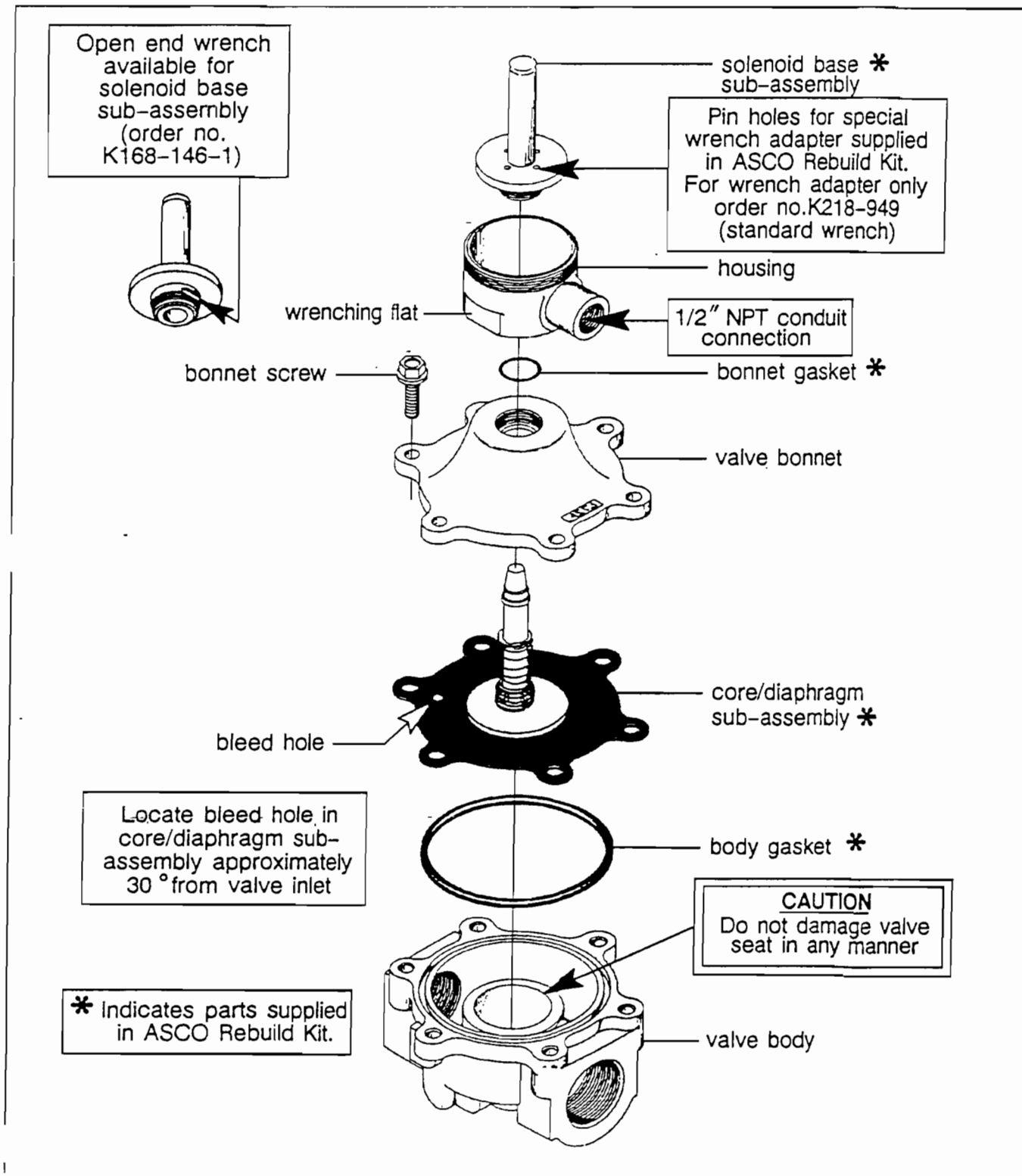


Figure 2. Series 8215 valves without solenoid, DC Construction.

Torque Chart

Part Name	Torque Value In Inch-Pounds	Torque Value In Newton-Meters
Solenoid Base Sub-Assembly	175 ± 25	19,8 ± 2,8
Bonnet Screws	100 ± 10	11,3 ± 1,1

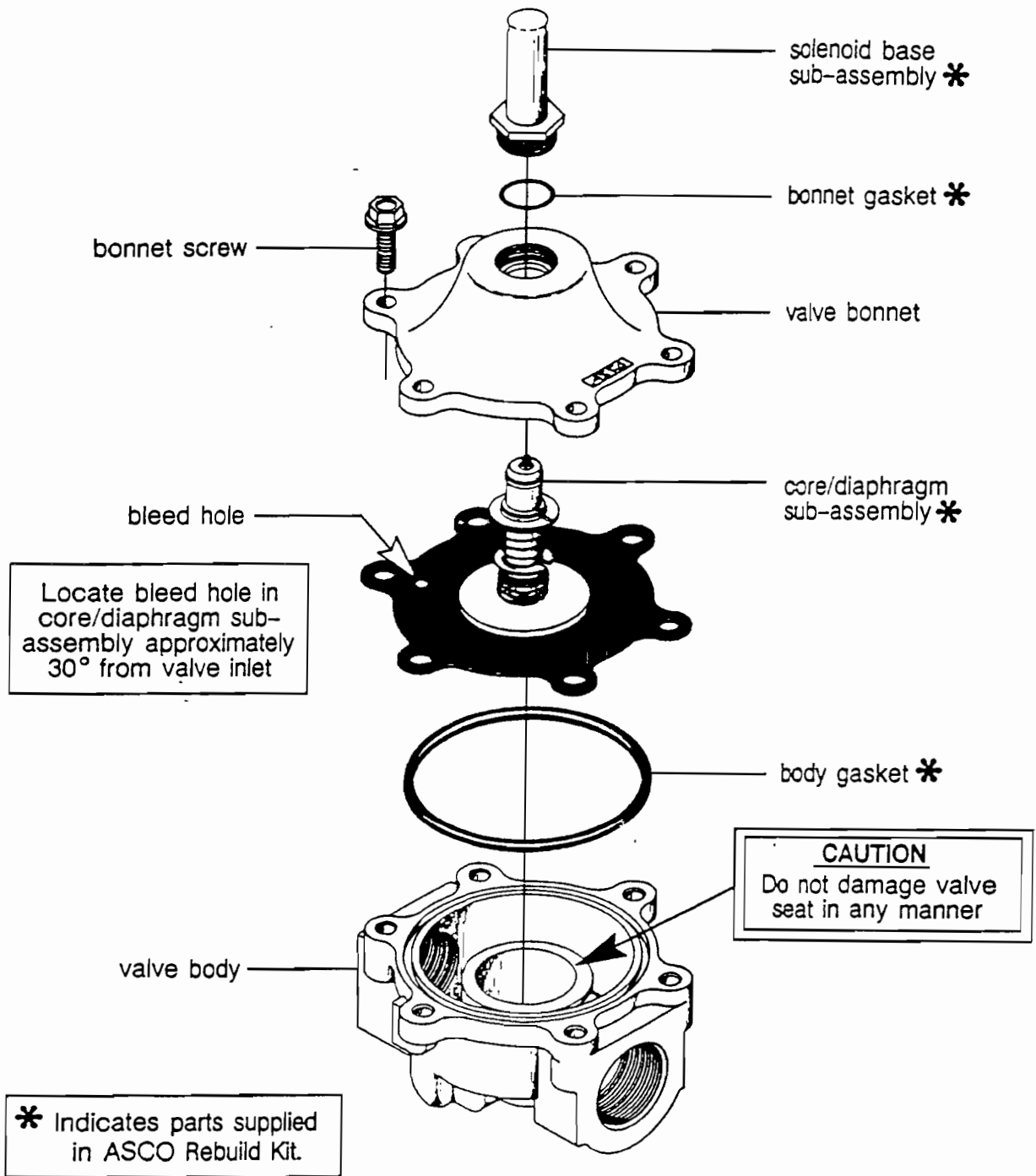


Figure 1. Series 8215 valves without solenoid, AC Construction.

Installation & Maintenance Instructions

GENERAL PURPOSE AND RAINTIGHT/WATERTIGHT/EXPLOSIONPROOF SOLENOIDS

SERIES

8017

Form No. V5381R8

IMPORTANT: See separate valve installation and maintenance instructions for information on: Operation, Positioning, Mounting, Cleaning, Preventive Maintenance, Causes of Improper Operation, Disassembly and Reassembly of basic valve.

DESCRIPTION

Solenoid Catalog Numbers 80171 and 80172 have a Type 1, General Purpose Solenoid Enclosure. Solenoid Catalog Numbers EF80171, EF80172, 80173, and 80174 meet the requirements of Enclosure Type 3 - Raintight, Type 7 (C & D) Explosionproof, and Type 9 (E, F, & G) Dust - Ignitionproof. When constructed with a cover gasket and solenoid bonnet gasket they also meet the requirement of Enclosure Type 4 - Watertight. Series 8017 solenoids (when installed as a solenoid and not as part of an ASCO valve) are supplied with a core which has a 0.250-28 UNF-2B tapped hole, with 0.38 inch minimum full thread.

OPERATION

When the solenoid is energized, the core is drawn into the solenoid base sub-assembly.

IMPORTANT: When the solenoid is de-energized, the initial return force for the core, whether developed by spring, pressure, or weight, must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force for AC construction is 1 pound, 12 ounces and 5 ounces for DC construction.

INSTALLATION

Check nameplate for correct catalog number, voltage, frequency, wattage, and service.

Enclosure Types 3, 4, 7, and 9

CAUTION: To prevent fire or explosion, do not install solenoid enclosure and/or valve where ignition temperature of hazardous atmosphere is less than 160°C. On valves used for steam service or when a class "H" solenoid is used, do not install in hazardous atmosphere where ignition temperature is less than 180°C. See nameplate for service.

Enclosure Types 3, 4, 7, and 9

Used in -40°C Ambient Temperature Applications

WARNING: To prevent fire or explosion, use only conduit runs 1/2" in size with a sealing fitting connected within 3 feet of the solenoid enclosure.

IMPORTANT: To protect the solenoid operator or valve, install a strainer or filter, suitable for the service involved in the inlet side as close to the valve or operator as possible. Clean periodically depending on service conditions.

Positioning

This solenoid is designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertically and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub-assembly area.

Wiring

Wiring must comply with local codes and the National Electrical Code.

CAUTION: Do not use the solenoid enclosure as a splice box.

The general purpose solenoid housing has a 7/8" diameter hole to accommodate 1/2" conduit. To facilitate wiring, the general purpose solenoid enclosure may be rotated 360° by removing the retaining cap or clip.

CAUTION: When metal retaining clip disengages, it will spring upward. Rotate solenoid enclosure to desired position. Then replace retaining cap or clip before operating. On some solenoids, a grounding wire which is green or green with yellow stripes is provided. Use rigid metallic conduit to ground

all enclosures not provided with a green grounding wire. For the raintight/watertight/ explosionproof solenoid enclosure, electrical fittings must be approved for use in hazardous locations. This enclosure has a 1/2" conduit connection and may be rotated 360° to facilitate wiring.

WARNING: To prevent the possibility of personal injury or property damage from accidental disengagement of solenoid from valve body, hold housing securely by wrenching flats while removing or replacing housing cover.

To rotate enclosure, loosen housing cover using a 1" socket wrench. Two wrenching flats are provided on the housing to hold it securely in place while the cover is being loosened or tightened. Rotate housing to desired position and tighten cover before operating. Torque cover to 135 ± 15 in-lbs [15.3 ± 1.7 Nm].

NOTE: Alternating current (AC) and direct current (DC) solenoids are built differently. To convert from one to the other, it is necessary to change the complete solenoid including the core and solenoid base sub-assembly, not just the coil. Consult ASCO.

Solenoid Enclosure Assembly

Solenoid Catalog Numbers 80171 and 80172 may be assembled as a complete unit. Tightening is accomplished by means of a hex flange at the base of the solenoid enclosure.

Solenoid Catalog Numbers EF80171, EF80172, 80173, and 80174 must be assembled in the following manner:

1. The solenoid enclosure must be completely disassembled. For disassembly, see the instructions given in *Coil Replacement* section.
2. After disassembly, the solenoid base sub-assembly is placed inside the housing over the assembly location.
3. The assembly is then tightened in place by means of two (2) slots in the bonnet adjacent to the tube on the solenoid base sub-assembly. Use special adapter wrench provided with solenoid. For ASCO wrench kit only, Order No. K218950. Exercise care during tightening procedure to prevent deforming or raising of bonnet surface adjacent to slots.
4. Reassemble solenoid, follow instructions in *Coil Replacement* section.

Solenoid Temperature

Standard solenoids are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid enclosure becomes hot and can be touched by hand only for an instant. This is a safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation.

MAINTENANCE

WARNING: To prevent the possibility of personal injury or property damage, turn off electrical power, depressurize solenoid operator or valve, and vent fluid to a safe area before servicing.

Cleaning

All solenoid operators and valves should be cleaned periodically. The time between cleaning will vary depending on medium and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise or leakage will indicate that cleaning is required. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep the medium flowing through the solenoid operator or valve as free from dirt and foreign material as possible.
- While in service, the solenoid operator or valve should be operated at least once a month to ensure proper opening and closing.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any parts that are worn or damaged.

© Automatic Switch Co.

MCN0011. All Rights Reserved

1 of 4

ASCO Valves

Automatic Switch Co.

50-00 Hanover Road, Flomham Park, New Jersey 07032

Causes of Improper Operation

- **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic *click* indicates loss of power supply. Check for loose or blown fuses, open-circuited or grounded coil, broken lead wires or splice connections.
- **Burned-Out Coil:** Check for open-circuited coil. Replace if necessary. Check supply voltage; it must be the same as specified on nameplate and as marked on the coil.
- **Low Voltage:** Check voltage across the coil leads. Voltage must be at least 85% of nameplate rating.

Coil Replacement for Solenoid Catalog Numbers 80171 and 80172 General Purpose Enclosure

1. Disconnect coil lead wires and grounding wire if present.
2. Remove retaining cap or clip from top of solenoid.

- ⚠ **CAUTION:** When metal retaining clip disengages, it will spring upward.
3. Remove nameplate (if present), cover, and spring washer (alternate construction only).
 4. For AC construction, slip yoke containing coil, sleeves, insulating washers, and grounding wire (if present) off solenoid base sub-assembly. For DC construction, slip grounding wire (if present), flux washer and coil off the solenoid base sub-assembly.
- NOTE: Insulating washers are omitted when a molded coil is used.
5. Coil is now accessible for replacement.

⚠ **CAUTION:** Solenoid must be fully reassembled because the housing and internal parts complete the magnetic circuit. Place an insulating washer at each end of non-molded coil.

Coil Replacement for Solenoid Catalog Numbers EF80171, EF80172, 80173, and 80174 Raintight/Watertight/Explosionproof Enclosure

1. Disconnect coil lead wires and grounding wire if present.

⚠ **WARNING:** To prevent the possibility of personal injury or property damage from accidental disengagement of solenoid from valve body, hold housing securely by wrenching flats while removing or replacing housing cover.

2. Unscrew housing cover with cover gasket and nameplate attached. Two wrenching flats are provided to hold the housing securely in place while the cover is being loosened or tightened.
- NOTE: Some older solenoid constructions do not have a cover gasket or solenoid bonnet gasket present.
3. Remove retainer from top of solenoid base sub-assembly.
 4. For AC construction, slip yoke containing coil, sleeves, insulating washers, and grounding wire, (if present) off the solenoid base sub-assembly. For DC construction, remove grounding wire (if present), yoke, insulating washer, coil and insulating washer.
- NOTE: Insulating washers are omitted when a molded coil is used.
5. Coil is now accessible for replacement.
 6. If additional disassembly is required, unscrew solenoid base sub-assembly using special wrench adapter supplied in ASCO Enclosure or Rebuild Kit. For ASCO wrench kit only, Order No.KJ218950.
 7. Remove solenoid base sub-assembly with solenoid bonnet gasket.
 8. Reassemble using exploded view for identification and placement of parts. Before reassembly, see note below for cleaning and greasing requirements.
 9. Torque solenoid base sub-assembly to 175 ± 25 in-lbs [19.8 ± 2.8 Nm].
 10. Torque housing cover to 135 ± 15 in-lbs [15.3 ± 1.7 Nm].

⚠ **CAUTION:** Solenoid must be fully reassembled because the housing and internal parts complete the magnetic circuit. Place an insulating washer at each end of non-molded coil.

NOTE: Solenoid Catalog Numbers EF80171, EF80172, 80173, and 80174—Installation and maintenance of raintight/watertight/explosionproof equipment requires more than ordinary care to insure safe performance. All finished surfaces of the solenoid are constructed to provide flame-proof seal. Be sure that the surfaces are wiped clean before reassembling. Grease the cover gasket, solenoid bonnet gasket, and the joints of the raintight/watertight/explosionproof solenoid enclosure with DOW CORNING® 111 Compound lubricant or an equivalent high-grade silicone grease. Grease all joints thoroughly including the underside of the solenoid base sub-assembly flange and internal threads of the housing cover.

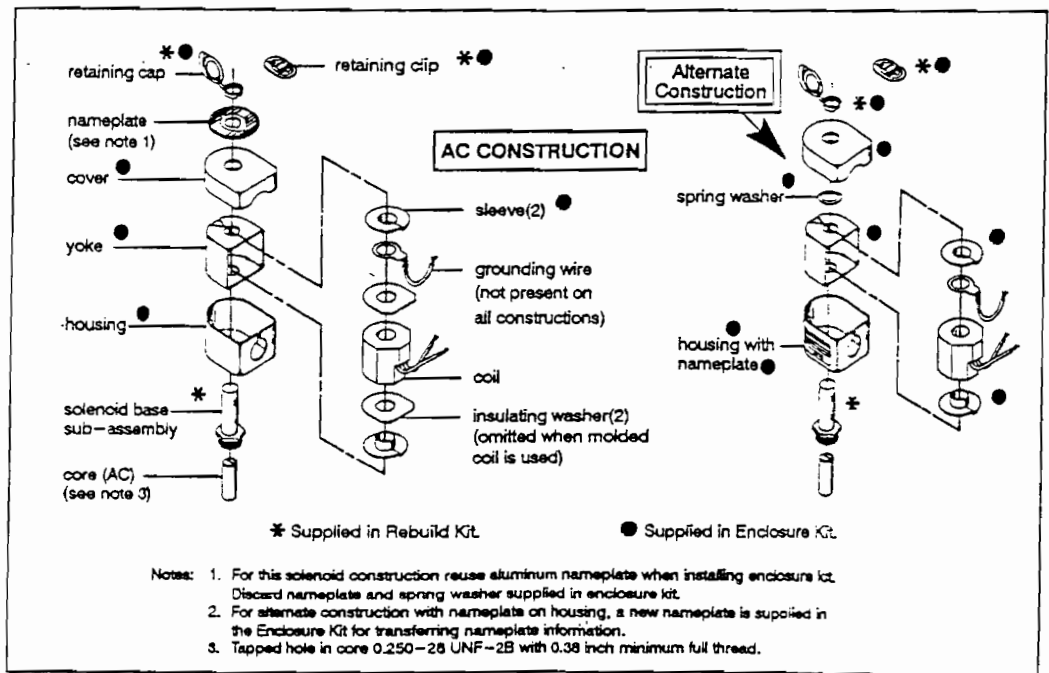


Figure 1. Catalog Nos. 80171 and 80172 General Purpose Solenoid Enclosure, AC Construction.
2 of 4 Form No.V5381R6

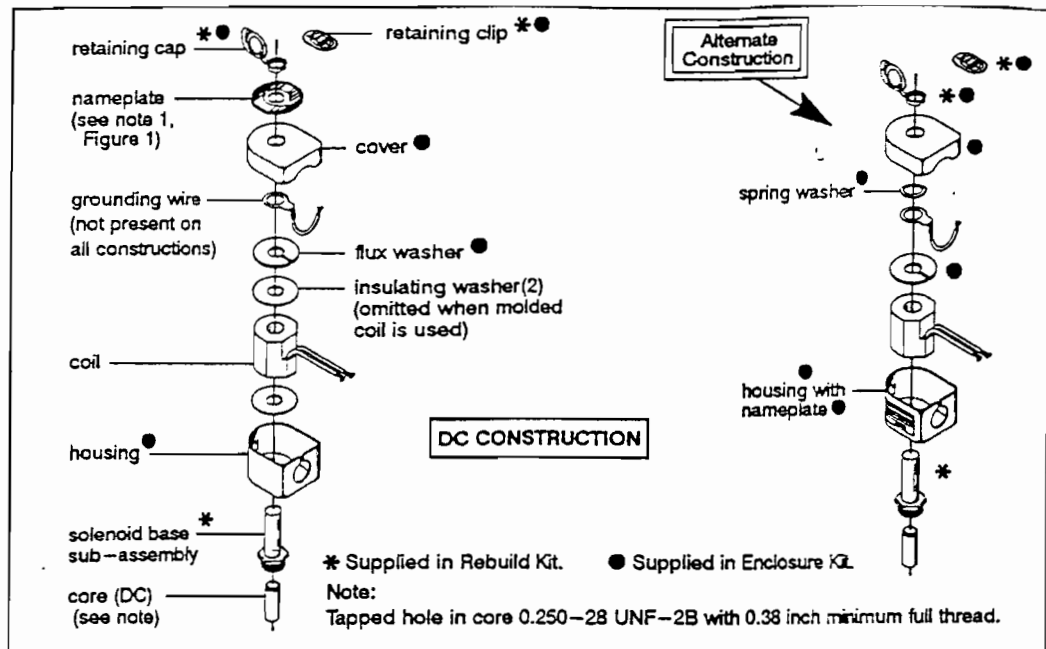


Figure 2. Catalog Nos. 80171 and 80172 General Purpose Solenoid Enclosure, DC Construction.

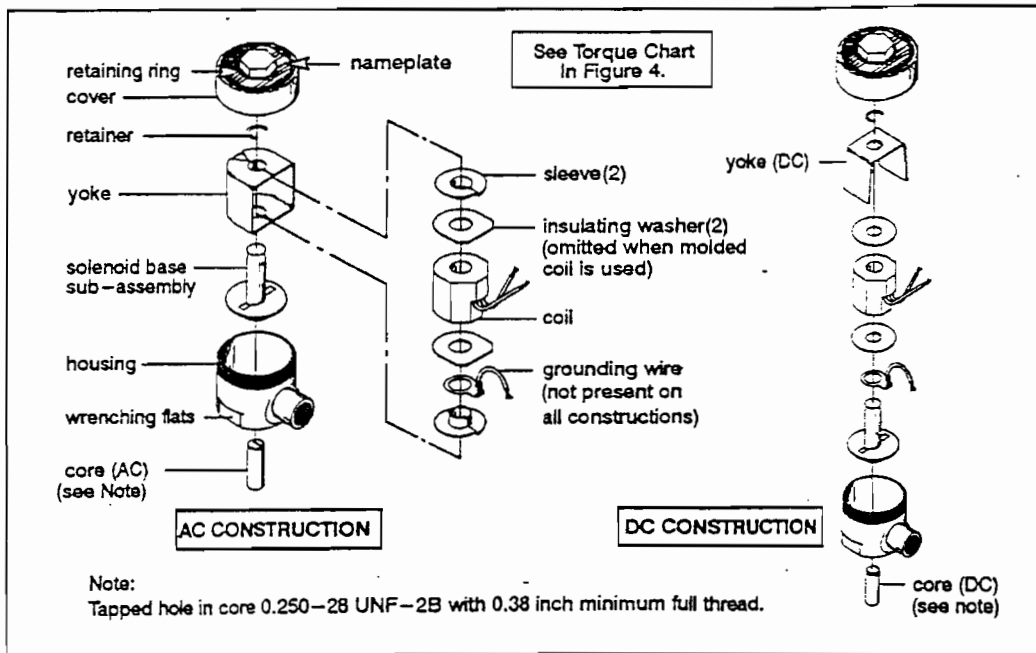


Figure 3. Catalog Nos. EF80171, EF 80172, 80173 and 80174 Raintight/Explosionproof Solenoid Enclosure.

ASCO Valves

Automatic Switch Co.

50-55 Hanover Road, Florham Park, New Jersey 07932

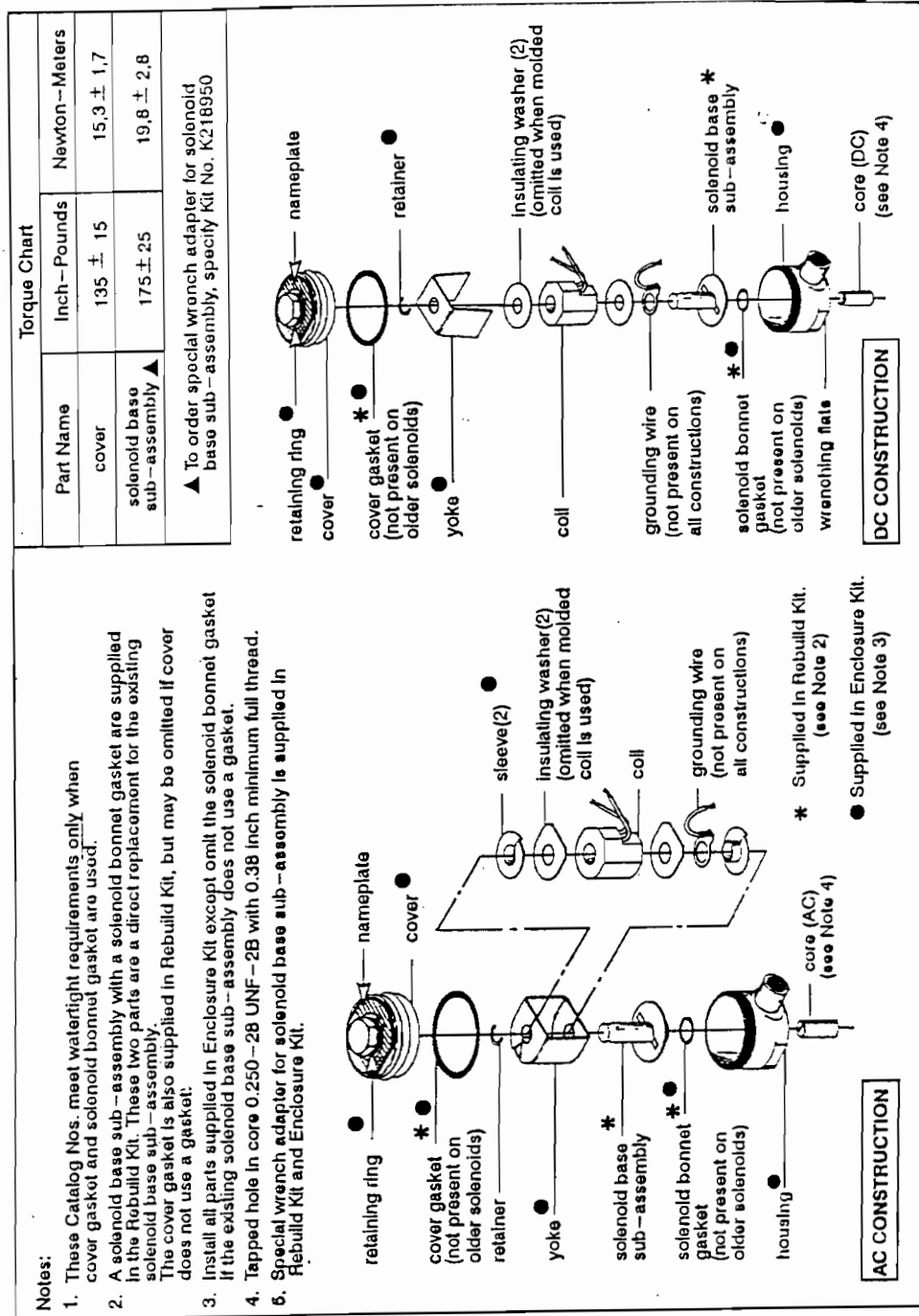
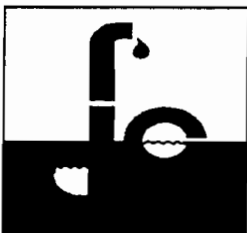


Figure 4. Catalog Nos. EF80171, EF80172, 80173, and 80174 Rainlight/Watertight/Explosionproof Solenoid Enclosure.

Air Stripper

DRC # 6154



DIVERSIFIED REMEDIATION & CONTROLS

21801 Industrial Blvd. Rogers, MN 55374 Phone (763) 428-3000 Fax (763) 428-3660

QED Environmental Systems

6155 Jackson Ave. Ann Arbor, MI 48103 Phone: 800-624-2026 Fax: 734-995-1170

QED EZ-Stacker™ Air Stripper Operations and Maintenance Manual

QED Treatment Equipment, P.O.Box 3726, Ann Arbor, MI 48106
Phone: (800)-624-2026, Fax: (734)-995-1170
QED p/n 95164 February 16, 1996 Rev 3/19/99

QED EZ-Stacker™ Operations and Maintenance Manual

Introduction

This manual contains instructions for installing, start-up and operation of a QED EZ-Stacker™ Air Stripper for the treatment of dissolved-VOC-contaminated waters. The EZ-Stacker™ Air Stripper is a sieve tray type of stripper which accomplishes mass transfer by creating a large amount of fine air bubbles into which volatile organics are stripped. Efficient stripping with this type of a unit is affected by:

- Water temperature-- higher temperature allows better stripping
- Specific compound being stripped--higher Henry's Law constant equals better stripping
- Air to water ratio--the higher the air to water ratio (air flow for a given water flow) the better the stripping
- Stripper efficiency--certain design elements, such as tray design affect stripping efficiency
- Surfactants (soaps, cleaning agents, etc.) and oil/grease can negatively impact stripping efficiency

From an operation standpoint the single most important factor is ensuring that the recommended amount of clean air is flowing through the stripper. Air flow is most affected by tray fouling (typically with precipitated iron oxides) which creates back pressure on the blower and causes it to operate at a lower air flow point on its curve. Maintaining clean trays and using the excess capacity on the blower can help control fouling conditions. Occasional gasket replacement can be anticipated depending on the frequency of stripper disassembly and reassembly. The stripper blowers and any transfer pumps should be regularly maintained based upon the manufacturer's maintenance schedule. All other stripper components are largely maintenance free. Please refer to Figure 1 at the end of this manual for understanding terminology.

Installation

Installing Skid Mounted Systems

Complete skid mounted systems arrive at your site as shown in Figure 1. A system of this type is mounted, piped and optionally wired at the factory. All components and functions are 100% wet checked.

Influent piping. Connect system influent piping to the influent feed pump or directly to the stripper at the piping connection located on the top of the stripper. Factory piped influent feed pump systems use flexible pressure hose between the pump and the stripper influent piping connection and includes a check valve to prevent air backup into a transfer tanks or oil water separator. If the stripper

influent is plumbed directly on site, a flexible hose connection is recommended to ease stripper disassembly and reassembly during use.

Effluent piping. Factory piped effluent discharge pump systems use flexible pressure hose between the stripper discharge piping connection, located at the bottom of the stripper sump and the effluent discharge pump. Factory installed gravity discharge piping connects at the same discharge point on the stripper sump and utilizes a gravity drain kit which includes a siphon break and water head seal. If the stripper is plumbed on site connect the discharge pump to the stripper sump at the discharge connector. Gravity drain piping should be a minimum of 2-3" in diameter (depends on the model) and designed as shown in Figures 4 or 5.

Blower piping. *Important! Total sump pressures should never exceed 50" WC! This will void QED Warranty.* The blower piping that connects the blower to the air stripper are typically of an inverted-U shape, with a high leg to reduce the chance of flooding the blower in the event of an unforeseen flood condition.

On EZ-2.xP models, QED typically use regenerative blowers sized so that they do not require much, if any, throttling of the airflow. Regenerative blowers are limited in the amount of throttling that can be applied, since added backpressures may cause the blower motor to run above full-load-amp condition and cause the blower motor to overheat. If customer is installing their own piping kit on an oversized regenerative blower, it is recommended that an air dilution/bleed valve be installed in the blower piping to provide flexibility in controlling airflow.

Stripper Air Discharge Stack. The stripper discharge pipe is located on top of the air stripper and is 4" or 6" in diameter (depending upon model). The wider section of the discharge porting contains the demister element which removes entrained water droplets from the air exiting the stripper. Coalesced water droplets collect on the demister and then fall back into the stripper top tray. Piping or ducting for the stripper discharge stack should be of equal diameter or larger to avoid creating excess back pressure on the stripper blower. A flexible coupling, such as a Fernco brand, is recommended to connect the discharge pipe to the stripper air discharge stack to ease unit disassembly for cleaning. It is also important to pipe the air stripper air discharge such that it is not in proximity with the air stripper blower inlet; this minimizes the risk of sending already-contaminated air back into the air stripper and reducing stripper performance.

Sensors. Normal sensors used with this type of air stripper include a sump high level alarm float sensor, sump low air pressure sensor and optional discharge pump on-off float sensor. If these sensors are supplied with the stripper they will be installed in the stripper sump and piping. Often the system control panel must be mounted in a remote location from the stripper (in cases where the location is classified as an explosion hazard area.) If the panel is to be remotely-mounted a licensed electrician should hook the stripper sensors up to the panel. It is

important that these sensors be tested prior to operating the stripper. A frequent cause of improperly operating systems are float sensors which act in the opposite sense of that which the control panel expects (normally-open vs. normally-closed). It is also important to conform to electrical code requirements for classified areas; sensors may require intrinsically safe barriers.

Installing Bare Stripper Sump and Tray Systems

Bare stripper sump and tray systems are provided in cases where the contractor will mount the stripper to a user supplied skid or concrete pad. These systems are supplied with a second gasket compression ring that anchors the gasket compression rods at the bottom of the stripper. The bottom gasket compression ring has tabs protruding around its circumference which allow mounting of the ring to a skid or concrete pad.

If the blower is purchased from the factory it is recommended that the blower piping package also be purchased. If the contractor is supplying their own blower it must meet the typical performance specifications listed below to achieve the desired contaminant removals. If the air stripper is built to non-standard parameters, the performance specifications below may not apply.

<u>Air Flow:</u>	140 cfm (for EZ-2.xP) or 280 cfm (for EZ-4.xP) at maximum system back pressure
<u>Pressure:</u>	Sufficient to overcome tray, piping and air treatment process back pressures at a flow rate of 140cfm. <i>Important! Total sump pressures should never exceed 50" WC! This will void QED Warranty.</i>
<u>Tray Back Pressures</u>	16-20"H ₂ O for 4-trays; 24-30"H ₂ O for 6-trays (assuming no add'l pressure from equipment downstream of air stack).

The blower piping should include a high leg which acts to reduce the risk of flooding the blower if the high sump level sensor was to malfunction in the stripper sump. See Figures 2 and 3 (for models EZ-2.xP and EZ-4.xP, respectively) for examples of proper blower piping configurations.

The EZ-2.xP models typically use regenerative blowers sized so that they do not require much, if any, throttling of the airflow. Regenerative blowers are limited in the amount of throttling that can be applied, since added backpressures can cause the blower motor to run above full-load-amp conditions and overheat. If customer is installing their own piping kit on an oversized regenerative blower, it is recommended that an air dilution/bleed valve be installed in the blower piping to provide flexibility in controlling airflow. A throttle valve is shown in Figure 1; a dilution/bleed valve is not shown.

Influent and effluent piping and sensor hook-up should be as described in the section on skid mounted systems, above.

Startup

The EZ-Stacker™ stripper is designed to start up dry without priming the sealpot or throttling the blower. The stripper blower should be running before water is introduced to the stripper. Water flows into the top tray and proceeds tray by tray to the stripper sump. Stripper seal pots fill with water and allow complete start up during intermittent operation. IMPORTANT: Before starting the system verify correct blower motor rotation (plus any other motors within the treatment system).

Verify that the sump air pressure is 16-20" H₂O for 4-tray systems or 24-30" H₂O for 6-tray systems (it is normal to see lower sump pressures at the very start of operation before the seal pots and trays fill with water.) Sump pressures lower than these values may indicate either a blower throttle which is not sufficiently open or insufficiently-compressed tray seal gaskets. *If the system configuration includes additional backpressure (from vapor phase carbon, for example), the sump pressures will be greater than these values. it is important that the blower is sized to accommodate the added pressures, being careful that air stripper sump pressures never exceed 50" WC. Total sump pressures exceeding 50" WC will void QED Warranty!* Check the blower piping throttle valve and make sure the hold-down rods are tightened firmly, but not over tightened. The hold-down tensioning springs should be compressed to a length of 3-1/2 inches for proper gasket sealing.

Step by step startup includes:

1. Power the main control panel on.
2. Turn the blower on. For QED supplied control panels set the motor operation switch to AUTO.
3. Turn the stripper feed pump on (allow water to enter the stripper for gravity feed systems.) For QED supplied control panels set the motor operation switch to AUTO (some systems have a delay timer on the feed pump--check control panel documentation for details.)
4. Turn the discharge pump on. For QED supplied control panels set the motor operation switch to AUTO.
5. Open or close the blower air flow throttle and air dilution valve (if required) to produce a sump pressure reading of 16-20" H₂O for 4-tray systems or 24-30" H₂O for 6-tray systems (these are typical values, but these may differ depending whether any other pressures need to be accounted for. NOTE: It is normal to see lower sump pressures at the very start of operation due to sealpots and trays filling with water.

Operation

Stripper operation is normally automatic. One option for QED supplied control panels is a blower time-out relay which continues to run the blower for several minutes after the feed pump stops. Continued blower operation insures that any residual water left on the stripper trays has sufficient time to strip before the blower shuts down. A time of at least 15 minutes is recommended. Strippers with start-stop cycles of more than 2-4 times per hour should be set to run continuously.

For sites with high dissolved iron content stripper cleaning may be required. Tray fouling is evidenced by increasing sump back pressure. Opening the blower air flow throttle will allow continued operation in some situations and will lengthen the time between tray cleanings. It is most important to maintain an air flow of 140cfm through the unit. If the stripper air flow decreases the stripping efficiency decreases. Below 100 cfm air flow the stripper will start begin to "weep" water through the tray holes from upper trays to lower trays before the water has had sufficient residence time for removal. If stripper performance falls off, check for tray fouling or a blower air flow throttle that is not opened sufficiently.

Maintenance

Tray fouling due to iron precipitation, solids loading, or bio-fouling is evidenced by increased sump pressures, decreased stripper performance (removal rates not being met) or noticeable discoloration on the trays. Stripper cleaning is required when trays are fouled.

Step by step cleaning includes:

1. Before working on any equipment lock-out power to the unit.
2. Disconnect the stripper discharge pipe from the stripper exhaust stack piping.
3. Unscrew the hold-down rod nuts (cranks) and remove the gasket hold-down ring.
4. Remove the stripper trays. Please note the tray seal pots will have some water remaining in them.
5. Using a pressure washer and medium bristle brush clean any residue from the trays surfaces, concentrating on the sieve holes. DO NOT USE SOAP or cleaning agents unless they will be thoroughly rinsed from the trays; soap residue can affect stripper performance.
6. For hard to remove scales and precipitates a dilute (5%-10%) muriatic acid and water solution can be used to rinse or soak the trays. Be certain to completely rinse the solution off the trays before reassembling the unit.

7. Reassemble the trays--note that they are numbered and that a mark is used to assist in proper alignment of the trays during reassembly. Check to make sure the gasket is still seated correctly and undamaged.
8. Reinstall the gasket hold-down ring and retension the hold-down rod nuts (cranks.) The hold-down tensioning springs should be compressed to a length of 3-1/2 inches for proper gasket sealing.
9. Reattach any pipe and exhaust stack connections.
10. Follow Start-Up instructions, above.

Other stripper maintenance items include:

1. Periodically check blower for vibration. Bearings may require eventual service or conditions of excessive motor start / stop cycles may lead to premature motor or blower failure.
2. Check gasket condition during disassembly for cleaning. The gasket is designed to allow numerous assembly and disassemblies before requiring replacement. Contact QED for information and pricing about gasket replacement kits.
3. The stripper demister element is essentially maintenance free, although dried inorganic residue can build up within the demister and affect demister operation. This condition is evidenced in water droplets not being removed by the demister and blowing out of the stripper exhaust stack--occasionally on start-up water is discharged from the stripper stack, which is normal. The demister may be cleaned with a dilute muriatic and water solution (5%-10%) as instructed for tray cleaning.
4. Solids may build up in the sump. These solids can be suctioned out during tray cleaning operations.
5. Periodically check the structural integrity of the stripper sump, trays and top. Check bulkhead nuts for snugness. Cracks or loose fittings will normally be evidenced by water leakage.

Troubleshooting

Some common problems include:

1. *Leaks.* Leaks around trays or at the sump indicate an insufficiently compressed tray gasket. Make sure the hold-down tensioning springs are compressed to a length of 3-1/2 inches for proper gasket sealing. Also check for damaged gaskets (over compressed gaskets, cut gaskets, loose gaskets, etc.) Damaged gaskets should be replaced with new gaskets. Contact QED for information and pricing about gasket replacement kits. For leaks at fittings, check for fitting tightness.
2. *Stripper not meeting removal requirements.* Contaminated stripper air is the most common reason for poor stripping performance within the low-ppb

concentration range--make sure that the stripper blower intake is drawing in clean, uncontaminated air. Check for sufficient air flow through the stripper. Check that trays are clean. Check that demister is not clogged or causing increased blower back pressure. Check any stripper air discharge treatment units for increased back pressure. Check that stripper influent flow or concentration has not increased beyond the design basis used to predict stripper performance. Make sure that the influent does not have surfactants (soaps, etc.), oils, grease, or other immiscible phases in the influent stream. Surfactants are evidenced by increased foaming through the stripper unit.

3. *Sump pressure not at recommended levels.* Check sump pressure gauge tubing for accumulated water that could impair gauge performance. Check gaskets for damage and proper seating. Check for proper hold-down spring tensioning. Check blower piping connections for leakage. Check blower for proper rotation. Check design of gravity drain piping if piping is not QED-supplied. Check blower intake filter / silencer (if included) for clogging. Order new filter elements from QED.

4. *Stripper cleaning frequency seems excessive.* At sites with high iron loading, consider iron sequestering agents or other technology which will reduce/prevent iron precipitation or allow for easier cleaning.

Please investigate all the above-mentioned items while troubleshooting. For additional problem solving assistance contact QED Service at:

Phone: 1-800-624-2026

FAX: 1-734-995-1170

24 Hour Service Hot Line: 1-800-272-9559

Please have the following information ready for the QED Service person:

1. Identify the product or system involved by QED order number.
2. Specify where, when, and from whom the product was purchased.
3. Describe the nature of the defect or malfunction.

QED TREATMENT EQUIPMENT WARRANTY

QED Environmental Systems Inc. (QED) warrants to the original purchaser of its products that, subject to the limitations and conditions provided below, the products, materials and/or workmanship shall reasonably conform to descriptions of the products and shall be free of defects in materials and workmanship. Any failure of the products to conform to this warranty will be remedied by QED in the manner provided herein.

QED warrants the equipment components of its manufacture for a period of one (1) year from date of delivery. Our sole obligation during this warranty will be to repair or replace (at our option) the defective components. We are not responsible for consequential damages. Labor costs are not included.

Purchaser's exclusive remedy for breach of said warranty shall be as follows: if, and only if, QED is notified in writing within the applicable warranty period of the existence of any such defects in the said products, and QED upon examination of any such defects, shall find the same to be within the term of and covered by the warranty running from QED to Purchaser, QED will, at its option, as soon as reasonably possible, replace or repair any such product, without charge to Purchaser. If QED for any reason, cannot repair a product covered hereby within four (4) weeks after receipt of the original Purchaser's notification of a warranty claim, then QED's sole responsibility shall be, at its option, either to replace the defective product with a comparable new unit at no charge to the Purchaser, or to refund the full purchase price. In no event shall such allegedly defective products be returned to QED without its consent, and QED's obligations of repair, replacement or refund are conditioned upon the Purchaser's return of the defective product to QED.

IN NO EVENT SHALL QED ENVIRONMENTAL SYSTEMS INC. BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF SAID WARRANTY.

The foregoing warranty does not apply to major subassemblies and other equipment, accessories, and other parts manufactured by others, and such other parts, accessories, and equipment are subject only to the warranties supplied by their respective manufacturers. In the event of failure of any such product or accessory, QED will give assistance to Purchaser in obtaining from the respective manufacturer whatever adjustment is reasonable in light of the manufacturer's own warranty.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY (INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE), WHICH OTHER WARRANTIES ARE EXPRESSLY EXCLUDED HEREBY, and of any other obligations or liabilities on the part of QED, and QED neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with said products, materials and/or workmanship.

It is understood and agreed that QED shall in no event be liable for incidental or consequential damages resulting from its breach of any of the terms of this agreement, nor for special damages, nor for improper selection of any product described or referred to for a particular application.

This warranty will be void in the event of unauthorized disassembly of component assemblies. Defects in any equipment that result from abuse, operation in any manner outside the recommended procedures, use and applications other than for intended use, or exposure to chemical or physical environment beyond the designated limits of materials and construction will also void this warranty.

The equipment is warranted to perform as specified under the conditions specified here and within the air stripper model or QED will make the necessary changes at no cost to the owner. Some restrictions apply. Requirements for warranty consideration include, (but are not limited to):

1. Current operating conditions do not differ from the previously-modeled conditions.
2. The system should be cleaned regularly to maintain system performance.
3. The equipment is installed, operated and maintained according to QED's instruction or non-QED manufactured subassembly manufacturer's instructions.
4. Air stripper influent air is not "dirty" (does not contain VOC's, etc.).
5. No surfactants, oils, greases, or other immiscible phases are present in the water.
6. Each influent contaminant does not exceed 25% of its maximum solubility under modeled conditions.

QED shall be released from all obligations under all warranties if any product covered hereby is repaired or modified by persons other than QED's service personnel unless such repair by others is made with the consent of QED. If any product covered hereby is actually defective within the terms of this warranty, Purchaser must contact QED for determination of warranty coverage. If the return of a component is determined to be necessary, QED will authorize the return of the component, at owner's expense. If the product proves not to be defective within the terms of this warranty, then all costs and expenses in connection with the processing of the Purchaser's claim and all costs for repair, parts and labor as authorized by owner hereunder shall be borne by the Purchaser.

In the event of air stripper performance issues, QED may require customer to conduct a variety of troubleshooting steps. These include, but are not limited to, modifying operational parameters, cleaning air stripper system, modifying (temporarily or permanently) process piping, and obtaining reasonable and necessary influent/effluent samples. These steps are the responsibility of the customer and will be conducted by customer prior to consideration by QED for a site visit. These steps and the associated costs incurred are the responsibility of the customer, regardless of future action. Should customer request a site visit by QED or accept a site visit offer by a QED-trained technician, the visit and associated costs: a) will be the responsibility of the customer at \$500/day, plus travel, lodging, and meals, if the visit finds improper sampling, process piping installation or equipment operation inconsistent with QED's Operation and Maintenance Manual; or b) will be the responsibility of QED if the visit finds QED responsible for the performance issue(s) raised.

The original Purchaser's sole responsibility in the instance of a warranty claim shall be to notify QED of the defect, malfunction, or other manner in which the terms of this warranty are believed to be violated. You may secure performance of obligations hereunder by contacting the Customer Service Department of QED and:

1. Identify the product or system involved by QED order number.
2. Specify where, when, and from whom the product was purchased.
3. Describe the nature of the defect or malfunction covered by this warranty.
4. If applicable, send the malfunctioning component, *after receiving a Return Authorization Code (RAC) Number by the QED Service Department, to:*

QED Environmental Systems Inc.
6241 Jackson Road
Ann Arbor, MI 48103
Attn: R.A.C. No. (Return Authorization Code Number provided by QED Service Dept.)

U:\HOME\MBREIDEN\TR\WARANT.DOC REV 11/3/98

Figure 1. Typical Configuration of EZ-Stacker (actual configuration will vary with model size)

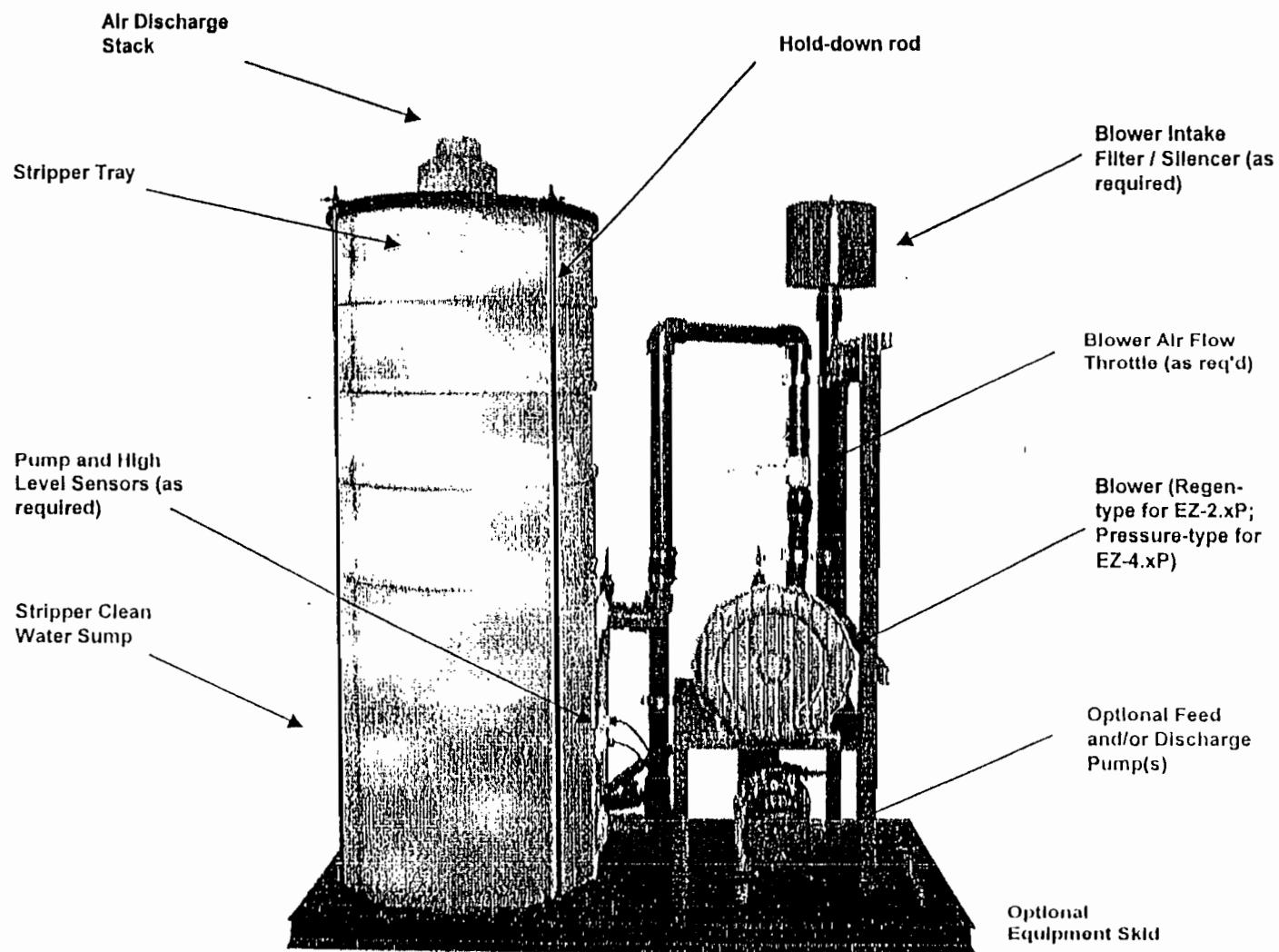
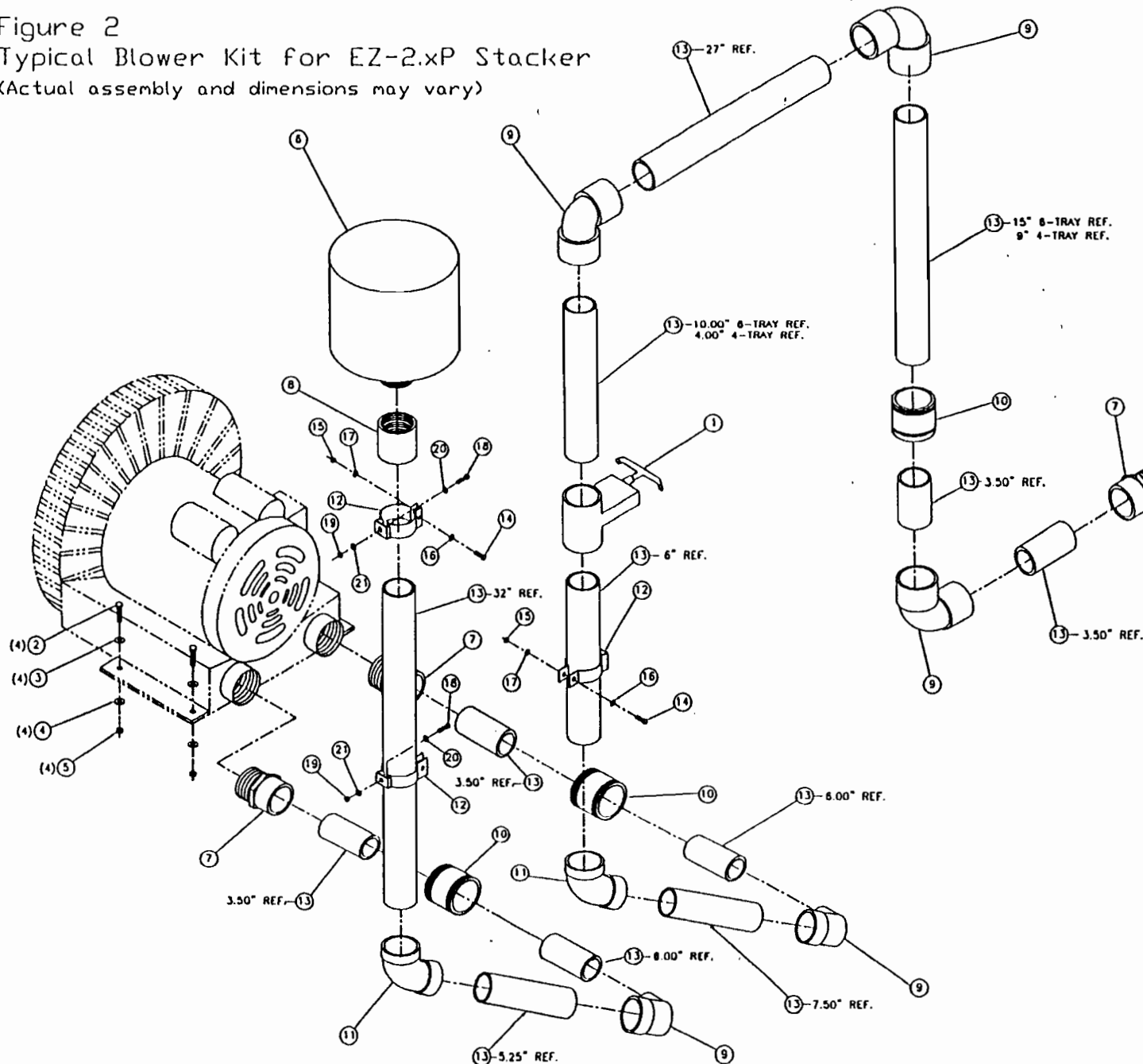


Figure 2
Typical Blower Kit for EZ-2.xP Stacker
(Actual assembly and dimensions may vary)



ITEM	QTY	DESCRIPTION	PART #
21	3	WASHER, LOCK FOR 1/4\" BOLT	
20	3	WASHER FLAT FOR 1/4\" BOLT	
19	3	1/4\"-20 NUT	
18	3	1/4\"-20 UNC X 1 1/4\" LG. HEX BOLT	
17	2	WASHER LOCK FOR 5/16\" BOLT	
16	2	5/16\" WASHER FLAT FOR 5/16\" BOLT	
15	2	5/16-18 NUT	
14	2	5/16-18 UNC .75 LG. HEX BOLT	

ITEM	QTY	DESCRIPTION	PART #
13	TBD	PIPE 2\" PVC REF.	
12	3	HANGER, 2\" PIPE W/ 1/4\"-20	
11	2	ELBOW, 45 DEGREE PVC 2\" SOCKET	
10	3	FERNCO 2\" COUPLER	
9	5	ELBOW, 90 DEGREE PVC 2\" SOCKET	
8	1	ADAPTOR, 2\" FPT X 2\" SOCKET PVC	
7	3	ADAPTOR, 2\" MPT X 2\" SOCKET PVC	
6	1	FILTER, BLOWER INLET	
5	4	NUT, 1/2\" - 13 UNC	
4	4	WASHERS, LOCK FOR 1/2\" BOLT	
3	4	WASHERS, FLAT FOR 1/2\" BOLT	
2	4	BOLTS HEX 1/2\"-13 UNC X 1.50 LONG	
1	1	VALVE, GATE 2\" SOCKET	

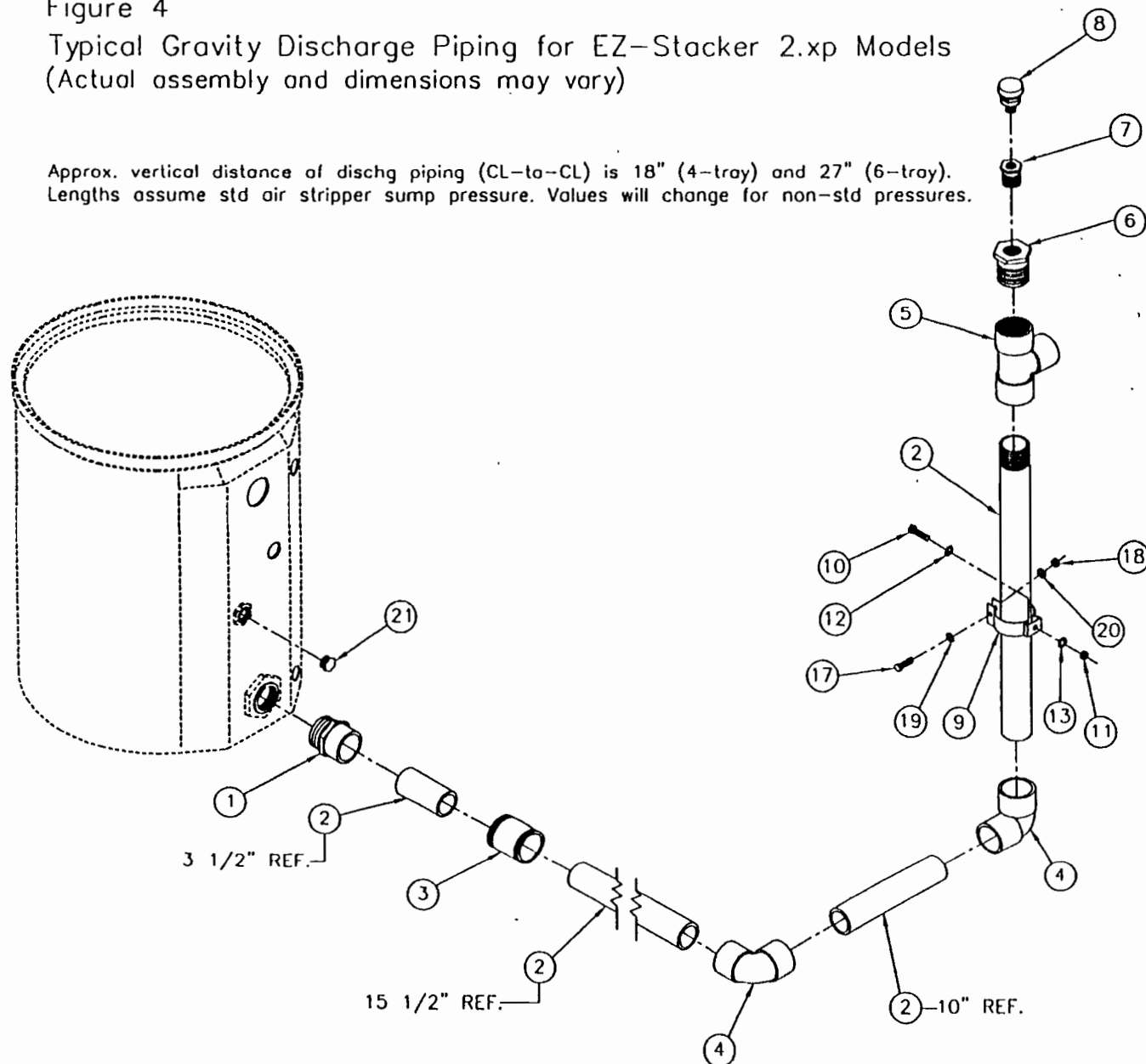
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND INCLUDE PLATING REMOVE ALL BURRS TOLERANCES XX +/- .01 INCHES +/- .1/64 XXX +/- .005 ANGLES +/- .1/2 OTHER TOLERANCES AS SPECIFIED	DESIGNED BY MED	DATE 8/8/97	Q.E.D. ENVIRONMENTAL SYSTEMS INC. 8155 JACKSON ROAD, ANN ARBOR, MI
	CHECKED BY DATE	APPROVED BY DATE	
EZ-STACKER (2 SERIES)	NEXT ASST	USED ON	DESIGNING NUMBER e2s2blw.dwg REV
	FWP		SCALE N.T.S. 1 OF 1

2/18/99, meb

Figure 4

Typical Gravity Discharge Piping for EZ-Stacker 2.xp Models
(Actual assembly and dimensions may vary)

Approx. vertical distance of dischg piping (CL-to-CL) is 18" (4-tray) and 27" (6-tray).
Lengths assume std air stripper sump pressure. Values will change for non-std pressures.



21	1	1/2" PLUG SCH 80	
20	1	LOCK WASHER FOR 1/4" BOLT	
19	1	FLAT WASHER FOR 1/4" BOLT	
18	1	1/4"-20 NUT	
17	1	1/4"-20 UNC HEX BOLT 1 1/4" LG.	
13	1	LOCK WASHER FOR 5/16/BOLT	
12	1	FLAT WASHER FOR 5/16 BOLT	
11	1	5/16-18 UNC NUT	
10	1	5/16-18 UNC HEX. HD. BOLT .75 LG.	
9	1	HANGER 2" PIPE	
8	1	BREAKER, VACUUM 1/2" MPT	
7	1	BUSHING, PVC 1 1/4" X 1/2"	
6	1	BUSHING, PVC 2" X 1 1/4"	
5	1	TEE, PVC 2" FPT	
4	2	ELBOW, 90 DEGREE PVC 2"	
3	1	FERNCO 2" COUPLER	
2	TBD	PIPE 2" PVC	
1	1	ADAPTOR 2" MPT X 2" SOCKET PVC	
ITEM	QTY	DESCRIPTION	PART #
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND INCLUDE PLATING REMOVE ALL BURRS		DRAWN BY MEB	DATE 10-6-98
TOLERANCES XX+/- .01 FRACT +/- 1/64 XXX+/- .005 ANGLES +/- 1/2		CHECKED BY	DATE
OTHER TOLERANCES AS SPECIFIED		APPROVED BY	DATE
EZ-STACKER (2 SERIES)		MFG. APPROVAL	
NEXT ASSY		MATERIAL	
USED ON		FINISH	
		DRAW	NUMBER B232grav.dwg
		SC	.S
		SHEET	1 of 1
		REV	
		TITLE GRAVITY DRAIN ASSEMBLY/BOM/KIT	
		ENVIRONMENTAL SYSTEMS INC. 6155 JACKSON ROAD, ANN ARBOR, MI	

QED
ENVIRONMENTAL SYSTEMS INC.
6155 JACKSON ROAD, ANN ARBOR, MI.

TITLE
GRAVITY DRAIN
ASSEMBLY/BOM/KIT

DRAW NUMBER
B252grav.dwg

REV

QED

ENVIRONMENTAL SYSTEMS INC.
6155 JACKSON ROAD, ANN ARBOR, MI.

TITLE
GRAVITY DRAIN
ASSEMBLY/BOM/KIT

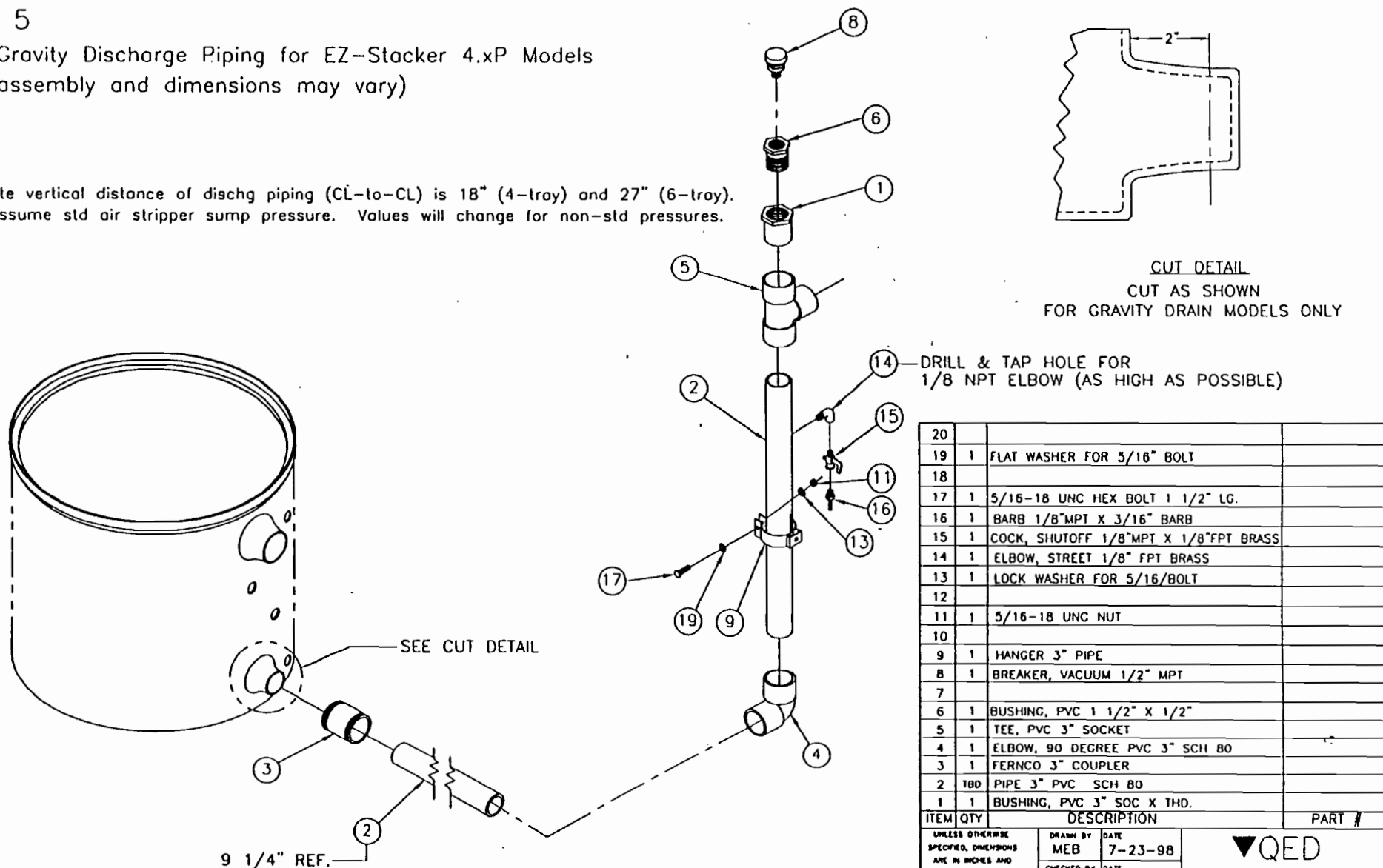
DRAW NUMBER B252grav.dwg REV

SHEET 1 OF 1

Figure 5

Typical Gravity Discharge Piping for EZ-Stacker 4.xP Models
(Actual assembly and dimensions may vary)

Approximate vertical distance of dischg piping (CL-to-CL) is 18" (4-tray) and 27" (6-tray).
Lengths assume std air stripper sump pressure. Values will change for non-std pressures.



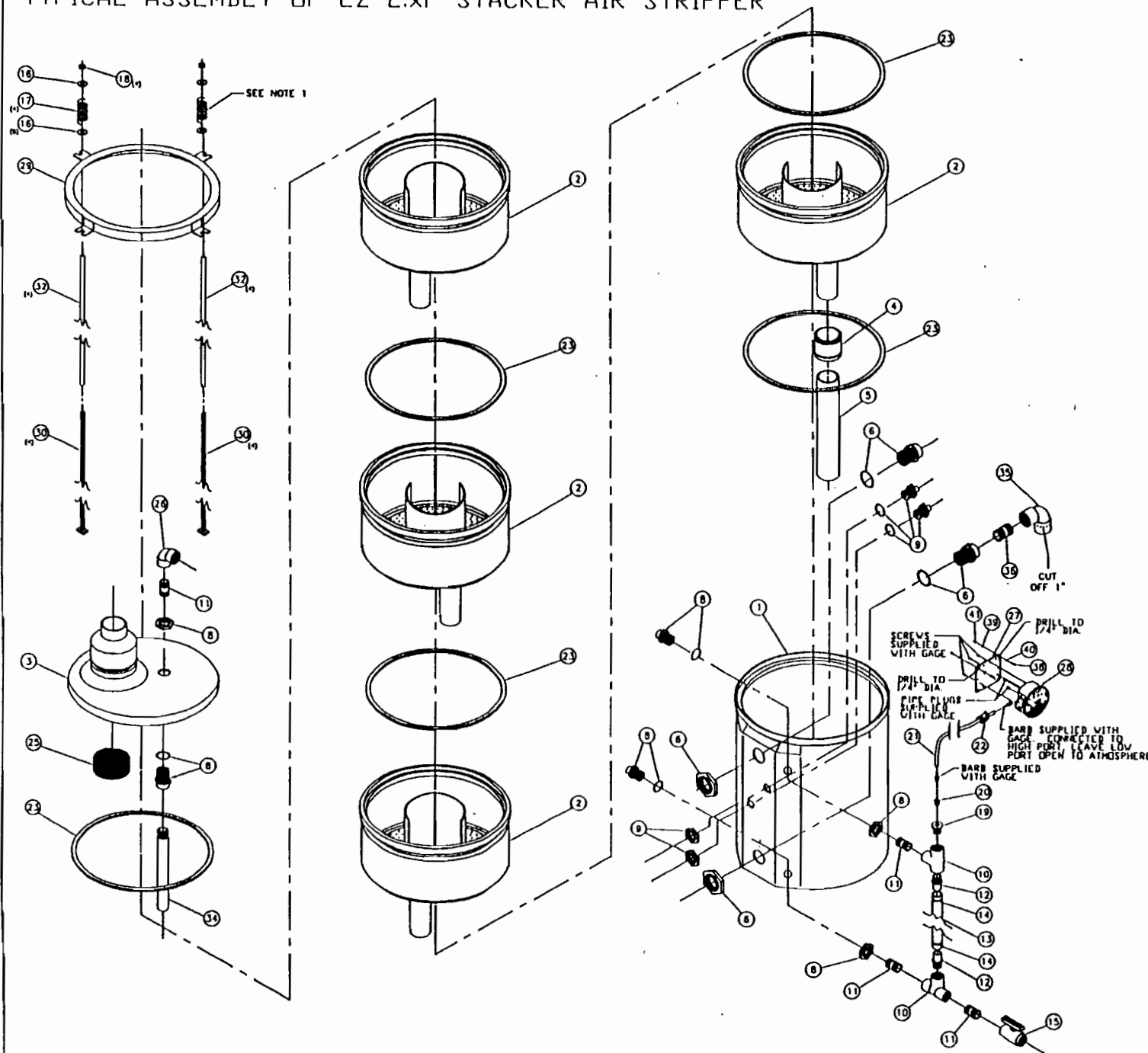
20			
19	1	FLAT WASHER FOR 5/16" BOLT	
18			
17	1	5/16-18 UNC HEX BOLT 1 1/2" LG.	
16	1	BARB 1/8"MPT X 3/16" BARB	
15	1	COCK, SHUTOFF 1/8"MPT X 1/8"FPT BRASS	
14	1	ELBOW, STREET 1/8" FPT BRASS	
13	1	LOCK WASHER FOR 5/16/BOLT	
12			
11	1	5/16-18 UNC NUT	
10			
9	1	HANGER 3" PIPE	
8	1	BREAKER, VACUUM 1/2" MPT	
7			
6	1	BUSHING, PVC 1 1/2" X 1/2"	
5	1	TEE, PVC 3" SOCKET	
4	1	ELBOW, 90 DEGREE PVC 3" SCH 80	
3	1	FERNCO 3" COUPLER	
2		TD PIPE 3" PVC SCH 80	
1	1	BUSHING, PVC 3" SOC X THD.	
ITEM	QTY	DESCRIPTION	PART #

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND INCLUDE PLATING REMOVE ALL BURRS		DRAWN BY MEB CHECKED BY DATE APPROVED BY DATE MFG. APPROVAL MATERIAL EZ-STACKER (4 SERIES) NEXT ASSY USED ON FRESH	DATE 7-23-98 TITLE GRAVITY DRAIN ASSEMBLY/BOM/KIT DRAWN BY ezs4grav.dwg SCALE S. SHEET 1 of 1

QED

ENVIRONMENTAL SYSTEMS INC.
6155 JACKSON ROAD, ANN ARBOR, MI.

TYPICAL ASSEMBLY OF EZ-2.xP STACKER AIR STRIPPER



1. COMPRESS SPRING TO 3.50 HEIGHT.

41	2	NUT 1/4"	EXPENSED
40	2	WASHER, FLAT 1/4"	EXPENSED
39	2	WASHER, LOCK 1/4"	EXPENSED
38	2	BOLT, 1/4" HEX HD.	EXPENSED
37			
36	1	NIPPLE, CLOSE 2" PVC	802074
35	1	ELBOW 2" 90 DEGREE PVC THREADED	802034
34	1	PIPE 1" PVC 12.50 LG (THD. ONE END)	802162
33			
32	4	TUBING, NYLON 1/2" OD X 3/8" ID 89" LG	35097
31			
30	4	TIE ROD ASSEMBLY	804042
29	1	RING, TOP HOLD DOWN 27.63 OD	804040
28	1	MAGNETIC DIFFERENTIAL PRESSURE GAGE INCLUDES THE FOLLOWING: SCREWS, 8-32 RD. HD. (2) PIPE PLUG 1/8" (2) BARBS, 1/8" MPT X 3/16" BARB (2)	EZPGAUGE
27	1	BRACKET MOUNTING	805179
26	1	ELBOW 90 DEGREE PVC 1" MPT SCH 80	802037
25	1	DEWISTER 3 PADS OF 37/97 3.60 INCH X 7.50 DIA.	804052
24			
23	3	GASKET, ROUND	804038
22	1	PINCH VALVE	38559
21	1	TBD TUBING, CLEAR 3/16" O.D. X 3/16" I.D.	802248
20	1	REDUCER, BUSHING 1/4" X 1/8" BRASS	34103
19	1	REDUCER, BUSHING 1" X 1/4" BRASS	803054
18	4	NUT, 3/8-16 ZINC PLATED STEEL	805180
17	4	SPRING, NICKEL PLATED	805214
16	8	WASHER, FLAT 3/8 ZINC PLATED STEEL	805181
15	1	VALVE, BALL PVC 1" FPT X 1" FPT	802198
14	2	CLAMPS, HOSE 13/16 X 1 1/2"	805053
13	1	TUBING, CLEAR PVC 1" I.D. 3/16" WALL	802236
12	2	BARB, NYLON 1" MPT X 1" BARB	805020
11	4	NIPPLE, CLOSE PVC 1" SCH 80	802103
10	2	TIE, PVC 1" FPT SCH 80	802028
9	2	BULKHEAD FITTING (RAVEN) 1/2" FPT	802169
8	3	BULKHEAD FITTING (RAVEN) 1" FPT	802171
7			
6	2	BULKHEAD FITTING 2" FPT (RAVEN)	802174
5	1	PIPE, PVC 3" 17.50 LG REF.	802156
4	1	FERNCO 3" COUPLER	802166
3	1	TRAY, TOP	804029
2	4	TRAYS, WITH SECONDARY PARTS	804030
1	1	SUMP	804031
ITEM	QTY	DESCRIPTION	PART

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND INCLUDE PLATING REMOVE ALL BURRS		DRAWN BY MEB 8/8/97 CHECKED BY APPROVED BY DATE APPROVAL MATERIAL 2.4 EZ STACKER NEXT ASSY USED ON	Q.E.D. ENVIRONMENTAL SYSTEMS INC. 8155 JACKSON ROAD, ANN ARBOR, MI TITLE EZ-2.4 P ASSEMBLY/BOM/KIT WORK NUMBER ez2s203m.dwg C.N.T.S. Sheet 1 of 1

INSTALLATION
OPERATION
MAINTENANCE

X100

CONVERTIBLE FILTER HOUSING

OPERATOR
STUDY
GUIDE

READ AND UNDERSTAND
ENTIRE MANUAL BEFORE
OPERATING THIS VESSEL

FSI

SAFETY

1. This manual has been prepared for the safe installation, operation, and maintenance of FSI pressure vessels.

Warning labels have been reprinted in this manual. Warning labels are not a substitute for reading and understanding this manual. All labels must be replaced when legibility is lost or visibility is blocked. Labels have a part number in the lower left-hand corner for reordering.

2. The location of the Installation, Operation and Maintenance Manual for the filter vessel.

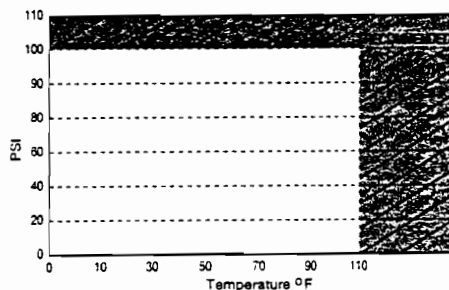
The end user is to place the Installation, Operation, and Maintenance Manual on each vessel upon final installation. The manual must be visible and accessible to the operator.

3. Chemical Compatibility of the filter and the fluid being filtered.

PROTECTIVE CLOTHING

Before operating this vessel, operator should wear protective gloves and face shield. Refer to Material Safety Data Sheet (MSDS), for specific instructions for handling the liquid, as supplied by the manufacturer of the material. (See Warnings)

Temperature of operating range for the X100 Filter Vessel.

**WARNINGS**

Before use, consult chemical compatibility guidelines.

This vessel is manufactured from talc filled polypropylene. The maximum operating pressure is rated at 100 PSI with water where the temperature does not exceed 110°F. The operating pressure may vary when using other substances and temperatures. Although this housing material has a wide range of chemical resistance, there are several factors that affect or restrict the usage, i.e., temperature and concentration of solutions. Therefore the user should refer to published reference materials for chemical compatibility.

A partial list follows:

- Compass Corrosion Guide—Section B.
- Compass Chemical Resistance Guide for Elastomers.
- Dow Chemical Resistance Guide.
- DuPont Chemical Resistance and Fluid Compatibility.

Failure to comply with the chemical compatibility guidelines may result in extensive vessel structural integrity failure. Such failure could result in severe injury to the user.

Hot and/or chemically active liquids can cause serious injury.

Wear protective face shield and clothing.

4. Mounting Location.

Locate the filter away from direct sunlight and all heat sources that could elevate its temperature beyond the maximum allowable. See lid for maximum temperature rating.

MOUNTING

Hard pipe the filter housing in place with 2 inch sch. 80 plastic piping. Secure the inlet and outlet pipe to provide filter support. If it is desirable to support the filter and its contents, polypropylene legs and floor mounting pads are a standard option.

The legs can be shortened by saw cutting. Note: The plastic legs are used in conjunction with hard piping to provide rigid filter support. For filters requiring solid floor mounting, stainless steel or carbon steel support legs are a standard option.

The height of the support legs can be adjusted by moving the belly bands of the leg assembly up or down the filter housing.

Maximum floor to filter outlet is 13 1/4 inches.

Use commercially available 3/8 inch diameter floor anchors.

5. Piping.

The piping material used should be the same as the base material of the vessel. The piping temperature and pressure rating should be equal to or greater than that of the vessel.

RELIEF VALVE

It is the responsibility of the end user to protect the system components, such as the FSI filter, from being over-pressurized.

This can be achieved by installing a system relief valve.

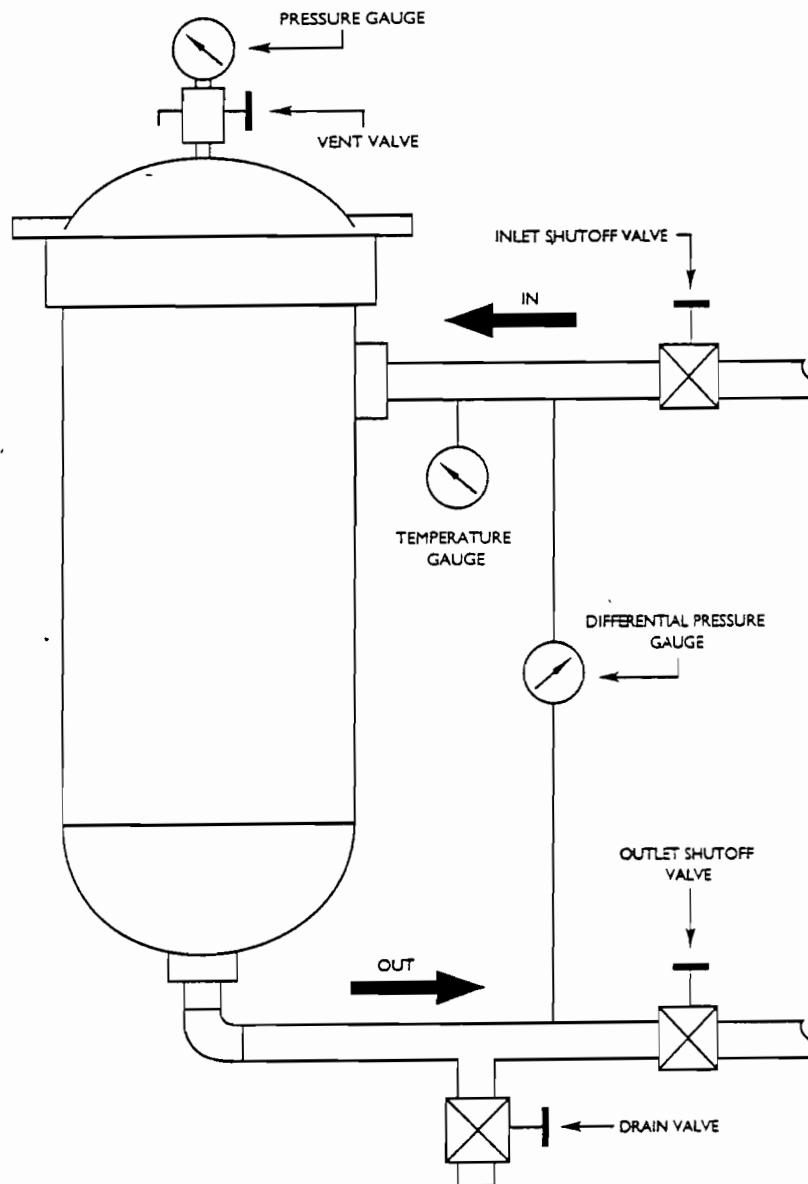
INSTALLATION

PRESSURE GAUGE, TEMPERATURE GAUGE, AND VENT VALVE

FSI does not supply the vessel pressure gauge, temperature gauge, or the vent valve.

It is the responsibility of the end user to obtain, install, and maintain the proper components.

Refer to Figure 1
(See Warnings)



(Figure 1)

6. Gasket.

GASKET INSTALLATION

Clean the gasket groove.

Slip the gasket over the filter and into the groove.

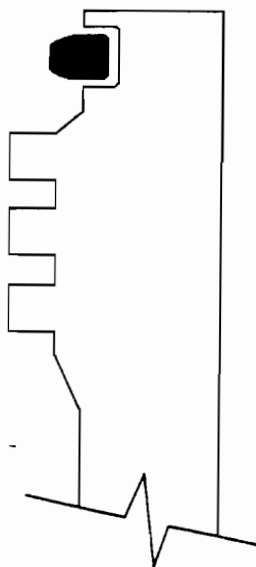
Make sure the gasket is not twisted and the bevelled edges are facing out.

Apply a small amount of non-contaminating lubricant to the outside of the gasket.

Use only FSI replacement gaskets.

Refer to Figure 2

(See Warnings)



(Figure 2)

7. Opening and Closing the Filter.

OPENING

To Isolate the filter:

1. Turn off and lock out pump.
2. Turn off inlet shutoff valve.
3. Turn off outlet shutoff valve.
4. Drain filter (vent valve may have to be cracked open).
5. Filter should have no internal pressure.
6. Check pressure gauge for zero PSI.
7. Remove lid manually by turning counterclockwise.

A gentle tap against the handle may be necessary, if the lid was over tightened.

Refer to Figure 1

WARNINGS

Vent Valve exhaust can be dangerous — direct exhaust to a safe place.

Do not open vessel under pressure: escaping fluid under pressure can cause serious injury.

Gasket can fail, causing serious injury.

Gasket material must be chemically and temperature compatible with fluid being filtered.

FILTER ELEMENT CHANGES

Remove filter bag or cartridge with caution. Insert new filter bag, or cartridge.

Note: The recommended differential pressure across a filter element before changing is: 10-15 PSI for bag filters, 10-15 PSI for cartridges.

CLOSING

1. Lubricate the gasket with a small amount of sanitary O-ring lubricant.
2. Turn the lid clockwise until it bottoms out.
STOP, additional force will not enhance the seal; it will cause the threads to stick.
3. Before opening the inlet valve, close the drain valve and vent bind.

8. Converting from a bag filter to a cartridge filter.

1. Remove the basket.
2. Clean the inside of the filter housing.
Do not scratch the molded interior surface.
3. Lubricate the cartridge conversion plate with a small amount of sanitary O-ring lubricant.
4. Slide the plate into the housing with the boss facing down.
Push the plate firmly against the support ribs.

Refer to Figure 4

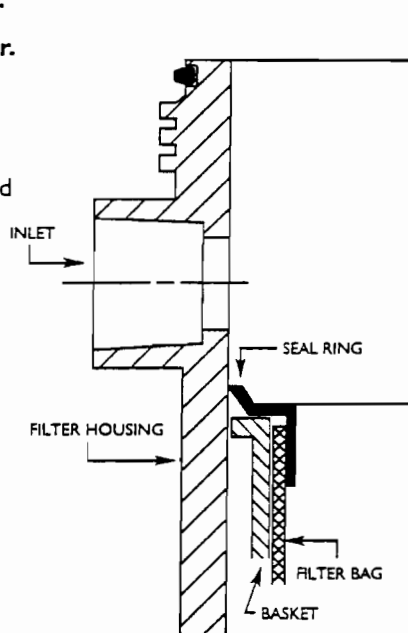
9. Converting from a cartridge filter to a bag filter.

1. Clean the inside of the filter housing.
Do not scratch the molded interior surface.

2. Pull out the cartridge conversion plate.

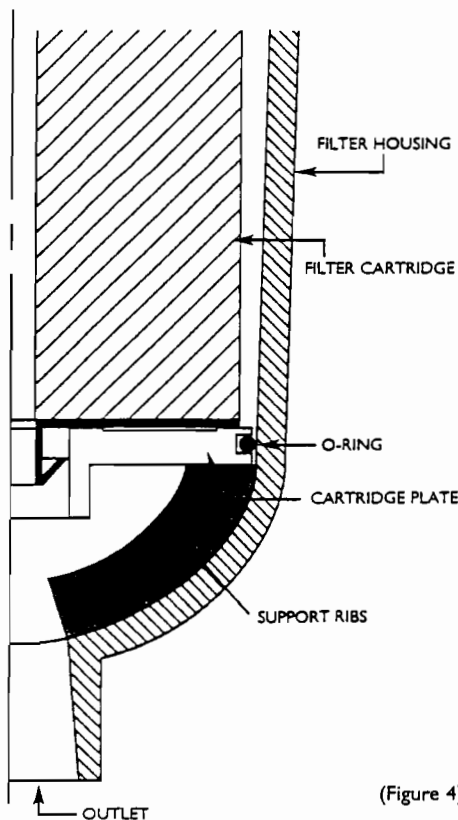
3. Drop the basket in.

Refer to Figure 3



(Figure 3)

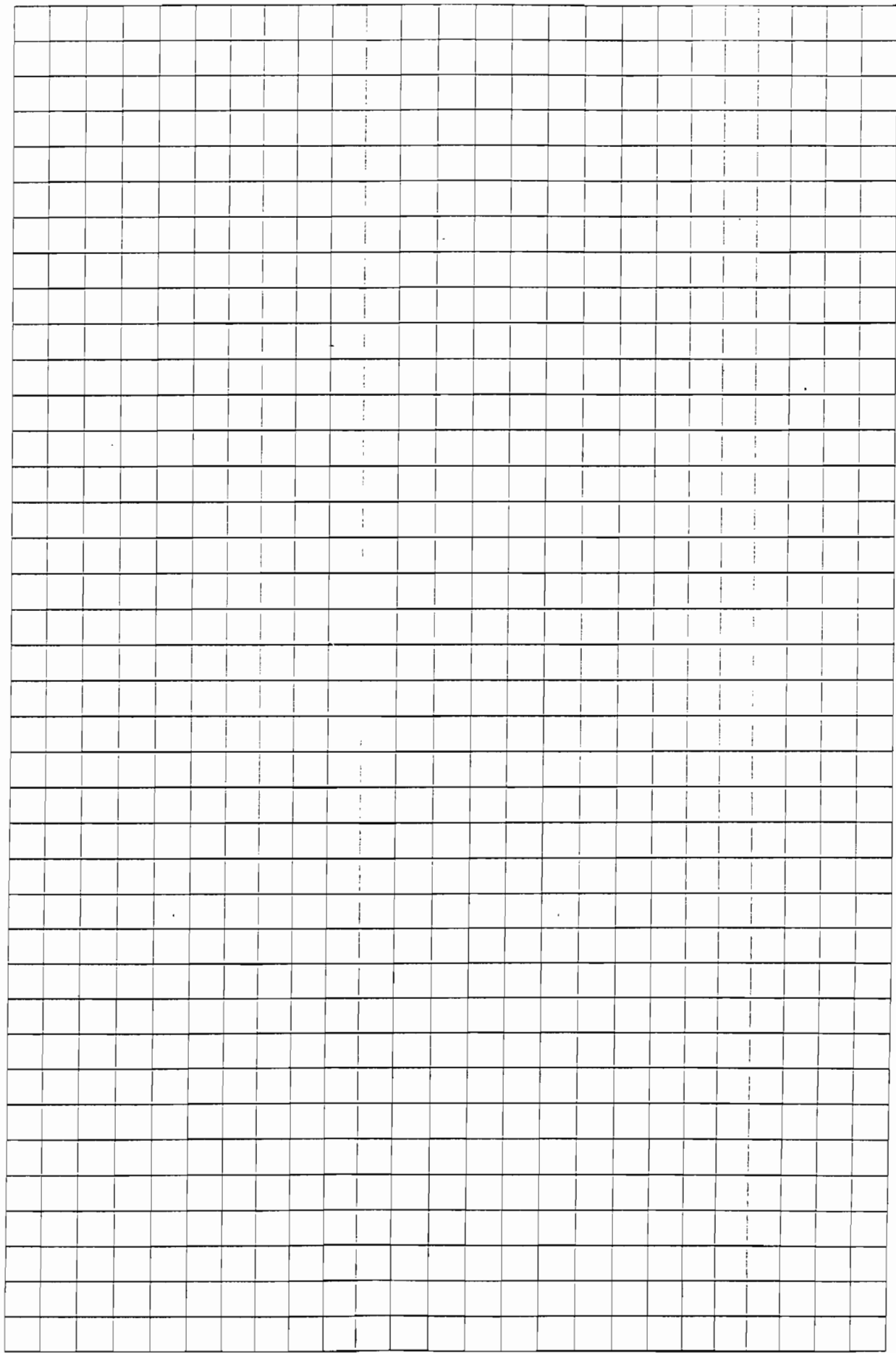
Insert Filter Bag into the basket. Make sure the bag seal ring bottoms out against the basket shoulder. The ring seals against the filter wall.



(Figure 4)

Insert the Self-centering Filter Cartridge. Stop when it bottoms out on the cartridge plate.

→ X100 FILTER VESSEL



→ OPTIONS & REPLACEMENT PARTS

Part No.	Description
36028	Replacement Lid - No Gasket
36002	X100 Plastic Basket
36005	Cartridge Plate
36017	(2) Plastic Leg and Foot Assembly
281276A	Carbon Steel Tripod Legs
281276B	304 Stainless Steel Tripod Legs
EGT30096B	Lid Gasket (BUNA)
EGT30096VI	Lid Gasket (VITON)
EGR253B	Plate Gasket (BUNA)
EGR253VI	Plate Gasket (VITON)

Patents Pending

X SERIES FILTERS MANUFACTURER'S SUGGESTED RETAIL PRICES

Housings - X100

Part No.	Model No.	Description	Price
416014B	X100B	X100 Bag Vessel - Buna Gasket	
416014C	X100C	X100 Cartridge Vessel - Buna Gasket	

Housings include - Lid, Basket or Cartridge Plate and Gaskets (Leg-Foot assemblies not included)

Filter Bags - X01

Part No.	Price	Part No.	Price
BPONG1X01		BPMO100X01	
BPONG5X01		BPMO150X01	
BPONG10X01		BPMO200X01	
BPONG25X01		BPMO300X01	
BPONG50X01		BPMO600X01	
BPONG100X01		BPMO800X01	

Case Quantity - 50 Bags

Cartridges - X20

Part No.	Price
CMMF [1-5] X20	
CMMF [10-25] X20	
CMMF [50-75-100] X20	

Case Quantity - 6 Cartridges



Filter Specialists, Inc. 800-348-3205

100 Anchor Road
P.O. Box 735
Michigan City, IN 46361
(219) 879-3307
(219) 879-0632 FAX



There are no expressed or implied warranties, including the implied warranty of merchantability and fitness for a particular purpose not specific herein respecting this agreement or the product being sold hereunder or the service provided herein.

WARNINGS

The X100 vessel is only designed to use lathe cut gaskets made of self-energizing material such as BUNA-N or VITON. FSI Does Not Recommend the use of gaskets or O-rings that are made of non-self energizing (i.e. non-elastomeric) material such as rope type gaskets, teflon, or graphite-impregnated materials.

The X100 is calc filled polypropylene. Please refer to chemical resistance guides for filter housing compatibility with specific chemicals at various temperatures. Only use this housing with chemical resistance ratings of "4" or "excellent". FSI will not assume responsibility for the use of this housing with chemicals and/or at temperatures and pressures that are not compatible with or within the safe operating range of this filter housing. Please refer to nameplate data on this housing which gives maximum operating temperature and pressure limits, and which assumes the operation of this housing is with chemically compatible fluids. Consult the FSI Engineering Department (1-800-348-3205) for pressure limits at different operating and/or ambient temperatures.

WARNING

BEFORE USE
REMOVE RED CAP
PLUG
REPLACE WITH
COMPATIBLE
PLUG VALVE OR
GAUGE

WARNING

WITH WATER
SERVICE
MAX PRESSURE
100 PSI
MAX TEMPERATURE
110°F

WARNING

BEFORE USE, CONSULT CHEMICAL COMPATIBILITY GUIDELINES.

This vessel is manufactured from calc filled polypropylene. The maximum operating pressure is rated at 100 PSI with water where the temperature does not exceed 110°F. The operating pressure may vary using other substances and temperatures. Although this housing material has a wide range of chemical resistance, there are several factors that affect or restrict usage, i.e. temperature and concentration of solutions. Therefore, the user should refer to published reference materials for chemical compatibility.

A partial list follows:

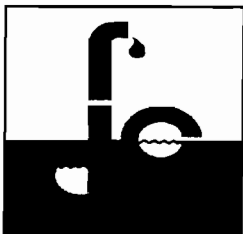
Compass Corrosion Guide-Section 3
Compass Chemical Resistance Guide for Elastomers
Dow Chemical Resistance Guide
DuPont Chemical Resistance and Fluid Compatibility

Failure to comply with the chemical compatibility guidelines may result in extensive vessel structural integrity failure.

SUCH FAILURE COULD RESULT IN SEVERE INJURY TO THE USER.

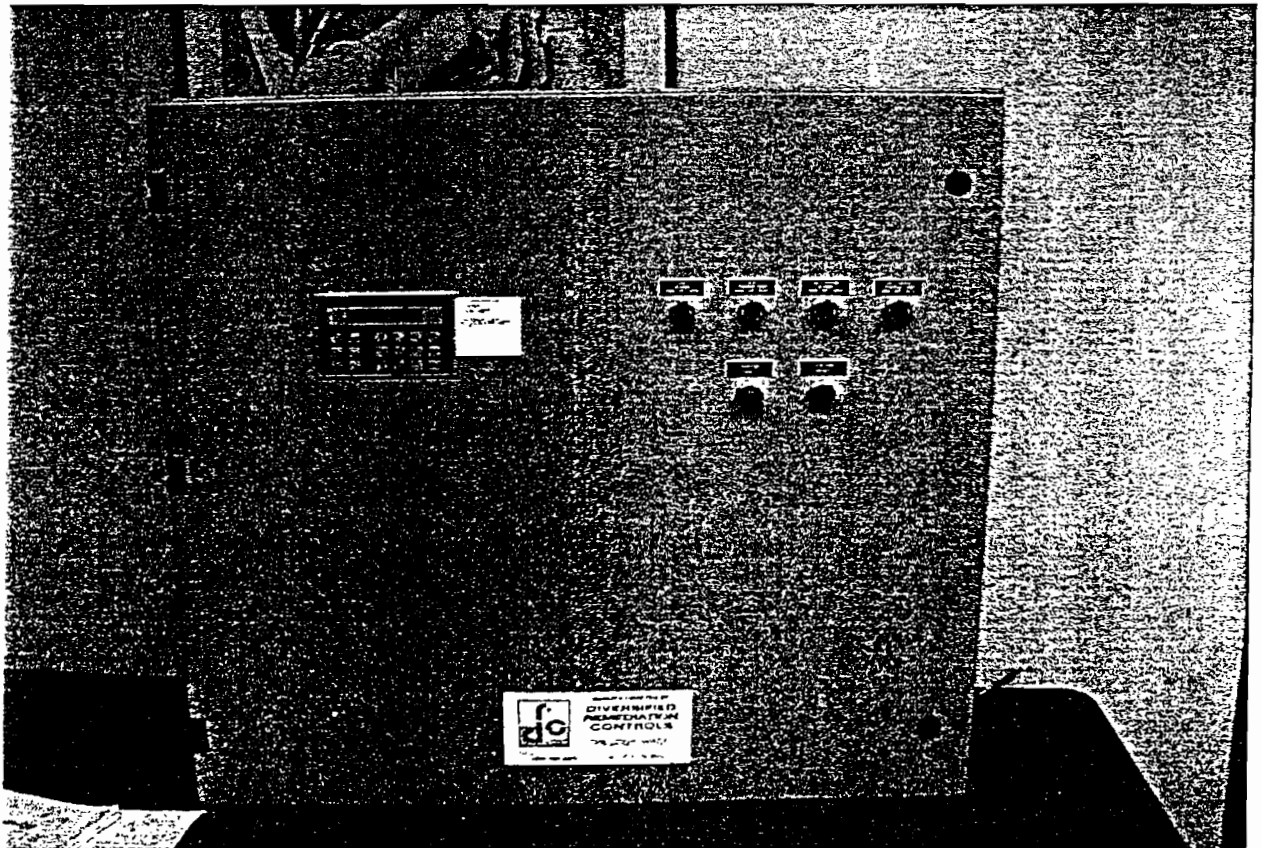
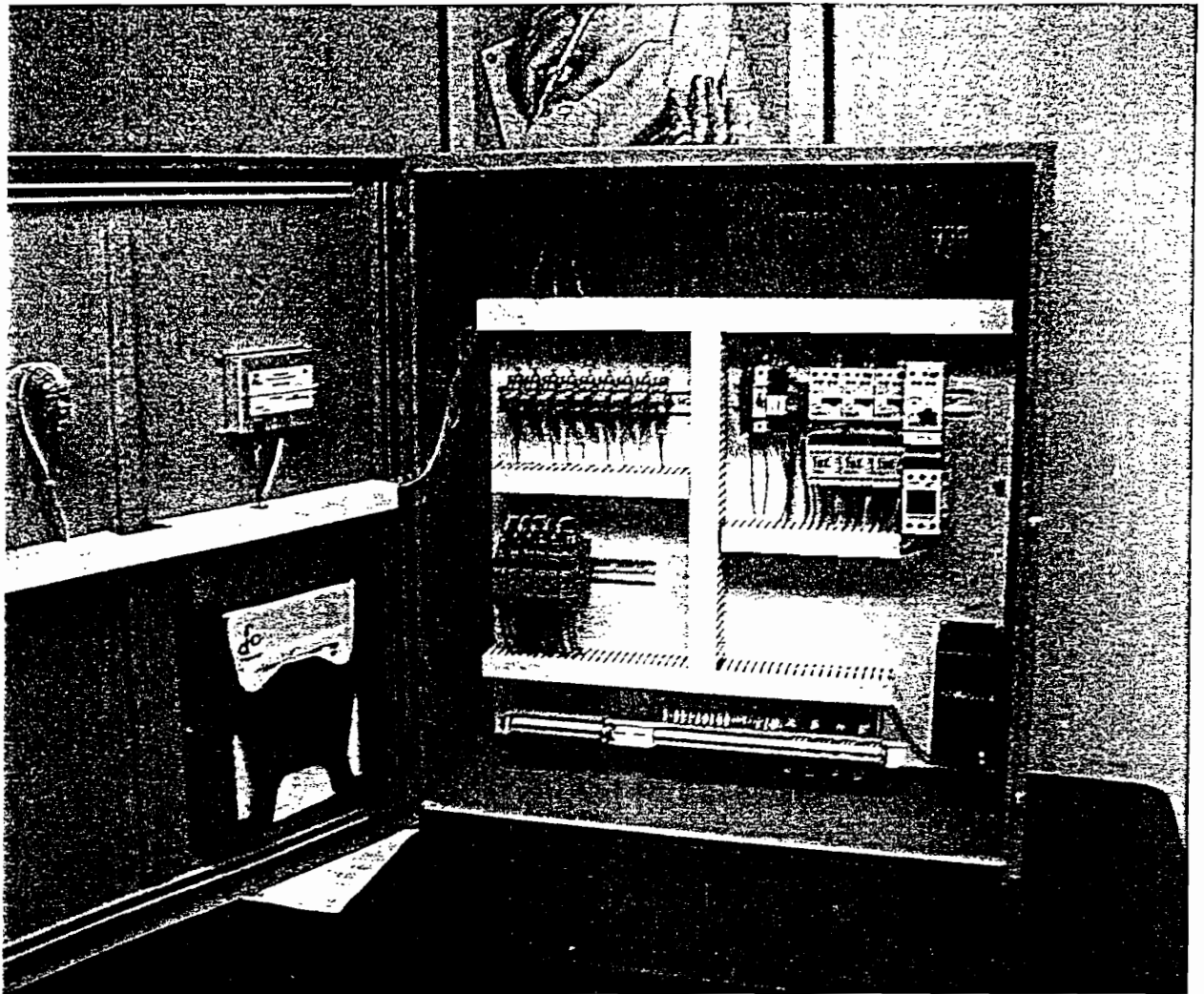
Control Panel

DRC # 6154

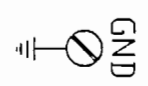


DIVERSIFIED REMEDIATION & CONTROLS

21801 Industrial Blvd. Rogers, MN 55374 Phone (763) 428-3000 Fax (763) 428-3660



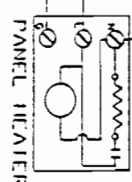
FIELD PANEL



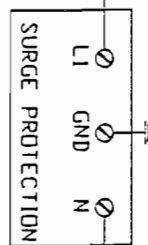
CB-1
10 AMP

115 VAC
INPUT

N

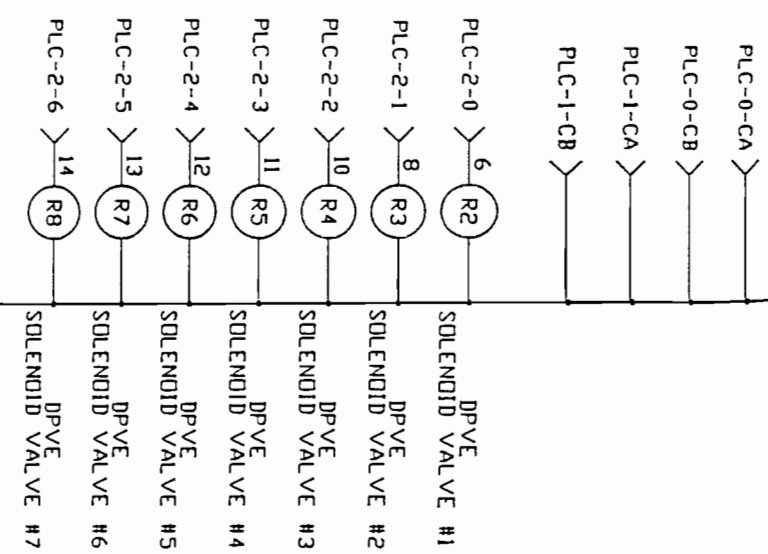
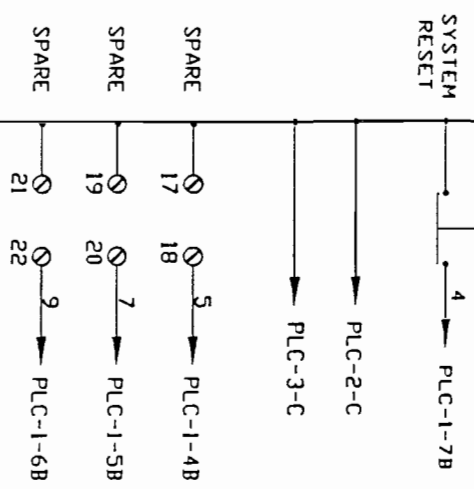
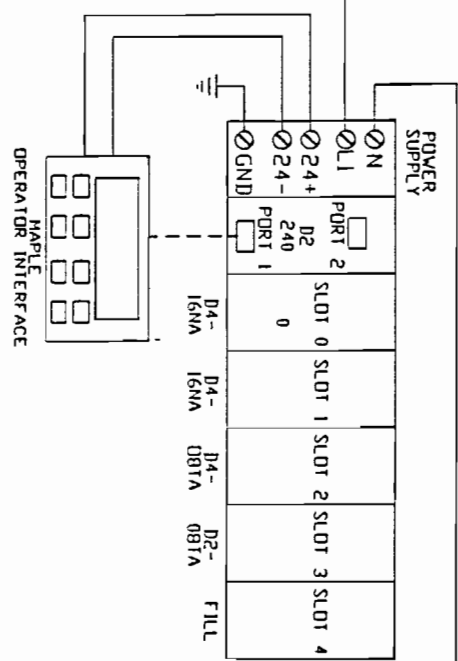


115 VAC RECEPTACLE



SURGE PROTECTION

CB-3
6 AMP



-----FIELD WIRING
R1, R2, ETC = RELAYS
C1, C2, ETC = CONTACTORS
T1, T2, ETC = TIMERS
Ø = TERMINAL BLOCK
T'STAT = MOTOR THERMOSTAT
(IF NONE THEN USE JUMPER WIRE)

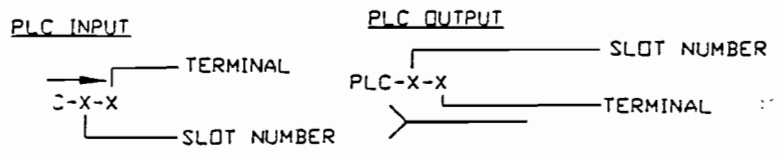
- NOTES: 1. FIELD WIRING TO BE 60" INSULATION.
2. TORQUE FIELD WIRING TO 14 IN/LBS.
3. INSTALLER MUST SUPPLY BRANCH CIRCUIT PROTECTION FOR 120 VAC INPUT



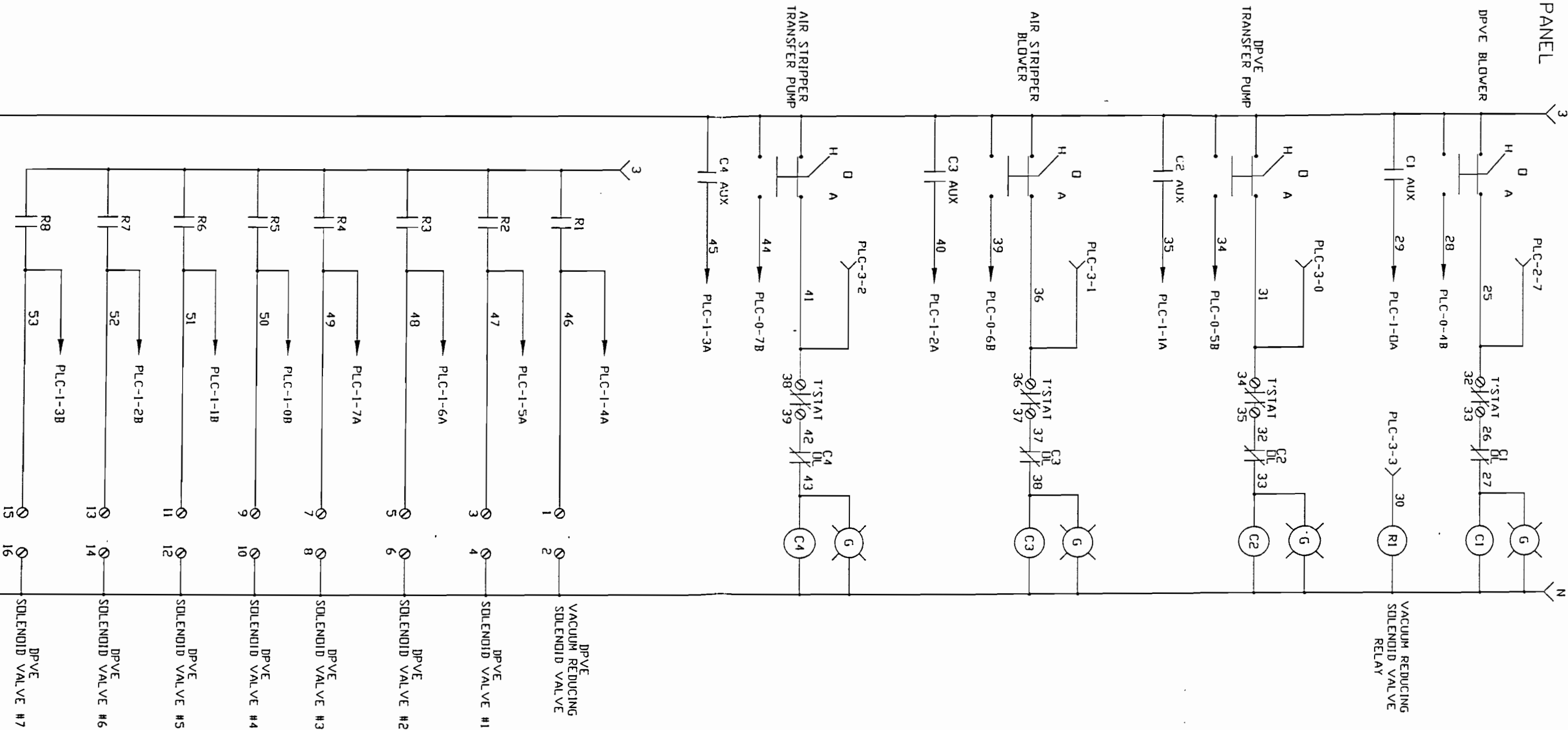
ALL SERVICE REMEDIATION
"PERRY, NY."

DIVERSIFIED REMEDIATION CONTROLS, INC.
21801 INDUSTRIAL BLVD. ROGERS, MN 55374
PHONE 612-428-3000 FAX 612-428-3660

PROPERTY OF DRC, INC. FOR REVIEW ONLY			
DRAWN BY: JF		SCALE: NTS	
BLD: TECH:		CKR:	
DATE: 6-23-00		DRC JOB# 6154	
PROJECT#		"PERRY, NY."	
DRAWING#		6154 1/5	



FIELD PANEL



-----FIELD WIRING
 R1, R2, ETC = RELAYS
 C1, C2, ETC = CONTACTORS
 T1, T2, ETC = TIMERS
 Ø = TERMINAL BLOCK
 T'STAT = MOTOR THERMOSTAT
 (IF NONE THEN USE JUMPER WIRE)

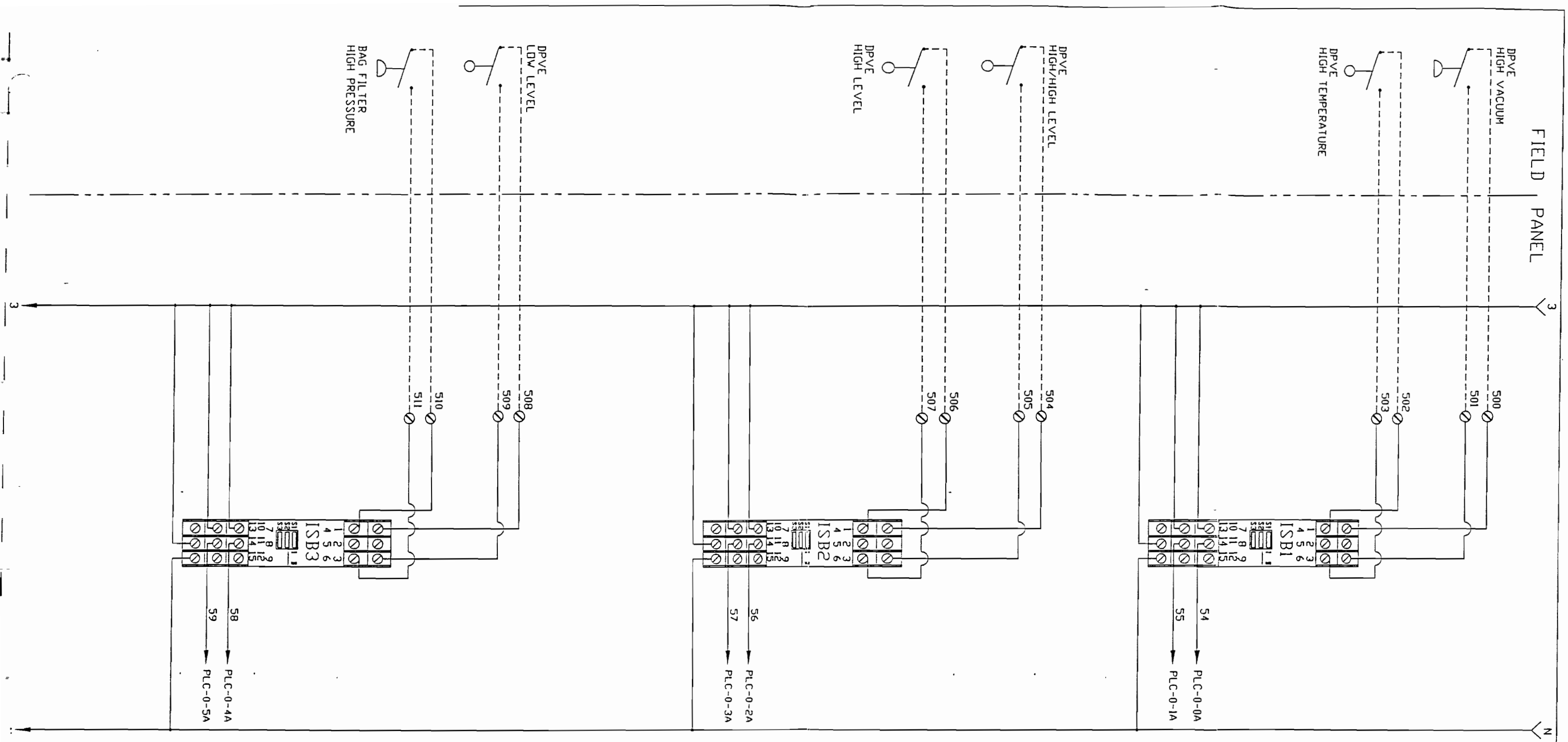
- NOTES:
1. FIELD WIRING TO BE 60" INSULATION.
 2. TORQUE FIELD WIRING TO 14 IN/LBS.
 3. INSTALLER MUST SUPPLY BRANCH CIRCUIT PROTECTION FOR 120 VAC INPUT



ALL SERVICE REMEDIATION
 "PERRY, NY."

DIVERSIFIED REMEDIATION CONTROLS, INC.
 21801 INDUSTRIAL BLVD. ROGERS, MN 55374
 PHONE 612-423-3000 FAX 612-428-3660

PROPERTY OF DRC, INC. FOR REVIEW ONLY			
DRAWN BY: JF	SCALE: NTS	BLDR:	TECH:
DATE: 6-23-00	DRC JOB# 6154	CKR:	
PROJECT#	"PERRY, NY."	DRAWING#	6154 2/5



SLOT NUMBER

-----FIELD WIRING
 R1, R2, ETC = RELAYS
 C1, C2, ETC = CONTACTORS
 T1, T2, ETC = TIMERS
 Ø = TERMINAL BLOCK
 T'STAT = MOTOR THERMOSTAT
 (IF NONE THEN USE JUMPER WIRE)

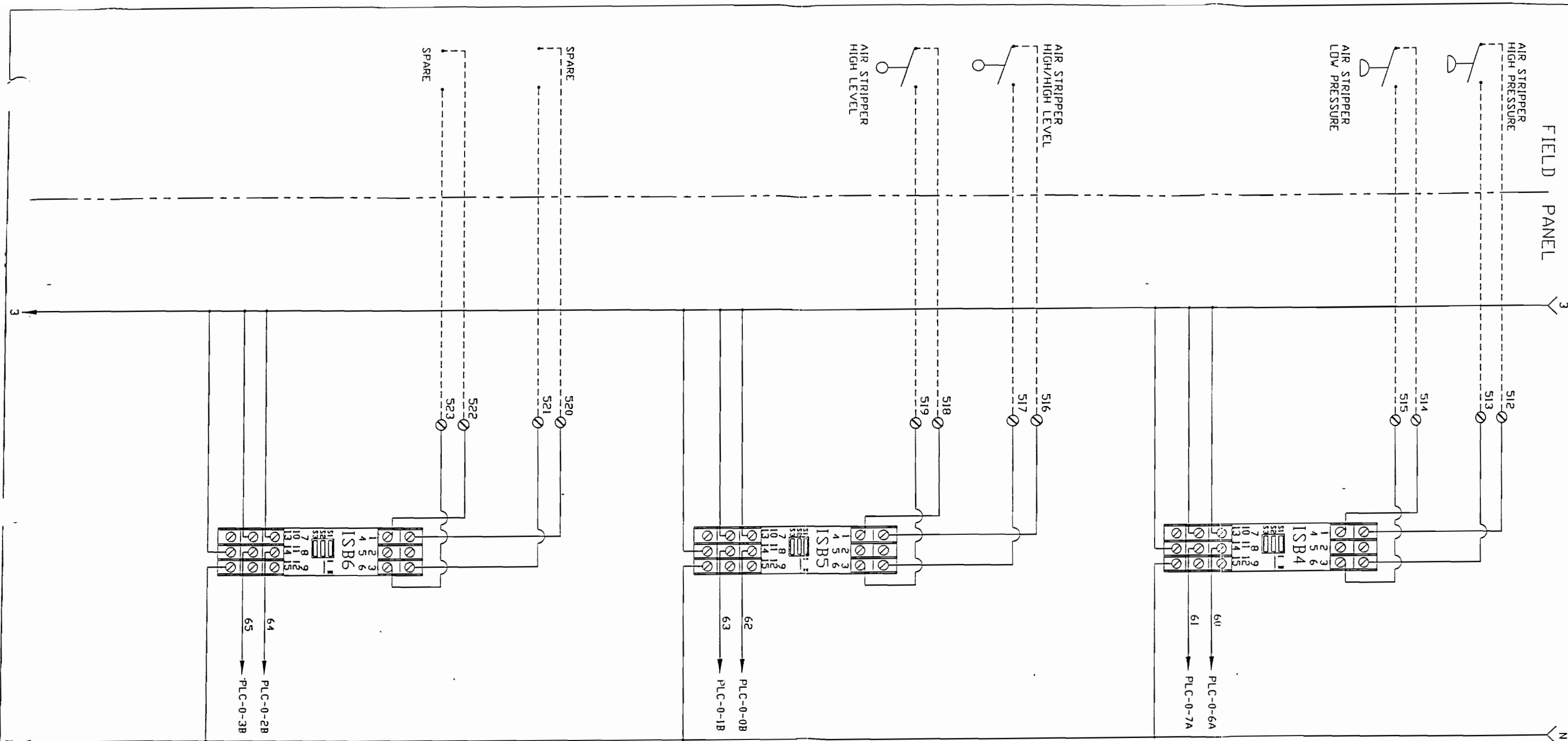
- NOTES: 1. FIELD WIRING TO BE 60" INSULATION.
2. TORQUE FIELD WIRING TO 14 IN/LBS.
3. INSTALLER MUST SUPPLY BRANCH CIRCUIT PROTECTION FOR 120 VAC INPUT



ALL SERVICE REMEDIATION
 "PERRY, NY."

DIVERSIFIED REMEDIATION CONTROLS, INC.
 21801 INDUSTRIAL BLVD. ROGERS, MN 55374
 PHONE 612-428-3000 FAX 612-428-3660

PROPERTY OF DRC, INC. FOR REVIEW ONLY			
DRAWN BY:	JF	SCALE:	NTS
BLDR:		TECH:	CKR:
DATE:	6-23-00	DRC JOB#	6154
PROJECT#	"PERRY, NY."		
DRAWING#	6154 3/5		



SLOT NUMBER

-----FIELD WIRING
 R1, R2, ETC = RELAYS
 C1, C2, ETC = CONTACTORS
 T1, T2, ETC = TIMERS
 Ø = TERMINAL BLOCK
 T'STAT = MOTOR THERMOSTAT
 (IF NONE THEN USE JUMPER WIRE)

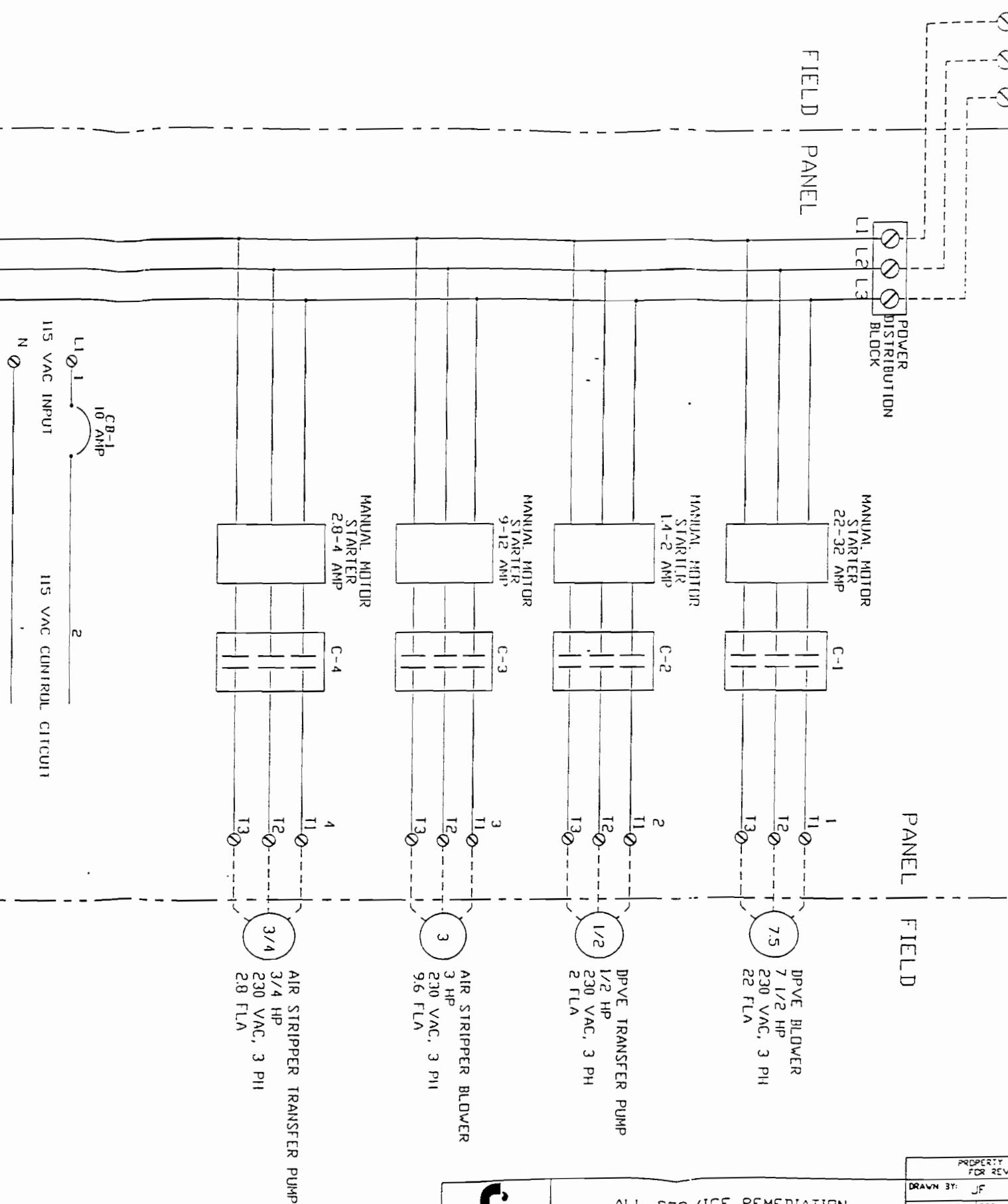
- NOTES: 1. FIELD WIRING TO BE 60" INSULATION.
2. TORQUE FIELD WIRING TO 14 IN/LBS.
3. INSTALLER MUST SUPPLY BRANCH CIRCUIT PROTECTION FOR 120 VAC INPUT



ALL SERVICE REMEDIATION "PERRY, NY."			
DIVERSIFIED REMEDIATION CONTROLS, INC. 21801 INDUSTRIAL BLVD. ROGERS, MN 55374 PHONE 612-428-3000 FAX 612-428-3660			
PROPERTY OF DRC, INC. FOR REVIEW ONLY			
DRAWN BY: JF	SCALE: NTS		
BLDR:	TECH:	CKR:	
DATE: 6-23-00	DRC JOB# 6154		
PROJECT#	"PERRY, NY."		
DRAWING#	6154 4/5		

230 VAC,
3 PH, 60 HZ

TOTAL FLA @ 230V = 36.4 AMPS



ALL SERVICE REMEDIATION
"PERRY, NY."

DIVERSIFIED REMEDIATION CONTROLS, INC.
21801 INDUSTRIAL BLVD. ROGERS, MN 55374
PHONE 612-428-3000 FAX 612-428-3660

PROPERTY OF DRC, INC. FOR REVIEW ONLY			
DRAWN BY:	JF	SCALE:	NTS
BLDR:	TECH	CKR:	
DATE:	6-23-00	DRC JOB#	6154
PROJECT#	"PERRY, NY."		
DRAWING#	6154 5/5		

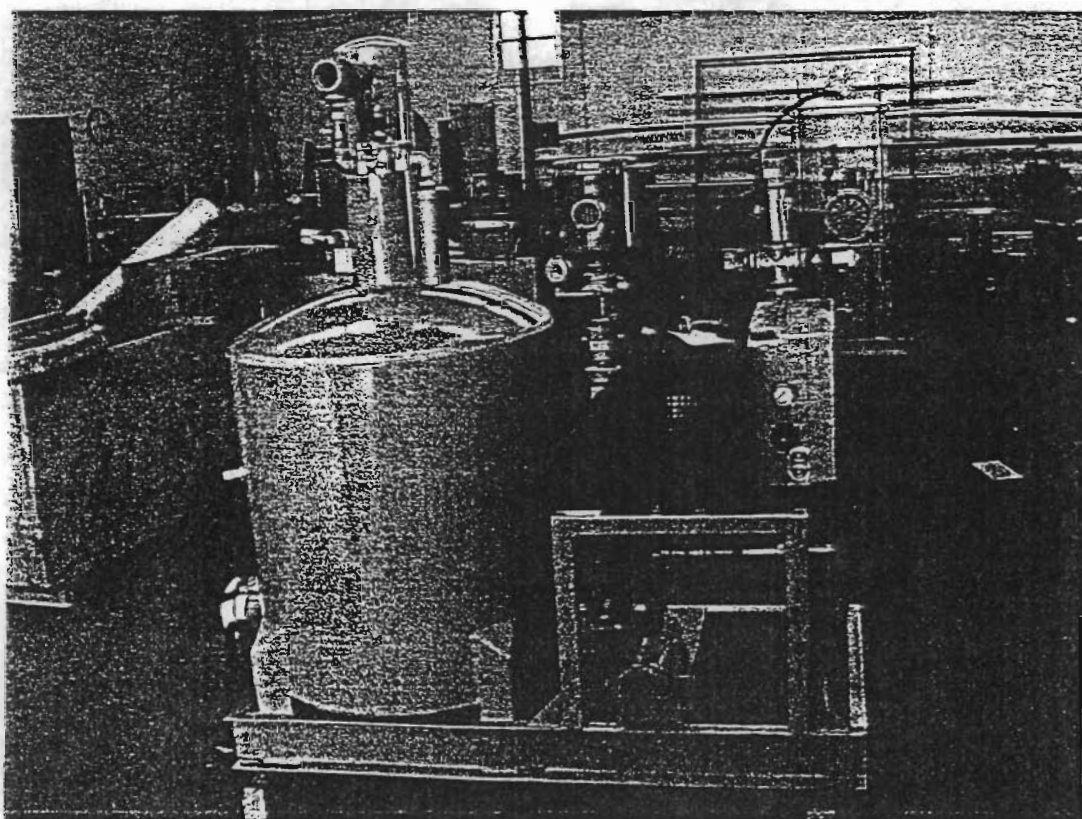
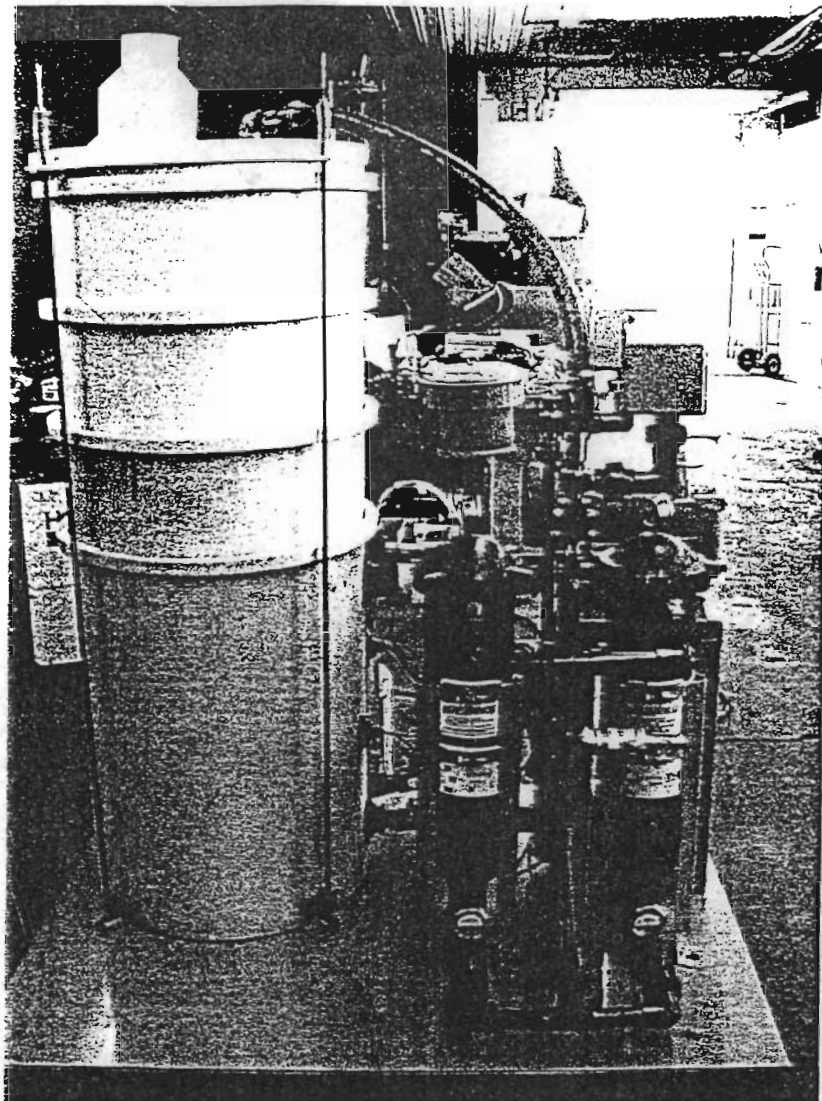
System Pictures

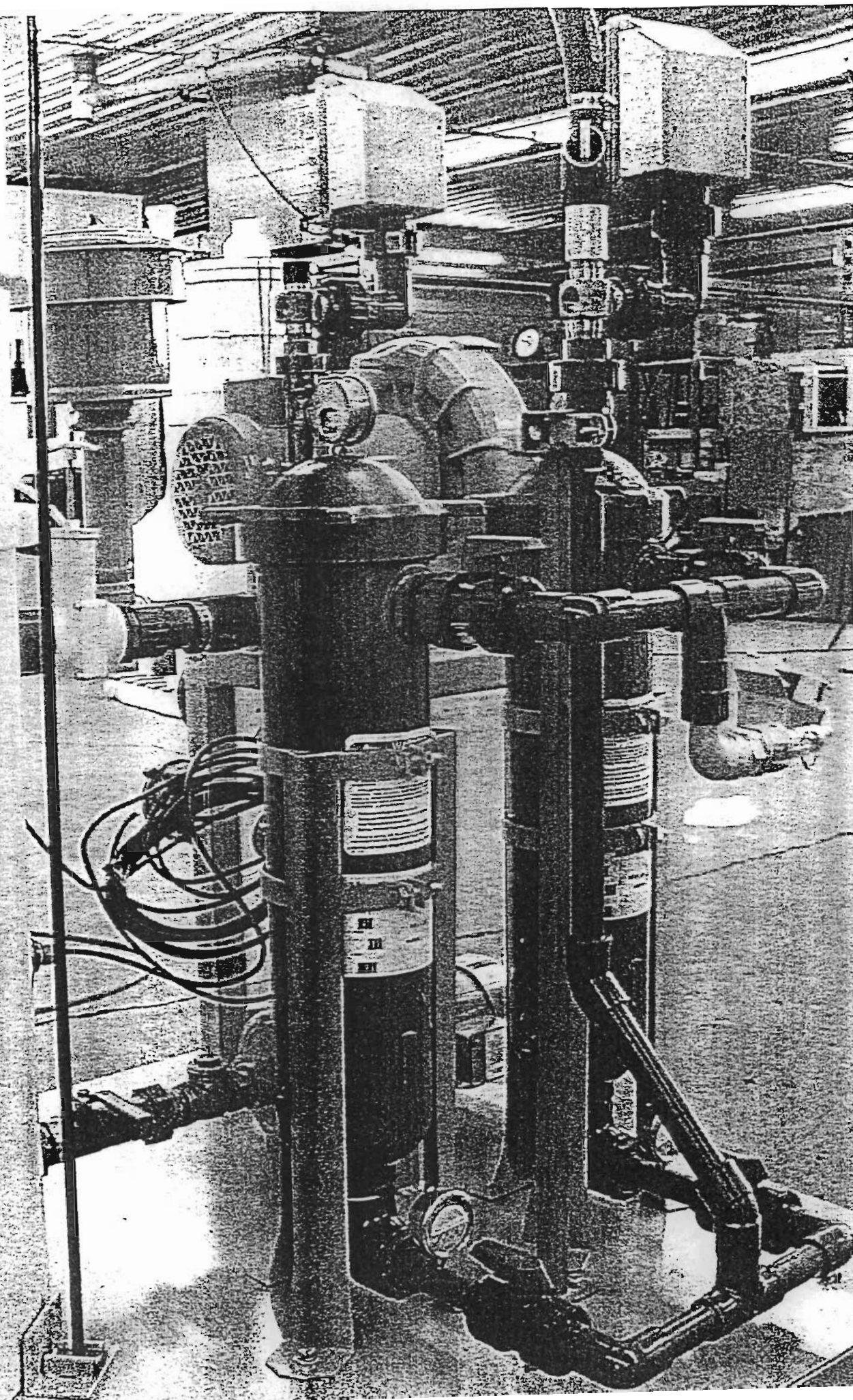
DRC # 6154

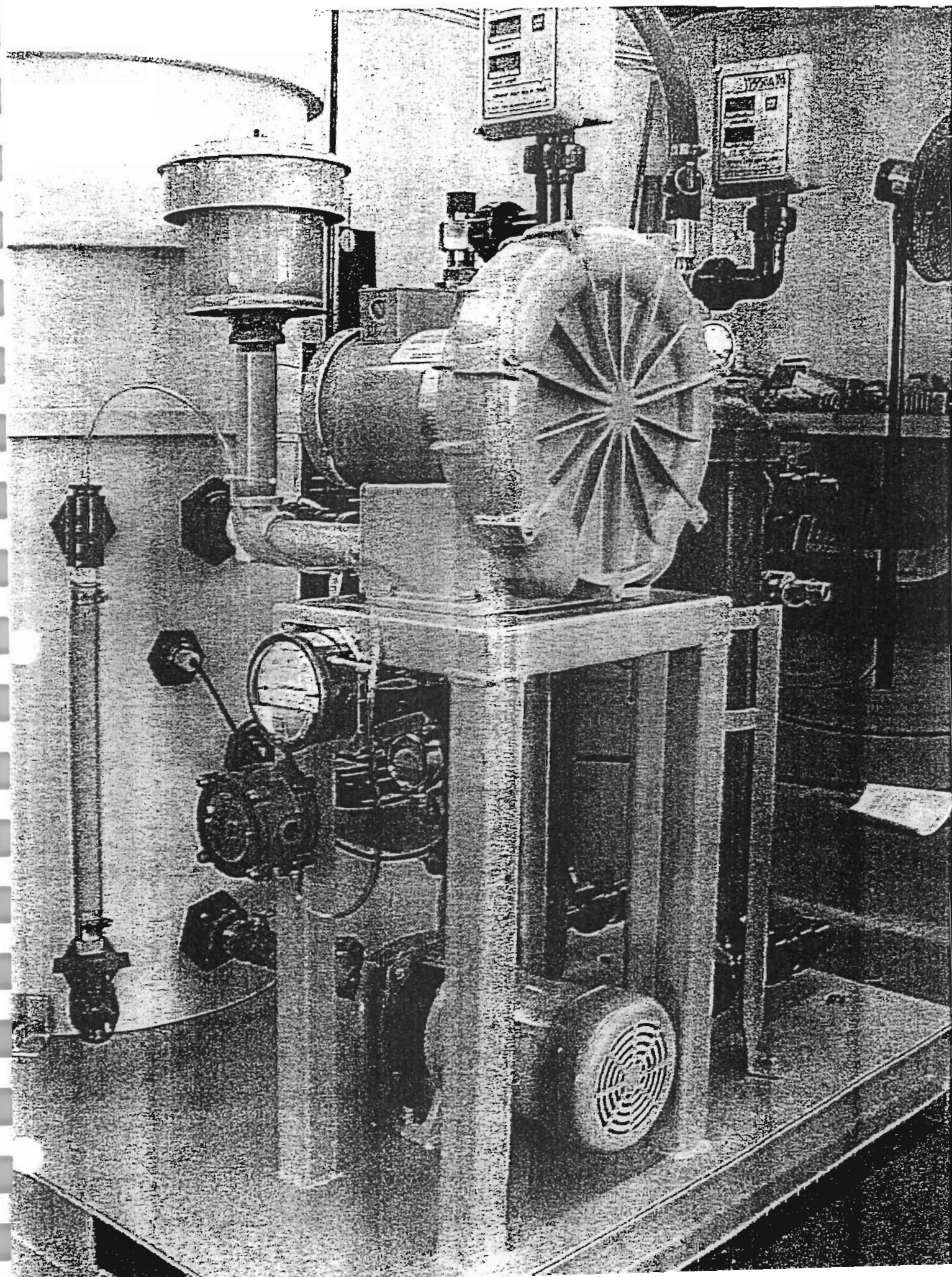


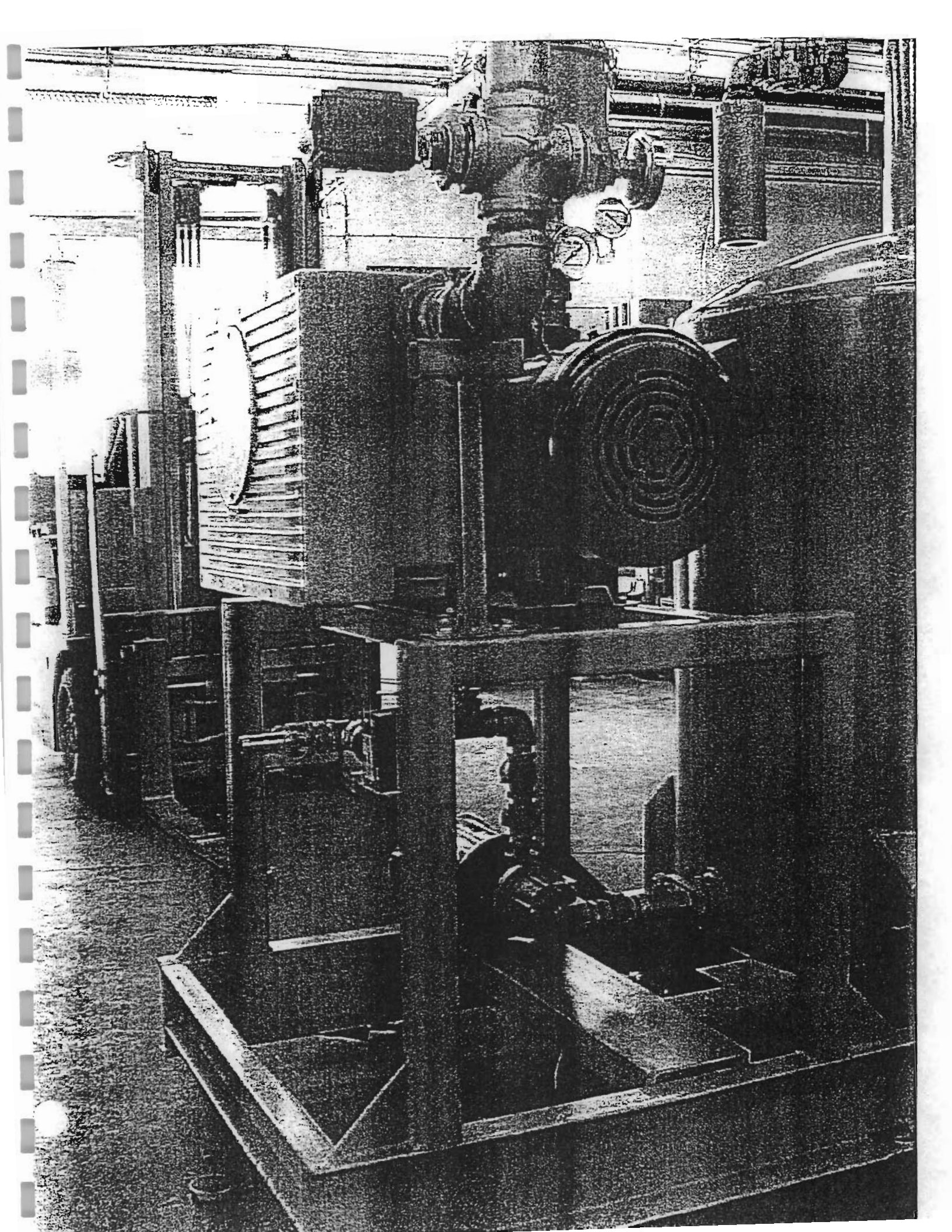
DIVERSIFIED REMEDIATION & CONTROLS

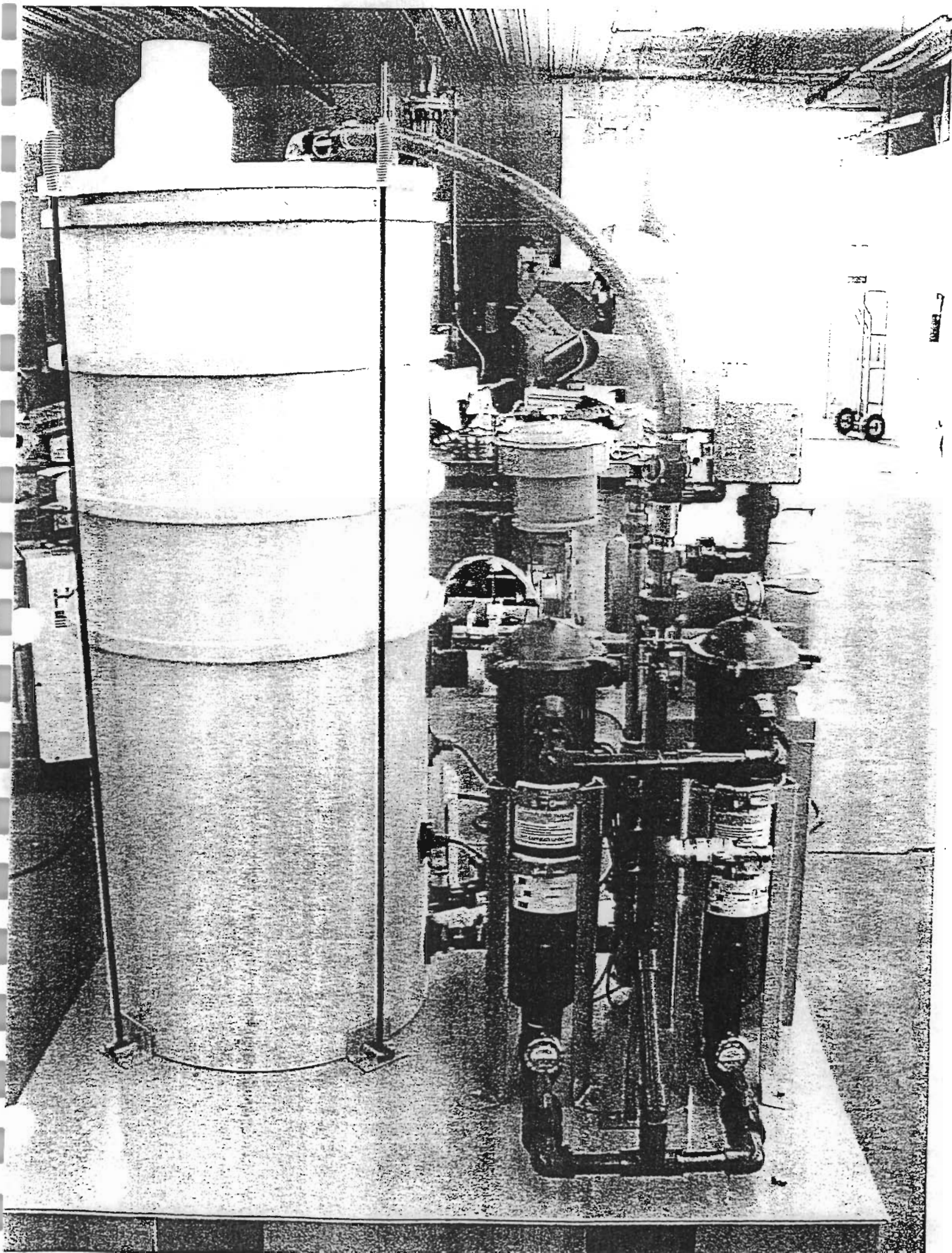
21801 Industrial Blvd. Rogers, MN 55374 Phone (763) 428-3000 Fax (763) 428-3660











APPENDIX C

O&M Log Sheet

System O&M Sheet Perry New York

Date _____
 Person onsite _____
 Total Hours onsite _____

COMMENTS

System status upon arrival	on/off	DVE Well Cycle Times in min.	
DPVE pump hours			
Vaccum in Hg		DVE-101	
Well cycling at time of reading		DVE-102	
Flow Stripper in WC		DVE-103	
Pump amps		DVE-104	
Pump Temp		DVE-105	
Totalizer 1		DVE-106	
Totalizer 2		DVE-107	
VLS transfer pump flow rate			
pH			
PID reading system influent DPVE			
PID reading system effluent DPVE			
PID reading system effluent stripper			
Change bag filters			
Clean Stripper site glass	yes/no		
Check oil vac pump	yes/no		
Change oil vac pump	yes/no		
System cycling properly	yes/no		
system sampled H2O	yes/no		
system sample air	yes/no		
system on upon departure	yes/no		

Liquid Levels

DTP	DTW		DTP	DTW		DTP	DTW		DTP	DTW
DVE-101		DVE-106			MW-104			MW-109		
DVE-102		DVE-107			MW-105			MW-110		
DVE-103		MW-101			MW-106			MW-111		
DVE-104		MW-102			MW-107					
DVE-105		MW-103			MW-108					

Mag Readings

MW-102 _____ PZ-1 _____
 MW-106 _____
 MW-110 _____

APPENDIX D

Remediation Monitoring Report

Jan 2000 - Sept 2001

REMEDIATION MONITORING REPORT
JULY 2000 THROUGH SEPTEMBER 2001



CHAMPION PRODUCTS, INC.
200 NORTH MAIN STREET
PERRY, NEW YORK
DEC Site # V00018-9
DELTA PROJECT NO. S098-009-5

Prepared for:

Sara Lee Corporation
Three First National Plaza
Chicago, IL 60602-4260

Prepared by:

Delta Environmental Consultants, Inc.
4068 Mt. Royal Blvd., Suite 225
Allison Park, PA 15101
(412) 487-7703

November 26, 2001



4068 Mt. Royal Boulevard
Suite 225-Gamma
Allison Park, Pennsylvania 15101-2951
USA
412/487-7700
FAX: 412/487-9785

November 26, 2001

New York State Department of Environmental Conservation
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Attention: Mr. Martin Doster

Subject: **Remediation Monitoring Report**
July 2000 through September 2001
Champion Products, Inc. Company
200 North Main Street
Perry, New York
Delta Project No.: S098-009-5

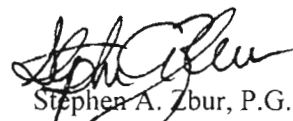
Dear Martin:

Enclosed are four copies of the referenced report, which summarizes site monitoring activities from July 2000 through September 2001. Please contact either of the undersigned if you have any questions.

Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.


Joyce Koker, P.E.
Project Manager
(262) 827-4802


Stephen A. Zbur, P.G.
Senior Consultant
(412) 487-7703

Enclosure

cc: George Johnson, Sara Lee
Sally Gallivan, Champion Products, Inc.
Maureen Crough, Sidley Austin Brown & Wood
Sam Gullo, Family Furniture
Paul Sylvestri, Harter Secrest & Emery, LLP
Harry Parker, Esq
Andrew English, NYSDEC
Matt Forcucci, NYSDOH

REMEDIATION MONITORING REPORT
JULY 2000 THROUGH SEPTEMBER 2001

CHAMPION PRODUCTS, INC.
200 NORTH MAIN STREET
PERRY, NEW YORK
DEC Site # V00018-9
DELTA PROJECT NO. S098-009-5

Prepared for:

Sara Lee Corporation
Three First National Plaza
Chicago, IL 60602-4260

Prepared by:

Delta Environmental Consultants, Inc.
4068 Mt. Royal Blvd., Suite 225
Allison Park, PA 15101
(412) 487-7703

November 26, 2001

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 Purpose	1
1.2 Background	1
2.0 REMEDIATION SYSTEM UPGRADES	2
3.0 GROUND WATER AND SURFACE WATER MONITORING	3
3.1 Ground Water Flow	3
3.2 Baseline Ground Water Sampling	4
3.3 Quarterly Ground Water Monitoring	4
3.4 Quarterly Surface Water Monitoring	5
4.0 REMEDIATION SYSTEM OPERATION & MAINTENANCE	5
5.0 MASS RECOVERY	7
6.0 CONCLUSIONS AND RECOMMENDATIONS	7
7.0 REMARKS	7

Tables

Table 1:	Historical Ground Water Elevation Data
Table 2:	Percentage Change in Analyte Concentration
Table 3:	Historical Surface Water Analytical Results
Table 4:	Monthly Ground Water Discharge and System Run-Time
Table 5:	Monthly Ground Water System Analytical Results
Table 6:	Induced Vacuum Readings
Table 7:	Summary of Air Sample Results
Table 8:	Vapor Mass Recovery Data
Table 9:	Ground Water Recovery Data

Figures

Figure 1:	Site Map
Figure 2:	Ground Water Contour Map (November 3, 1998)
Figure 3:	Water Table Contour Map (July 6, 2000)
Figure 4:	Ground Water Contour Map (June 28, 2001)
Figure 5:	Ground Water Contour Map (August 7, 2001)
Figure 6:	Hydrograph: MW-106 / MW-102 / DVE-106
Figure 7:	Hydrograph: MW-101 / MW-107 / DVE-107
Figure 8:	Isoconcentration Contour Map: Toluene
Figure 9:	Isoconcentration Contour Map: 1,2,4-Trimethylbenzene
Figure 10:	Isoconcentration Contour Map: TCA
Figure 11:	Isoconcentration Contour Map: DCA
Figure 12:	Isoconcentration Contour Map: Xylenes
Figure 13:	Vapor Cumulative Mass Recovery
Figure 14:	Ground Water Cumulative Mass Recovery

Appendices

- Appendix A: Laboratory Analytical Reports
- Appendix B: Graph of Dissolved Analyte Concentrations
- Appendix C: System Operational Data
- Appendix D: Graphs of Vapor and Ground Water Recovery for Specific Volatile Organic Compounds

REMEDIATION MONITORING REPORT

JULY 2000 TO SEPTEMBER 2001

CHAMPION PRODUCTS COMPANY

200 NORTH MAIN STREET

PERRY, NEW YORK

DELTA PROJECT NO. S098-009-5

1.0 INTRODUCTION

1.1 Purpose

The purpose of this report is to provide an update to the New York Department of Environmental Conservation (Department) on the status of the on-going remediation activities at the referenced site. This report includes an overview of the remediation system, upgrades that have been performed since system installation in July 2000, monitoring results and an evaluation of system operating efficiency.

In summary, the results are as follows:

- Volume of ground water extracted: 1,307,836 gallons
- Estimated volume of soil vapor extracted: 15,223,200 cubic feet
- Estimated mass removal of dissolved volatile organic compounds (VOCs) through 9/20/01 3 pounds
- Estimated mass removal of vapor (residual) VOC (through 8/7/01): 117 pounds
- Ground water treatment system removal efficiency: 78% – 100%
- Dissolved toluene reductions:
(prior to system start-up through August 2001; from ground water at the monitoring and dual phase vapor extraction (DVE) well that displayed the highest dissolved concentrations):

MW-106 (48,000 ug/l → 1,700 ug/l)	96% reduction
DVE-101 (8,300 ug/l → 610 ug/l)	93% reduction
- Dissolved toluene increases:
(prior to system start-up through August 2001; from ground water at the monitoring and DVE well that displayed the greatest dissolved increase):

MW-109 (6.5ug/l – 12ug/l)	85% increase
DVE-102 (7 ug/l → 130 ug/l)	94% increase

1.2 Background

On March 9, 2000, the Department and Champion Products, Inc. (Champion) entered into a Remedial Voluntary Cleanup Agreement (the Agreement) for the site to remove VOCs from the soil and ground water. In accordance with the Agreement, Champion implemented the remedial strategy presented in the Final Remediation Workplan (Workplan), submitted to the Department on February 11, 2000. The Workplan included installation, operation and

maintenance of a DVE system and excavation and off-site disposal of impacted soil from the former empty drum storage area.

Operation of the DVE system began in July 2000. All ground water and soil vapor is generated from seven extraction wells (DVE-101 through DVE-107), as illustrated on Figure 1. The extraction wells are constructed of 4-inch diameter schedule 40 PVC pipe, completed to depths ranging from 18 to 20 feet below ground surface. Each well contains a 12- to 15-foot section of 0.020 slot well screen, connected to the appropriate length of riser pipe. A ground water/soil vapor extraction line is connected to each extraction well and manifolded to the rotary vane pump. The average ground water removal rate from the surficial aquifer is 2.15 gallons per minute (gpm). Air flow ranges from 20 to 75 cubic feet per minute (cfm), depending on which wells are operating.

Extracted soil vapor and ground water are discharged to the vapor/liquid separator (VLS) where they are physically separated. Soil vapors are then drawn through two, 1,000-pound vapor-phase, granular activated carbon (GAC) units, plumbed in series, and discharged to the atmosphere. Ground water that accumulates in the VLS is pumped through two 50-micron sediment filters and then to an air stripper using the VLS transfer pump. The aerated ground water is then passed through GAC units prior to discharge to an unnamed tributary of the Silver Lake Outlet, in accordance with Department requirements. The air stripper off-gas is passed through two, 500-pound vapor phase GAC units, plumbed in series and then discharged to the atmosphere.

Additional information regarding construction and specifications of the DVE system is presented in the Final Engineering Report submitted to the Department on March 9, 2001

2.0 REMEDIATION SYSTEM UPGRADES

Since initial system start up, various modifications were made to the remediation system due to increases in the concentration and type of VOCs, appearance of light non-aqueous phase liquids (LNAPL) and volume of water extracted from the subsurface. The following is a brief summary of system modifications:

- Upgrading the original VLS transfer pump with a larger pump capable of handling the “slugs” of ground water and overcoming increased subsurface vacuums encountered at DVE-101 and DVE-102 (which are located proximate to building footers and permeable backfill).
- Adding a tray to the air stripper to increase removal efficiencies due to the presence of LNAPL (mineral spirits).
- Adding two, 1,000-pound GAC units to the ground water effluent stream to ensure discharge limitations are met.
- Upgrading the existing air stripper transfer pump with a vertical multistage transfer pump to overcome higher back pressures associated with discharging the water through the GAC units.

These changes were discussed in various written correspondences provided to the Department between August 8 and November 9, 2000.

3.0 GROUND WATER AND SURFACE WATER MONITORING

The monitoring program includes:

- Monthly collection of influent and midfluent (obtained after the water has passed through the air stripper but prior to being treated by the carbon) system ground water samples for analysis of VOCs by Environmental Protection Agency (EPA) Method 8021.
- Monthly collection of effluent system ground water samples for analysis of select VOCs by EPA Method 8021. Effective September 2001, the effluent sample analysis was expanded to include all targeted VOCs that are analyzed as part of the influent and midfluent samples, as requested by the Department.
- Quarterly ground water sampling (February, May, August, November) of all 13 monitoring wells (MW-101 through MW-111, MW-201 and MW-202) and all seven DVE wells for laboratory analysis of VOCs by EPA Method 8021.
- Annual collection of three surface water samples for analysis of VOCs, by EPA Method 8021.

3.1 Ground Water Flow

Ground water level and LNAPL thickness measurements have been obtained from each monitoring and DVE extraction well on a monthly basis since system start-up. Figure 1 illustrates the location of each well. A summary of ground water elevations is presented in Table 1. Approximately 0.13 and 0.04 feet of LNAPL were present in extraction well DVE-101 on July 14 and July 21, 2000, respectively. Measurable LNAPL has not been observed in extraction well DVE-101 since July 21, 2000. Laboratory analysis of the LNAPL indicated that the material resembled mineral spirits. Measurable LPH (greater than 0.01 ft.) has not been observed in any other extraction well or ground water monitoring well since system start-up.

Figures 2 through 5 illustrate water table contour maps based on data collected prior to system start-up (on November 3, 1998 and July 6, 2000) and during system operation (on June 28 and August 7, 2001), respectively. Review of Figures 2 and 3 (prior to system start-up) indicates that ground water flows radially from the areas of monitoring wells MW-102 and MW-106 and generally to the east/northeast. The horizontal hydraulic gradient, based on data obtained in November 1998 between monitoring wells MW-102, MW-105 and MW-110 is 0.02.

Review of Figures 4 and 5 (post system start-up) indicates changes in the water table in response to the induced vacuum at various DVE extraction wells as noted on each figure. As shown in Figure 4, the induced vacuum results in a downward radial flow toward operating extraction well DVE-106 and water table mounding at extraction well DVE-102 and monitoring wells MW-106 and MW-107. This upward mounding is commonly associated with DVE systems and is attributed to upward displacement of ground water due to the increased movement of air through more permeable subsurface material. Thus, areas of mounded ground water are interpreted as being within the radius of influence of the operating DVE wells. To minimize the potential of altering ground water and VOC flow due to mounding affects, run-times of individual DVE wells are controlled and modified using a remote telemetry system. As shown in Figure 5, the water table surface between the three operating extraction wells (DVE-103, DVE-106 and DVE-107) has responded to the induced vacuum; thus, resulting in a decreased hydraulic gradient of approximately

0.004 (as compared to a hydraulic gradient of 0.02 observed in November 1998). This decrease is attributed to continued operation of the system; thus, resulting in near steady state conditions.

Relative water level changes have been observed in various monitoring wells in response to DVE system operation. Figures 6 and 7 illustrate hydrographs of water levels at well cluster MW-106/MW-102/DVE-106 and MW-101/MW-107/ DVE-107, respectively. Review of these figures indicates a radius of influence of at least 50 feet based on drawdown in water levels at monitoring well MW-107 (as compared to the estimated radius of influence of 22 feet discussed in the Workplan). Therefore, the system is effective at maintaining hydraulic control of the dissolved phase plume.

3.2 Baseline Ground Water Sampling

Ground water samples were collected in July 2000 to establish baseline ground water concentrations prior to full-scale system operation. Ground water samples were collected from all 13 monitoring wells and 7 extraction wells. The samples were analyzed for VOCs by EPA Method 8021.

3.3 Quarterly Ground Water Monitoring

Ground water samples were collected from the 13 monitoring wells and seven extraction wells in November 2000 and February, May and August 2001. The samples were analyzed for VOCs by EPA Method 8021. Table 2 presents analytes that have displayed the highest dissolved concentration at each monitoring and extraction well and the associated decrease or increase since system start-up. Analytical results from June 1998 through August 2001 are presented as Appendix A. (The laboratory analytical reports for all samples (ground water, surface water and air) are not included with this submittal since each report has already been submitted to the Department as part of the Monthly Progress Report).

Graphs of dissolved concentrations, for select wells, with respect to time are presented as Appendix B. Review of these graphs indicates a downward trend for all analytes through May 2001 in ground water collected from all monitoring and extraction wells. The August 2001 data indicates an increase of various VOCs at monitoring well MW-104 and extraction wells DVE-102, DVE-104 and DVE-107. These increases are attributed to:

- Migration of dissolved phase VOCs toward the extraction wells as these extraction wells are located on the downgradient periphery of the dissolved plume.
- Dewatering of the surficial aquifer; thus, exposing additional soil that contains residual VOCs.
- Diffusion of the VOCs from the residual/vapor phase into the dissolved phase.

Isoconcentration maps were prepared to compare dissolved VOC concentrations from November 1998 (as presented in the Workplan) versus August 2001 for the following VOCs:

- toluene
- 1,2,4-trimethylbenzene
- 1,1,1-trichloroethane (TCA)
- 1,1-dichloroethane (DCA)

- total xylenes

These constituents were selected based on their prevalence across the site and historical elevated concentrations in the ground water. Each map (which is presented as Figures 8 through 12) illustrates the varying aerial extent of the dissolved concentrations in response to system operation. As shown in the majority of the figures, the aerial extent of VOCs has decreased and moved toward the DVE wells. Several analytes show an expanded aerial extent between November 1998 and August 2001. This increase is attributed to more precise plume definition in August 2001 (as compared to November 1998) since DVE well ground water data was used to develop the August 2001 isoconcentrations (the DVE wells were not installed until December 1999).

3.4 Quarterly Surface Water Monitoring

Three surface water samples were obtained in July, February and May from the intermittent stream located immediately west and south of the site as shown on Figure 1. Surface water samples were not obtained in August due to the absence of running water. The samples were analyzed for VOCs by EPA Method 8021 and results are summarized in Table 3. Review of Table 3 indicates that VOCs have not been detected in surface water since June 1998.

4.0 REMEDIATION SYSTEM OPERATION & MAINTENANCE

System operation and maintenance (O&M) visits are performed monthly. Weekly site visits are made to change the bag filters and obtain system operational data. A remote telemetry system is also used 2-3 times per week to monitor system operational data and modify the timing of the "ON" and "OFF" cycles of each DVE well as necessary.

A summary of the monthly ground water discharge and system run-time is presented as Table 4. Since system start-up, a total of 1,307,836 gallons of ground water have been removed from the subsurface at an average flow rate of 2.15 gpm. The system operated for 6,343 hours, or 62% of the time since system start-up; although, the system operated 93% of the time during the 3rd quarter of 2001. Monthly ground water discharge rates range from a maximum of 219,443 gallons in January 2001 to a minimum of 11,797 gallons in October 2000. Although the system was operational during 90% of September 2001, only 15,757 gallons of water were extracted from the subsurface. This decrease is attributed to dewatering of the surficial aquifer due to system operation and seasonal decrease in water levels across the site (as indicated by the absence of ground water in monitoring wells MW-109 and MW-110).

As part of the monthly O&M, all parts of the system are inspected and operational data is obtained to determine if equipment is operating properly. Ground water system samples are collected from the following three locations:

- Influent: prior to entering the primary air stripper;
- Midfluent (system stripper): between air stripper and GAC units; and,
- Effluent: after treatment through the GAC units and prior to discharge to an unnamed tributary of the Silver Lake Outlet.

The influent and midfluent system samples are analyzed monthly for VOCs by EPA Method 8021. Until August 2001, the effluent sample was analyzed for the eight VOCs that were assigned discharge limitations by the Department. Since August 2001, the effluent sample analysis was expanded, as requested by the Department, to include all of the analytes that are analyzed and reported by EPA Method 8021. All system samples are submitted to an independent laboratory for analysis.

System analytical results are presented in Table 5. Effluent data and ground water discharge rates are submitted monthly to the Department in accordance with their discharge reporting requirements. All VOCs have been below the discharge limits or method detection limits (if the VOC does not have a discharge limit) during 14 of the 15 months the system has been in operation. The lone exceedence (n-butylbenzene) was detected in August 2001 and discussed in detail as part of the August 2001 Discharge Monitoring Data submitted to the Department on September 26, 2001.

System operation results in an induced vacuum on individual DVE wells, resulting in air flow rates ranging from 25 to 70 cfm, depending on which wells are operating. Vacuum readings are obtained from monitoring wells MW-102, MW-106 and MW-110 on a monthly basis. Review of Table 6 indicates an induced vacuum in each of the three monitoring wells and a resulting vacuum radius of influence exceeding 70 feet (as compared to the estimated radius of influence of 40 discussed in the Workplan).

Air samples are collected from the following vapor streams on a quarterly basis:

- Influent
- Rotary vane effluent
- Air stripper effluent

The influent sample is obtained prior to the recovered vapor contacting the rotary vane pump, VLS or GAC. The effluent samples are obtained after the associated vapor streams have passed through the GAC units but prior to discharge to the atmosphere. The air samples are submitted to an independent laboratory for analysis of VOCs. Air sample analytical results are summarized on Table 7. Review of Table 7 indicates a reduction of VOCs, as expected, in the influent vapor stream. This reduction is due to the continued mass removal of VOCs from the unsaturated zone.

Extraction well run-times are adjusted during each site visit and modified remotely, as necessary, throughout the month. The selected run-times are based on the ratio of air flow to ground water production and dissolved VOC concentrations, to optimize system operation and maximize VOC recovery and radius of influence. Extraction wells with higher airflow rates (DVE-101) and dissolved VOC concentrations (DVE-106 and DVE-107) are operated in the "HAND" position (continuously on) to recover more ground water and soil vapor than those with lesser concentrations. Appendix C presents system operational data that is generated from the remote telemetry system software during each system check. This data includes hours of operation for each system component including each DVE well.

The system contains two GAC vessels for ground water treatment and four GAC vessels for vapor treatment. The liquid GAC is rebedded after sediment accumulation reduces the water flow to a point that the system continuously

shuts down (due to an air stripper high-high fault) after numerous backflushing events. The vapor GACs are rebudded after quarterly effluent air data indicates VOC breakthrough. The spent carbon is regenerated by Encotech, Inc. as a non-hazardous media.

5.0 MASS RECOVERY

Operation of the remediation system results in removal of residual and dissolved phase VOCs from the subsurface. The amount of VOCs recovered through vapor and ground water recovery was estimated using mass balance calculations based on operational data and various assumptions. Tables 8 and 9 present the estimated mass of VOCs recovered from the vapor and dissolved phase respectively. Total VOC recovery data from the vapor and dissolved phase are graphically presented in Figures 13 and 14. Appendix D presents graphs of vapor and ground water recovery for specific VOCs.

Review of mass recovery data indicates that an estimated 117 pounds of VOCs have been removed through soil vapor and approximately 3 pounds have been removed from the ground water. A linear regression was performed on each set of data points (Figures 13 and 14) to determine a "best fit" straight line. Review of the graphs indicates that each line has an upward slope; 0.37 for the vapor recovery and 0.006 for the ground water recovery. Future data points will be plotted in this manner to compare relative slopes and assist in comparing mass removal versus time.

Air emissions associated with the system O&M are exempt from Department air permitting requirements (reference Appendix O of the Workplan); however, emissions need to be controlled using the best available control technology (GAC).

6.0 CONCLUSIONS AND RECOMMENDATIONS

Review of current and historical analytical and system operational data indicate that the remediation system is effectively removing VOCs from the subsurface. Based on this conclusion, we recommend the following:

- O&M of the existing ground water recovery and treatment system will continue through March 2002. A monitoring report will be prepared and submitted to the Department in April 2002.
- Ground water quality monitoring at the site will continue with the next quarterly sampling event in November 2001. Based on an absence of VOCs above ground water standards at monitoring wells MW-104, MW-110, MW-111, MW-201 and MW-202, we will reduce the sampling frequency from quarterly to annually in these wells only. Ground water samples will be obtained from all 13 on-site monitoring wells and 7 extraction wells. The remediation system will be shut down prior to ground water sampling to allow water levels to return to static conditions and samples to be collected from all appropriate wells.
- Additional surface water monitoring is not necessary since VOCs have not been detected during the past three sampling events. Therefore, surface water sampling will be discontinued.

7.0 REMARKS

The observations and recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted industry and engineering practices at this time for this location. Other than this, no other warranties are implied or intended.

TABLES

TABLE 1
HISTORICAL GROUND WATER ELEVATION DATA
CHAMPION PRODUCTS INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

Page: 1

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SITE	DATE	MP ELEVATION (feet)	TIME	DEPTH TO WATER (feet)	DELTA WATER ELEV/ (feet)	WATER ELEV. (feet)
DVE-101	7/6/2000	99.13	00:00	8.95	NA	90.18
DVE-101	8/22/2000	99.13	00:00	10.50	-1.55	88.63
DVE-101	2/9/2001	99.13	16:00	8.80	1.70	90.33
DVE-101	6/28/2001	99.13	10:25	9.30	-0.50	89.83
DVE-101	8/7/2001	99.13	13:05	10.80	-1.50	88.33
DVE-102	7/6/2000	99.52	00:00	8.15	NA	91.37
DVE-102	8/22/2000	99.52	00:00	9.75	-1.60	89.77
DVE-102	2/9/2001	99.52	16:00	7.25	2.50	92.27
DVE-102	6/28/2001	99.52	00:00	9.10	-1.85	90.42
DVE-102	8/7/2001	99.52	13:05	11.42	-2.32	88.10
DVE-103	7/6/2000	99.26	00:00	8.00	NA	91.26
DVE-103	8/22/2000	99.26	00:00	9.64	-1.64	89.62
DVE-103	2/9/2001	99.26	16:30	8.82	0.82	90.44
DVE-103	4/17/2001	99.26	00:00	7.00	1.82	92.26
DVE-103	6/28/2001	99.26	00:00	9.30	-2.30	89.96
DVE-103	8/7/2001	99.26	13:10	10.80	-1.50	88.46
DVE-104	7/6/2000	99.74	00:00	8.38	NA	91.36
DVE-104	8/22/2000	99.74	00:00	10.42	-2.04	89.32
DVE-104	2/9/2001	99.74	16:40	6.50	3.92	93.24
DVE-104	4/17/2001	99.74	00:00	12.96	-6.46	86.78
DVE-104	6/28/2001	99.74	00:00	10.01	2.95	89.73
DVE-104	8/7/2001	99.74	13:18	11.20	-1.19	88.54
DVE-105	7/6/2000	99.35	00:00	8.95	NA	90.40
DVE-105	8/22/2000	99.35	00:00	9.92	-0.97	89.43
DVE-105	2/9/2001	99.35	16:50	8.32	1.60	91.03
DVE-105	4/17/2001	99.35	00:00	7.69	0.63	91.66
DVE-105	6/28/2001	99.35	00:00	9.85	-2.16	89.50
DVE-105	8/7/2001	99.35	13:21	10.60	-0.75	88.75
DVE-106	7/6/2000	99.01	00:00	8.15	NA	90.86
DVE-106	8/22/2000	99.01	00:00	9.58	-1.53	89.33
DVE-106	2/9/2001	99.01	17:10	7.04	2.64	91.97
DVE-106	4/17/2001	99.01	00:00	7.25	-0.21	91.76
DVE-106	6/28/2001	99.01	00:00	11.04	-3.79	87.97
DVE-106	8/7/2001	99.01	13:25	10.90	0.14	88.11
DVE-107	7/6/2000	99.82	00:00	8.38	NA	91.44
DVE-107	8/22/2000	99.82	00:00	10.00	-1.62	89.82
DVE-107	2/9/2001	99.82	17:20	8.45	1.55	91.37
DVE-107	4/17/2001	99.82	00:00	7.59	0.86	92.23
DVE-107	6/28/2001	99.82	00:00	10.60	-3.01	89.22
DVE-107	8/7/2001	99.82	13:30	11.25	-0.65	88.57
MW-101	6/25/1998	96.72	00:00	6.25	NA	90.47

Change in Water Elevation since last reported measurement.
Water Elevation Measurements Based on Mean Sea Level.

TABLE 1
HISTORICAL GROUND WATER ELEVATION DATA
CHAMPION PRODUCTS INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SITE	DATE	MP ELEVATION (feet)	TIME	DEPTH TO WATER (feet)	DELTA WATER ELEV (feet)	WATER ELEV. (feet)
MW-101	7/16/1998	96.72	00:00	5.56	0.69	91.16
MW-101	8/21/1998	96.72	00:00	6.66	-1.10	90.06
MW-101	11/3/1998	96.72	00:00	7.40	-0.74	89.32
MW-101	7/6/2000	96.72	00:00	6.03	1.37	90.69
MW-101	8/22/2000	96.72	00:00	7.30	-1.27	89.42
MW-101	2/13/2001	96.72	14:05	5.90	1.40	90.82
MW-101	4/17/2001	96.72	00:00	5.01	0.89	91.71
MW-101	5/22/2001	96.72	11:20	5.85	-0.84	90.87
MW-101	6/28/2001	96.72	00:00	7.00	-1.15	89.72
MW-101	8/7/2001	96.72	14:55	8.30	-1.30	88.42
MW-102	6/25/1998	99.13	00:00	7.69	NA	91.44
MW-102	7/16/1998	99.13	00:00	6.53	1.16	92.60
MW-102	8/21/1998	99.13	00:00	8.62	-2.09	90.51
MW-102	11/3/1998	99.13	00:00	9.05	-0.43	90.08
MW-102	7/6/2000	99.13	00:00	7.30	1.75	91.83
MW-102	8/22/2000	99.13	00:00	9.25	-1.95	89.88
MW-102	2/13/2001	99.13	13:55	7.53	1.72	91.60
MW-102	4/17/2001	99.13	00:00	6.84	0.69	92.29
MW-102	5/22/2001	99.13	10:30	7.49	-0.65	91.64
MW-102	6/28/2001	99.13	00:00	9.20	-1.71	89.93
MW-102	8/7/2001	99.13	15:07	10.31	-1.11	88.82
MW-103	6/25/1998	97.14	00:00	8.10	NA	89.04
MW-103	7/16/1998	97.14	00:00	7.32	0.73	89.82
MW-103	8/21/1998	97.14	00:00	8.62	-1.30	88.52
MW-103	11/3/1998	97.14	00:00	9.19	-0.57	87.95
MW-103	7/6/2000	97.14	00:00	7.92	1.27	89.22
MW-103	8/22/2000	97.14	00:00	9.00	-1.08	88.14
MW-103	2/13/2001	97.14	14:15	8.34	0.66	88.80
MW-103	4/17/2001	97.14	00:00	7.10	1.24	90.04
MW-103	5/22/2001	97.14	11:04	7.82	-0.72	89.32
MW-103	6/28/2001	97.14	00:00	8.74	-0.92	88.40
MW-103	8/7/2001	97.14	14:49	9.90	-1.16	87.24
MW-104	6/25/1998	95.38	00:00	4.94	NA	90.44
MW-104	7/16/1998	95.38	00:00	4.06	0.88	91.32
MW-104	8/21/1998	95.38	00:00	5.33	-1.27	90.05
MW-104	11/3/1998	95.38	00:00	6.00	-0.67	89.38
MW-104	7/6/2000	95.38	00:00	4.90	1.10	90.48
MW-104	8/22/2000	95.38	00:00	6.10	-1.20	89.28
MW-104	2/13/2001	95.38	14:20	4.71	1.39	90.67
MW-104	4/17/2001	95.38	00:00	3.89	0.82	91.49
MW-104	5/22/2001	95.38	11:43	4.78	-0.89	90.60
MW-104	6/28/2001	95.38	00:00	5.70	-0.92	89.68
MW-104	8/7/2001	95.38	15:03	7.05	-1.35	88.33

Change in Water Elevation since last reported measurement.
Water Elevation Measurements Based on Mean Sea Level.

TABLE 1
HISTORICAL GROUND WATER ELEVATION DATA
CHAMPION PRODUCTS INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

Page: 3

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SITE	DATE	MP ELEVATION (feet)	TIME	DEPTH TO WATER (feet)	DELTA WATER ELEV (feet)	WATER ELEV. (feet)
MW-105	6/25/1998	96.15	00:00	9.59	NA	86.56
MW-105	7/16/1998	96.15	00:00	8.46	1.13	87.69
MW-105	8/21/1998	96.15	00:00	10.02	-1.56	86.13
MW-105	11/3/1998	96.15	00:00	11.20	-1.18	84.95
MW-105	7/7/1999	96.15	00:00	10.53	0.67	85.62
MW-105	7/6/2000	96.15	00:00	9.19	1.34	86.96
MW-105	8/22/2000	96.15	00:00	7.41	1.78	88.74
MW-105	2/13/2001	96.15	14:25	10.35	-2.94	85.80
MW-105	5/22/2001	96.15	10:48	8.95	1.40	87.20
MW-105	6/28/2001	96.15	00:00	NM	NA	NA
MW-105	8/7/2001	96.15	14:45	11.25	-11.25	84.90
MW-106	8/21/1998	99.59	00:00	9.25	NA	90.34
MW-106	11/3/1998	99.59	00:00	10.15	-0.50	89.44
MW-106	7/6/2000	99.59	00:00	8.55	1.50	91.04
MW-106	8/22/2000	99.59	00:00	9.65	-1.10	89.94
MW-106	2/13/2001	99.59	14:50	8.64	1.01	90.95
MW-106	4/17/2001	99.59	00:00	7.24	1.40	92.35
MW-106	5/22/2001	99.59	15:00	8.42	-1.18	91.17
MW-106	6/28/2001	99.59	00:00	9.35	-0.93	90.24
MW-106	8/7/2001	99.59	11:50	11.80	-2.45	87.79
MW-107	8/21/1998	99.56	00:00	9.67	NA	89.89
MW-107	11/3/1998	99.56	00:00	10.15	-0.48	89.41
MW-107	7/6/2000	99.56	00:00	8.63	1.52	90.93
MW-107	8/22/2000	99.56	00:00	9.82	-1.19	89.74
MW-107	2/9/2001	99.56	15:05	8.98	0.84	90.58
MW-107	4/17/2001	99.56	00:00	7.59	1.39	91.97
MW-107	5/22/2001	99.56	15:30	8.70	-1.11	90.86
MW-107	6/28/2001	99.56	00:00	9.50	-0.30	90.06
MW-107	8/7/2001	99.56	12:00	11.00	-1.50	88.56
MW-108	8/21/1998	99.60	00:00	9.01	NA	90.59
MW-108	11/3/1998	99.60	00:00	10.00	-0.39	89.60
MW-108	7/6/2000	99.60	00:00	8.10	1.90	91.50
MW-108	8/22/2000	99.60	00:00	10.15	-2.05	89.45
MW-108	2/9/2001	99.60	15:40	9.95	0.20	89.65
MW-108	4/17/2001	99.60	00:00	7.98	1.97	91.62
MW-108	5/22/2001	99.60	15:20	8.40	-0.42	91.20
MW-108	6/28/2001	99.60	00:00	9.95	-1.55	89.65
MW-108	8/7/2001	99.60	12:40	11.06	-1.11	88.54
MW-109	8/21/1998	99.52	00:00	11.98	NA	87.54
MW-109	11/3/1998	99.52	00:00	12.60	-0.62	86.92
MW-109	7/6/2000	99.52	00:00	11.05	1.55	88.47
MW-109	8/22/2000	99.52	00:00	10.22	0.83	89.30
MW-109	2/9/2001	99.52	15:15	12.09	-1.87	87.43

Change in Water Elevation since last reported measurement.
Water Elevation Measurements Based on Mean Sea Level.

TABLE 1
HISTORICAL GROUND WATER ELEVATION DATA
CHAMPION PRODUCTS INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

Page: 4

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SITE	DATE	MP ELEVATION (feet)	TIME	DEPTH TO WATER (feet)	DELTA WATER ELEV (feet)	WATER ELEV. (feet)
MW-109	4/17/2001	99.52	00:00	10.28	1.31	89.24
MW-109	5/22/2001	99.52	15:15	11.25	-0.97	88.27
MW-109	6/28/2001	99.52	00:00	12.13	-0.38	87.39
MW-109	8/7/2001	99.52	13:00	D	NA	NA
MW-110	8/21/1998	100.47	00:00	9.82	NA	90.65
MW-110	11/3/1998	100.47	00:00	10.70	-0.88	89.77
MW-110	7/7/1999	100.47	00:00	9.92	0.78	90.55
MW-110	7/6/2000	100.47	00:00	8.86	1.06	91.61
MW-110	8/22/2000	100.47	00:00	10.40	-1.54	90.07
MW-110	2/13/2001	100.47	12:25	8.81	1.59	91.66
MW-110	4/17/2001	100.47	00:00	7.20	1.51	93.27
MW-110	5/22/2001	100.47	10:15	8.70	-1.50	91.77
MW-110	6/28/2001	100.47	00:00	9.89	-1.19	90.58
MW-110	8/7/2001	100.47	15:05	D	NA	NA
MW-111	8/21/1998	99.37	00:00	10.72	NA	88.65
MW-111	11/3/1998	99.37	00:00	12.44	-1.72	86.93
MW-111	7/7/1999	99.37	00:00	11.88	0.56	87.49
MW-111	7/6/2000	99.37	00:00	10.58	1.30	88.79
MW-111	8/22/2000	99.37	00:00	10.62	-0.04	88.75
MW-111	2/13/2001	99.37	12:30	11.35	-0.73	88.02
MW-111	4/17/2001	99.37	00:00	3.49	2.36	90.88
MW-111	5/22/2001	99.37	10:20	10.33	-1.34	89.04
MW-111	6/28/2001	99.37	00:00	NM	NA	NA
MW-111	8/7/2001	99.37	15:10	12.70	-12.70	86.67
MW-201	6/25/1998	97.52	00:00	25.03	NA	71.49
MW-201	7/16/1998	97.52	00:00	29.43	-3.40	68.09
MW-201	8/21/1998	97.52	00:00	25.73	2.70	70.79
MW-201	11/3/1998	97.52	00:00	17.65	9.08	79.87
MW-201	7/6/2000	97.52	00:00	3.16	9.49	89.36
MW-201	2/13/2001	97.52	14:10	15.85	-7.69	81.67
MW-201	5/22/2001	97.52	11:30	15.36	0.49	82.16
MW-201	8/7/2001	97.52	14:54	13.90	-3.54	78.62
MW-202	8/21/1998	96.33	00:00	31.57	NA	64.76
MW-202	11/3/1998	96.33	00:00	15.82	15.75	80.51
MW-202	7/6/2000	96.33	00:00	18.80	-2.98	77.53
MW-202	2/13/2001	96.33	14:18	14.98	3.82	81.35
MW-202	5/22/2001	96.33	11:10	14.59	0.39	81.74
MW-202	8/7/2001	96.33	14:51	17.48	-2.89	78.85

Change in Water Elevation since last reported measurement.
Water Elevation Measurements Based on Mean Sea Level.

TABLE 2
Percentage Change in Analyte Concentration
Champion Products, Inc.
Perry, New York
Delta Project No: S098-009-5

Monitoring Well	VOC with Highest Dissolved Concentration	Prior to System Startup			After System Startup					% change prior to start-up and 8/01	
		Aug-98	Nov-98	Jul-00	Sep-00	Nov-00	Feb-01	May-01	Aug-01		
DVE-101	Toluene	NI	NI	8,300	15,000	880	2,400	660	610	92.65%	decrease
DVE-101	1,2,4-Trimethylbenzene	NI	NI	NA	15,000	320	200	67	12.5	99.92%	decrease
DVE-101	n-Butylbenzene	NI	NI	NA	15,000	84	<50	<50	12.5	99.92%	decrease
DVE-102	Toluene	NI	NI	7	NS	<0.50	6	5	130	94.62%	increase
DVE-103	Methyl-ethyl-ketone	NI	NI	45	NS	NA	<10	<2.0	5	88.89%	decrease
DVE-104	Toluene	NI	NI	1.5	NS	<0.50	<0.50	<0.50	25	94.00%	increase
DVE-105	Methyl-ethyl-ketone	NI	NI	38	NS	NA	<10	<2.0	5	86.84%	decrease
DVE-106	Toluene	NI	NI	2,900	NS	75	<1.0	<1.0	2,600	10.34%	decrease
DVE-107	1,1-Dichloroethane	NI	NI	10	NS	37	<0.50	3	100	90.00%	increase
MW-101	Chloromethane	<3	<1	14	NS	<0.50	<0.50	<0.50	0.25	98.21%	decrease
MW-102	Chloromethane	<3	<1	24	NS	<0.50	<0.50	<0.50	0.25	98.96%	decrease
MW-103	Methylene chloride	16	<1	<3	NS	<0.50	<0.50	<0.50	0.25	98.44%	decrease
MW-104	Chloromethane	<3	<1	17	NS	8	15	3	23	26.09%	increase
MW-105	Chloroethane	23	<1	78	NS	<0.50	<0.50	<0.50	0.25	99.68%	decrease
MW-106	Toluene	48,000	6,100	24,000	NS	22,000	11,000	2,300	1,700	96.46%	decrease
MW-107	1,1-Dichloroethane	130	290	350	NS	NS	380	240	250	28.57%	decrease
MW-108	Methyl-ethyl-ketone	69	<5	<10	NS	NA	<10	<4.0	25	63.77%	decrease
MW-109	Toluene	<3	6.5	<3	NS	1	55	12	NS	88.18%	increase
MW-110	All ND	ND	ND	ND	NS	ND	ND	ND	ND		
MW-111	All ND	ND	ND	ND	NS	ND	ND	ND	ND		
MW-201	Methyl-ethyl-ketone	50	7.3	<10	NS	NA	<10	<4.0	10	80.00%	decrease
MW-202	All ND	ND	ND	ND	NS	ND	ND	ND	ND		

Notes:

All concentrations reported in micrograms per liter.

System startup occurred in July 2000.

NI = DVE-101 through DVE-107 were not installed until July 2000.

NA = The ground water sample was not analyzed for this constituent.

NS = No sample obtained for this date.

ND = All analytes were reported below the method detection limits.

Concentrations reported below the detection limit are assumed to be 1/2 the detection limit for calculation purposes.

Bold = Highest concentration reported for this analyte.

TABLE 3
HISTORICAL SURFACE WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

Page: 1
Date: 11/01/2001

PERIOD: From 06/23/1998 thru 05/22/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Acetone (ug/l)	Methyl ethyl ketone (ug/l)
SURFACE-1	06/23/1998	12	<10
SURFACE-1	07/06/2000	<10	10
SURFACE-1	02/13/2001	---	<10
SURFACE-1	05/22/2001	<10	<10
SURFACE-2	06/23/1998	11	11
SURFACE-2	07/06/2000	<10	<10
SURFACE-2	02/13/2001	---	<10
SURFACE-2	05/22/2001	<10	<10
SURFACE-3	06/23/1998	<10	<10
SURFACE-3	07/06/2000	<10	<10
SURFACE-3	02/13/2001	---	<10
SURFACE-3	05/22/2001	<10	<10
---=Not analyzed			

Table 4
Monthly Ground Water Discharge and System Run- Time
Champion Products, Inc.
Perry, NY.
DEC Site No. V00018-9

Month	Date	No. of Days Between Readings	Days in Reporting Period	Total Gallons Pumped (Totalizer Reading)	Avg. Gallons per Day (Flow)	Average Gallons Per Minute (Flow)	Average Gallons Per Month (Flow)	DPVE Blower Hours	Hrs. of operation since last DPVE reading	Total hrs. since last reading	System run time since last reading (%)
Aug-00	8/1/2000	0									
	8/22/2000	21	21	38,008	1,810	1.26	38,008	228	228	504	45%
Sep-00	9/14/2000	23		72,977	1,520	1.06		450	222		
	9/28/2000	14	37	91,392	1,443	1.00	53,384				
Oct-00	11/3/2000	36	36	103,189	328	0.23	11,797	605.2	155	864	18%
Nov-00	11/6/2000	3		125,199	7,337	5.09					
	11/9/2000	3		132,644	2,482	1.72					
	11/17/2000	8		191,095	7,306	5.07					
	11/22/2000	5		206,053	2,992	2.08					
	11/29/2000	7	26	213,934	4,259	2.96	110,745	953.2	348	624	56%
Dec-00	12/6/2000	7		233,712	2,825	1.96					
	12/7/2000	1		239,326	5,614	3.90					
	12/14/2000	7		281,612	6,041	4.20					
	12/22/2000	8		335,950	6,792	4.72					
	12/28/2000	6	29	395,165	6,249	4.34	181,231	1538.8	586	696	84%
Jan-01	1/5/2001	8		421,530	3,296	2.29					
	1/15/2001	10		496,668	7,514	5.22					
	1/23/2001	8		555,504	7,355	5.11					
	1/31/2001	8	34	614,608	6,454	4.48	219,443	2250.1	711	816	87%
Feb-01	02/12/01	12		633,210	1,550	1.08					
	02/13/01	1		644,031	10,821	7.51					
	02/14/01	1		651,973	7,942	5.52					
	02/15/01	1		663,112	1,139	0.79					
	02/22/01	7		711,105	8,285	5.75					
	02/28/01	6	28	727,598	4,035	2.80	112,990	2587.1	337	672	50%
Mar-01	3/13/2001	13		774,457	3,605	2.50					
	3/19/2001	6		788,468	2,335	1.62					
	3/21/2001	2		800,247	5,890	4.09					
	3/29/2001	8	29	850,954	4,254	2.95	123,356	3082.6	496	696	71%
Apr-01	04/09/01	11		891,938	3,726	2.59					
	04/19/01	10		952,210	6,027	4.19					
	04/25/01	6	27	978,556	4,726	3.28	127,602	3535.8	453	648	70%
May-01	05/02/01	7		999,284	2,961	2.06					
	05/09/01	7		1,027,519	4,034	2.80					
	05/31/01	22	36	1,038,000	1,651	1.15	59,444	3903.2	367	364	43%
Jun-01	06/11/01	11		1,056,482	1,680	1.17					
	06/28/01	17	28	1,127,651	3,202	2.22	89,651	4297.9	395	672	59%
Jul-01	07/06/01	8		1,134,170	815	0.57					
	07/13/01	7		1,162,526	4,051	2.81					
	07/27/01	14	29	1,219,721	3,175	2.20	92,070	4975.8	678	396	97%
Aug-01	08/03/01	7		1,242,986	3,324	2.31					
	08/24/01	21		1,288,920	2,187	1.52					
	08/31/01	7	35	1,292,079	2,067	1.44	72,358	5737.6	762	840	91%
Sep-01	09/12/01	12		1,299,785	642	0.45					
	09/20/01	8		1,304,693	614	0.43					
	09/28/01	8	28	1,307,836	563	0.39	15,757	6342.9	605	672	90%

Total gallons recovered and treated during reporting period:

1,307,836 gallons

No. of days during reporting period:

423 days

Average gallons per day (GPD) since start-up:

3,092 GPD

Average gallons per minute (GPM) since start-up:

2.15 GPM

System run time during reporting period (hrs.):

6,343 hours

System run time during reporting period (%):

62%

BOLD = Average GPD and GPM for final readings of each month are determined by dividing the total gallons pumped during the month by the days in the reporting period.

DELTA PROJECT NO. S098-009

SAMPLE TYPE: Water

SITE	DATE	1,1,1-trichloro ethane (ug/l)	1,1-Dichloro ethane (ug/l)	1,2-Dichloro ethane (ug/l)	Benzene (ug/l)	1,2,4-Trimethyl benzene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	Isopropyl benzene (ug/l)
SYST_INFL	03/14/2001	32	12	<10	<10	21	<10	<10
SYST_INFL	04/17/2001	<10	11	<10	<10	<10	<10	<10
SYST_INFL	06/05/2001	12	6	<5	<5	<5	<5	<5
SYST_INFL	06/28/2001	10	6	<5	<5	<5	<5	<5
SYST_INFL	07/27/2001	7	14	<5	<5	46	20	<5
SYST_INFL	08/07/2001	<10	<10	<10	<10	270	78	<10
SYST_STRIPPER	08/22/2000	<3.0	<3.0	<3.0	<3.0	26	13	<3.0
SYST_STRIPPER	09/14/2000	<25	<25	<25	<25	<25	<25	<25
SYST_STRIPPER	11/02/2000	<0.50	1	<0.50	<0.50	<0.50	<0.50	<0.50
SYST_STRIPPER	11/29/2000	<0.50	<0.50	<0.50	<0.50	0.9	<0.50	<0.50
SYST_STRIPPER	01/05/2001	<0.50	<0.50	<0.50	<0.50	2	1	<0.50
SYST_STRIPPER	02/13/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SYST_STRIPPER	03/14/2001	<5	<5	<5	<5	<5	<5	<5
SYST_STRIPPER	04/17/2001	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
SYST_STRIPPER	06/05/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SYST_STRIPPER	06/28/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SYST_STRIPPER	07/27/2001	<1.0	<1.0	<1.0	<1.0	4	2	<1.0
SYST_STRIPPER	08/07/2001	<3.0	<3.0	<3.0	<3.0	93	25	<3.0

---=Not analyzed

PERIOD: From 07/14/2000 thru 08/07/2001 - Inclusive
SAMPLE TYPE: Water

SITE	DATE	Chloroethane (ug/l)	cls-1,2- Dichloroethene (ug/l)	Dichloro difluoromethane (ug/l)	Ethylbenzene (ug/l)	Methyl ethyl ketone (ug/l)	Methylene chloride (ug/l)	Naphthalene (ug/l)
SYST_EFFL	07/14/2000	<1	<1	---	<1	200	<1	---
SYST_EFFL	08/22/2000	---	---	---	---	---	<0.5	<0.5
SYST_EFFL	09/14/2000	---	---	---	---	---	<5.0	16
SYST_EFFL	09/28/2000	---	---	---	---	---	<0.5	<0.5
SYST_EFFL	11/02/2000	---	---	---	---	---	<0.5	<0.5
SYST_EFFL	11/29/2000	---	---	---	---	---	<0.5	<0.5
SYST_EFFL	01/05/2001	---	---	---	---	---	<0.5	<0.5
SYST_EFFL	02/13/2001	---	---	---	---	---	<1.0	<1.0
SYST_EFFL	03/14/2001	---	---	---	---	---	<1.0	<1.0
SYST_EFFL	06/05/2001	---	---	---	---	---	<0.5	<0.5
SYST_EFFL	06/28/2001	---	---	---	---	---	<0.5	<0.5
SYST_EFFL	07/27/2001	---	---	---	---	---	<0.5	6
SYST_EFFL	08/07/2001	---	---	---	---	---	<1.0	23
SYST_INFL	07/14/2000	58	6	---	3	120	3	---
SYST_INFL	08/22/2000	<10	<10	<10	<10	---	26	28
SYST_INFL	09/14/2000	<100	<100	<100	<100	---	<100	200
SYST_INFL	11/02/2000	19	<3.0	<3.0	<3.0	---	<3.0	5
SYST_INFL	11/29/2000	<3.0	<3.0	<3.0	<3.0	---	9	<3.0
SYST_INFL	01/05/2001	<5	<5	<5	<5	---	30	8
SYST_INFL	02/13/2001	<5	<5	<5	<5	<20	<5	<5

---=Not analyzed

TABLE 5
GROUNDWATER SYSTEM ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

Date: 11/01/2001

PERIOD: From 07/14/2000 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Chloroethane (ug/l)	cls-1,2- Dichloroethene (ug/l)	Dichloro difluoromethane (ug/l)	Ethylbenzene (ug/l)	Methyl ethyl ketone (ug/l)	Methylene chloride (ug/l)	Naphthalene (ug/l)
SYST_INFL	03/14/2001	<10	<10	<10	<10	<40	<10	<10
SYST_INFL	04/17/2001	<10	<10	<10	<10	<200	<10	<10
SYST_INFL	06/05/2001	<5	<5	<5	<5	<100	<5	<5
SYST_INFL	06/28/2001	<5	<5	<5	<5	<100	<5	<5
SYST_INFL	07/27/2001	<5	<5	<5	<5	<100	11	6
SYST_INFL	08/07/2001	<10	<10	<10	<10	<200	<10	50
SYST_STRIPPER	08/22/2000	<3.0	<3.0	3	<3.0	---	7	7
SYST_STRIPPER	09/14/2000	<25	<25	<25	<25	---	<25	<25
SYST_STRIPPER	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	<0.50	<0.50
SYST_STRIPPER	11/29/2000	<0.50	<0.50	<0.50	<0.50	---	<0.50	<0.50
SYST_STRIPPER	01/05/2001	<0.50	<0.50	<0.50	<0.50	---	<0.50	3
SYST_STRIPPER	02/13/2001	<1.0	<1.0	<1.0	<1.0	---	<1.0	<1.0
SYST_STRIPPER	03/14/2001	<5	<5	<5	<5	---	<5	<5
SYST_STRIPPER	04/17/2001	<3.0	<3.0	<3.0	<3.0	<50	<3.0	<3.0
SYST_STRIPPER	06/05/2001	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<1.0
SYST_STRIPPER	06/28/2001	<1.0	<1.0	<1.0	<1.0	<20	<1.0	<1.0
SYST_STRIPPER	07/27/2001	<1.0	<1.0	<1.0	<1.0	<20	1	5
SYST_STRIPPER	08/07/2001	<3.0	<3.0	<3.0	<3.0	<50	<3.0	44

---=Not analyzed

TABLE 5
GROUNDWATER SYSTEM ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 07/14/2000 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	n-Butylbenzene (ug/l)	n-Propyl benzene (ug/l)	4-Isopropyl toluene (ug/l)	sec-Butyl benzene (ug/l)	tert-Butyl benzene (ug/l)	Tetrachloro ethene (ug/l)	Toluene (ug/l)
SYST_EFFL	07/14/2000	---	---	---	---	---	<1	11
SYST_EFFL	08/22/2000	0.9	<0.5	---	---	---	<0.5	<0.5
SYST_EFFL	09/14/2000	39	<5.0	---	---	---	<5.0	<5.0
SYST_EFFL	09/28/2000	<0.5	<0.5	---	---	---	<0.5	<0.5
SYST_EFFL	11/02/2000	<0.5	<0.5	---	---	---	<0.5	<0.5
SYST_EFFL	11/29/2000	<0.5	<0.5	---	---	---	<0.5	<0.5
SYST_EFFL	01/05/2001	<0.5	<0.5	---	---	---	<0.5	<0.5
SYST_EFFL	02/13/2001	<1.0	<1.0	---	---	---	<1.0	<1.0
SYST_EFFL	03/14/2001	<1.0	<1.0	---	---	---	<1.0	<1.0
SYST_EFFL	06/05/2001	<0.5	<0.5	---	---	---	<0.5	<0.5
SYST_EFFL	06/28/2001	<0.5	<0.5	---	---	---	<0.5	<0.5
SYST_EFFL	07/27/2001	12	<0.5	---	---	---	<0.5	1
SYST_EFFL	08/07/2001	47	<1.0	---	---	---	<1.0	5
SYST_INFL	07/14/2000	---	---	---	---	---	6	440
SYST_INFL	08/22/2000	120	35	10	29	<10	<10	<10
SYST_INFL	09/14/2000	160	<100	<100	<100	<100	<100	3100
SYST_INFL	11/02/2000	17	<3.0	4	<3.0	<3.0	6	81
SYST_INFL	11/29/2000	13	<3.0	7	<3.0	<3.0	4	160
SYST_INFL	01/05/2001	67	<5	<5	9	<5	<5	160
SYST_INFL	02/13/2001	<5	<5	<5	<5	<5	<5	<5

---=Not analyzed

TABLE 5
MONTHLY GROUNDWATER SYSTEM ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

Page: 7
Date: 11/01/2001

PERIOD: From 07/14/2000 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Xylene (total) (ug/l)
SYST_EFFL	07/14/2000	<1
SYST_EFFL	08/22/2000	---
SYST_EFFL	09/14/2000	---
SYST_EFFL	09/28/2000	---
SYST_EFFL	11/02/2000	---
SYST_EFFL	11/29/2000	---
SYST_EFFL	01/05/2001	---
SYST_EFFL	02/13/2001	---
SYST_EFFL	03/14/2001	---
SYST_EFFL	06/05/2001	---
SYST_EFFL	06/28/2001	---
SYST_EFFL	07/27/2001	---
SYST_EFFL	08/07/2001	---
SYST_INFL	07/14/2000	25
SYST_INFL	08/22/2000	27
SYST_INFL	09/14/2000	<200
SYST_INFL	11/02/2000	5
SYST_INFL	11/29/2000	(3)
SYST_INFL	01/05/2001	<10
SYST_INFL	02/13/2001	<10
()=Less than Reporting Limit ---=Not analyzed		

TABLE 5
MONTHLY GROUNDWATER SYSTEM ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

Page: 8
Date: 11/01/2001

PERIOD: From 07/14/2000 thru 08/07/2001 - Inclusive
SAMPLE TYPE: Water

SITE	DATE	Xylene (total) (ug/l)
SYST_INFL	03/14/2001	<20
SYST_INFL	04/17/2001	<20
SYST_INFL	06/05/2001	<10
SYST_INFL	06/28/2001	<10
SYST_INFL	07/27/2001	<10
SYST_INFL	08/07/2001	<20
SYST_STRIPPER	08/22/2000	<6.0
SYST_STRIPPER	09/14/2000	<50
SYST_STRIPPER	11/02/2000	<1.0
SYST_STRIPPER	11/29/2000	<1.0
SYST_STRIPPER	01/05/2001	<1.0
SYST_STRIPPER	02/13/2001	<2.0
SYST_STRIPPER	03/14/2001	<10
SYST_STRIPPER	04/17/2001	<6.0
SYST_STRIPPER	06/05/2001	<2.0
SYST_STRIPPER	06/28/2001	<2.0
SYST_STRIPPER	07/27/2001	<2.0
SYST_STRIPPER	08/07/2001	<6.0
---=Not analyzed		

TABLE 6
Induced Vacuum Readings
 Champion Products, Inc. Perry, NY.
 DEC site No. V00018-9

<u>Date</u>	<u>MW-102</u>	<u>MW-106</u>	<u>MW-110</u>
9/14/00	N	N	N
11/3/00	N	N	N
11/29/01	0.11	0.28	0.10
12/6/00	0.00	0.00	0.00
1/5/01	0.06	N	0.05
2/12/01	0.00	0.00	0.00
3/12/01	0.10	0.11	0.04
4/17/01	0.08	0.10	0.09
5/22/01	0.09	0.12	0.04
6/28/01	0.15	0.35	0.10
7/27/01	0.16	0.37	0.12
8/7/01	0.12	0.29	0.09
9/20/01	0.14	0.33	0.09

Vacuum readings are reported in inches of water
 N = Not Obtained

TABLE 7
Summary of Air Sample Results
Champion Products, Inc.
Perry, New York
Delta Project No. S098-009-5

Sample Location Date	System Influent				Rotary Vane Effluent				Air Stripper Effluent			
	11/2/00	2/13/01	6/28/01	8/7/01	11/2/00	2/13/01	6/28/01	8/7/01	11/2/00	2/13/01	6/28/01	8/7/01
1,2-Dichloroethane	8,400	<5,000	<500	<250	<250	NS	<100	NS	<50	NS	<10	NS
1,1,1-Trichloroethane	<2,500	63,000	22,000	12,000	7,800	NS	4,600	NS	<50	NS	<10	NS
1,1-Dichloroethane	85,000	<5,000	<500	470	<250	NS	1,200	NS	<50	NS	<10	NS
Tetrachloroethene	<2,500	<5,000	<500	540	5,200	NS	<100	NS	<50	NS	<10	NS
Methylene Chloride	69,000	<5,000	<500	<250	<250	NS	<100	NS	<50	NS	<10	NS
Benzene	4,300	<5,000	<500	<250	<250	NS	<100	NS	<50	NS	<10	NS
Toluene	<2,500	150,000	2,400	430	1,700	NS	<100	NS	55	NS	11	NS
Total Xylenes	<5,000	<10,000	<1,000	<500	2,520	NS	<100	NS	91	NS	<10	NS
Naphthalene	<2,500	<5,000	<500	<250	<250	NS	<100	NS	<50	NS	18	NS
Isopropyl Benzene	<2,500	<5,000	<500	<250	3,000	NS	<100	NS	<50	NS	<10	NS
tert-Butyl Benzene	<2,500	<5,000	<500	<250	340	NS	<100	NS	<50	NS	<10	NS
n-Propyl Benzene	<2,500	<5,000	<500	<250	1,200	NS	<100	NS	<50	NS	<10	NS
1,3,5-Trimethybenzene	<2,500	<5,000	<500	<250	730	NS	<100	NS	<50	NS	<10	NS
1,2,4-Trimethybenzene	<2,500	<5,000	<500	<250	1,000	NS	<100	NS	<50	NS	<10	NS
p-Isopropyl Toluene	2,800	<5,000	<500	250	1,500	NS	<100	NS	<50	NS	<10	NS
n-Butyl Benzene	<2,500	<5,000	<500	<250	760	NS	<100	NS	<50	NS	<10	NS

All concentrations are reported in micrograms per meters cubed ($\mu\text{g}/\text{m}^3$).

NS = No effluent sample obtained.

TABLE 8
Vapor Mass Recovery Data
 Champion Products, Inc.
 Perry, New York
 Delta Project No. S098-009-5

Sample Date	11/02/00	02/13/01	06/28/01	08/07/01
Flow (ft ³ /m)	40	40	40	40
Pump Hours	605.2	2316.9	4297.9	5269.7
1,2-Dichloroethane (ug/m³)	8,400	2,500	250	125
Recovery by Sample Date	0.759	1.394	0.407	0.027
Cumulative Recovery	0.759	2.153	2.560	2.587
1,1,1-Trichloroethane (ug/m³)	1250	63,000	22,000	12,000
Recovery by Sample Date	0.113	8.214	12.577	2.468
Cumulative Recovery	0.113	8.327	20.904	23.372
1,1-Dichloroethane (ug/m³)	85,000	2,500	250	470
Recovery by Sample Date	7.684	11.187	0.407	0.052
Cumulative Recovery	7.684	18.871	19.278	19.330
Tetrachloroethene (ug/m³)	1,250	2,500	250	540
Recovery by Sample Date	0.113	0.479	0.407	0.057
Cumulative Recovery	0.113	0.592	0.999	1.057
Methylene chloride (ug/m³)	69,000	2,500	250	125
Recovery by Sample Date	6.238	9.141	0.407	0.027
Cumulative Recovery	6.238	15.379	15.786	15.813
Benzene (ug/m³)	4,300	2,500	250	125
Recovery by Sample Date	0.389	0.869	0.407	0.027
Cumulative Recovery	0.389	1.258	1.665	1.692
Toluene (ug/m³)	1,250	150,000	2,400	430
Recovery by Sample Date	0.113	19.337	22.549	0.205
Cumulative Recovery	0.113	19.450	41.999	42.205
Total Xylenes (ug/m³)	2,500	5,000	500	250
Recovery by Sample Date	0.226	0.959	0.814	0.054
Cumulative Recovery	0.226	1.185	1.999	2.053
Naphthalene (ug/m³)	1,250	2,500	250	125
Recovery by Sample Date	0.113	0.479	0.407	0.027
Cumulative Recovery	0.113	0.592	0.999	1.027
Isopropyl Benzene (ug/m³)	1,250	2,500	250	125
Recovery by Sample Date	0.113	0.479	0.407	0.027
Cumulative Recovery	0.113	0.592	0.999	1.027
tert-Butyl Benzene (ug/m³)	1,250	2,500	250	125
Recovery by Sample Date	0.113	0.479	0.407	0.027
Cumulative Recovery	0.113	0.592	0.999	1.027
n-Propyl Benzene (ug/m³)	1,250	2,500	250	125
Recovery by Sample Date	0.113	0.479	0.407	0.027
Cumulative Recovery	0.113	0.592	0.999	1.027
1,3,5-Trimethylbenzene (ug/m³)	1,250	2,500	250	125
Recovery by Sample Date	0.113	0.479	0.407	0.027
Cumulative Recovery	0.113	0.592	0.999	1.027
1,2,4-Trimethylbenzene (ug/m³)	1,250	2,500	250	125
Recovery by Sample Date	0.113	0.479	0.407	0.027
Cumulative Recovery	0.113	0.592	0.999	1.027
p-Isopropyltoluene (ug/m³)	2,800	2,500	250	250
Recovery by Sample Date	0.253	0.678	0.407	0.036
Cumulative Recovery	0.253	0.931	1.338	1.374
n-Butyl Benzene (ug/m³)	1,250	2,500	250	125
Recovery by Sample Date	0.113	0.479	0.407	0.027
Cumulative Recovery	0.113	0.592	0.999	1.027
TOTAL RECOVERY	16.68	55.61	41.23	3.15
CUMULATIVE RECOVERY	16.68	72.29	113.52	116.67

ug/m3 = micrograms per cubic meter

Indicates concentration is below the analytical detection limit. Reported value is 1/2 the method detection limit.

Recovery calculations are based on the following formula:

$$\text{Recovery (lbs.)} = \text{Influent Concentration}^* (\text{ug/m}^3) \times 1/1000 (\text{mg/ug}) \times 1/1000 (\text{m}^3/\text{L}) \times \text{Flow (ft}^3/\text{min)} \times 60 (\text{min/hr}) \times 28.32 (\text{L/ft}^3) \times 1/1000 (\text{g/mg}) \times 1/1,000 (\text{kg/g}) \times 1/0.455 (\text{lbs/kg}) \times \text{Pump Hrs. (hrs)}$$

*Influent concentrations are based on a 2-month rolling average.

TABLE 9
Ground Water Recovery Data
 Champion Products, Inc.
 Perry, New York
 Delta Project No. S098-009-5

Sample Date	07/14/00	08/22/00	09/14/00	11/02/00	11/29/00	01/05/01	02/13/01	03/14/01	04/17/01	06/05/01	06/28/01	07/27/01	08/07/01	09/20/01
Average Flow (gallons/day)	0	1,810	1,520	328	1,126	3,296	10,821	3,605	6,027	1,680	4,186	4,085	3,324	614
Pump Hours	0	228.3	450.8	605.2	953.2	1626.9	2316.9	2756.3	3381.9	3903.2	4297.9	4975.8	5269.7	6169.3
1,1,1-Trichloroethane (ug/l)	8	24	120	16	26	15	25	32	5	12	10	7	5	5
Recovery by Sample Date		0.001	0.009	0.003	0.002	0.011	0.015	0.019	0.019	0.006	0.004	0.008	0.002	0.003
Cumulative Recovery		0.001	0.010	0.014	0.016	0.026	0.041	0.060	0.079	0.085	0.089	0.098	0.100	0.103
1,1-Dichloroethane (ug/l)	29	49	120	48	45	22	25	12	11	6	6	14	5	5
Recovery by Sample Date		0.003	0.011	0.004	0.004	0.017	0.021	0.008	0.012	0.006	0.002	0.010	0.004	0.003
Cumulative Recovery		0.003	0.014	0.018	0.022	0.039	0.060	0.068	0.080	0.086	0.088	0.098	0.101	0.104
1,2-Dichloroethane (ug/l)	3	5	50	15	15	25	25	5	5	25	25	25	5	5
Recovery by Sample Date		0.000	0.004	0.001	0.000	0.001	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery		0.000	0.004	0.005	0.005	0.006	0.010	0.015	0.020	0.022	0.023	0.026	0.027	0.030
Benzene (ug/l)	1.5	610	50	15	15	25	25	5	5	25	25	25	5	5
Recovery by Sample Date		0.022	0.042	0.001	0.000	0.001	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery		0.022	0.064	0.065	0.066	0.067	0.071	0.075	0.080	0.083	0.084	0.086	0.088	0.091
1,2,4-Trimethylbenzene (ug/l)	NS	290	400	59	72	66	25	21	5	25	25	46	270	350
Recovery by Sample Date		0.010	0.026	0.001	0.003	0.017	0.002	0.012	0.003	0.001	0.001	0.022	0.051	0.107
Cumulative Recovery		0.010	0.036	0.037	0.041	0.058	0.060	0.071	0.074	0.075	0.075	0.098	0.148	0.256
1,3,5-Trimethylbenzene (ug/l)	NS	93	110	22	29	37	25	5	5	25	25	20	78	120
Recovery by Sample Date		0.003	0.007	0.001	0.001	0.010	0.002	0.003	0.003	0.001	0.001	0.010	0.015	0.037
Cumulative Recovery		0.003	0.010	0.011	0.012	0.022	0.024	0.027	0.029	0.030	0.031	0.040	0.055	0.092
Isopropylbenzene (ug/l)	NS	13	50	15	15	25	25	5	5	25	25	25	5	33
Recovery by Sample Date		0.000	0.003	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.001	0.010
Cumulative Recovery		0.000	0.004	0.004	0.004	0.004	0.007	0.009	0.012	0.013	0.013	0.014	0.015	0.026
Chloroethane (ug/l)	58	5	50	19	15	25	25	5	5	25	25	25	5	5
Recovery by Sample Date		0.002	0.004	0.002	0.001	0.001	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery		0.002	0.006	0.007	0.008	0.009	0.014	0.018	0.023	0.026	0.027	0.029	0.030	0.033
cis-1-2-Dichloroethene (ug/l)	6	5	50	15	15	25	25	5	5	25	25	25	5	5
Recovery by Sample Date		0.000	0.004	0.001	0.000	0.001	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery		0.000	0.004	0.005	0.005	0.006	0.011	0.015	0.020	0.023	0.024	0.026	0.027	0.030
Dichlorodifluoromethane (ug/l)	NS	5	50	15	15	25	25	5	5	25	25	25	5	5
Recovery by Sample Date		0.000	0.003	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.001	0.002
Cumulative Recovery		0.000	0.003	0.003	0.003	0.004	0.006	0.009	0.012	0.012	0.013	0.014	0.015	0.017
Ethylbenzene (ug/l)	3	5	50	15	15	25	25	5	5	25	25	25	5	5
Recovery by Sample Date		0.000	0.004	0.001	0.000	0.001	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery		0.000	0.004	0.005	0.005	0.006	0.010	0.015	0.020	0.022	0.023	0.026	0.027	0.030
Methyl-ethyl ketone (ug/l)	120	0	0	0	0	0	10	20	100	50	50	50	100	100
Recovery by Sample Date		0.004	0.000	0.000	0.000	0.000	0.008	0.016	0.063	0.052	0.020	0.049	0.028	0.061
Cumulative Recovery		0.004	0.004	0.004	0.004	0.004	0.013	0.029	0.092	0.144	0.164	0.212	0.241	0.302

TABLE 9
Ground Water Recovery Data
 Champion Products, Inc.
 Perry, New York
 Delta Project No. S098-009-5

Sample Date	07/14/00	08/22/00	09/14/00	11/02/00	11/29/00	01/05/01	02/13/01	03/14/01	04/17/01	06/05/01	06/28/01	07/27/01	08/07/01	09/20/01
Average Flow (gallons/day)	0	1,810	1,520	328	1,126	3,296	10,821	3,605	6,027	1,680	4,186	4,085	3,324	614
Pump Hours	0	228.3	450.8	605.2	953.2	1626.9	2316.9	2756.3	3381.9	3903.2	4297.9	4975.8	5269.7	6169.3
Methylene chloride (ug/l)	3	26	50	1.5	9	30	2.5	5	5	2.5	2.5	11	5	5
Recovery by Sample Date		0.001	0.005	0.001	0.000	0.010	0.027	0.004	0.005	0.003	0.001	0.007	0.003	0.003
Cumulative Recovery		0.001	0.006	0.007	0.008	0.018	0.045	0.049	0.054	0.057	0.058	0.065	0.068	0.071
Naphthalene (ug/l)	NS	28	200	5	1.5	8	2.5	5	5	2.5	2.5	6	50	5
Recovery by Sample Date		0.001	0.013	0.000	0.000	0.002	0.002	0.003	0.003	0.001	0.001	0.003	0.009	0.002
Cumulative Recovery		0.001	0.014	0.014	0.014	0.016	0.018	0.021	0.024	0.024	0.025	0.028	0.037	0.039
n-Butylbenzene (ug/l)	NS	120	160	17	13	67	2.5	5	5	2.5	2.5	55	150	340
Recovery by Sample Date		0.004	0.010	0.000	0.001	0.017	0.002	0.003	0.003	0.001	0.001	0.027	0.028	0.104
Cumulative Recovery		0.004	0.015	0.015	0.016	0.033	0.035	0.038	0.040	0.041	0.042	0.068	0.097	0.201
n-Propylbenzene (ug/l)	NS	35	50	1.5	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	38
Recovery by Sample Date		0.001	0.003	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.001	0.012
Cumulative Recovery		0.001	0.004	0.004	0.005	0.005	0.007	0.010	0.013	0.014	0.014	0.015	0.016	0.028
4-Isopropyltoluene (ug/l)	NS	10	50	4	7	2.5	2.5	5	5	2.5	2.5	2.5	15	78
Recovery by Sample Date		0.000	0.003	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.003	0.024
Cumulative Recovery		0.000	0.004	0.004	0.004	0.005	0.007	0.009	0.012	0.013	0.013	0.015	0.017	0.041
sec-Butylbenzene (ug/l)	NS	29	50	1.5	1.5	9	2.5	1.5	5	2.5	2.5	11	5	100
Recovery by Sample Date		0.001	0.003	0.000	0.000	0.002	0.002	0.003	0.003	0.001	0.001	0.005	0.001	0.031
Cumulative Recovery		0.001	0.004	0.004	0.004	0.007	0.009	0.012	0.014	0.015	0.015	0.021	0.022	0.052
tert-Butylbenzene (ug/l)	NS	5	50	1.5	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	22
Recovery by Sample Date		0.000	0.003	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.001	0.007
Cumulative Recovery		0.000	0.003	0.003	0.003	0.004	0.006	0.009	0.012	0.012	0.013	0.014	0.015	0.022
Tetrachloroethene (ug/l)	6	5	50	6	4	2.5	2.5	5	5	2.5	2.5	2.5	5	5
Recovery by Sample Date		0.000	0.004	0.001	0.000	0.002	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery		0.000	0.004	0.005	0.006	0.007	0.012	0.016	0.021	0.024	0.025	0.027	0.028	0.031
Toluene (ug/l)	440	5	3100	81	160	160	2.5	270	150	180	10	22	200	69
Recovery by Sample Date		0.016	0.199	0.079	0.011	0.082	0.137	0.149	0.219	0.115	0.038	0.016	0.042	0.082
Cumulative Recovery		0.016	0.215	0.294	0.304	0.387	0.524	0.673	0.892	1.007	1.045	1.060	1.102	1.185
Xylenes (ug/l)	25	27	100	5	3	1	1	10	20	5	5	5	10	10
Recovery by Sample Date		0.002	0.008	0.003	0.000	0.002	0.008	0.008	0.016	0.009	0.002	0.005	0.003	0.006
Cumulative Recovery		0.002	0.010	0.013	0.013	0.015	0.023	0.032	0.047	0.056	0.058	0.063	0.066	0.072
TOTAL RECOVERY		0.075	0.364	0.101	0.025	0.180	0.261	0.263	0.388	0.213	0.078	0.180	0.198	0.488
CUMULATIVE RECOVERY		0.075	0.439	0.539	0.564	0.744	1.005	1.268	1.657	1.870	1.949	2.128	2.327	2.815

ug/l = micrograms per liter

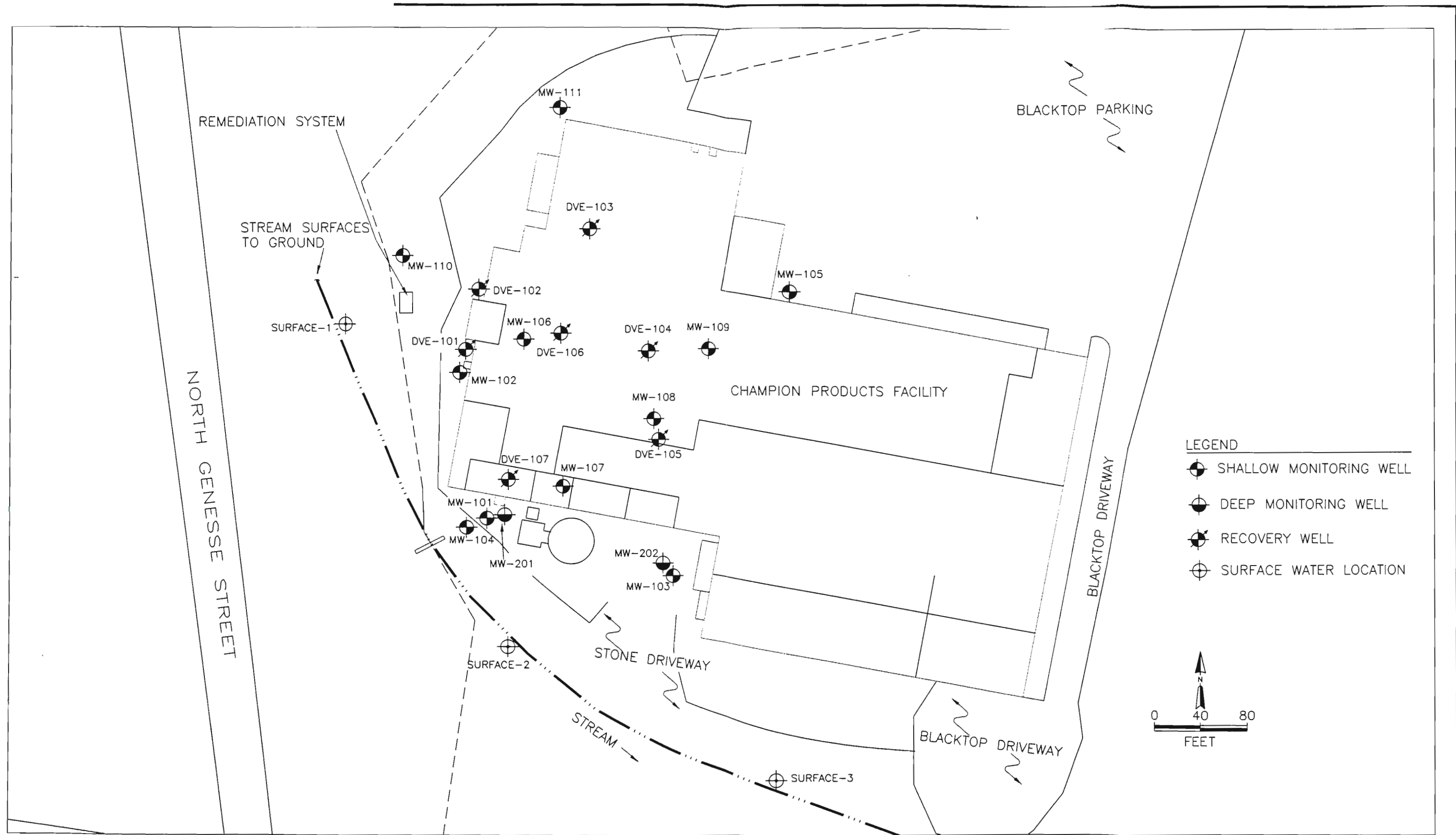
Indicates concentration is below the analytical detection limit. Reported value is 1/2 the method detection limit

Recovery calculations are based on the following formula:

$$\text{Recovery (lbs.)} = \text{Influent Concentration}^* (\text{ug/L}) \times \text{Flow}^* (\text{gal/day}) \times 3.78 (\text{L/gal}) \times 1/0.455 (\text{lbs/kg}) \times 1/1.00\text{E}+09 (\text{kg/ug}) \times \text{Pump Hours (hrs)} \times 1/24 (\text{day/hrs})$$

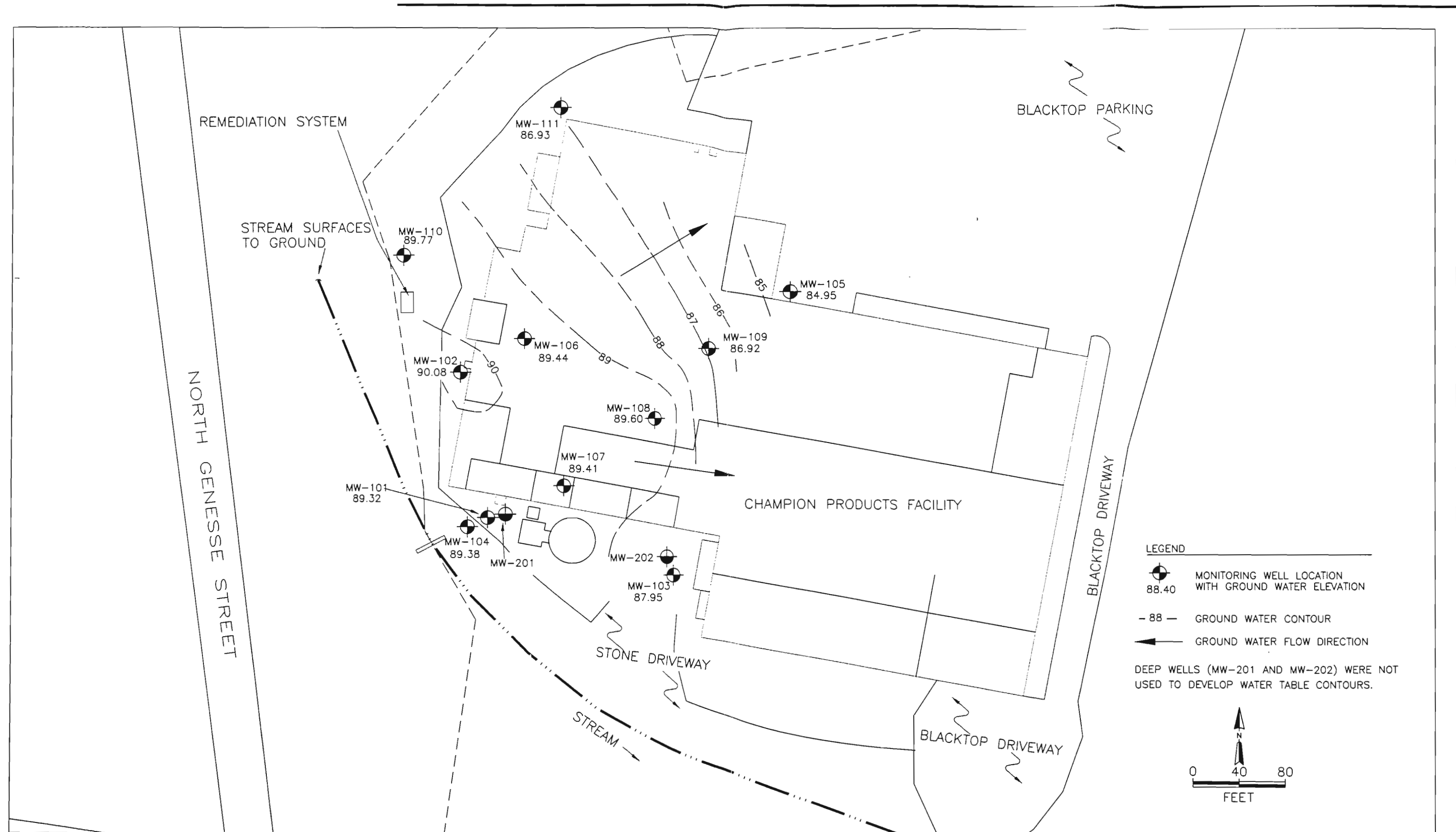
*Influent concentrations and Flow are based on a 2-month rolling average.

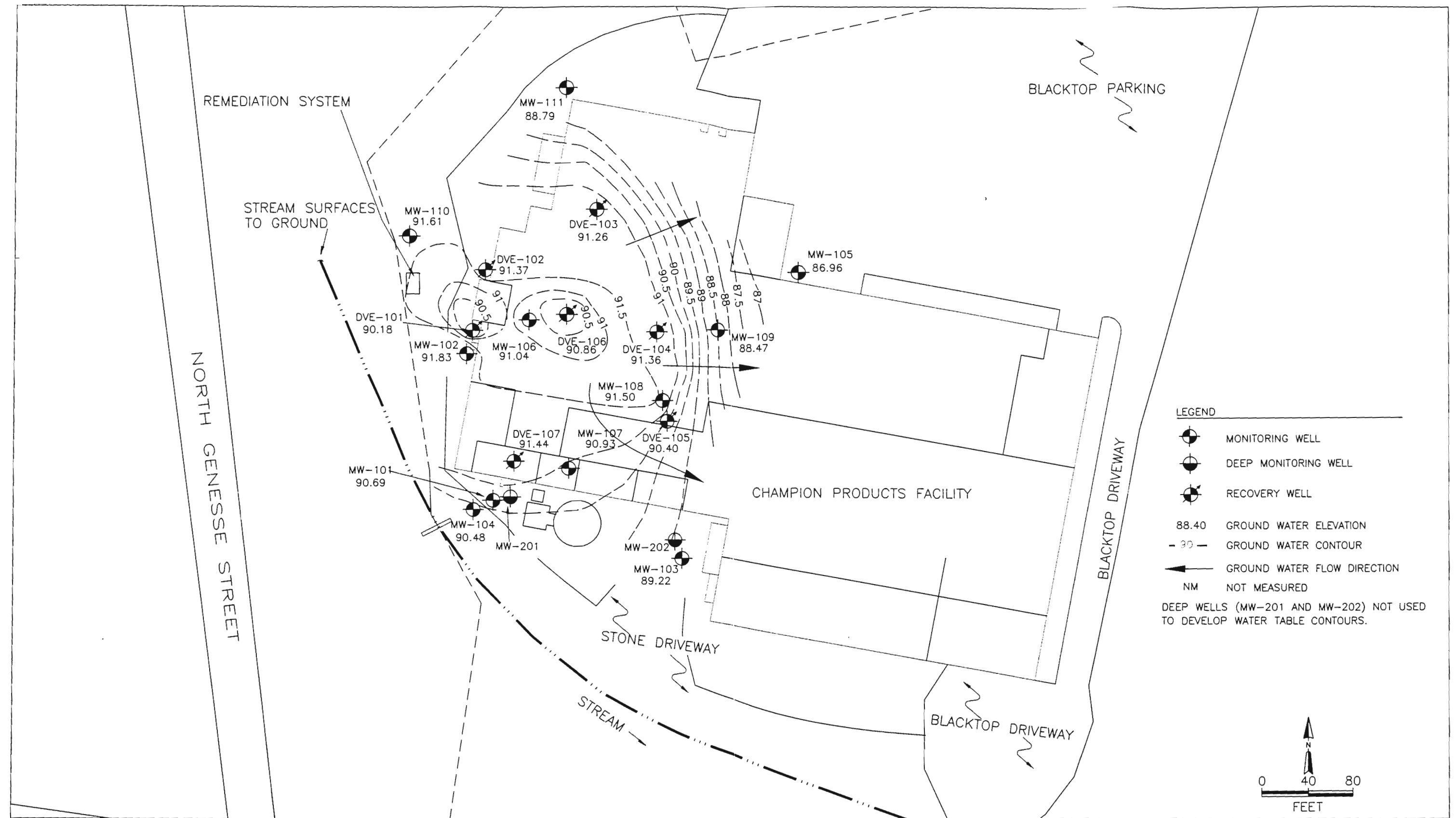
FIGURES



TITLE:
 SITE MAP
 CHAMPION PRODUCTS, INC.
 PERRY, NEW YORK

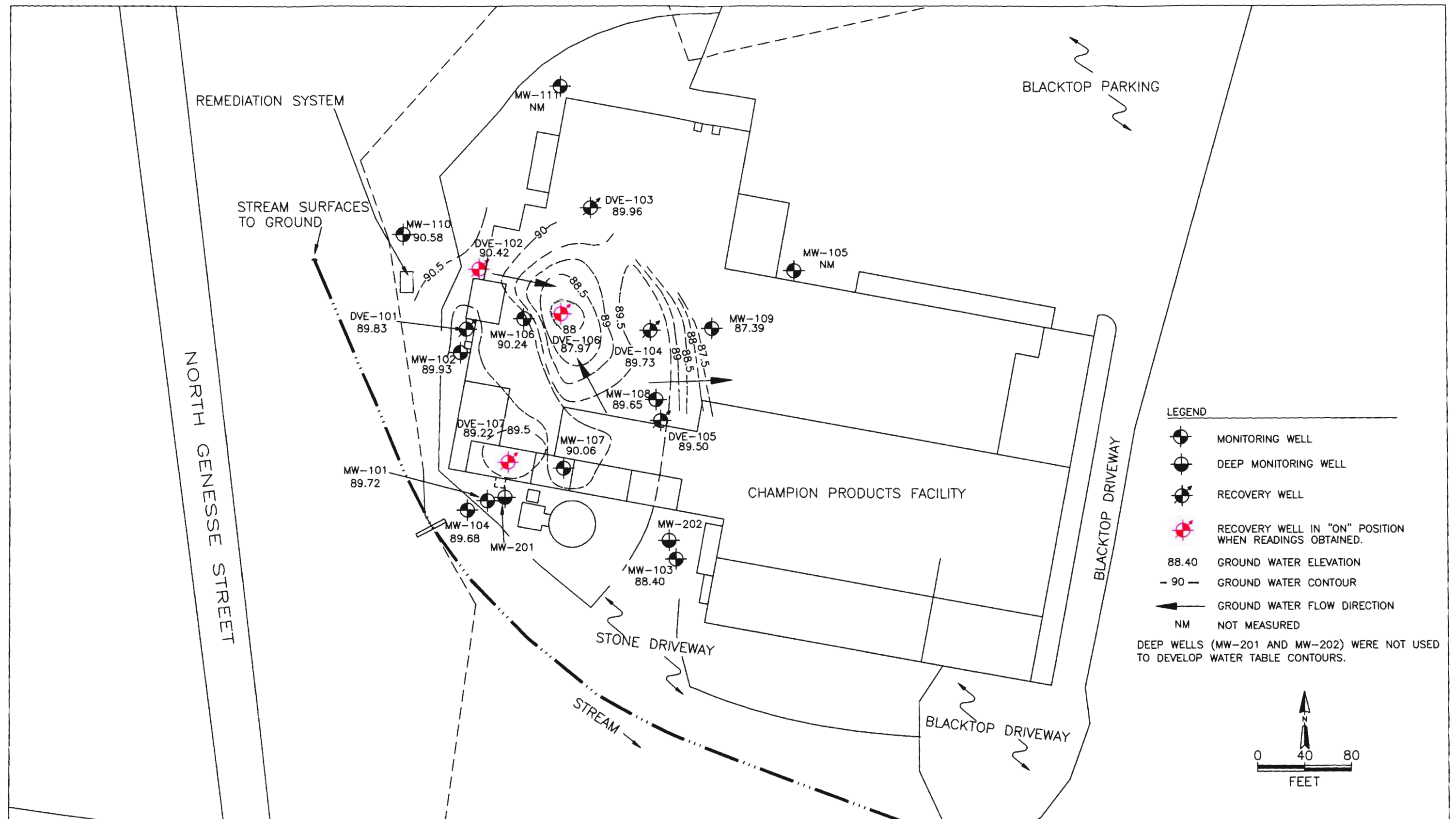
DWN:	DES.:	PROJECT NO.:
HLW		S098-009
CHKD:	APPD:	FIGURE NO.:
DATE:	REV.:	1
2/6/01		





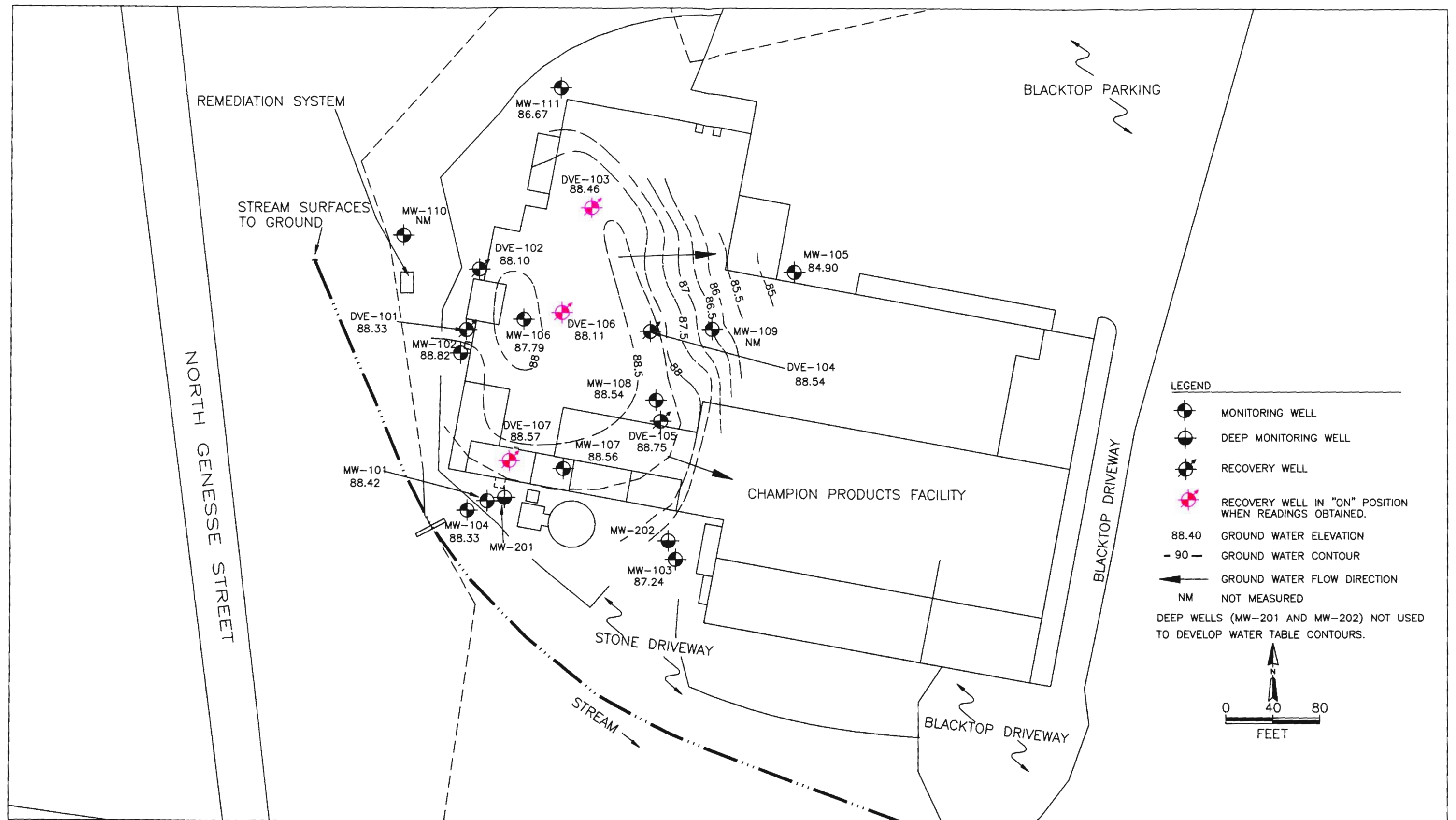
TITLE:
GROUND WATER CONTOUR MAP (JULY 6, 2000)
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK

OWN: HLW	DES.:	PROJECT NO.: S098-009
CHKD:	APPD:	FIGURE NO.: 3
DATE: 10/10/01	REV.:	



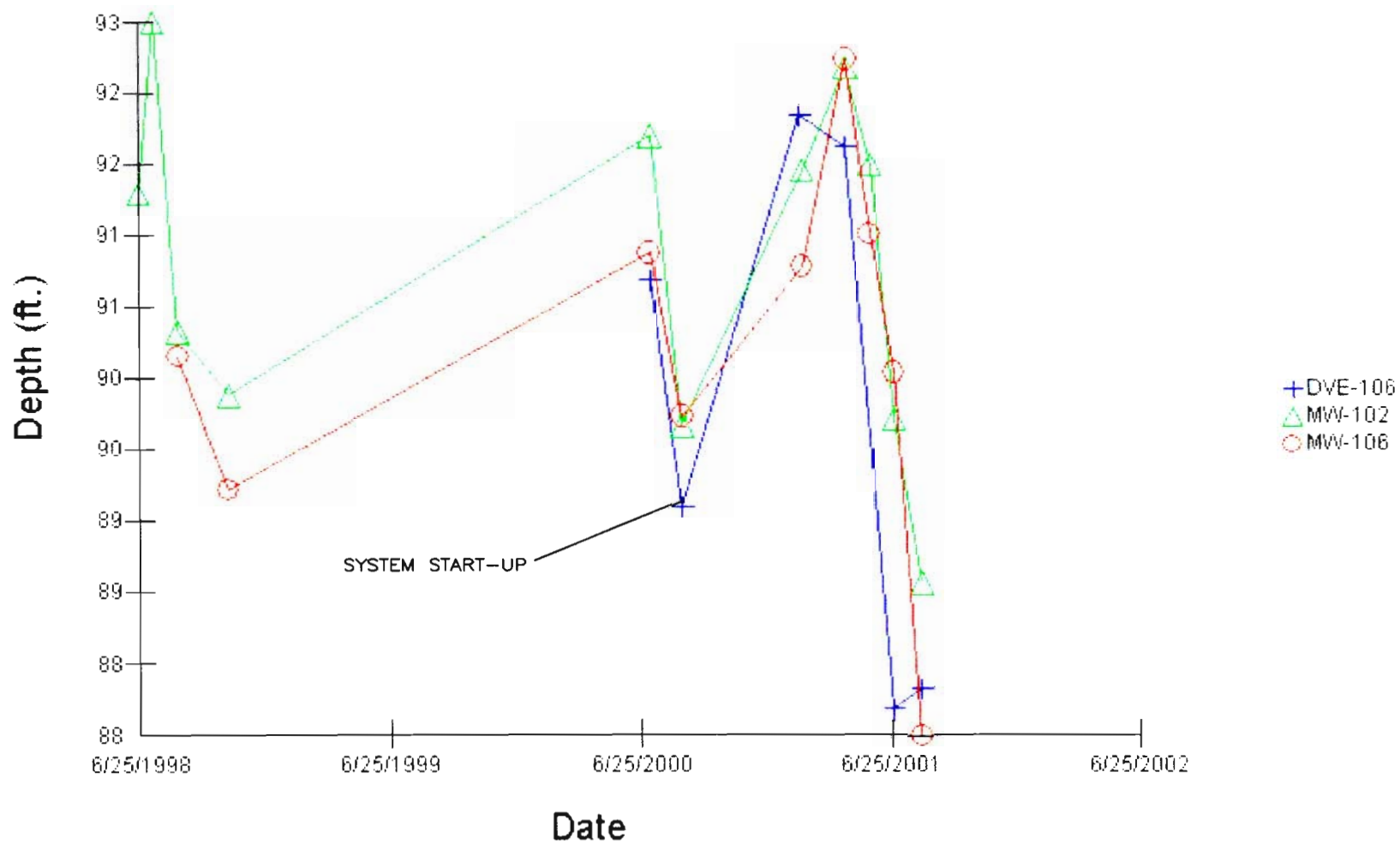
TITLE:
GROUND WATER CONTOUR MAP (JUNE 28, 2001)
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK

DWN:	HLW	DES.:		PROJECT NO.:	S098-009
CHKD:		APPD:		FIGURE NO.:	4
DATE:	10/10/01	REV.:			



TITLE:
GROUND WATER CONTOUR MAP (AUGUST 7, 2001)
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK

DWN:	HLW	DES.:	PROJECT NO.:
CHKD:		APPD:	S098-009
DATE:	10/8/01	REV.:	FIGURE NO.:
			5



TITLE:

HYDROGRAPH: DVE-106/ MW-102/ MW-106
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK

DWN:

HLW

CHKD:

DATE:

11/26/01

DES.:

APPD:

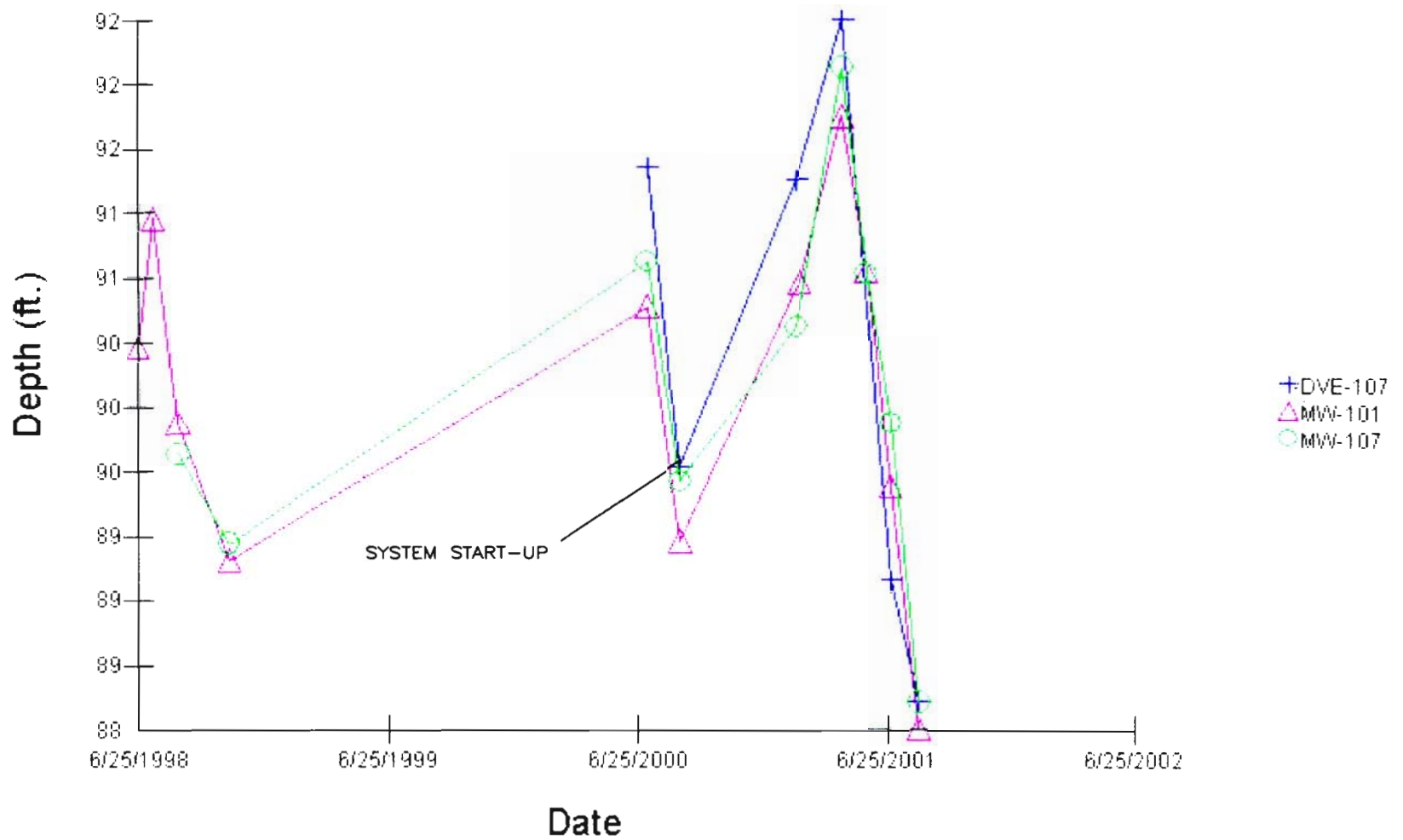
REV.:

PROJECT NO.:

S098-009

FIGURE NO.:

6



TITLE:

HYDROGRAPH: DVE-107/ MW-101/ MW-107
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK

DWN:

HLW

CHKD:

DATE:
11/26/01

DES.:

APPD:

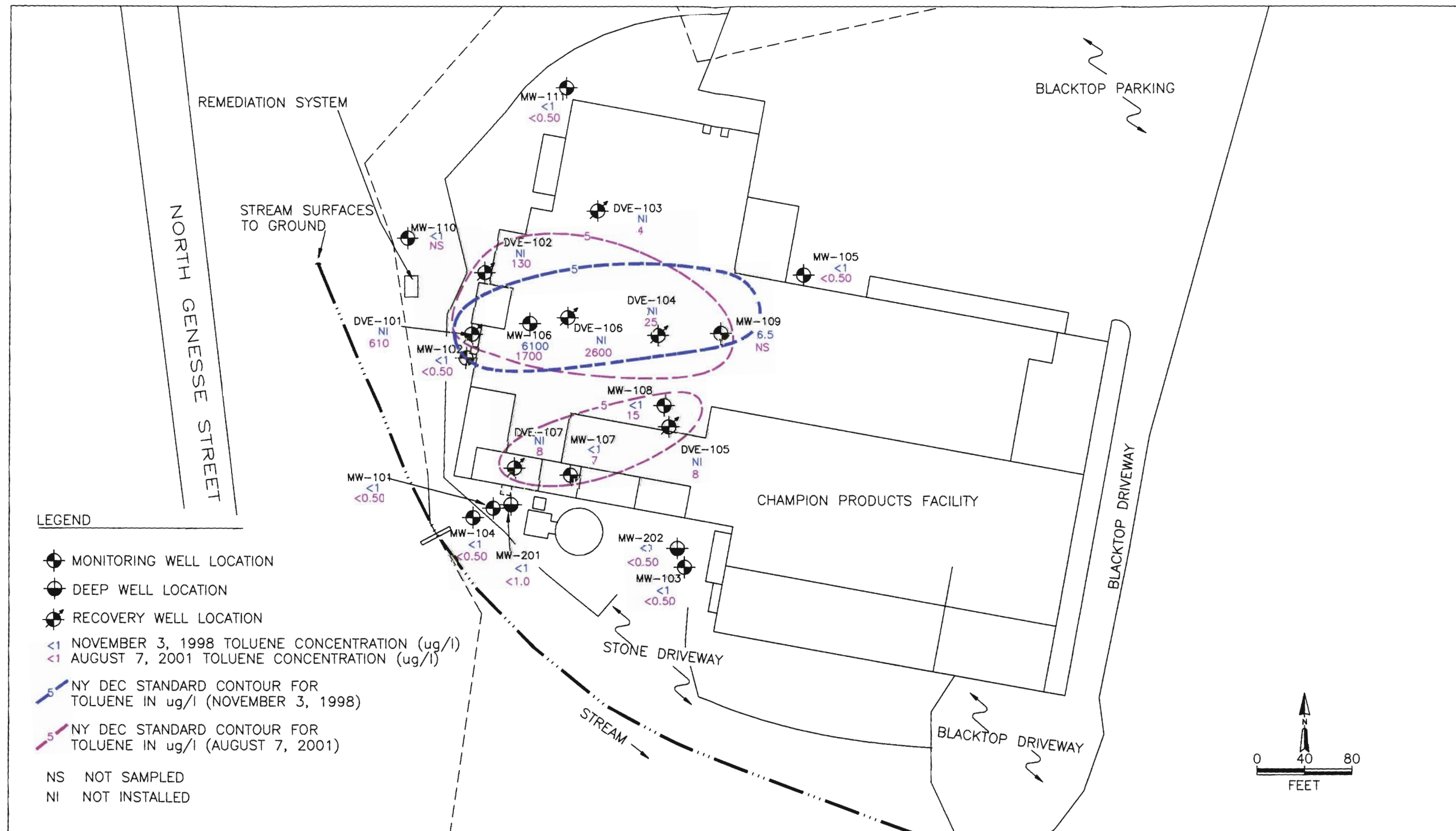
REV.:

PROJECT NO.:

S098-009

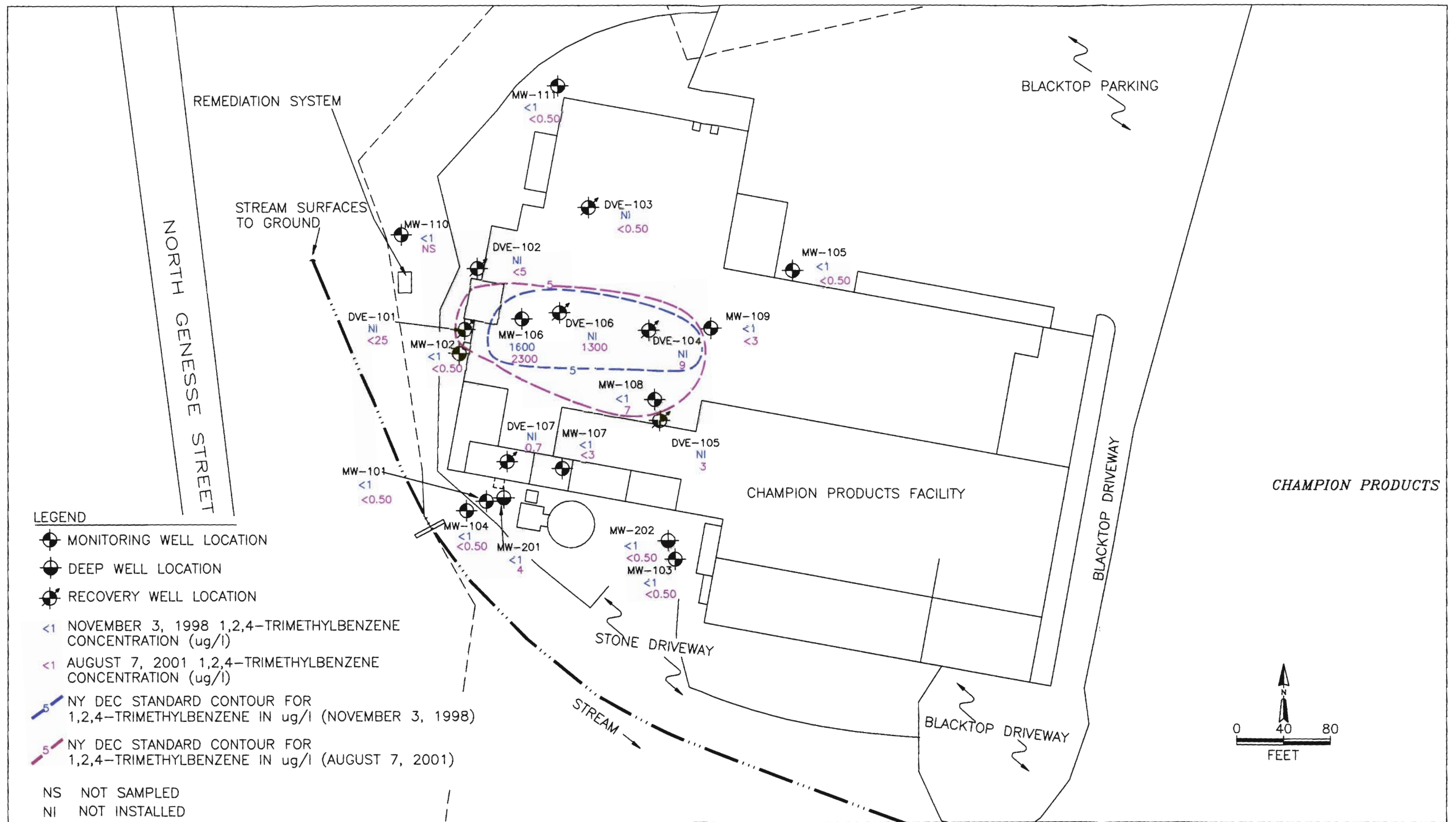
FIGURE NO.:

7



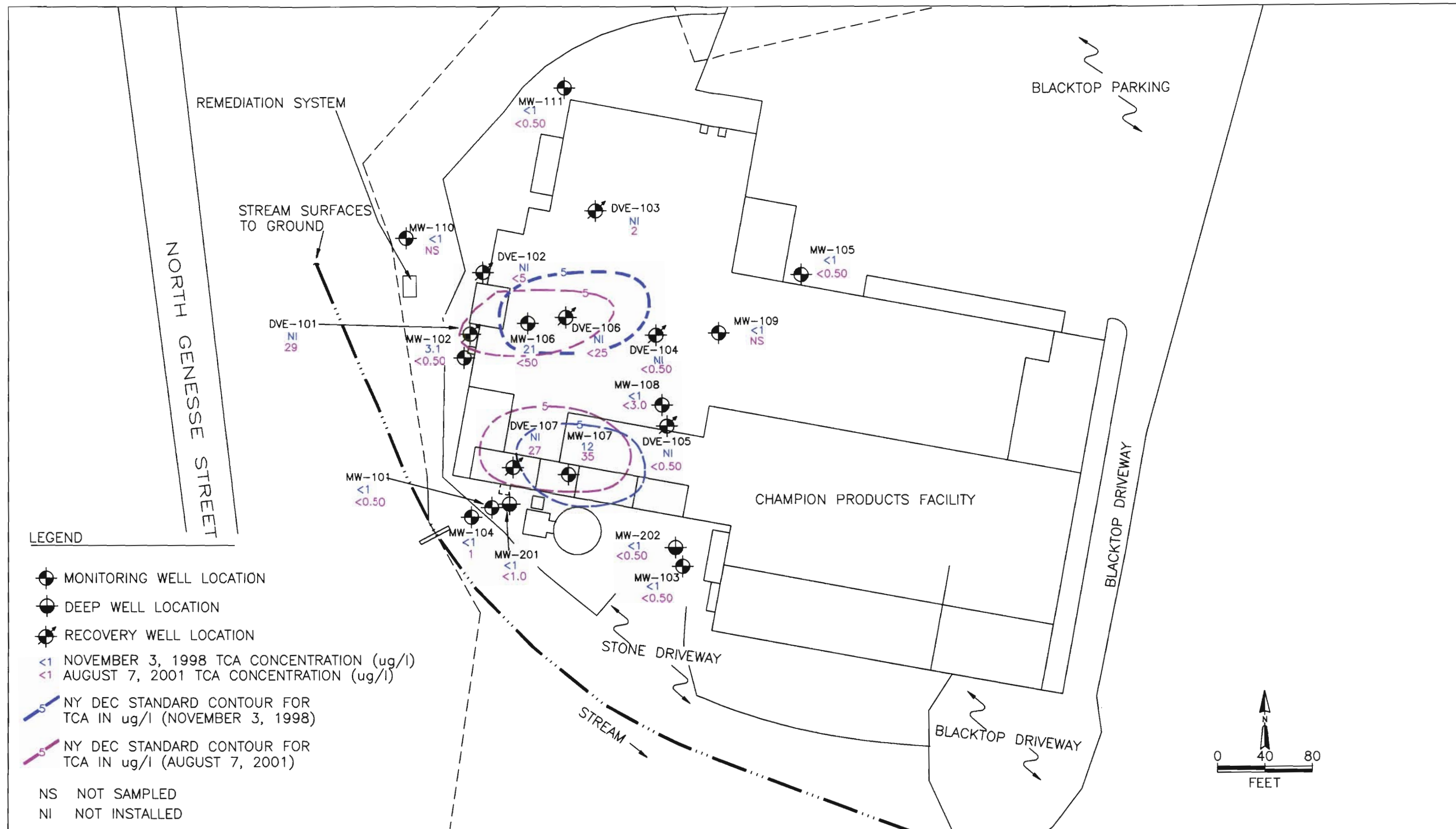
TITLE:
 ISOCONCENTRATION CONTOUR MAP: TOLUENE
 CHAMPION PRODUCTS, INC.
 PERRY, NEW YORK

DWN: HLW	DES.:	PROJECT NO.: S098-009
CHKD:	APPD:	FIGURE NO.: 8
DATE: 9/24/01	REV.:	



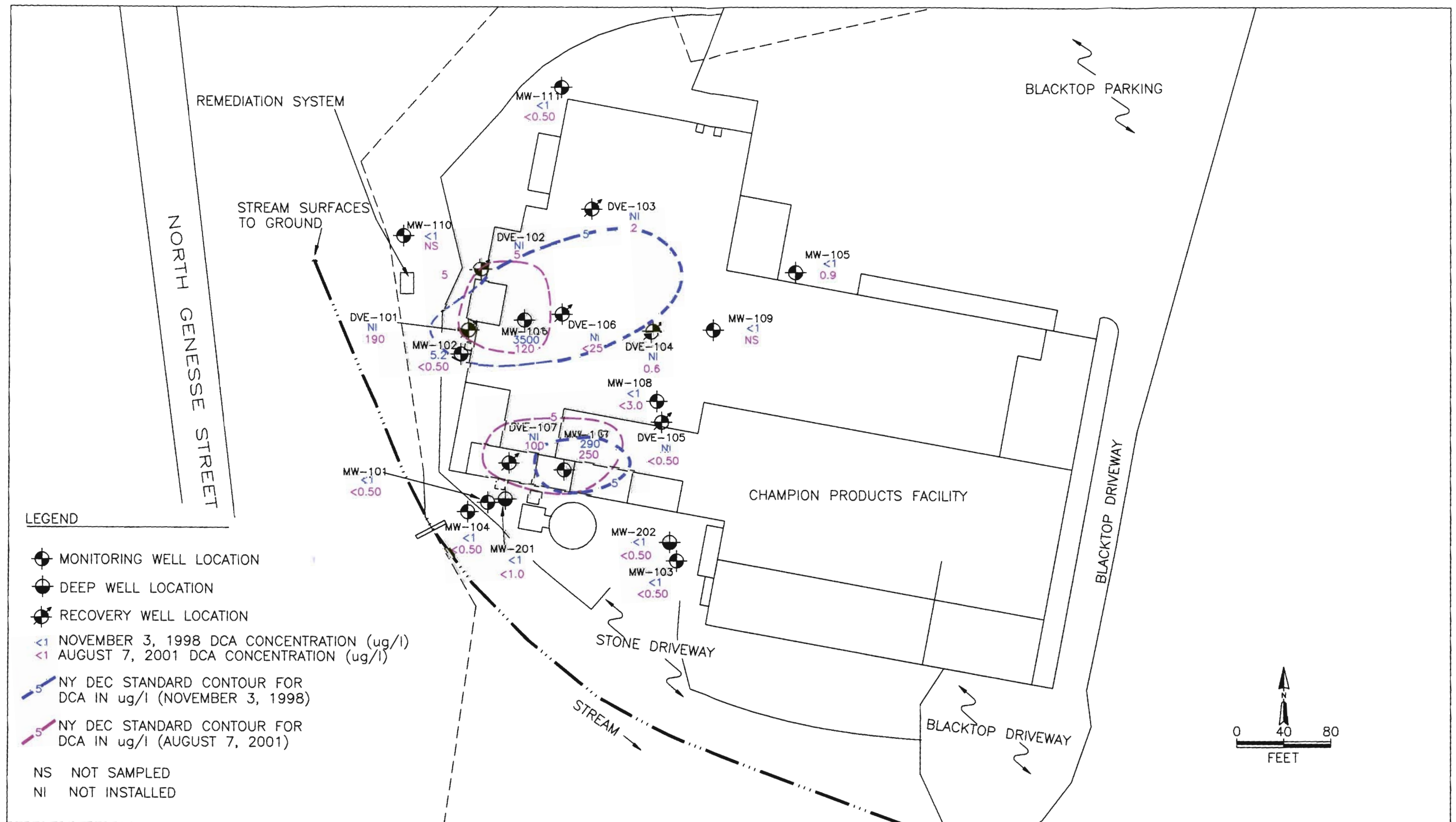
TITLE:
ISOCONCENTRATION CONTOUR: 1,2,4-TRIMETHYLBENZENE
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK

DWN: HLW	DES.:	PROJECT NO.: S098-009
CHKD:	APPD:	FIGURE NO.: 9
DATE: 10/8/01	REV.:	



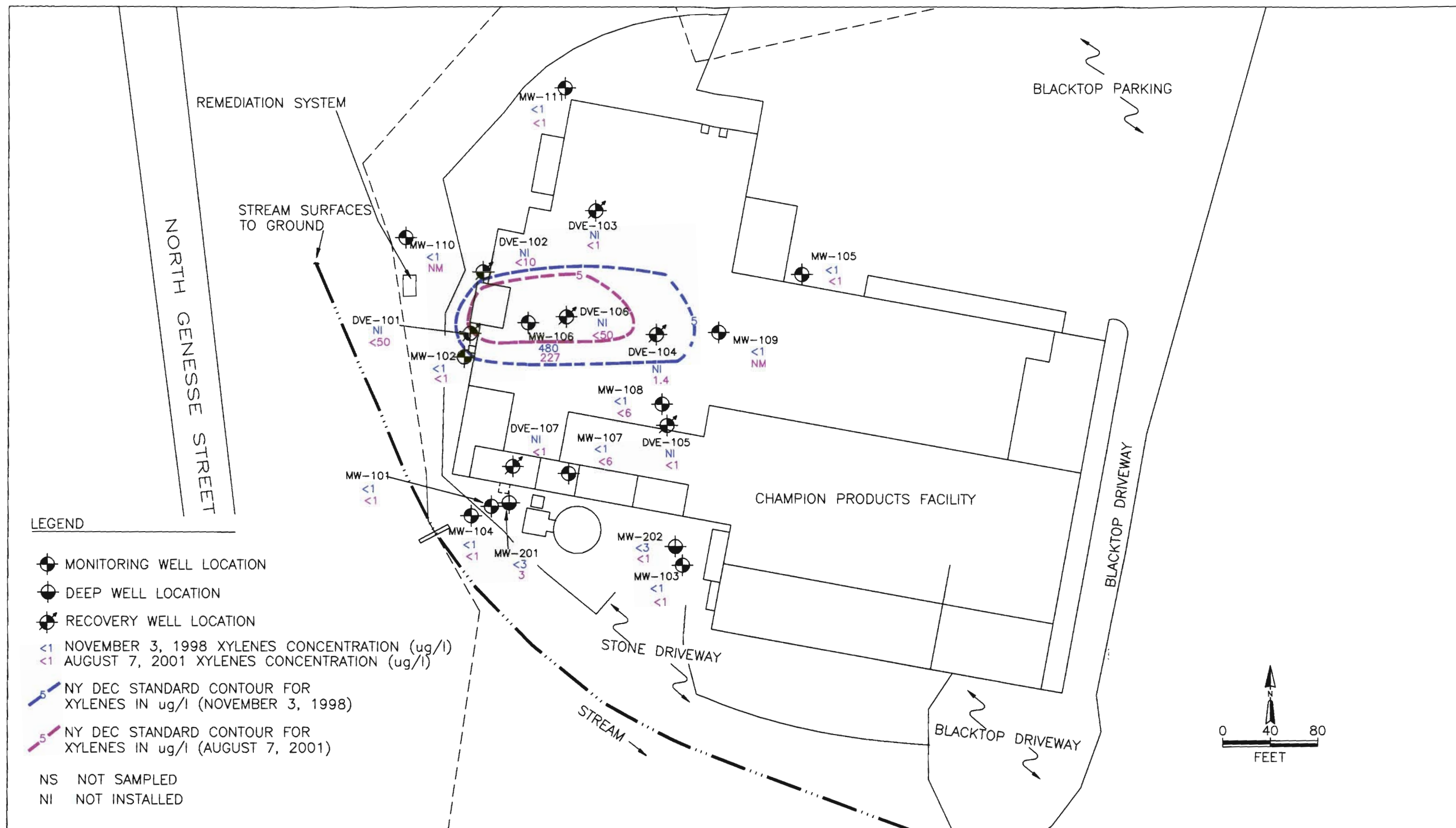
TITLE:
ISOCONCENTRATION MAP: TCA
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK

DWN:	DES.:	PROJECT NO.:
HLW		S098-009
CHKD:	APPD:	FIGURE NO.:
DATE:	REV.:	10
9/18/01		



TITLE:
ISOCONCENTRATION CONTOUR MAP: DCA
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK

DWN: HLW	DES.:	PROJECT NO.: S098-009
CHKD:	APPD:	FIGURE NO.: 11
DATE: 9/24/01	REV.:	



TITLE:
ISOCONCENTRATION CONTOUR: XYLENES
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK

DWN: HLW	DES:	PROJECT NO.: S098-009
CHKD:	APPD:	FIGURE NO.: 12
DATE: 10/11/01	REV:	

APPENDIX A

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Tetrachloro ethene (ug/l)	1,1,1-trichloro ethane (ug/l)	1,1-Dichloro ethane (ug/l)	1,2-Dichloro ethane (ug/l)	Trichloroethene (ug/l)	Chloroethane (ug/l)	1,1-Dichloro ethene (ug/l)
WQS		5	5	5	0.6	5	5	5
DVE-101	07/14/2000	<150	<150	[550]	<150	<150	<150	<150
DVE-101	09/14/2000	<250	[410]	[250]	<250	<250	<250	<250
DVE-101	11/02/2000	<25	[26]	<25	<25	<25	<25	<25
DVE-101	02/09/2001	<50	[65]	[95]	<50	<50	<50	<50
DVE-101	05/22/2001	<50	<50	<50	<50	<50	<50	<50
DVE-101	08/07/2001	<25	[29]	[190]	<25	<25	<25	<25
DVE-102	07/14/2000	[29]	<3	<3	<3	<3	<3	<3
DVE-102	11/02/2000	1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-102	02/09/2001	<0.50	<0.50	0.5	<0.50	<0.50	<0.50	<0.50
DVE-102	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-102	08/07/2001	<5	<5	[5]	<5	<5	<5	<5
DVE-103	07/14/2000	<3	<3	<3	<3	<3	<3	<3
DVE-103	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-103	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-103	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-103	08/07/2001	<0.50	2	2	<0.50	<0.50	<0.50	<0.50
DVE-104	07/14/2000	[19]	<3	<3	<3	<3	<3	<3
DVE-104	11/02/2000	[10]	0.6	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-104	02/09/2001	[6]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Tetrachloro ethene (ug/l)	1,1,1-trichloro ethane (ug/l)	1,1-Dichloro ethane (ug/l)	1,2-Dichloro ethane (ug/l)	Trichloroethene (ug/l)	Chloroethane (ug/l)	1,1-Dichloro ethene (ug/l)
WQS		5	5	5	0.6	5	5	5
DVE-104	05/22/2001	0.6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-104	08/07/2001	<0.50	<0.50	0.6	<0.50	<0.50	<0.50	<0.50
DVE-105	07/14/2000	<3	<3	<3	<3	<3	<3	<3
DVE-105	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-105	02/09/2001	0.6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-105	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-105	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-106	07/14/2000	<150	<150	[220]	<150	<150	[590]	<150
DVE-106	11/02/2000	<3.0	[11]	[43]	<3.0	<3.0	[62]	<3.0
DVE-106	02/09/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DVE-106	05/22/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DVE-106	08/07/2001	<25	<25	<25	<25	<25	[78]	<25
DVE-107	07/14/2000	<3	<3	[10]	<3	<3	<3	<3
DVE-107	11/02/2000	<1.0	[20]	[37]	<1.0	<1.0	<1.0	<1.0
DVE-107	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-107	05/22/2001	<0.50	2	3	<0.50	<0.50	<0.50	<0.50
DVE-107	08/07/2001	<0.50	[27]	[100]	<0.50	<0.50	1	<0.50
MW-101	06/25/1998	<3	<3	<3	<3	<3	<3	<3
MW-101	07/17/1998	<3	<3	<3	<3	<3	<3	<3

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

SAMPLE TYPE: Water

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Tetrachloro ethene (ug/l)	1,1,1-trichloro ethane (ug/l)	1,1-Dichloro ethane (ug/l)	1,2-Dichloro ethane (ug/l)	Trichloroethene (ug/l)	Chloroethane (ug/l)	1,1-Dichloro ethene (ug/l)
WQS		5	5	5	0.6	5	5	5
MW-103	11/03/1998	<1	<1	<1	<1	<1	<1	<1
MW-103	07/06/2000	3	<3	<3	<3	<3	<3	<3
MW-103	11/02/2000	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-103	02/13/2001	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-103	05/22/2001	2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-103	08/07/2001	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-104	06/25/1998	<3	<3	<3	<3	<3	<3	<3
MW-104	07/17/1998	<3	<3	<3	<3	<3	<3	<3
MW-104	08/18/1998	<3	<3	<3	<3	<3	<3	<3
MW-104	11/03/1998	<1	<1	<1	<1	<1	<1	<1
MW-104	07/06/2000	<3	<3	<3	<3	<3	<3	<3
MW-104	11/02/2000	<0.50	1	<0.50	<0.50	<0.50	<0.50	<0.50
MW-104	02/13/2001	<0.50	1	<0.50	<0.50	<0.50	<0.50	<0.50
MW-104	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-104	08/07/2001	<0.50	1	<0.50	<0.50	<0.50	<0.50	<0.50
MW-105	06/25/1998	<3	<3	4	<3	<3	[59]	<3
MW-105	08/18/1998	<3	<3	<3	<3	<3	[23]	<3
MW-105	11/05/1998	<1	<1	<1	<1	<1	<1	<1
MW-105	07/14/2000	<3	<3	[5]	<3	<3	[78]	<3

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Tetrachloro ethene (ug/l)	1,1,1-trichloro ethane (ug/l)	1,1-Dichloro ethane (ug/l)	1,2-Dichloro ethane (ug/l)	Trichloroethene (ug/l)	Chloroethane (ug/l)	1,1-Dichloro ethene (ug/l)
WQS		5	5	5	0.6	5	5	5
MW-105	11/02/2000	<0.50	0.5	0.7	<0.50	<0.50	<0.50	<0.50
MW-105	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-105	05/22/2001	<0.50	4	[8]	<0.50	<0.50	<0.50	<0.50
MW-105	08/07/2001	<0.50	<0.50	0.9	<0.50	<0.50	<0.50	<0.50
MW-106	08/18/1998	<30	[59]	<30	<30	<30	[420]	<30
MW-106	11/04/1998	[10]	[21]	[3500]	[54]	[11]	[1200]	[11]
MW-106	07/06/2000	<750	<750	[2100]	<750	<750	<750	<750
MW-106	11/02/2000	<500	<500	[570]	<500	<500	<500	<500
MW-106	02/13/2001	<250	<250	[2300]	<250	<250	[320]	<250
MW-106	05/22/2001	<100	<100	[390]	<100	<100	<100	<100
MW-106	08/07/2001	<50	<50	[120]	<50	<50	<50	<50
MW-107	08/18/1998	<3	[42]	[130]	[17]	<3	[6]	<3
MW-107	11/04/1998	<1	[12]	[290]	[15]	<1	[18]	[7.0]
MW-107	07/06/2000	<15	[84]	[350]	[34]	<15	[29]	<15
MW-107	02/09/2001	<10	[66]	[380]	[14]	<10	[28]	<10
MW-107	05/22/2001	<10	[41]	[240]	[12]	<10	<10	<10
MW-107	08/07/2001	<3.0	[35]	[250]	[16]	<3.0	[13]	<3.0
MW-108	08/18/1998	<3	<3	<3	<3	<3	<3	<3
MW-108	11/04/1998	<1	<1	<1	<1	<1	<1	<1

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Tetrachloro ethene (ug/l)	1,1,1-trichloro ethane (ug/l)	1,1-Dichloro ethane (ug/l)	1,2-Dichloro ethane (ug/l)	Trichloroethene (ug/l)	Chloroethane (ug/l)	1,1-Dichloro ethene (ug/l)
WQS		5	5	5	0.6	5	5	5
MW-108	07/06/2000	<3	<3	<3	<3	<3	<3	<3
MW-108	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-108	02/09/2001	<0.50	<0.50	4	<0.50	<0.50	0.9	<0.50
MW-108	05/22/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-108	08/07/2001	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
MW-109	08/18/1998	<3	<3	<3	<3	<3	<3	<3
MW-109	11/04/1998	<1	<1	<1	<1	<1	<1	<1
MW-109	07/06/2000	<3	<3	<3	<3	<3	<3	<3
MW-109	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-109	02/09/2001	<3.0	<3.0	[5]	<3.0	<3.0	<3.0	<3.0
MW-109	05/22/2001	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
MW-110	08/20/1998	<3	<3	<3	<3	<3	<3	<3
MW-110	11/05/1998	<1	<1	<1	<1	<1	<1	<1
MW-110	07/06/2000	<3	<3	<3	<3	<3	<3	<3
MW-110	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-110	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-110	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-111	08/20/1998	<3	<3	<3	<3	<3	<3	<3
MW-111	11/05/1998	<1	<1	<1	<1	<1	<1	<1

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Tetrachloro ethene (ug/l)	1,1,1-trichloro ethane (ug/l)	1,1-Dichloro ethane (ug/l)	1,2-Dichloro ethane (ug/l)	Trichloroethene (ug/l)	Chloroethane (ug/l)	1,1-Dichloro ethene (ug/l)
WQS		5	5	5	0.6	5	5	5
MW-111	07/06/2000	<3	<3	<3	<3	<3	<3	<3
MW-111	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-111	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-111	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-201	06/25/1998	<3	<3	<3	<3	<3	<3	<3
MW-201	07/17/1998	<3	<3	<3	<3	<3	<3	<3
MW-201	08/18/1998	<3	<3	<3	<3	<3	<3	<3
MW-201	11/05/1998	<1	<1	<1	<1	<1	<1	<1
MW-201	07/06/2000	<3	<3	<3	<3	<3	<3	<3
MW-201	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-201	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-201	05/22/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-201	08/07/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-202	08/21/1998	<3	<3	<3	<3	<3	<3	<3
MW-202	11/05/1998	<1	<1	<1	<1	<1	<1	<1
MW-202	07/06/2000	<3	<3	<3	<3	<3	<3	<3
MW-202	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-202	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-202	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

----=Not analyzed

SAMPLE TYPE: Water

SITE	DATE	Tetrachloro ethene (ug/l)	1,1,1-trichloro ethane (ug/l)	1,1-Dichloro ethane (ug/l)	1,2-Dichloro ethane (ug/l)	Trichloroethene (ug/l)	Chloroethane (ug/l)	1,1-Dichloro ethene (ug/l)
WQS		5	5	5	0.6	5	5	5
MW-202	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5) ---=Not analyzed								

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	cis-1,2- Dichloroethene (ug/l)	Vinyl chloride (ug/l)	Ethylbenzene (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Xylene (total) (ug/l)	Naphthalene (ug/l)
WQS		5	2	5	1	5	5	10
DVE-101	07/14/2000	<150	<100	<150	<150	[8300]	<150	---
DVE-101	09/14/2000	<250	<250	<250	<250	[15000]	[(410)]	[4600]
DVE-101	11/02/2000	<25	<25	<25	<25	[880]	[(27)]	<25
DVE-101	02/09/2001	<50	<50	<50	<50	[2400]	<100	<50
DVE-101	05/22/2001	<50	<50	<50	<50	[660]	<100	<50
DVE-101	08/07/2001	<25	<25	<25	<25	[610]	<50	<25
DVE-102	07/14/2000	<3	<2	<3	<3	[7]	<3	---
DVE-102	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-102	02/09/2001	<0.50	<0.50	<0.50	<0.50	[6]	<1.0	<0.50
DVE-102	05/22/2001	<0.50	<0.50	<0.50	<0.50	[5]	<1.0	<0.50
DVE-102	08/07/2001	<5	<5	<5	<5	[130]	<10	[40]
DVE-103	07/14/2000	<3	<2	<3	<3	<3	<3	---
DVE-103	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-103	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-103	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-103	08/07/2001	<0.50	<0.50	<0.50	<0.50	4	<1.0	<0.50
DVE-104	07/14/2000	<3	<2	<3	<3	<3	<3	---
DVE-104	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-104	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	cis-1,2- Dichloroethene (ug/l)	Vinyl chloride (ug/l)	Ethylbenzene (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Xylene (total) (ug/l)	Naphthalene (ug/l)
WQS		5	2	5	1	5	5	10
DVE-104	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-104	08/07/2001	<0.50	<0.50	<0.50	<0.50	[25]	1.4	1
DVE-105	07/14/2000	<3	<2	<3	<3	<3	<3	---
DVE-105	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-105	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-105	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-105	08/07/2001	<0.50	<0.50	<0.50	<0.50	[8]	<1.0	0.6
DVE-106	07/14/2000	<150	<100	<150	<150	[2900]	<150	---
DVE-106	11/02/2000	<3.0	<3.0	<3.0	<3.0	[75]	[8]	4
DVE-106	02/09/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0
DVE-106	05/22/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0
DVE-106	08/07/2001	<25	<25	<25	<25	[2600]	<50	[130]
DVE-107	07/14/2000	<3	<2	<3	<3	<3	<3	---
DVE-107	11/02/2000	2	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0
DVE-107	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-107	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
DVE-107	08/07/2001	[8]	<0.50	<0.50	<0.50	[8]	<1.0	<0.50
MW-101	06/25/1998	<3	<2	<3	<3	<3	<3	---
MW-101	07/17/1998	<3	<2	<3	<3	<3	<3	---

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	cis-1,2- Dichloroethene (ug/l)	Vinyl chloride (ug/l)	Ethylbenzene (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Xylene (total) (ug/l)	Naphthalene (ug/l)
WQS		5	2	5	1	5	5	10
MW-101	08/18/1998	<3	<2	<3	<3	<3	<3	---
MW-101	11/03/1998	<1	<1	<1	<1	<1	<1	<1
MW-101	07/06/2000	<3	<2	<3	<3	<3	<3	---
MW-101	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-101	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-101	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-101	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-102	06/25/1998	<3	<2	<3	<3	<3	<3	---
MW-102	07/17/1998	<3	<2	<3	<3	<3	<3	---
MW-102	08/18/1998	<3	<2	<3	<3	[12]	<3	---
MW-102	11/05/1998	<1	<1	<1	<1	<1	<1	<1
MW-102	07/06/2000	<3	<2	<3	<3	<3	<3	---
MW-102	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-102	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-102	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-102	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-103	06/25/1998	<3	<2	<3	<3	<3	<3	---
MW-103	07/17/1998	<3	<2	<3	<3	<3	<3	---
MW-103	08/18/1998	<3	<2	<3	<3	[12]	<3	---

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	cis-1,2- Dichloroethene (ug/l)	Vinyl chloride (ug/l)	Ethylbenzene (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Xylene (total) (ug/l)	Naphthalene (ug/l)
WQS		5	2	5	1	5	5	10
MW-103	11/03/1998	<1	<1	<1	<1	<1	<1	<1
MW-103	07/06/2000	<3	<2	<3	<3	<3	<3	---
MW-103	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-103	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-103	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-103	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-104	06/25/1998	<3	<2	<3	<3	<3	<3	---
MW-104	07/17/1998	<3	<2	<3	<3	<3	<3	---
MW-104	08/18/1998	<3	<2	<3	<3	<3	<3	---
MW-104	11/03/1998	<1	<1	<1	<1	<1	<1	<1
MW-104	07/06/2000	<3	<2	<3	<3	<3	<3	---
MW-104	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-104	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-104	05/22/2001	<0.50	<0.50	<0.50	<0.50	0.8	0.7	<0.50
MW-104	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-105	06/25/1998	4	<2	<3	<3	<3	<3	---
MW-105	08/18/1998	<3	<2	<3	<3	<3	<3	---
MW-105	11/05/1998	<1	<1	<1	<1	<1	<1	<1
MW-105	07/14/2000	<3	<2	<3	<3	<3	<3	---

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	cis-1,2- Dichloroethene (ug/l)	Vinyl chloride (ug/l)	Ethylbenzene (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Xylene (total) (ug/l)	Naphthalene (ug/l)
WQS		5	2	5	1	5	5	10
MW-105	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-105	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-105	05/22/2001	2	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-105	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-106	08/18/1998	[44]	<20	[72]	<30	[48000]	[460]	---
MW-106	11/04/1998	[180]	[6.3]	[114]	[3.3]	[6100]	[480]	[92]
MW-106	07/06/2000	<750	<500	<750	<750	[24000]	<750	---
MW-106	11/02/2000	<500	<500	<500	<500	[22000]	[(720)]	[790]
MW-106	02/13/2001	<250	<250	<250	<250	[11000]	<500	<250
MW-106	05/22/2001	<100	<100	<100	<100	[2300]	<200	<100
MW-106	08/07/2001	<50	<50	[54]	<50	[1700]	[227]	[100]
MW-107	08/18/1998	<3	<2	<3	<3	[10]	<3	---
MW-107	11/04/1998	<1	<1	<1	<1	<1	<1	<1
MW-107	07/06/2000	<15	<10	<15	<15	<15	<15	---
MW-107	02/09/2001	<10	<10	<10	<10	<10	<20	<10
MW-107	05/22/2001	<10	<10	<10	<10	<10	<20	<10
MW-107	08/07/2001	[5]	<3.0	<3.0	<3.0	[7]	<6.0	<3.0
MW-108	08/18/1998	<3	<2	<3	<3	<3	<3	---
MW-108	11/04/1998	<1	<1	<1	<1	<1	<1	<1

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	cis-1,2- Dichloroethene (ug/l)	Vinyl chloride (ug/l)	Ethylbenzene (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Xylene (total) (ug/l)	Naphthalene (ug/l)
WQS		5	2	5	1	5	5	10
MW-108	07/06/2000	<3	<2	<3	<3	<3	<3	---
MW-108	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	1
MW-108	02/09/2001	<0.50	<0.50	<0.50	<0.50	[25]	<1.0	<0.50
MW-108	05/22/2001	<1.0	<1.0	<1.0	<1.0	[6]	<2.0	<1.0
MW-108	08/07/2001	<3.0	<3.0	<3.0	<3.0	[15]	<6.0	<3.0
MW-109	08/18/1998	<3	<2	<3	<3	<3	<3	---
MW-109	11/04/1998	<1	<1	<1	<1	[6.5]	<1	<1
MW-109	07/06/2000	<3	<2	<3	<3	<3	<3	---
MW-109	11/02/2000	<0.50	<0.50	<0.50	<0.50	1	<1.0	0.9
MW-109	02/09/2001	<3.0	<3.0	<3.0	<3.0	[55]	<6.0	<3.0
MW-109	05/22/2001	<3.0	<3.0	<3.0	<3.0	[12]	<6.0	<3.0
MW-110	08/20/1998	<3	<2	<3	<3	<3	<3	---
MW-110	11/05/1998	<1	<1	<1	<1	<1	<1	<1
MW-110	07/06/2000	<3	<2	<3	<3	<3	<3	---
MW-110	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-110	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-110	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-111	08/20/1998	<3	<2	<3	<3	<3	<3	---
MW-111	11/05/1998	<1	<1	<1	<1	<1	<1	<1

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	cis-1,2- Dichloroethene (ug/l)	Vinyl chloride (ug/l)	Ethylbenzene (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Xylene (total) (ug/l)	Naphthalene (ug/l)
WQS		5	2	5	1	5	5	10
MW-111	07/06/2000	<3	<2	<3	<3	<3	<3	---
MW-111	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-111	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-111	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-201	06/25/1998	<3	<2	<3	<3	<3	<3	---
MW-201	07/17/1998	<3	<2	<3	<3	<3	<3	---
MW-201	08/18/1998	<3	<2	<3	<3	<3	<3	---
MW-201	11/05/1998	<1	<1	<1	<1	<1	<3	<1
MW-201	07/06/2000	<3	<2	<3	<3	<3	<3	---
MW-201	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	(0.8)	<0.50
MW-201	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	1	<0.50
MW-201	05/22/2001	<1.0	<1.0	<1.0	<1.0	<1.0	1	<1.0
MW-201	08/07/2001	<1.0	<1.0	<1.0	<1.0	<1.0	3	<1.0
MW-202	08/21/1998	<3	<2	<3	<3	<3	---	---
MW-202	11/05/1998	<1	<1	<1	<1	<1	---	<1
MW-202	07/06/2000	<3	<2	<3	<3	<3	<3	---
MW-202	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-202	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50
MW-202	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

()=Less than Reporting Limit ---=Not analyzed

SAMPLE TYPE: Water

SITE	DATE	cis-1,2-Dichloroethene (ug/l)	Vinyl chloride (ug/l)	Ethylbenzene (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Xylene (total) (ug/l)	Naphthalene (ug/l)
WQS		5	2	5	1	5	5	10
MW-202	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5) ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	1,2,4-Trimethyl benzene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	Isopropyl benzene (ug/l)	Chloromethane (ug/l)	Methyl ethyl ketone (ug/l)	Methyl isobutyl ketone (MIBK) (ug/l)	Methylene chloride (ug/l)
WQS		5	5	5	5	50	50	5
DVE-101	07/14/2000	---	---	---	<150	<500	<500	[160]
DVE-101	09/14/2000	[15000]	[5600]	[2400]	<250	---	---	[790]
DVE-101	11/02/2000	[320]	[85]	<25	<25	---	---	<25
DVE-101	02/09/2001	[200]	[58]	<50	<50	<1000	---	<50
DVE-101	05/22/2001	[67]	<50	<50	<50	<200	---	<50
DVE-101	08/07/2001	<25	[33]	<25	<25	<500	---	<25
DVE-102	07/14/2000	---	---	---	<3	39	<10	<3
DVE-102	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	<0.50
DVE-102	02/09/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
DVE-102	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
DVE-102	08/07/2001	<5	[84]	[13]	<5	<100	---	<5
DVE-103	07/14/2000	---	---	---	<3	45	<10	<3
DVE-103	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	0.6
DVE-103	02/09/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
DVE-103	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
DVE-103	08/07/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
DVE-104	07/14/2000	---	---	---	<3	<10	<10	4
DVE-104	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	1
DVE-104	02/09/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	1,2,4-Trimethyl benzene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	Isopropyl benzene (ug/l)	Chloromethane (ug/l)	Methyl ethyl ketone (ug/l)	Methyl isobutyl ketone (MIBK) (ug/l)	Methylene chloride (ug/l)
WQS		5	5	5	5	50	50	5
DVE-104	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
DVE-104	08/07/2001	[9]	3	<0.50	<0.50	<10	---	<0.50
DVE-105	07/14/2000	---	---	---	<3	38	<10	3
DVE-105	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	4
DVE-105	02/09/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
DVE-105	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
DVE-105	08/07/2001	3	0.8	<0.50	<0.50	<10	---	<0.50
DVE-106	07/14/2000	---	---	---	<150	<500	<500	<150
DVE-106	11/02/2000	[83]	[29]	<3.0	<3.0	---	---	<3.0
DVE-106	02/09/2001	[5]	<1.0	<1.0	<1.0	<20	---	<1.0
DVE-106	05/22/2001	<1.0	<1.0	<1.0	<1.0	<4.0	---	<1.0
DVE-106	08/07/2001	[1300]	[470]	[61]	<25	<500	---	<25
DVE-107	07/14/2000	---	---	---	<3	[91]	<10	<3
DVE-107	11/02/2000	<1.0	<1.0	<1.0	<1.0	---	---	4
DVE-107	02/09/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
DVE-107	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
DVE-107	08/07/2001	0.7	1	<0.50	<0.50	<10	---	<0.50
MW-101	06/25/1998	---	---	---	<3	<10	<10	<3
MW-101	07/17/1998	---	---	---	<3	<10	<10	<3

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	1,2,4-Trimethyl benzene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	Isopropyl benzene (ug/l)	Chloromethane (ug/l)	Methyl ethyl ketone (ug/l)	Methyl isobutyl ketone (MIBK) (ug/l)	Methylene chloride (ug/l)
WQS		5	5	5	5	50	50	5
MW-101	08/18/1998	---	---	---	<3	<10	<10	<3
MW-101	11/03/1998	<1	<1	<1	<1	<5	<1	<1
MW-101	07/06/2000	---	---	---	[14]	<10	<10	<3
MW-101	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	<0.50
MW-101	02/13/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-101	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
MW-101	08/07/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-102	06/25/1998	---	---	---	<3	<10	<10	<3
MW-102	07/17/1998	---	---	---	<3	<10	<10	<3
MW-102	08/18/1998	---	---	---	<3	<10	<10	[17]
MW-102	11/05/1998	<1	2.1	<1	<1	<5	<1	<1
MW-102	07/06/2000	---	---	---	[24]	<10	<10	<3
MW-102	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	<0.50
MW-102	02/13/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-102	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
MW-102	08/07/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
MW-103	06/25/1998	---	---	---	<3	<10	<10	<3
MW-103	07/17/1998	---	---	---	<3	<10	<10	<3
MW-103	08/18/1998	---	---	---	<3	<10	<10	[16]

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	1,2,4-Trimethyl benzene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	Isopropyl benzene (ug/l)	Chloromethane (ug/l)	Methyl ethyl ketone (ug/l)	Methyl isobutyl ketone (MIBK) (ug/l)	Methylene chloride (ug/l)
WQS		5	5	5	5	50	50	5
MW-103	11/03/1998	<1	<1	<1	<1	<5	<1	<1
MW-103	07/06/2000	---	---	---	<3	<10	<10	<3
MW-103	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	<0.50
MW-103	02/13/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-103	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
MW-103	08/07/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-104	06/25/1998	---	---	---	<3	<10	<10	<3
MW-104	07/17/1998	---	---	---	<3	<10	<10	<3
MW-104	08/18/1998	---	---	---	<3	<10	<10	<3
MW-104	11/03/1998	<1	<1	<1	<1	<5	<1	<1
MW-104	07/06/2000	---	---	---	[17]	<10	<10	<3
MW-104	11/02/2000	<0.50	<0.50	<0.50	[8]	---	---	<0.50
MW-104	02/13/2001	<0.50	<0.50	<0.50	[15]	<10	---	<0.50
MW-104	05/22/2001	<0.50	<0.50	<0.50	3	<2.0	---	<0.50
MW-104	08/07/2001	<0.50	<0.50	<0.50	[23]	<10	---	<0.50
MW-105	06/25/1998	---	---	---	<3	<10	<10	<3
MW-105	08/18/1998	---	---	---	<3	<10	<10	<3
MW-105	11/05/1998	<1	<1	<1	<1	<5	<1	<1
MW-105	07/14/2000	---	---	---	<3	<10	<10	<3

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	1,2,4-Trimethyl benzene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	Isopropyl benzene (ug/l)	Chloromethane (ug/l)	Methyl ethyl ketone (ug/l)	Methyl isobutyl ketone (MIBK) (ug/l)	Methylene chloride (ug/l)
WQS		5	5	5	5	50	50	5
MW-105	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	<0.50
MW-105	02/13/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-105	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
MW-105	08/07/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-106	08/18/1998	---	---	---	<30	[290]	<100	[190]
MW-106	11/04/1998	[1600]	[600]	[70]	<1	[130]	9.8	[51]
MW-106	07/06/2000	---	---	---	<750	<2500	<2500	<750
MW-106	11/02/2000	[13000]	[6200]	[1400]	<500	---	---	<500
MW-106	02/13/2001	[720]	<250	<250	<250	<5000	---	<250
MW-106	05/22/2001	[310]	[110]	<100	<100	<400	---	<100
MW-106	08/07/2001	[2300]	[530]	[140]	<50	<1000	---	<50
MW-107	08/18/1998	---	---	---	<3	[160]	<10	[5]
MW-107	11/04/1998	<1	<1	<1	<1	<5	<1	<1
MW-107	07/06/2000	---	---	---	<15	<50	<50	<15
MW-107	02/09/2001	<10	<10	<10	<10	---	---	<10
MW-107	05/22/2001	<10	<10	<10	<10	<40	---	<10
MW-107	08/07/2001	<3.0	<3.0	<3.0	<3.0	<50	---	<3.0
MW-108	08/18/1998	---	---	---	<3	[69]	<10	<3
MW-108	11/04/1998	<1	<1	<1	<1	<5	<1	<1

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	1,2,4-Trimethyl benzene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	Isopropyl benzene (ug/l)	Chloromethane (ug/l)	Methyl ethyl ketone (ug/l)	Methyl isobutyl ketone (MIBK) (ug/l)	Methylene chloride (ug/l)
WQS		5	5	5	5	50	50	5
MW-108	07/06/2000	---	---	---	<3	<10	<10	<3
MW-108	11/02/2000	4	1	<0.50	<0.50	---	---	1
MW-108	02/09/2001	0.6	<0.50	<0.50	<0.50	<10	---	<0.50
MW-108	05/22/2001	<1.0	<1.0	<1.0	<1.0	<4.0	---	<1.0
MW-108	08/07/2001	[7]	3	<3.0	<3.0	<50	---	<3.0
MW-109	08/18/1998	---	---	---	<3	<10	<10	<3
MW-109	11/04/1998	<1	<1	<1	<1	<5	<1	4.5
MW-109	07/06/2000	---	---	---	<3	<10	<10	<3
MW-109	11/02/2000	[9]	3	<0.50	<0.50	---	---	[5]
MW-109	02/09/2001	<3.0	<3.0	<3.0	<3.0	<50	---	<3.0
MW-109	05/22/2001	<3.0	<3.0	<3.0	<3.0	<12	---	<3.0
MW-110	08/20/1998	---	---	---	<3	<10	<10	<3
MW-110	11/05/1998	<1	<1	<1	<1	<5	<1	<1
MW-110	07/06/2000	---	---	---	<3	<10	<10	<3
MW-110	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	<0.50
MW-110	02/13/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-110	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50
MW-111	08/20/1998	---	---	---	<3	<10	<10	<3
MW-111	11/05/1998	<1	<1	<1	<1	<5	<1	<1

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	1,2,4-Trimethyl benzene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	Isopropyl benzene (ug/l)	Chloromethane (ug/l)	Methyl ethyl ketone (ug/l)	Methyl isobutyl ketone (MIBK) (ug/l)	Methylene chloride (ug/l)
WQS		5	5	5	5	50	50	5
MW-111	07/06/2000	---	---	---	<3	<10	<10	<3
MW-111	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	<0.50
MW-111	02/13/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-111	08/07/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-201	06/25/1998	---	---	---	<3	12	<10	[6]
MW-201	07/17/1998	---	---	---	<3	[50]	<10	<3
MW-201	08/18/1998	---	---	---	<3	27	<10	<3
MW-201	11/05/1998	<1	<1	<1	<1	7.3	<1	<1
MW-201	07/06/2000	---	---	---	[6]	<10	<10	<3
MW-201	11/02/2000	2	0.5	<0.50	<0.50	---	---	2
MW-201	02/13/2001	2	<0.50	<0.50	<0.50	<10	---	<0.50
MW-201	05/22/2001	2	<1.0	<1.0	<1.0	<4.0	---	<1.0
MW-201	08/07/2001	4	<1.0	<1.0	<1.0	<20	---	<1.0
MW-202	08/21/1998	---	---	---	<3	<10	<10	<3
MW-202	11/05/1998	<1	<1	<1	<1	<5	<1	<1
MW-202	07/06/2000	---	---	---	<3	<10	<10	<3
MW-202	11/02/2000	<0.50	<0.50	<0.50	<0.50	---	---	<0.50
MW-202	02/13/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50
MW-202	05/22/2001	<0.50	<0.50	<0.50	<0.50	<2.0	---	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

SAMPLE TYPE: Water

SITE	DATE	1,2,4-Trimethyl benzene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	Isopropyl benzene (ug/l)	Chloromethane (ug/l)	Methyl ethyl ketone (ug/l)	Methyl isobutyl ketone (MIBK) (ug/l)	Methylene chloride (ug/l)
WQS		5	5	5	5	50	50	5
MW-202	08/07/2001	<0.50	<0.50	<0.50	<0.50	<10	---	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	n-Butylbenzene (ug/l)	n-Propyl benzene (ug/l)	4-Isopropyl toluene (ug/l)	sec-Butyl benzene (ug/l)	tert-Butyl benzene (ug/l)	Trichloro fluoromethane (ug/l)	1,2,4-Trichloro benzene (ug/l)
WQS		5	5	5	5	5	5	5
DVE-101	07/14/2000	---	---	---	---	---	---	---
DVE-101	09/14/2000	[15000]	[2000]	[5900]	[5400]	[670]	<250	<250
DVE-101	11/02/2000	[84]	<25	<25	<25	<25	<25	<25
DVE-101	02/09/2001	<50	<50	<50	<50	<50	<50	<50
DVE-101	05/22/2001	<50	<50	<50	<50	<50	<50	<50
DVE-101	08/07/2001	<25	<25	<25	<25	<25	<25	<25
DVE-102	07/14/2000	---	---	---	---	---	---	---
DVE-102	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-102	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-102	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-102	08/07/2001	[25]	[9]	[88]	[30]	<5	<5	<5
DVE-103	07/14/2000	---	---	---	---	---	---	---
DVE-103	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-103	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-103	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-103	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-104	07/14/2000	---	---	---	---	---	---	---
DVE-104	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-104	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	n-Butylbenzene (ug/l)	n-Propyl benzene (ug/l)	4-Isopropyl toluene (ug/l)	sec-Butyl benzene (ug/l)	tert-Butyl benzene (ug/l)	Trichloro fluoromethane (ug/l)	1,2,4-Trichloro benzene (ug/l)
WQS		5	5	5	5	5	5	5
DVE-104	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-104	08/07/2001	4	<0.50	0.7	<0.50	<0.50	<0.50	<0.50
DVE-105	07/14/2000	---	---	---	---	---	---	---
DVE-105	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-105	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-105	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-105	08/07/2001	1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-106	07/14/2000	---	---	---	---	---	---	---
DVE-106	11/02/2000	[26]	<3.0	[5]	<3.0	<3.0	<3.0	<3.0
DVE-106	02/09/2001	2	<1.0	2	2	1	<1.0	<1.0
DVE-106	05/22/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DVE-106	08/07/2001	<25	[48]	<25	[150]	[40]	<25	<25
DVE-107	07/14/2000	---	---	---	---	---	---	---
DVE-107	11/02/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DVE-107	02/09/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-107	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DVE-107	08/07/2001	<0.50	<0.50	0.7	<0.50	<0.50	<0.50	<0.50
MW-101	06/25/1998	---	---	---	---	---	---	---
MW-101	07/17/1998	---	---	---	---	---	---	---

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	n-Butylbenzene (ug/l)	n-Propyl benzene (ug/l)	4-Isopropyl toluene (ug/l)	sec-Butyl benzene (ug/l)	tert-Butyl benzene (ug/l)	Trichloro fluoromethane (ug/l)	1,2,4-Trichloro benzene (ug/l)
WQS		5	5	5	5	5	5	5
MW-101	08/18/1998	---	---	---	---	---	---	---
MW-101	11/03/1998	<1	<1	<1	<1	<1	<1	<1
MW-101	07/06/2000	---	---	---	---	---	---	---
MW-101	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-101	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-101	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-101	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-102	06/25/1998	---	---	---	---	---	---	---
MW-102	07/17/1998	---	---	---	---	---	---	---
MW-102	08/18/1998	---	---	---	---	---	---	---
MW-102	11/05/1998	<1	<1	<1	<1	<1	<1	3.0
MW-102	07/06/2000	---	---	---	---	---	---	---
MW-102	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-102	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-102	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-102	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-103	06/25/1998	---	---	---	---	---	---	---
MW-103	07/17/1998	---	---	---	---	---	---	---
MW-103	08/18/1998	---	---	---	---	---	---	---

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	n-Butylbenzene (ug/l)	n-Propyl benzene (ug/l)	4-Isopropyl toluene (ug/l)	sec-Butyl benzene (ug/l)	tert-Butyl benzene (ug/l)	Trichloro fluoromethane (ug/l)	1,2,4-Trichloro benzene (ug/l)
WQS		5	5	5	5	5	5	5
MW-103	11/03/1998	<1	<1	<1	<1	<1	<1	<1
MW-103	07/06/2000	---	---	---	---	---	---	---
MW-103	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-103	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-103	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-103	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-104	06/25/1998	---	---	---	---	---	---	---
MW-104	07/17/1998	---	---	---	---	---	---	---
MW-104	08/18/1998	---	---	---	---	---	---	---
MW-104	11/03/1998	<1	<1	<1	<1	<1	<1	<1
MW-104	07/06/2000	---	---	---	---	---	---	---
MW-104	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	<0.50
MW-104	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-104	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-104	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-105	06/25/1998	---	---	---	---	---	---	---
MW-105	08/18/1998	---	---	---	---	---	---	---
MW-105	11/05/1998	<1	<1	<1	<1	<1	<1	<1
MW-105	07/14/2000	---	---	---	---	---	---	---

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	n-Butylbenzene (ug/l)	n-Propyl benzene (ug/l)	4-Isopropyl toluene (ug/l)	sec-Butyl benzene (ug/l)	tert-Butyl benzene (ug/l)	Trichloro fluoromethane (ug/l)	1,2,4-Trichloro benzene (ug/l)
WQS		5	5	5	5	5	5	5
MW-105	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-105	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-105	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-105	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-106	08/18/1998	---	---	---	---	---	---	---
MW-106	11/04/1998	[120]	[160]	[114]	[54]	[230]	<1	<1
MW-106	07/06/2000	---	---	---	---	---	---	---
MW-106	11/02/2000	[8500]	<500	[5900]	[3500]	[1400]	<500	<500
MW-106	02/13/2001	<250	<250	[270]	<250	<250	<250	<250
MW-106	05/22/2001	[160]	<100	<100	<100	<100	<100	<100
MW-106	08/07/2001	[740]	[71]	[530]	[290]	[72]	<50	<50
MW-107	08/18/1998	---	---	---	---	---	---	---
MW-107	11/04/1998	<1	<1	<1	<1	<1	<1	<1
MW-107	07/06/2000	---	---	---	---	---	---	---
MW-107	02/09/2001	<10	<10	<10	<10	<10	<10	<10
MW-107	05/22/2001	<10	<10	<10	<10	<10	<10	<10
MW-107	08/07/2001	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
MW-108	08/18/1998	---	---	---	---	---	---	---
MW-108	11/04/1998	<1	<1	<1	<1	<1	<1	<1

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

SAMPLE TYPE: Water

[illegible]

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

[]=Greater than Action Level ---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	n-Butylbenzene (ug/l)	n-Propyl benzene (ug/l)	4-Isopropyl toluene (ug/l)	sec-Butyl benzene (ug/l)	tert-Butyl benzene (ug/l)	Trichloro fluoromethane (ug/l)	1,2,4-Trichloro benzene (ug/l)
WQS		5	5	5	5	5	5	5
MW-111	07/06/2000	---	---	---	---	---	---	---
MW-111	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-111	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-111	08/07/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-201	06/25/1998	---	---	---	---	---	---	---
MW-201	07/17/1998	---	---	---	---	---	---	---
MW-201	08/18/1998	---	---	---	---	---	---	---
MW-201	11/05/1998	<1	<1	<1	<1	<1	<1	<1
MW-201	07/06/2000	---	---	---	---	---	---	---
MW-201	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-201	02/13/2001	<0.50	0.7	<0.50	<0.50	<0.50	<0.50	<0.50
MW-201	05/22/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-201	08/07/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-202	08/21/1998	---	---	---	---	---	---	---
MW-202	11/05/1998	<1	<1	<1	<1	<1	<1	<1
MW-202	07/06/2000	---	---	---	---	---	---	---
MW-202	11/02/2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-202	02/13/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-202	05/22/2001	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

---=Not analyzed

SAMPLE TYPE: Water

[illegible]

APPENDIX A
 HISTORICAL GROUND WATER ANALYTICAL RESULTS
 CHAMPION PRODUCTS, INC.
 PERRY, NEW YORK
 DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Chloroform (ug/l)
WQS		7
DVE-101	07/14/2000	<150
DVE-101	09/14/2000	<250
DVE-101	11/02/2000	<25
DVE-101	02/09/2001	<50
DVE-101	05/22/2001	<50
DVE-101	08/07/2001	<25
DVE-102	07/14/2000	<3
DVE-102	11/02/2000	<0.50
DVE-102	02/09/2001	<0.50
DVE-102	05/22/2001	<0.50
DVE-102	08/07/2001	<5
DVE-103	07/14/2000	<3
DVE-103	11/02/2000	<0.50
DVE-103	02/09/2001	<0.50
DVE-103	05/22/2001	<0.50
DVE-103	08/07/2001	<0.50
DVE-104	07/14/2000	<3
DVE-104	11/02/2000	<0.50
DVE-104	02/09/2001	<0.50
WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)		---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Chloroform (ug/l)
WQS		7
DVE-104	05/22/2001	<0.50
DVE-104	08/07/2001	<0.50
DVE-105	07/14/2000	<3
DVE-105	11/02/2000	<0.50
DVE-105	02/09/2001	<0.50
DVE-105	05/22/2001	<0.50
DVE-105	08/07/2001	<0.50
DVE-106	07/14/2000	<150
DVE-106	11/02/2000	<3.0
DVE-106	02/09/2001	<1.0
DVE-106	05/22/2001	<1.0
DVE-106	08/07/2001	<25
DVE-107	07/14/2000	<3
DVE-107	11/02/2000	<1.0
DVE-107	02/09/2001	<0.50
DVE-107	05/22/2001	<0.50
DVE-107	08/07/2001	<0.50
MW-101	06/25/1998	<3
MW-101	07/17/1998	<3
WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5) -----Not analyzed		

APPENDIX A
 HISTORICAL GROUND WATER ANALYTICAL RESULTS
 CHAMPION PRODUCTS, INC.
 PERRY, NEW YORK
 DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Chloroform (ug/l)
WQS		7
MW-101	08/18/1998	<3
MW-101	11/03/1998	<1
MW-101	07/06/2000	<3
MW-101	11/02/2000	<0.50
MW-101	02/13/2001	<0.50
MW-101	05/22/2001	<0.50
MW-101	08/07/2001	0.6
MW-102	06/25/1998	<3
MW-102	07/17/1998	<3
MW-102	08/18/1998	<3
MW-102	11/05/1998	<1
MW-102	07/06/2000	<3
MW-102	11/02/2000	<0.50
MW-102	02/13/2001	<0.50
MW-102	05/22/2001	<0.50
MW-102	08/07/2001	<0.50
MW-103	06/25/1998	<3
MW-103	07/17/1998	<3
MW-103	08/18/1998	<3
WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5) ---=Not analyzed		

APPENDIX A
 HISTORICAL GROUND WATER ANALYTICAL RESULTS
 CHAMPION PRODUCTS, INC.
 PERRY, NEW YORK
 DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Chloroform (ug/l)
WQS		7
MW-103	11/03/1998	<1
MW-103	07/06/2000	<3
MW-103	11/02/2000	<0.50
MW-103	02/13/2001	<0.50
MW-103	05/22/2001	<0.50
MW-103	08/07/2001	<0.50
MW-104	06/25/1998	<3
MW-104	07/17/1998	<3
MW-104	08/18/1998	<3
MW-104	11/03/1998	<1
MW-104	07/06/2000	<3
MW-104	11/02/2000	<0.50
MW-104	02/13/2001	0.6
MW-104	05/22/2001	1
MW-104	08/07/2001	1
MW-105	06/25/1998	6
MW-105	08/18/1998	<3
MW-105	11/05/1998	<1
MW-105	07/14/2000	<3
WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)		---=Not analyzed

APPENDIX A
 HISTORICAL GROUND WATER ANALYTICAL RESULTS
 CHAMPION PRODUCTS, INC.
 PERRY, NEW YORK
 DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Chloroform (ug/l)
WQS		7
MW-105	11/02/2000	<0.50
MW-105	02/13/2001	<0.50
MW-105	05/22/2001	<0.50
MW-105	08/07/2001	<0.50
MW-106	08/18/1998	<30
MW-106	11/04/1998	<1
MW-106	07/06/2000	<750
MW-106	11/02/2000	<500
MW-106	02/13/2001	<250
MW-106	05/22/2001	<100
MW-106	08/07/2001	<50
MW-107	08/18/1998	<3
MW-107	11/04/1998	<1
MW-107	07/06/2000	<15
MW-107	02/09/2001	<10
MW-107	05/22/2001	<10
MW-107	08/07/2001	<3.0
MW-108	08/18/1998	<3
MW-108	11/04/1998	<1
WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5) ---=Not analyzed		

APPENDIX A
 HISTORICAL GROUND WATER ANALYTICAL RESULTS
 CHAMPION PRODUCTS, INC.
 PERRY, NEW YORK
 DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Chloroform (ug/l)
WQS		7
MW-108	07/06/2000	<3
MW-108	11/02/2000	<0.50
MW-108	02/09/2001	<0.50
MW-108	05/22/2001	<1.0
MW-108	08/07/2001	<3.0
MW-109	08/18/1998	<3
MW-109	11/04/1998	<1
MW-109	07/06/2000	<3
MW-109	11/02/2000	<0.50
MW-109	02/09/2001	<3.0
MW-109	05/22/2001	<3.0
MW-110	08/20/1998	<3
MW-110	11/05/1998	<1
MW-110	07/06/2000	<3
MW-110	11/02/2000	<0.50
MW-110	02/13/2001	<0.50
MW-110	05/22/2001	<0.50
MW-111	08/20/1998	<3
MW-111	11/05/1998	<1
WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5) ---=Not analyzed		

APPENDIX A
 HISTORICAL GROUND WATER ANALYTICAL RESULTS
 CHAMPION PRODUCTS, INC.
 PERRY, NEW YORK
 DELTA PROJECT NO. S098-009

PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

SITE	DATE	Chloroform (ug/l)
WQS		7
MW-111	07/06/2000	<3
MW-111	11/02/2000	<0.50
MW-111	02/13/2001	<0.50
MW-111	08/07/2001	<0.50
MW-201	06/25/1998	<3
MW-201	07/17/1998	<3
MW-201	08/18/1998	<3
MW-201	11/05/1998	<1
MW-201	07/06/2000	<3
MW-201	11/02/2000	<0.50
MW-201	02/13/2001	<0.50
MW-201	05/22/2001	<1.0
MW-201	08/07/2001	<1.0
MW-202	08/21/1998	<3
MW-202	11/05/1998	<1
MW-202	07/06/2000	<3
MW-202	11/02/2000	<0.50
MW-202	02/13/2001	<0.50
MW-202	05/22/2001	<0.50

WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)

---=Not analyzed

APPENDIX A
HISTORICAL GROUND WATER ANALYTICAL RESULTS
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK
DELTA PROJECT NO. S098-009

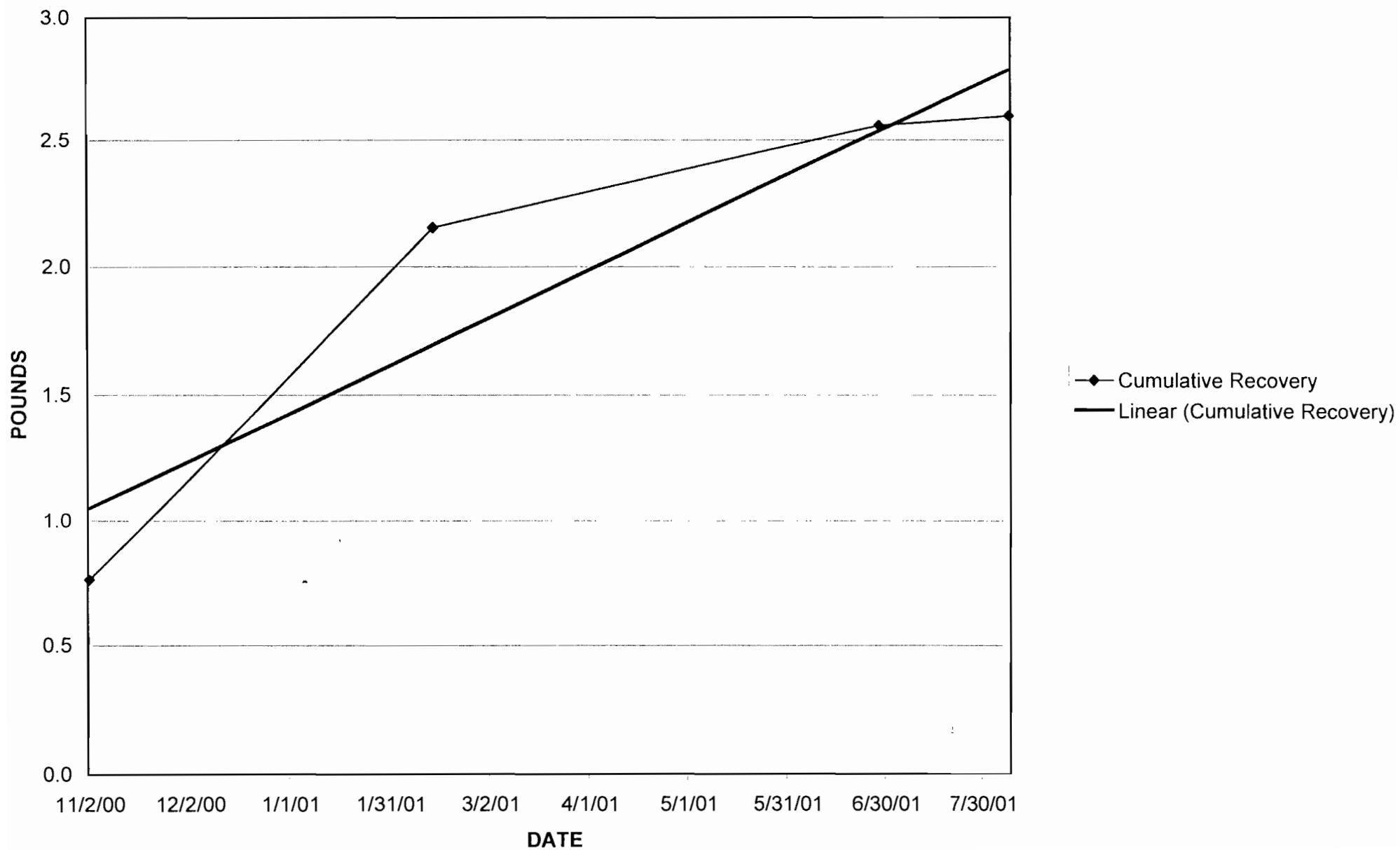
PERIOD: From 06/25/1998 thru 08/07/2001 - Inclusive

SAMPLE TYPE: Water

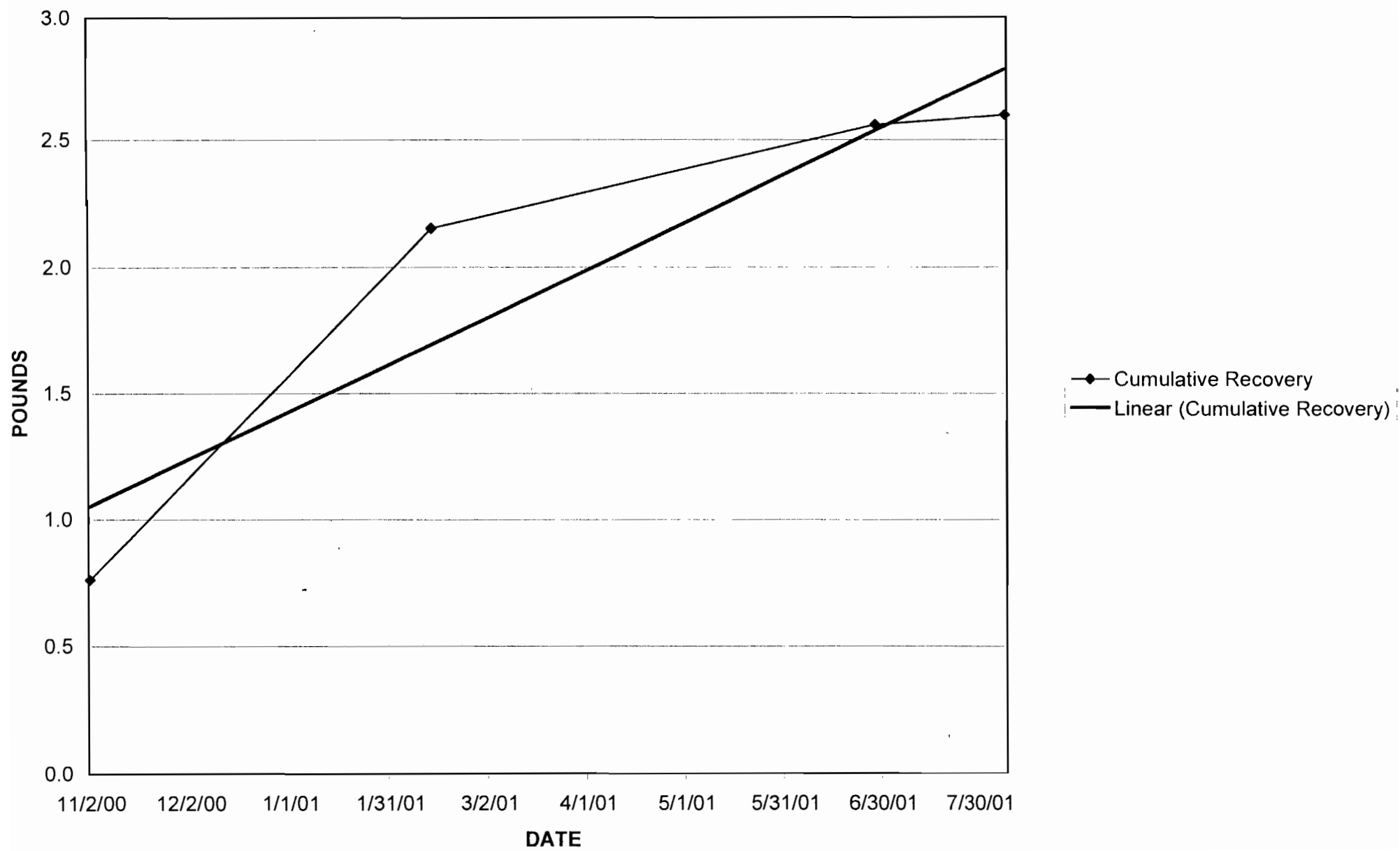
SITE	DATE	Chloroform (ug/l)
WQS		7
MW-202	08/07/2001	<0.50
WQS= Water Quality Standard (6NYRR, Table 4, cf. section 703.5)		
---=Not analyzed		

APPENDIX B

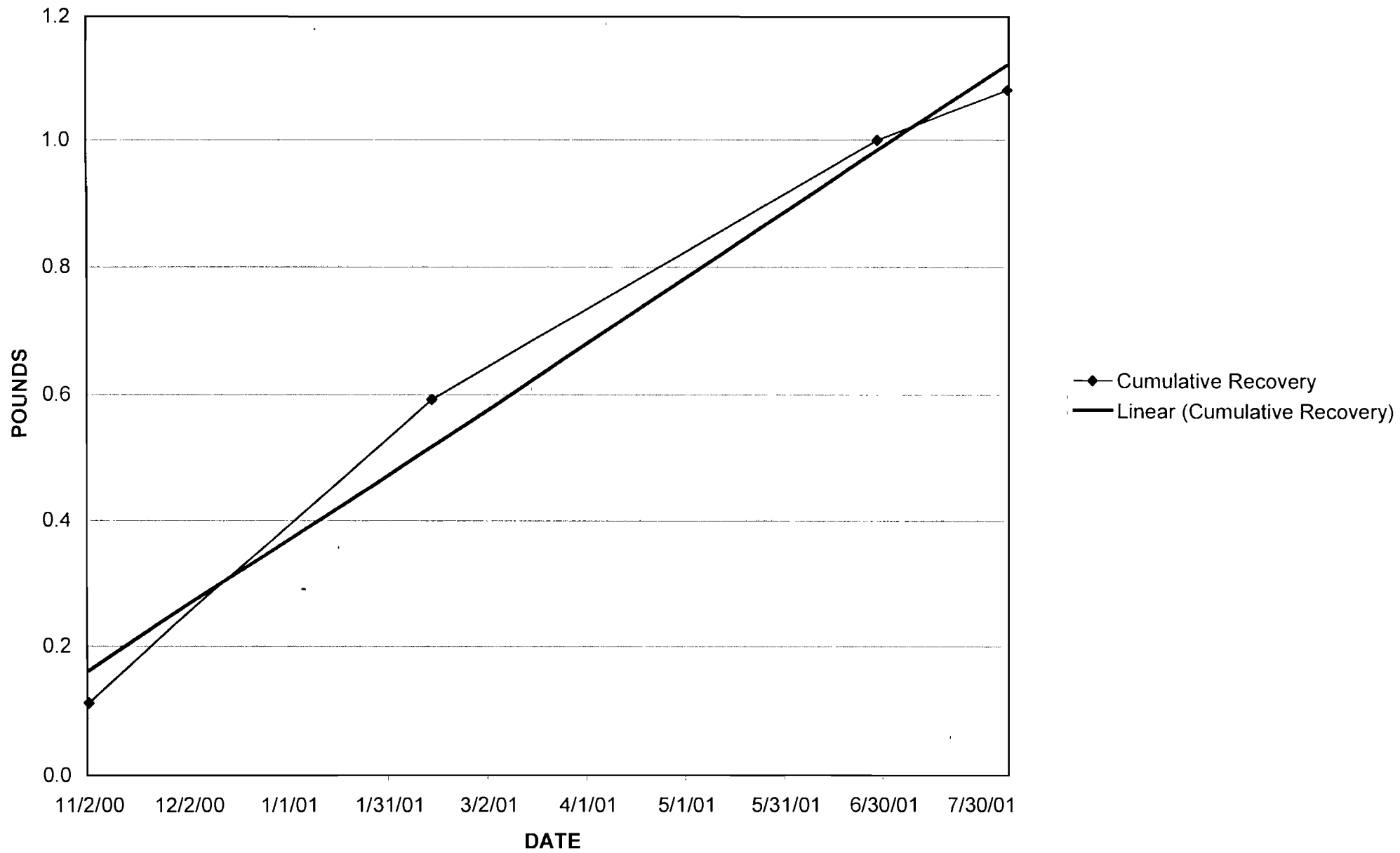
**AIR RECOVERY
1,2-DICHLOROETHANE**



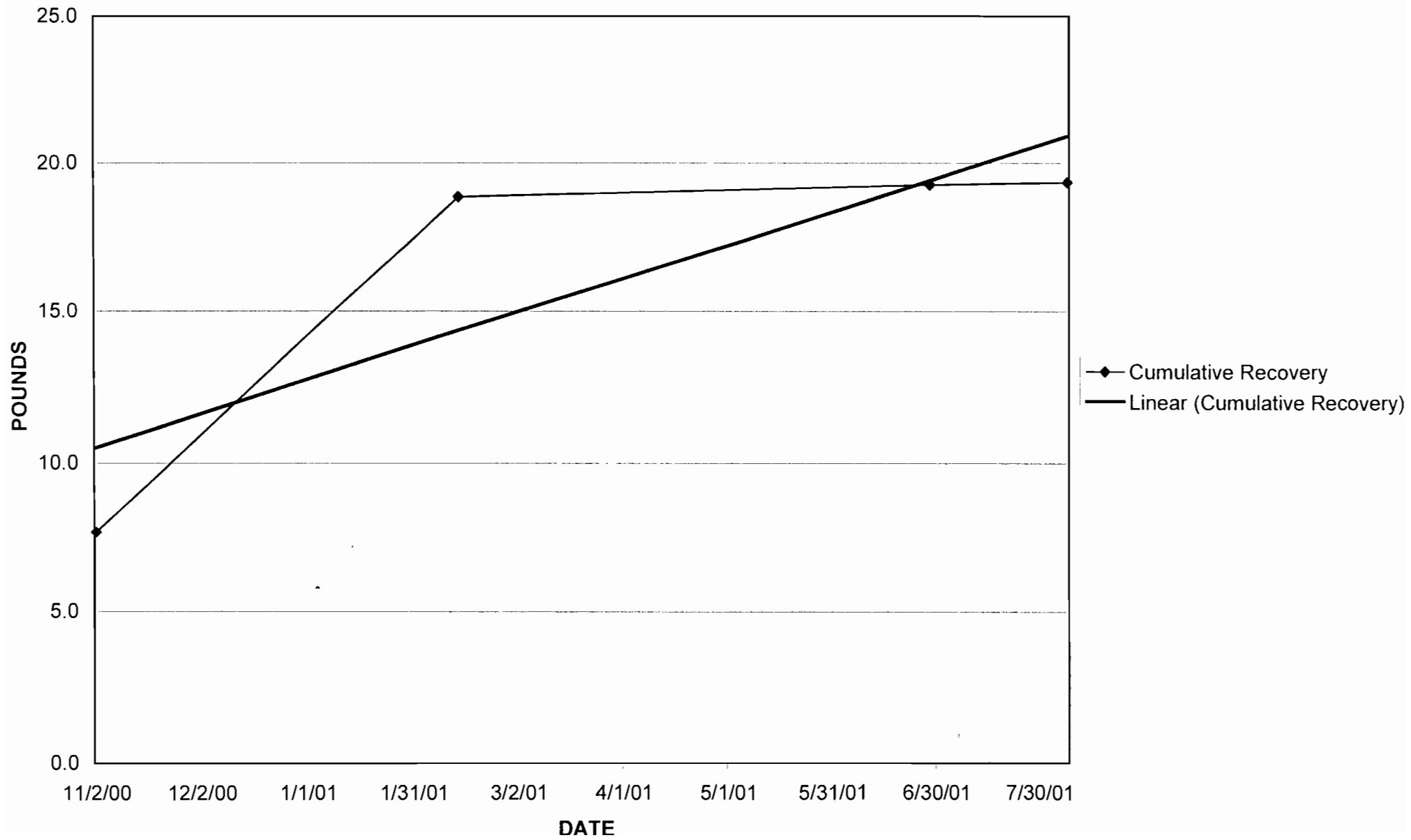
AIR RECOVERY
1,1,1-TRICHLOROETHANE



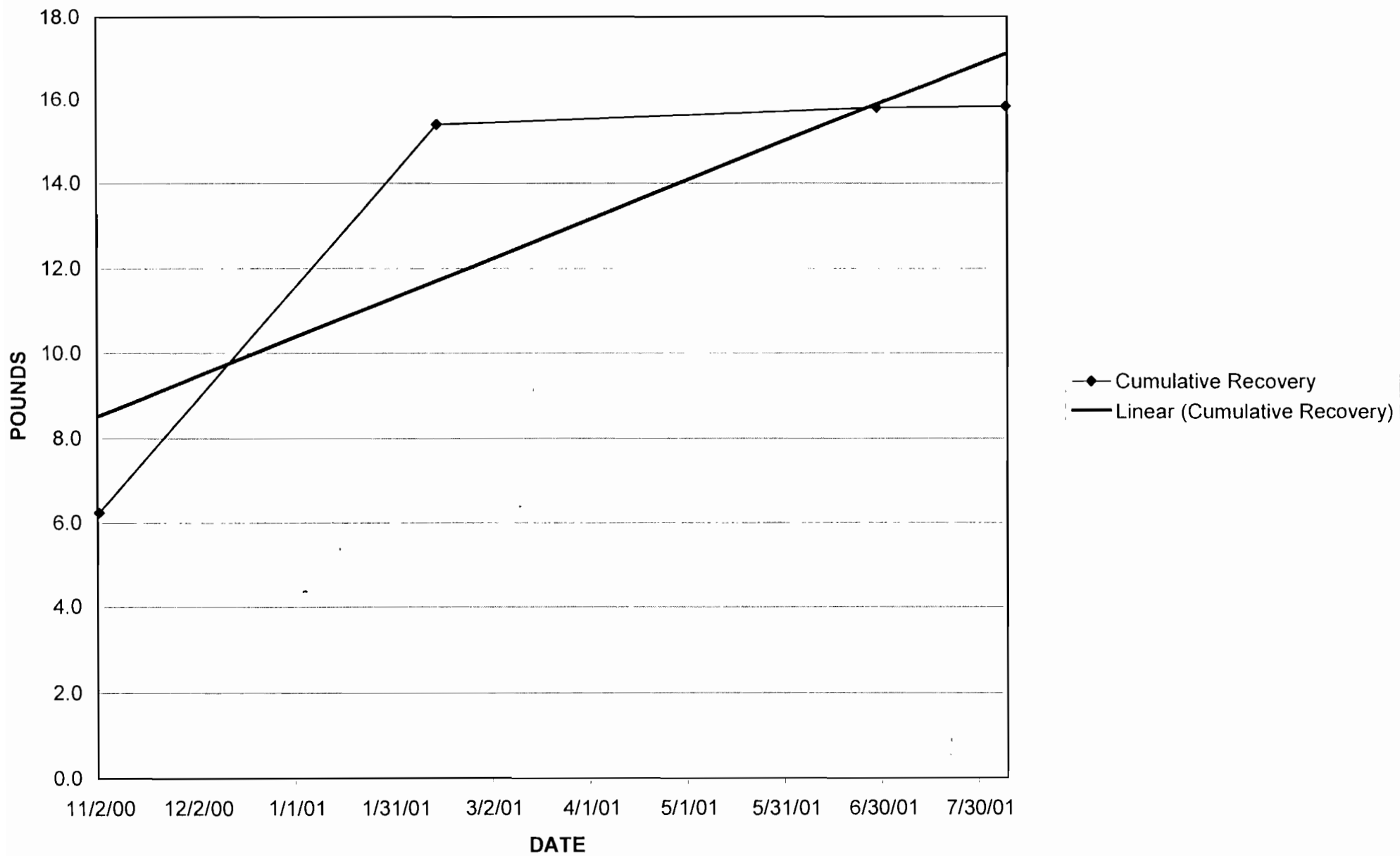
AIR RECOVERY
TETRACHLOROETHENE



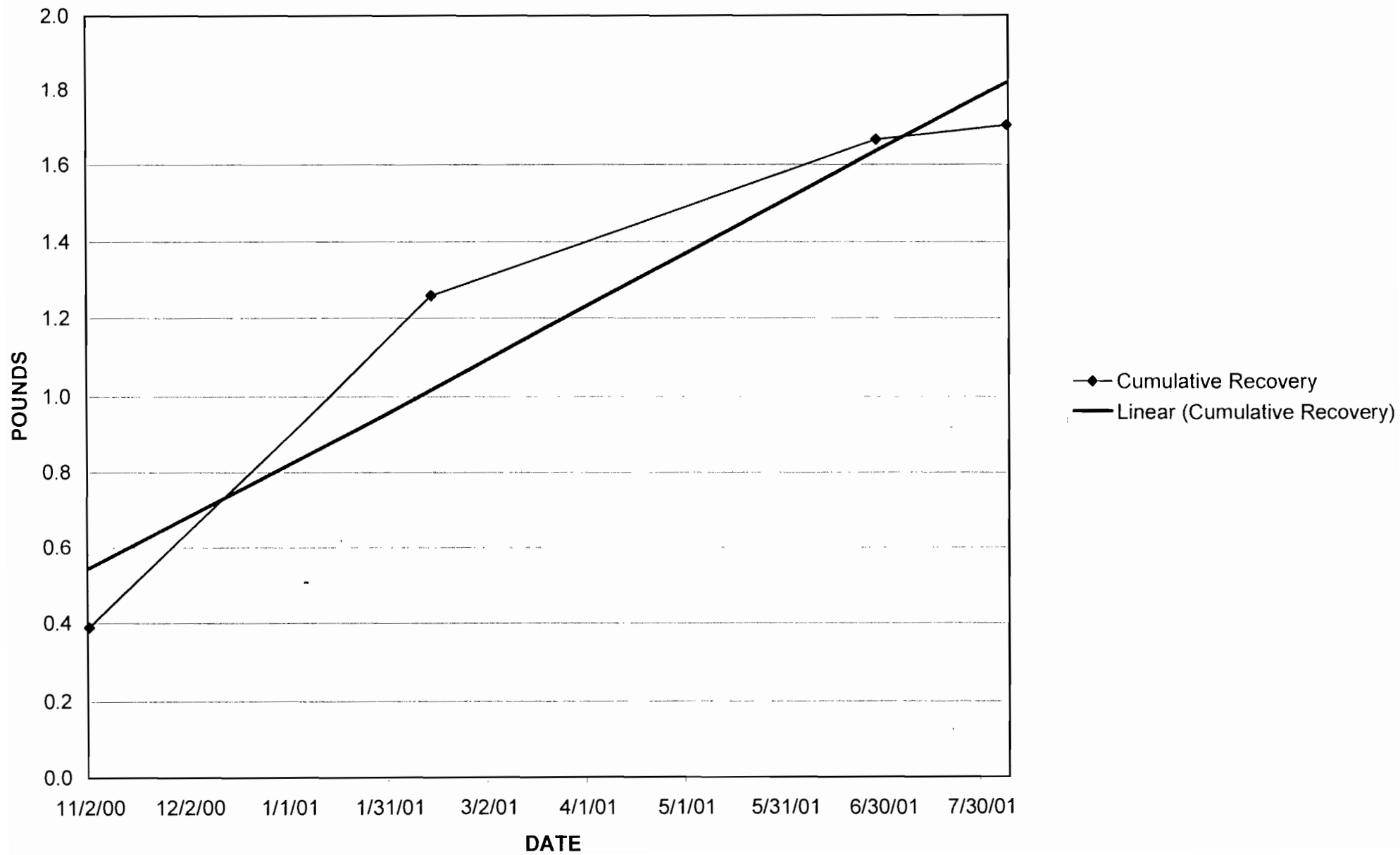
AIR RECOVERY
1,1-DICHLOROETHANE



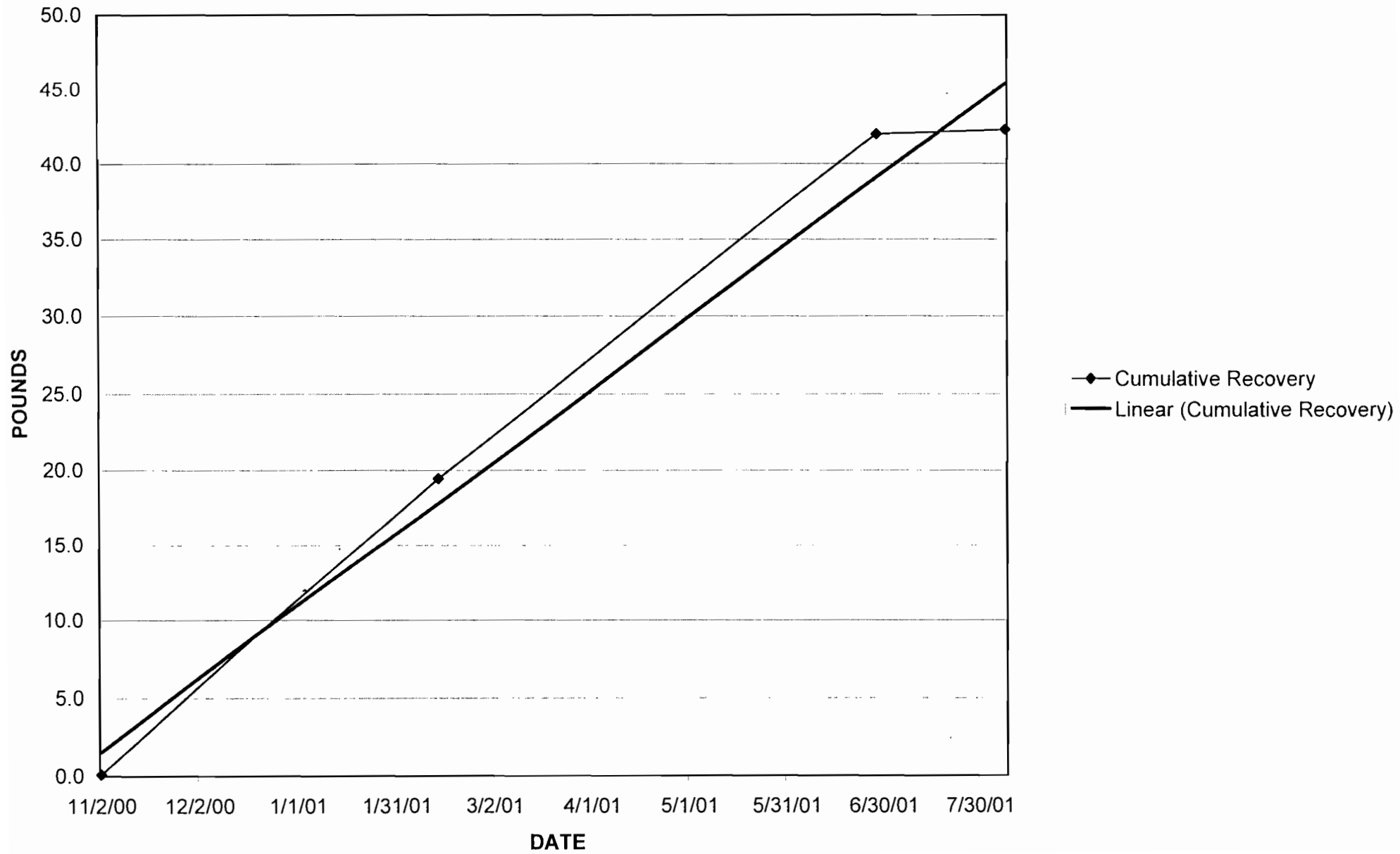
**AIR RECOVERY
METHYLENE CHLORIDE**



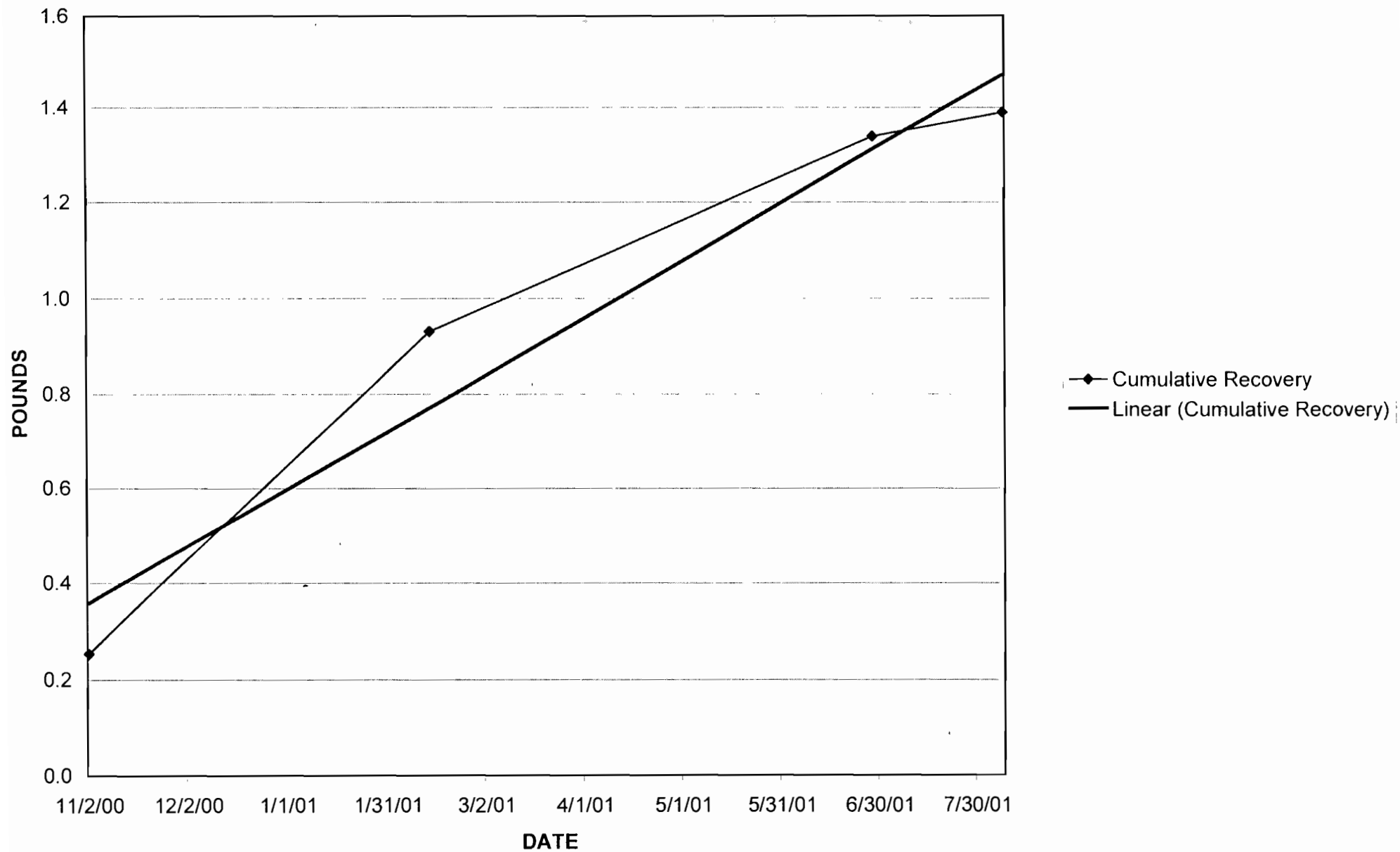
AIR RECOVERY BENZENE



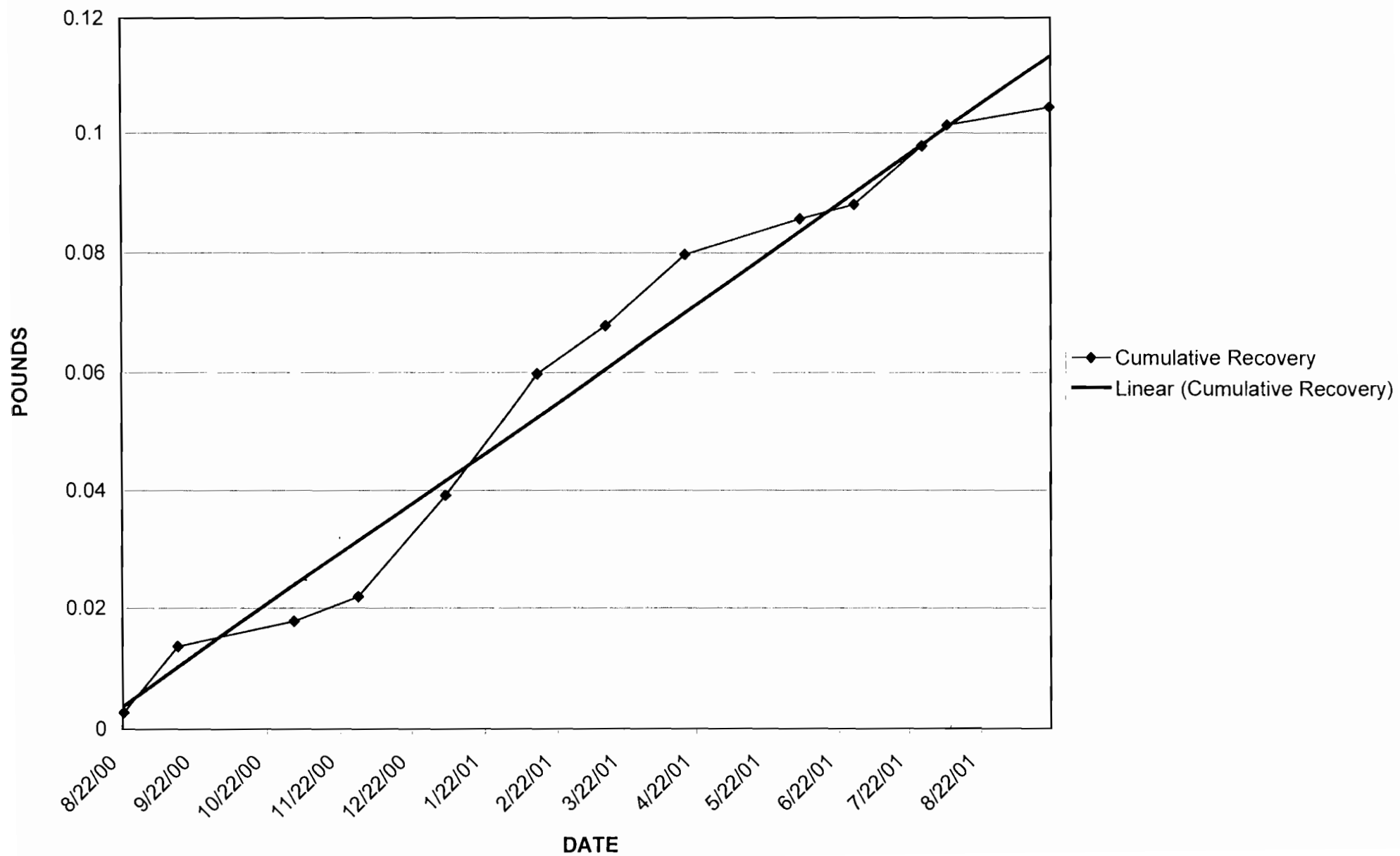
AIR RECOVERY TOLUENE



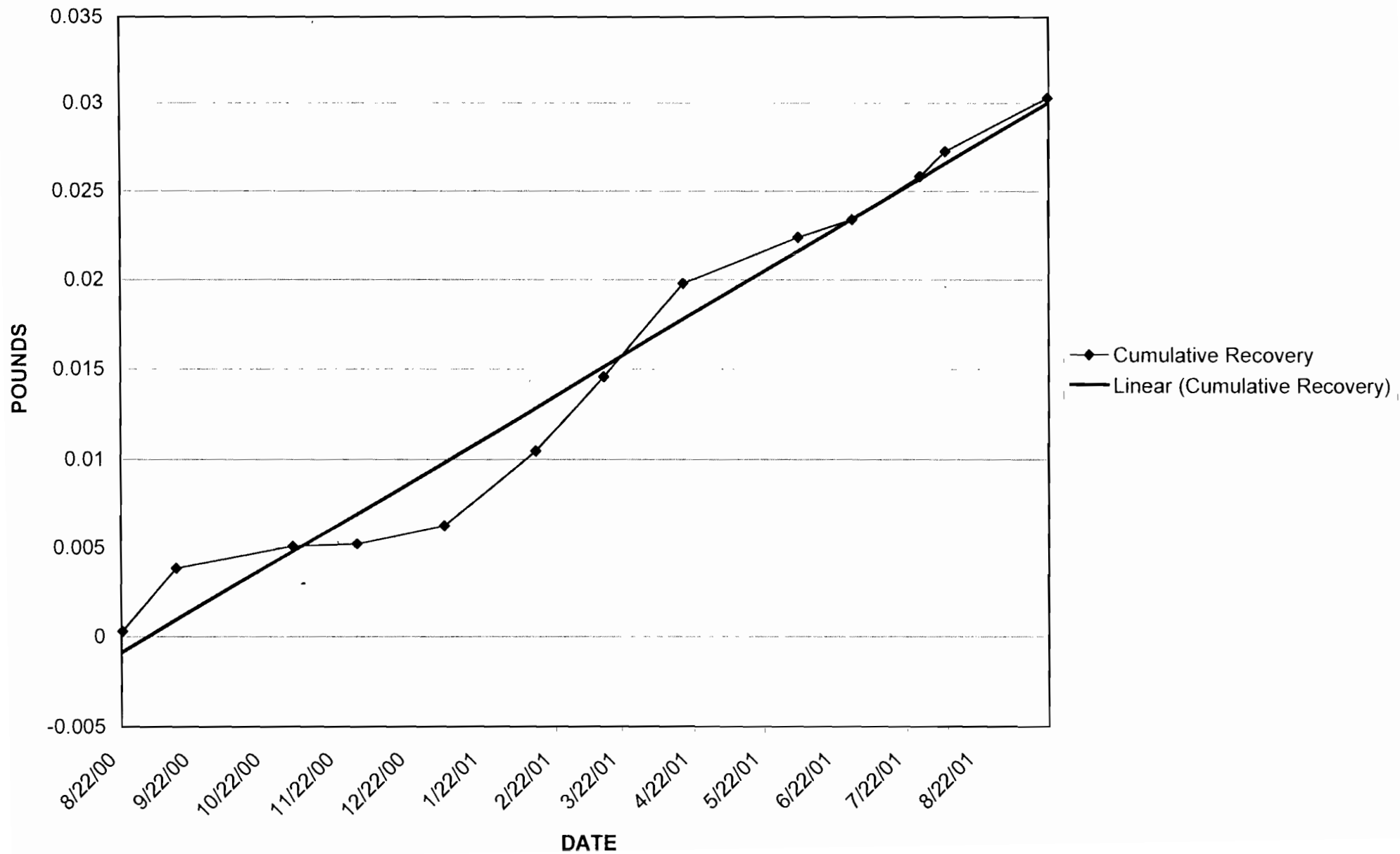
**AIR RECOVERY
P-ISOPROPYL TOLUENE**



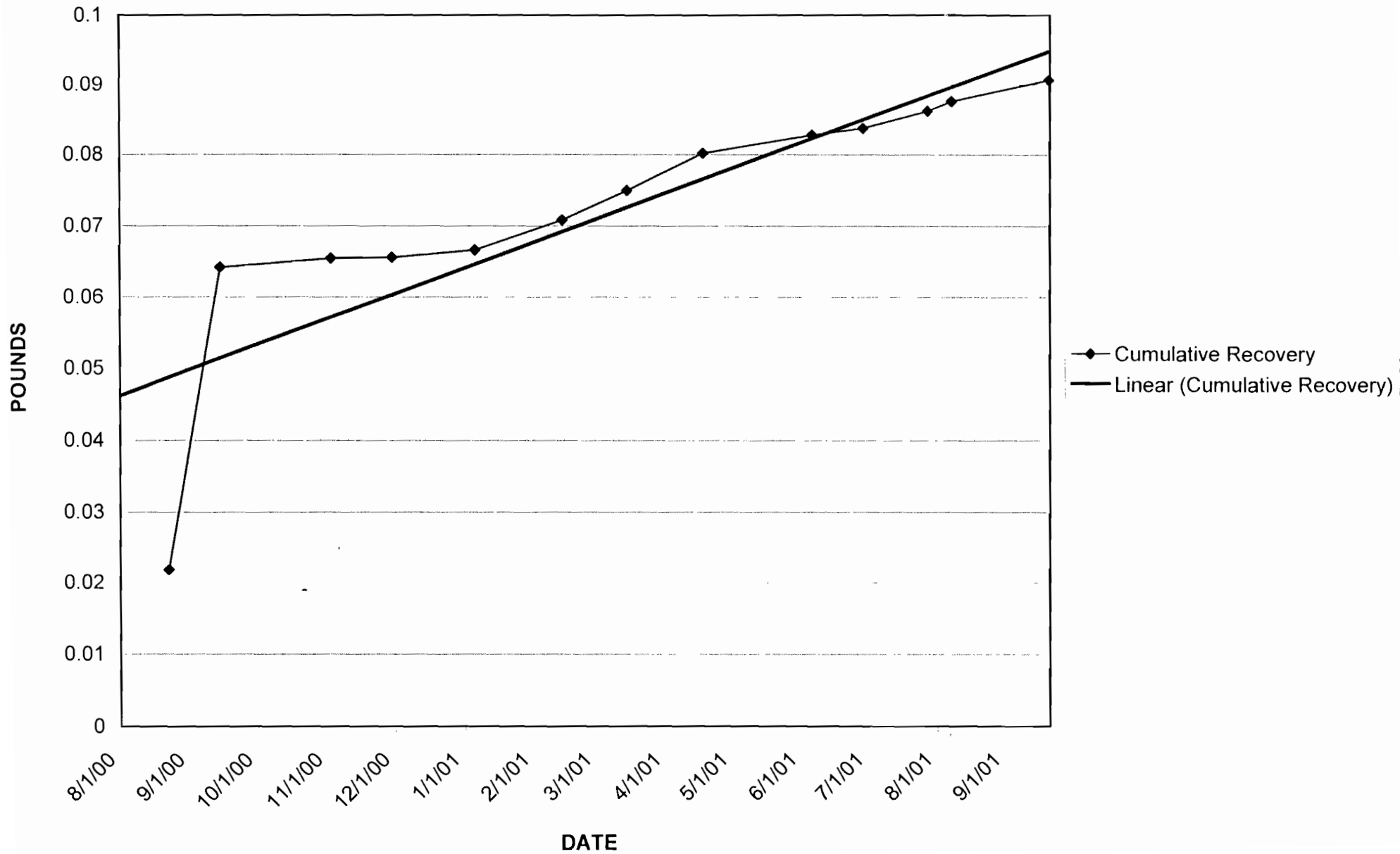
**GROUND WATER RECOVERY
1,1-DICHLOROETHANE**



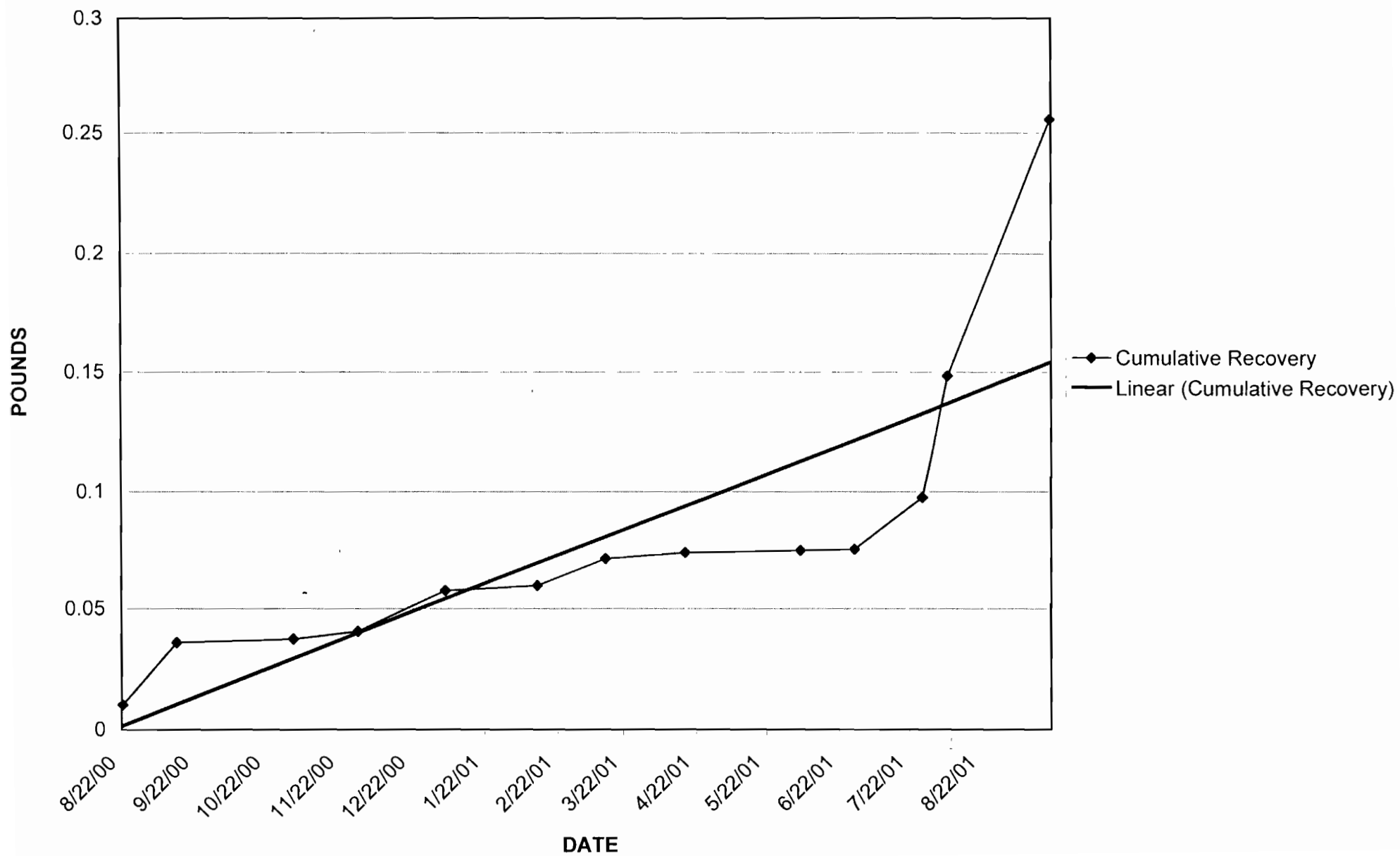
GROUND WATER RECOVERY 1,2-DICHLOROETHANE



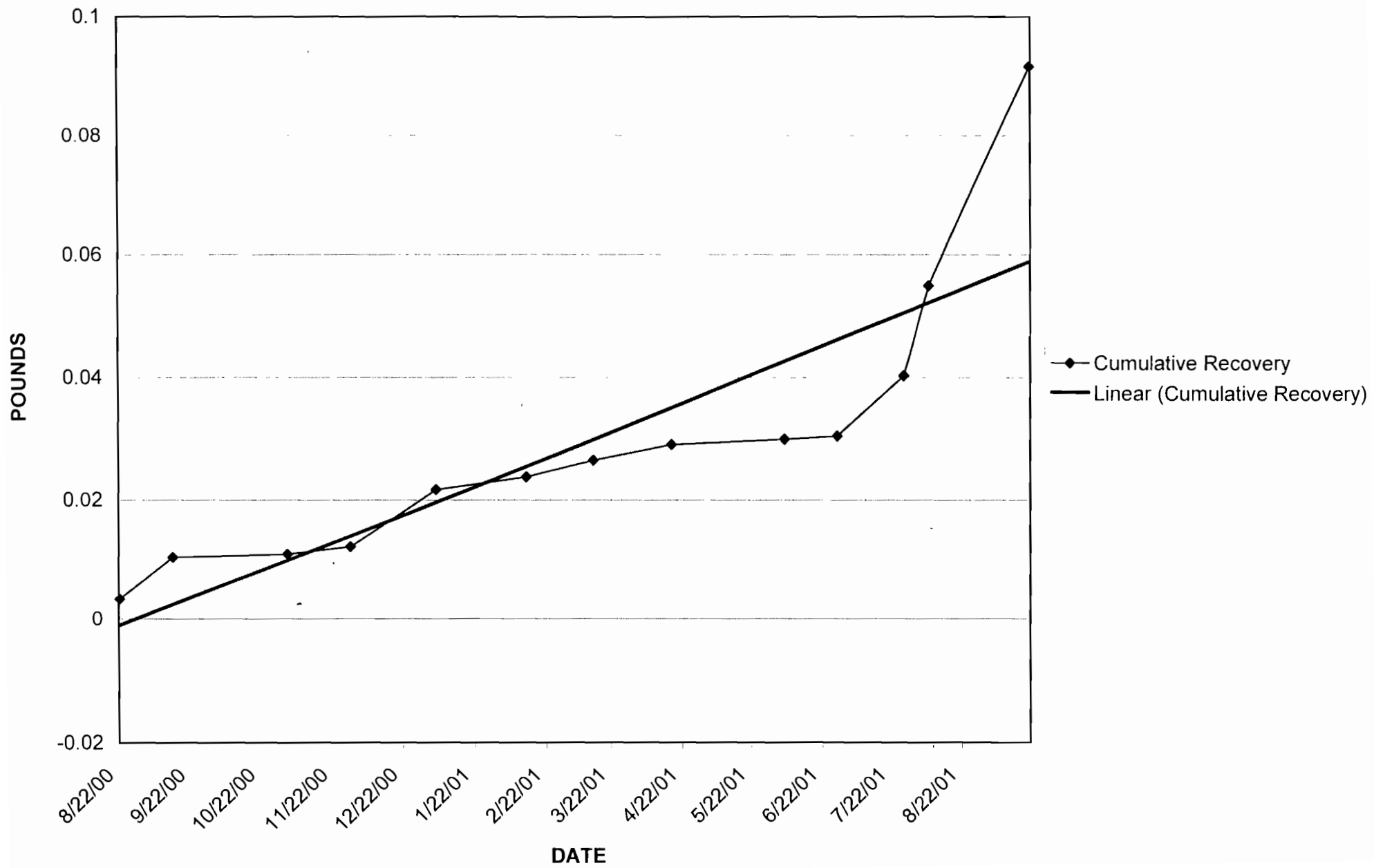
GROUND WATER RECOVERY BENZENE



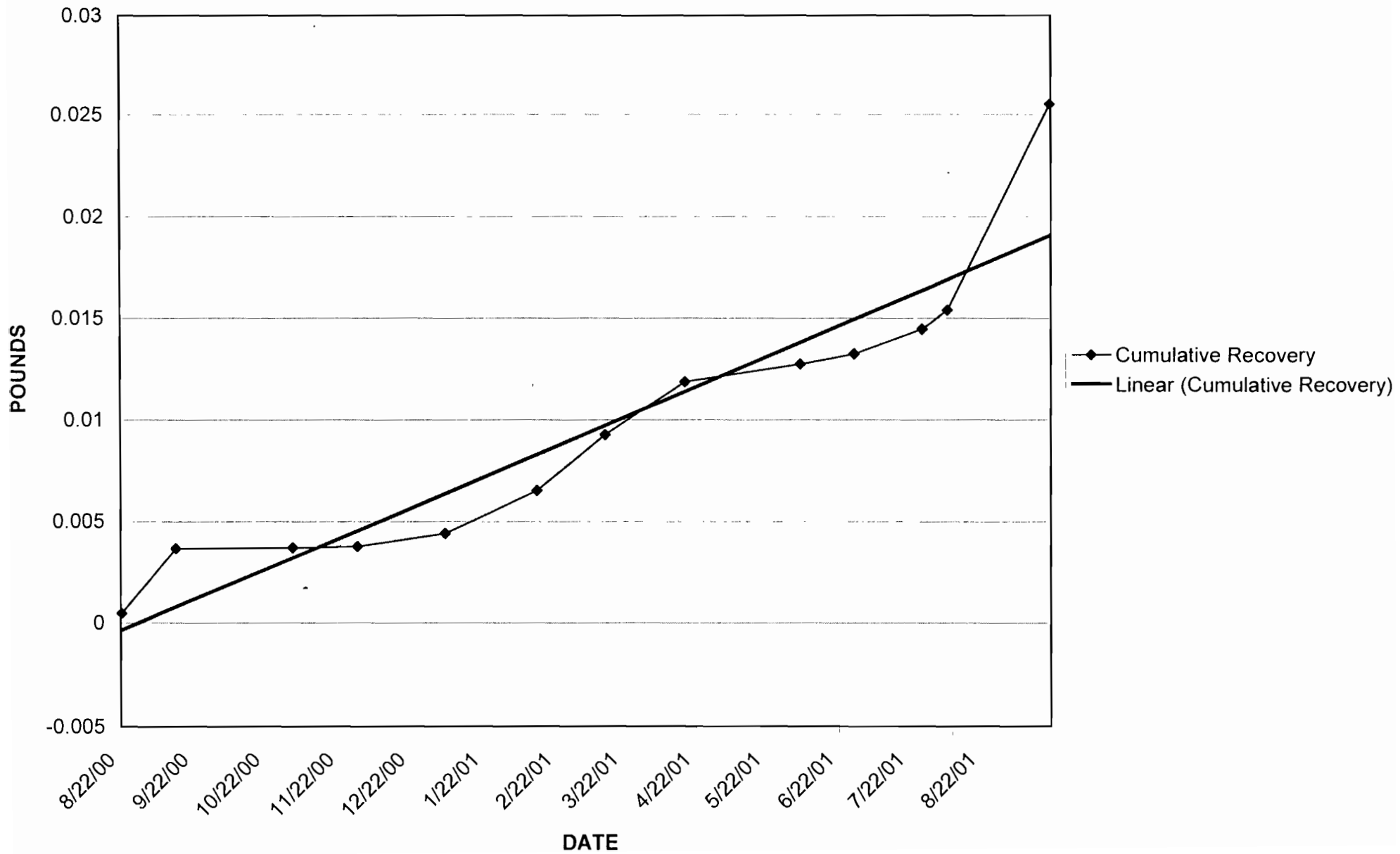
GROUND WATER RECOVERY
1,2,4-TRIMETHYLBENZENE



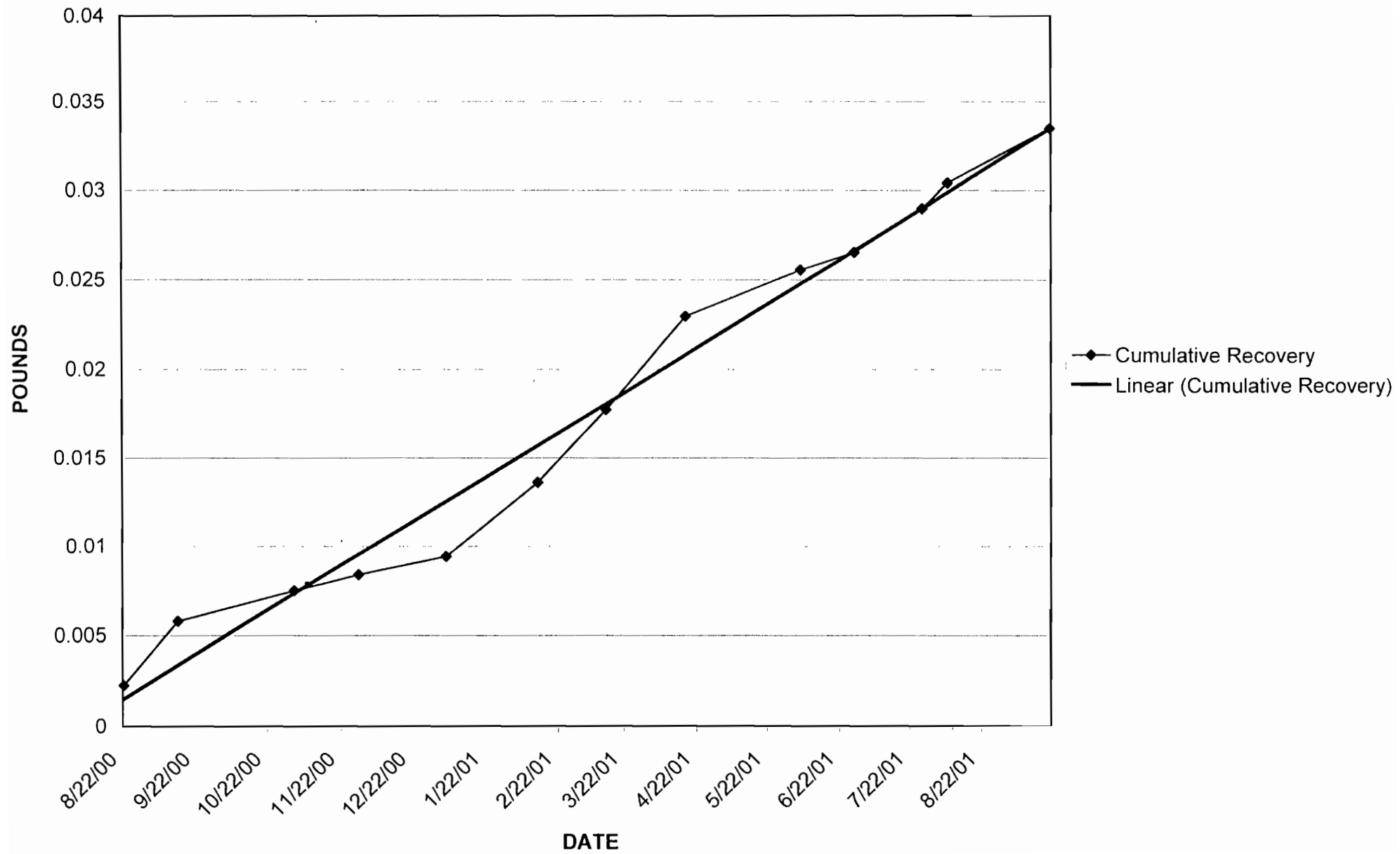
GROUND WATER RECOVERY 1,3,5-TRIMETHYLBENZENE



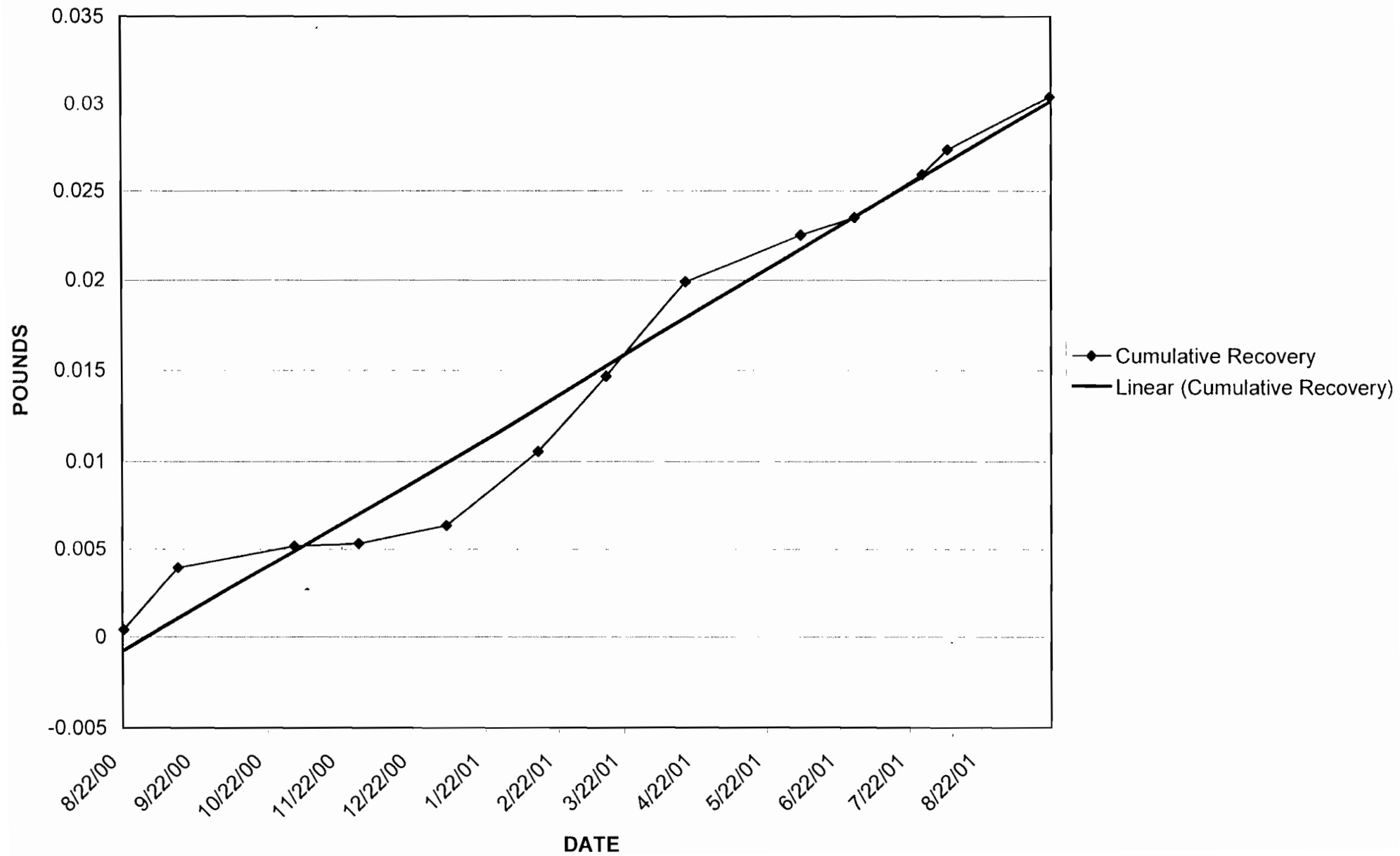
GROUND WATER RECOVERY ISOPROPYLBENZENE



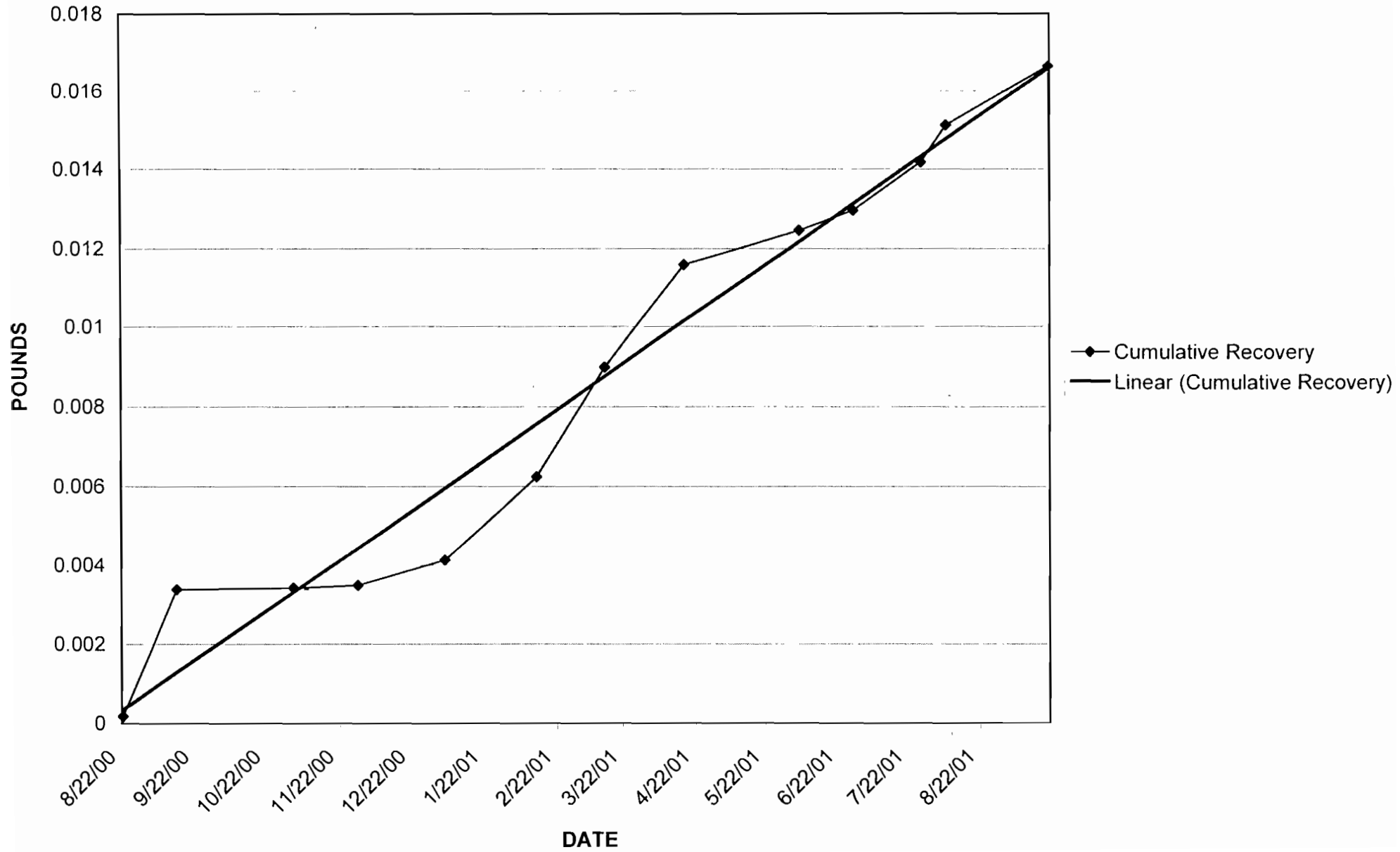
GROUND WATER RECOVERY CHLOROETHANE



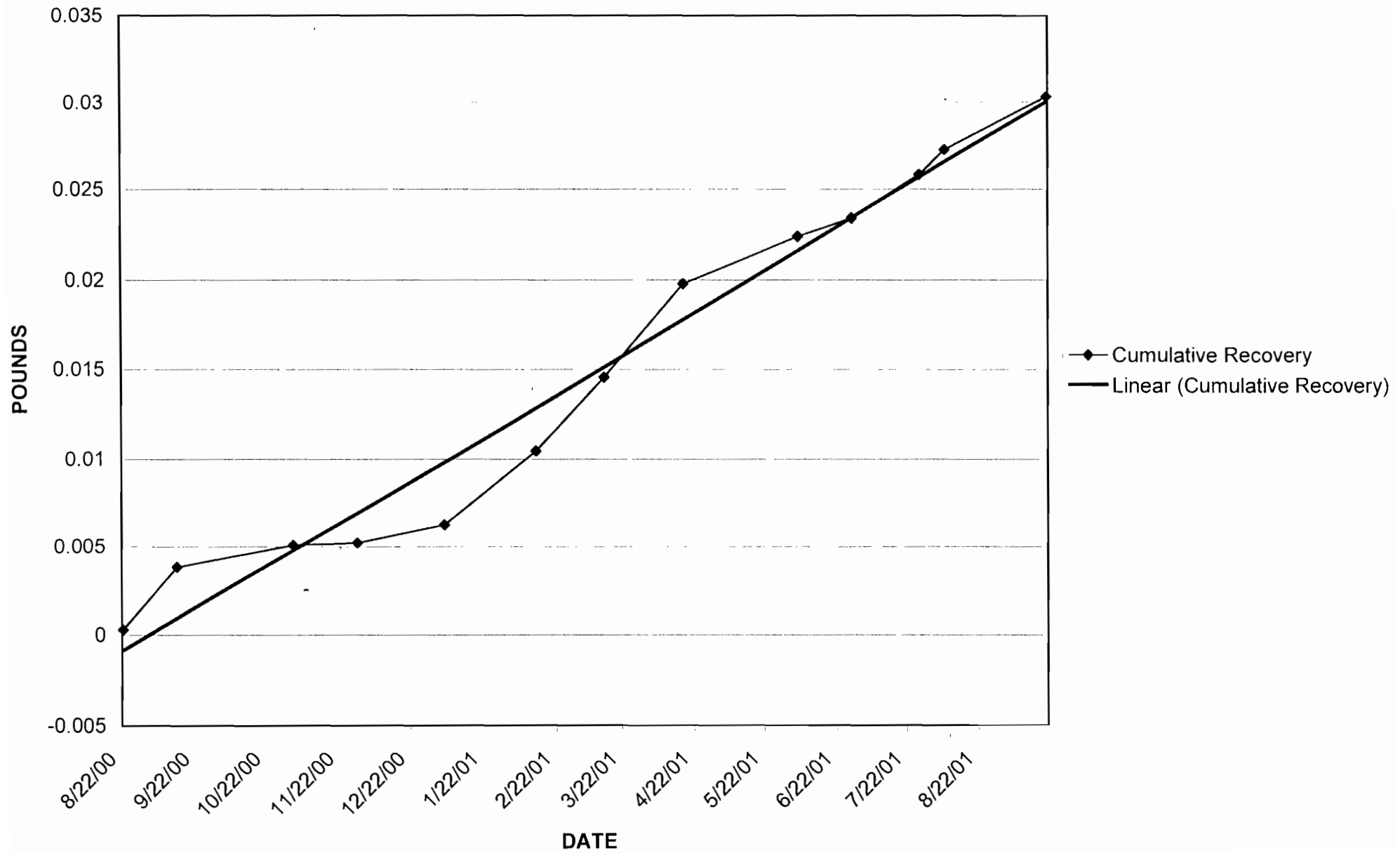
GROUND WATER RECOVERY
CIS-1,2-DICHLOROETHENE



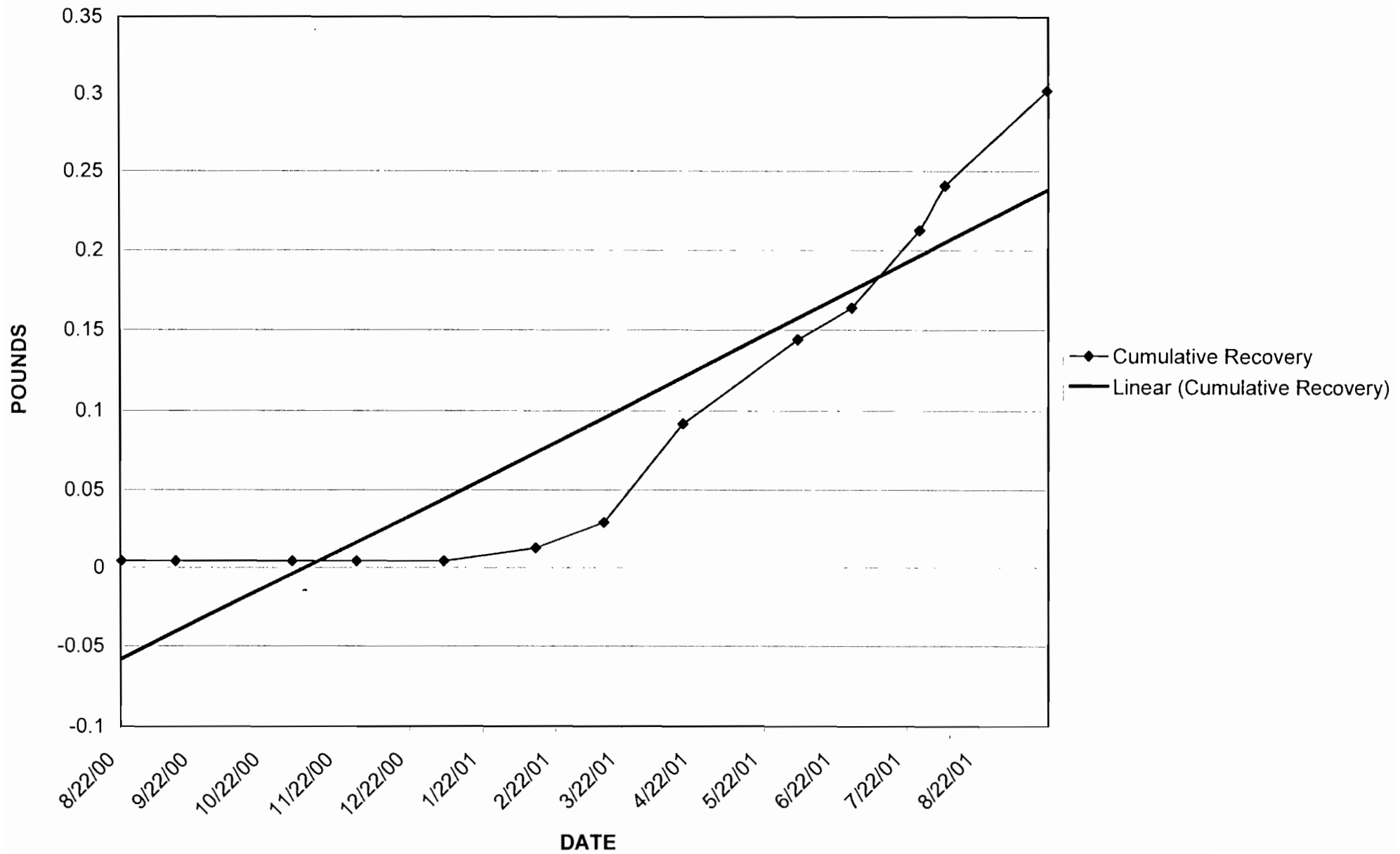
**GROUND WATER RECOVERY
DICHLORODIFLUOROMETHANE**



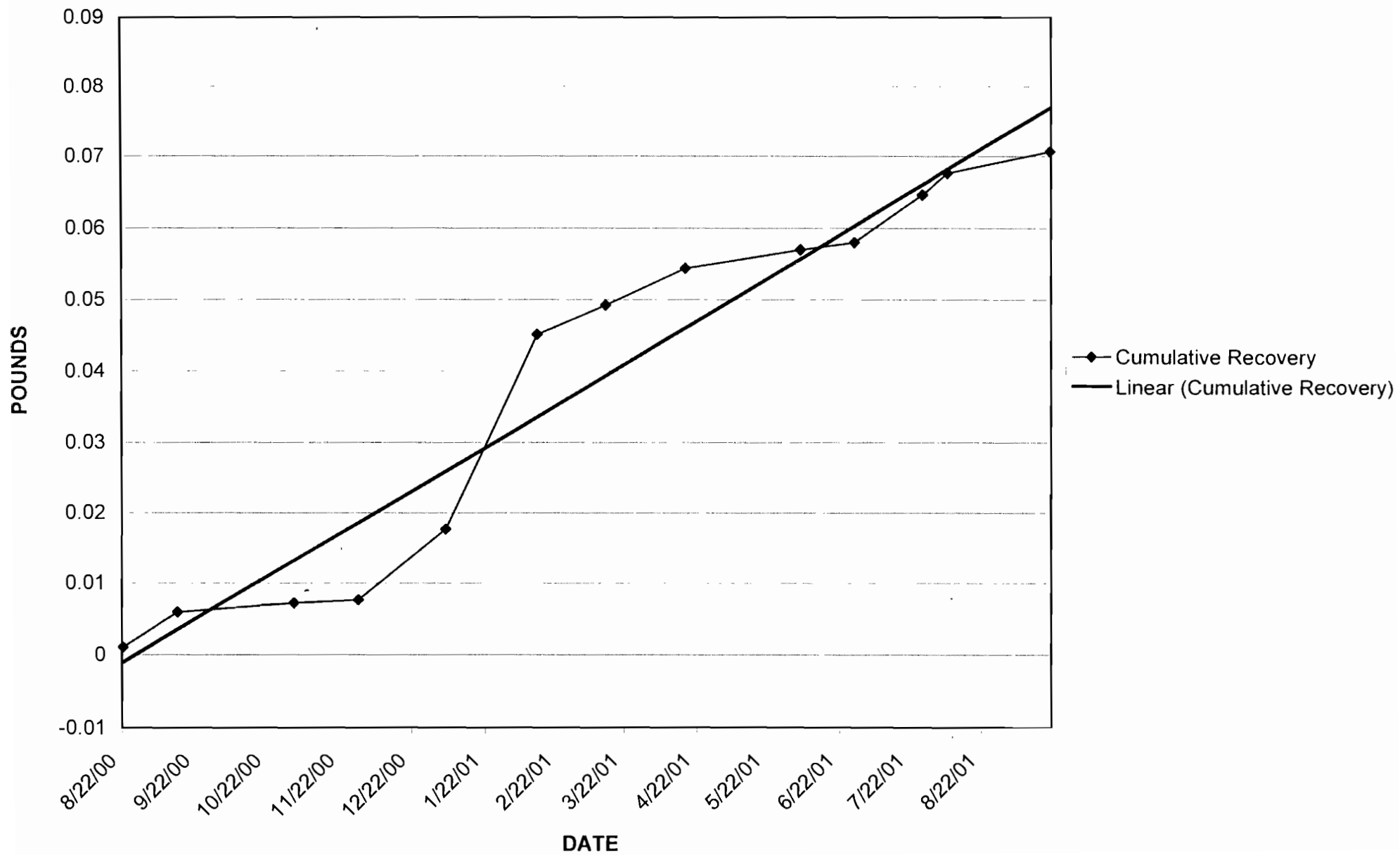
GROUND WATER RECOVERY ETHYLBENZENE



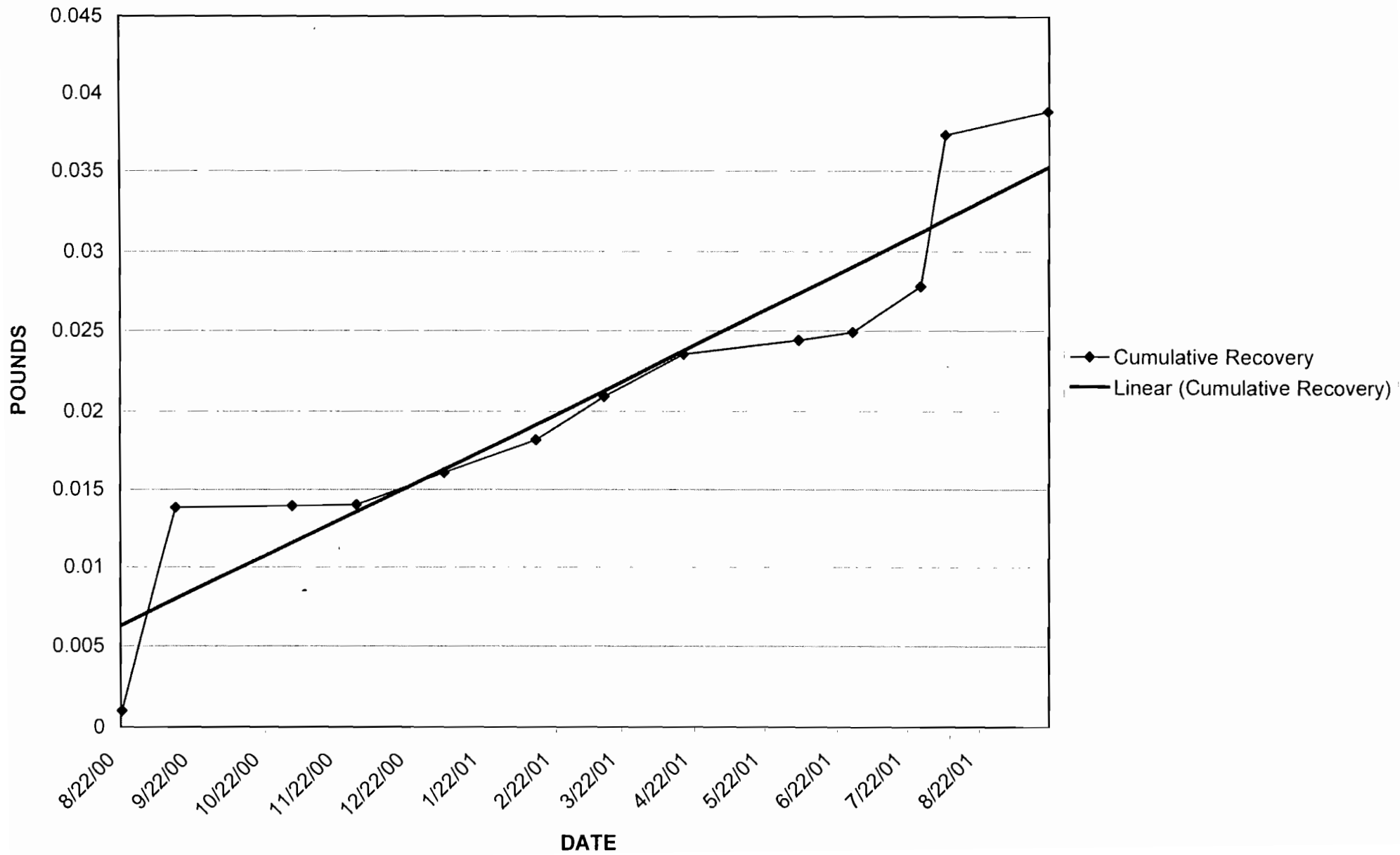
GROUND WATER RECOVERY METHYL-ETHYL KETONE



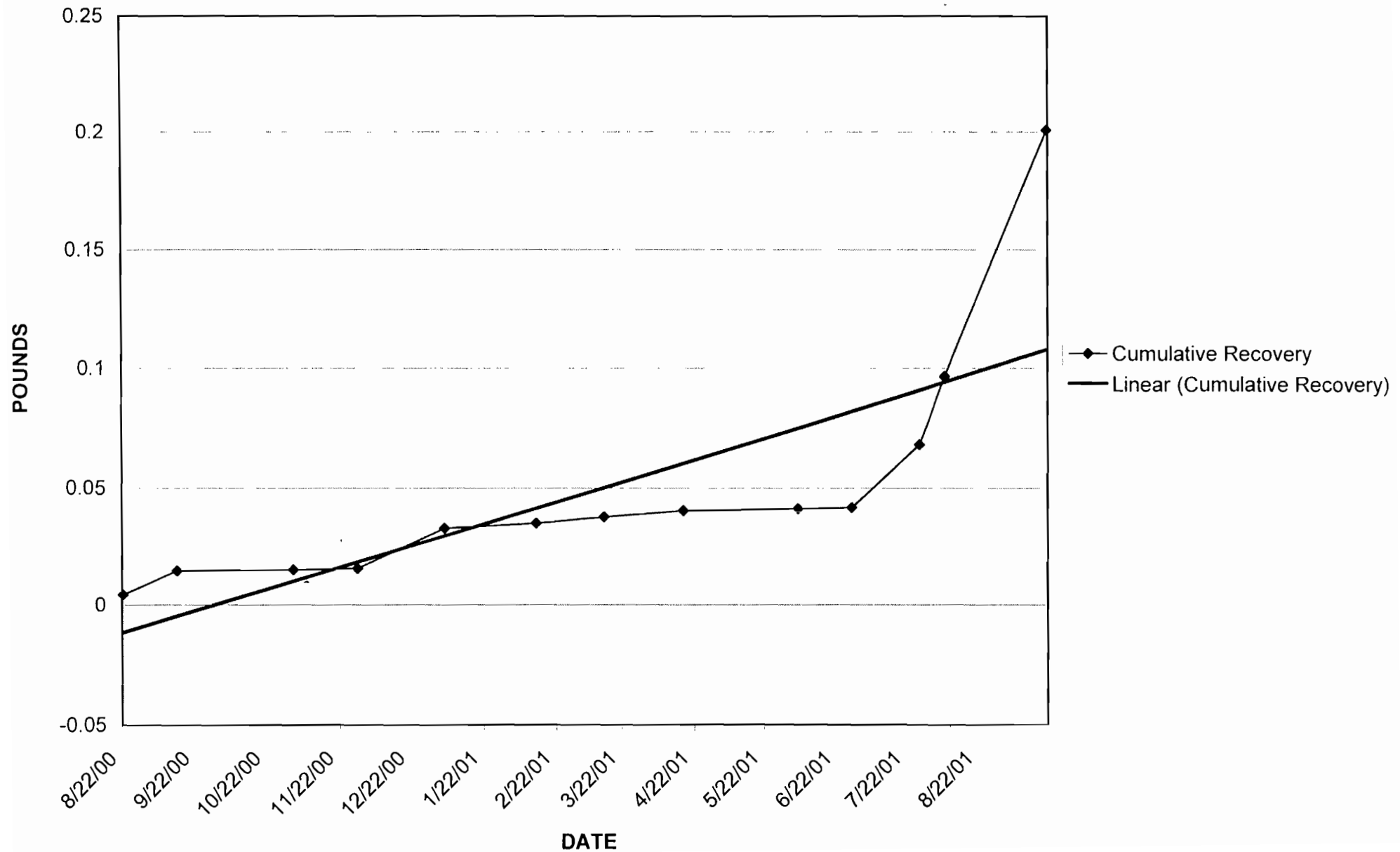
GROUND WATER RECOVERY METHYLENE CHLORIDE



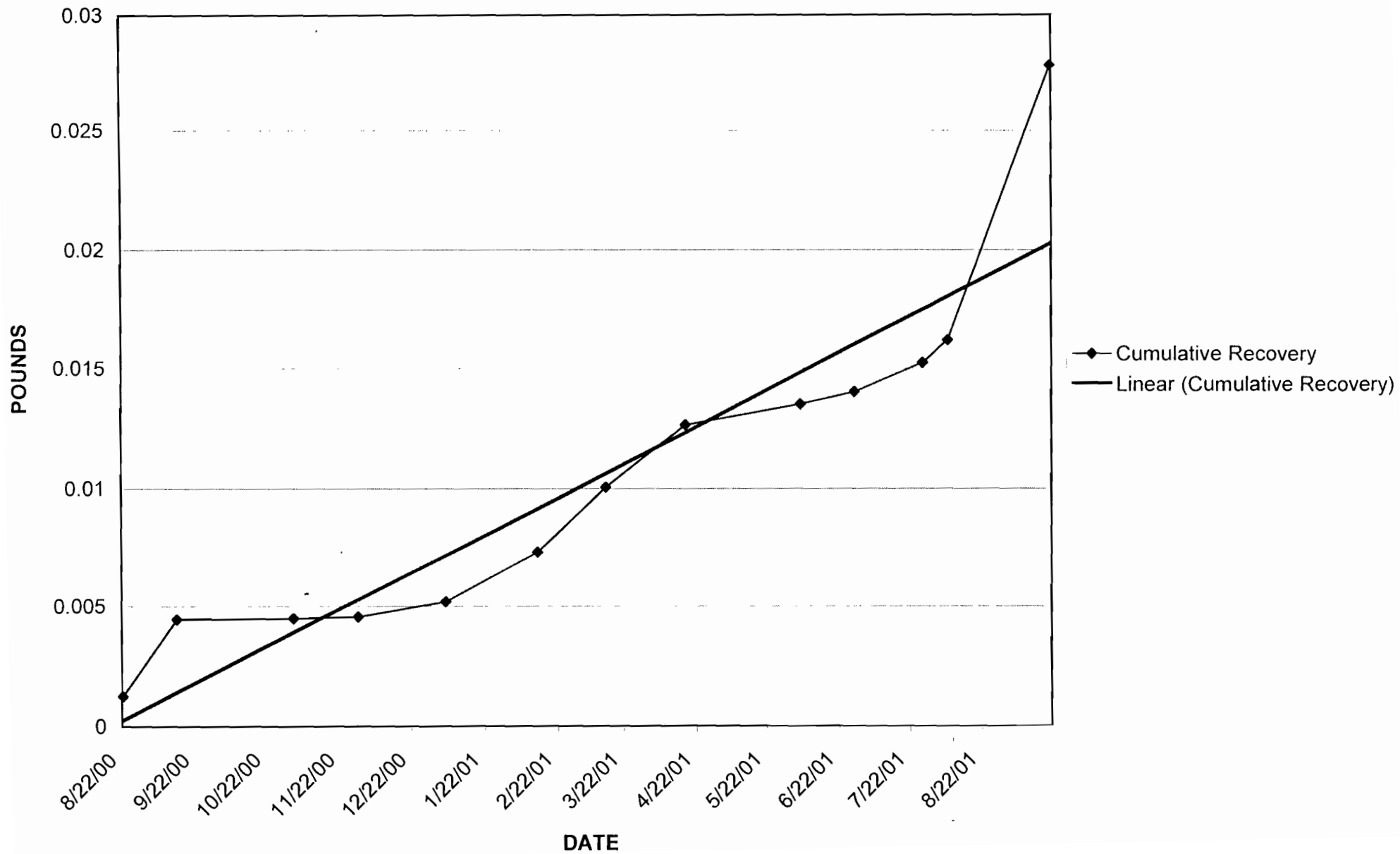
GROUND WATER RECOVERY NAPHTHALENE



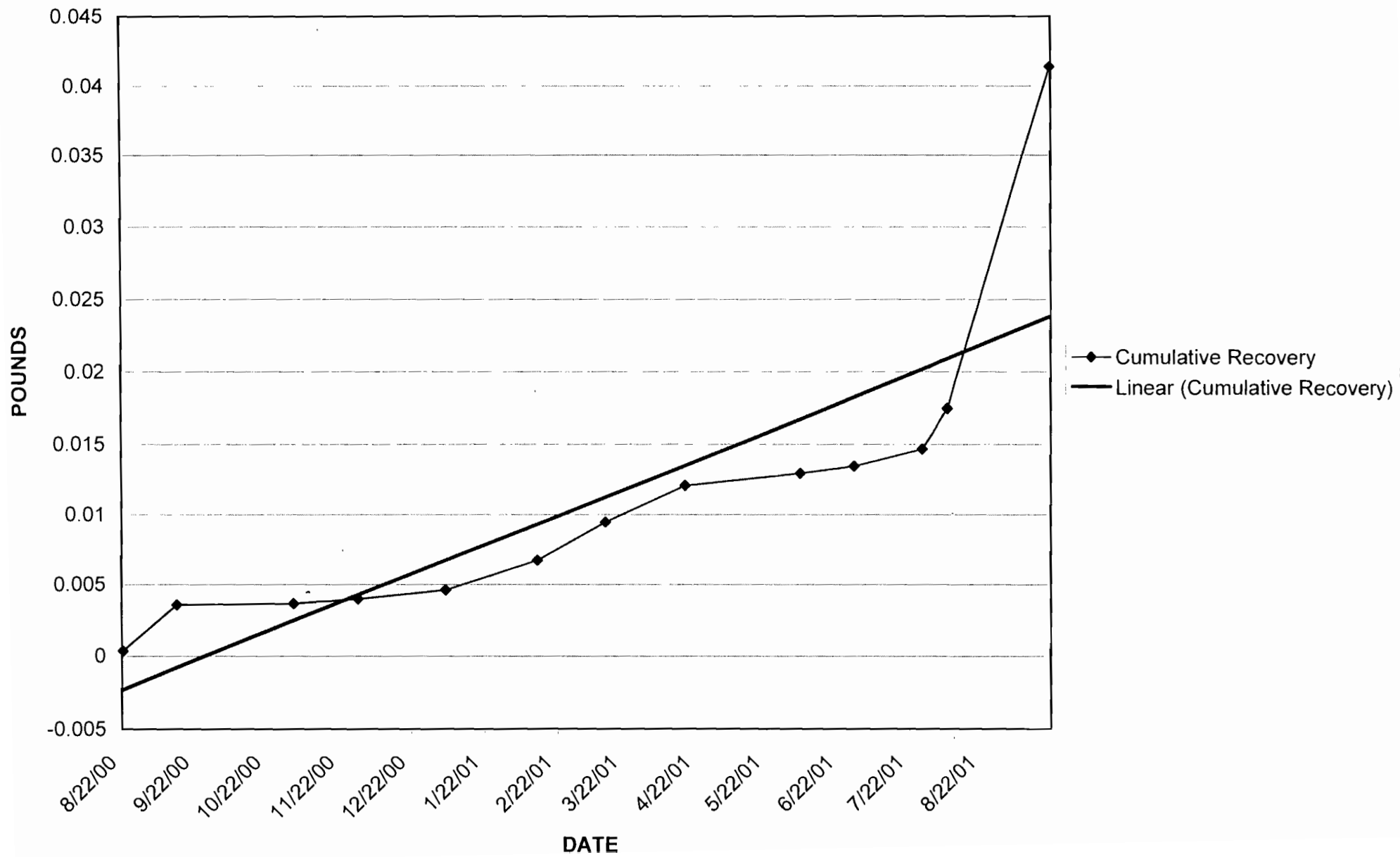
GROUND WATER RECOVERY N-BUTYLBENZENE



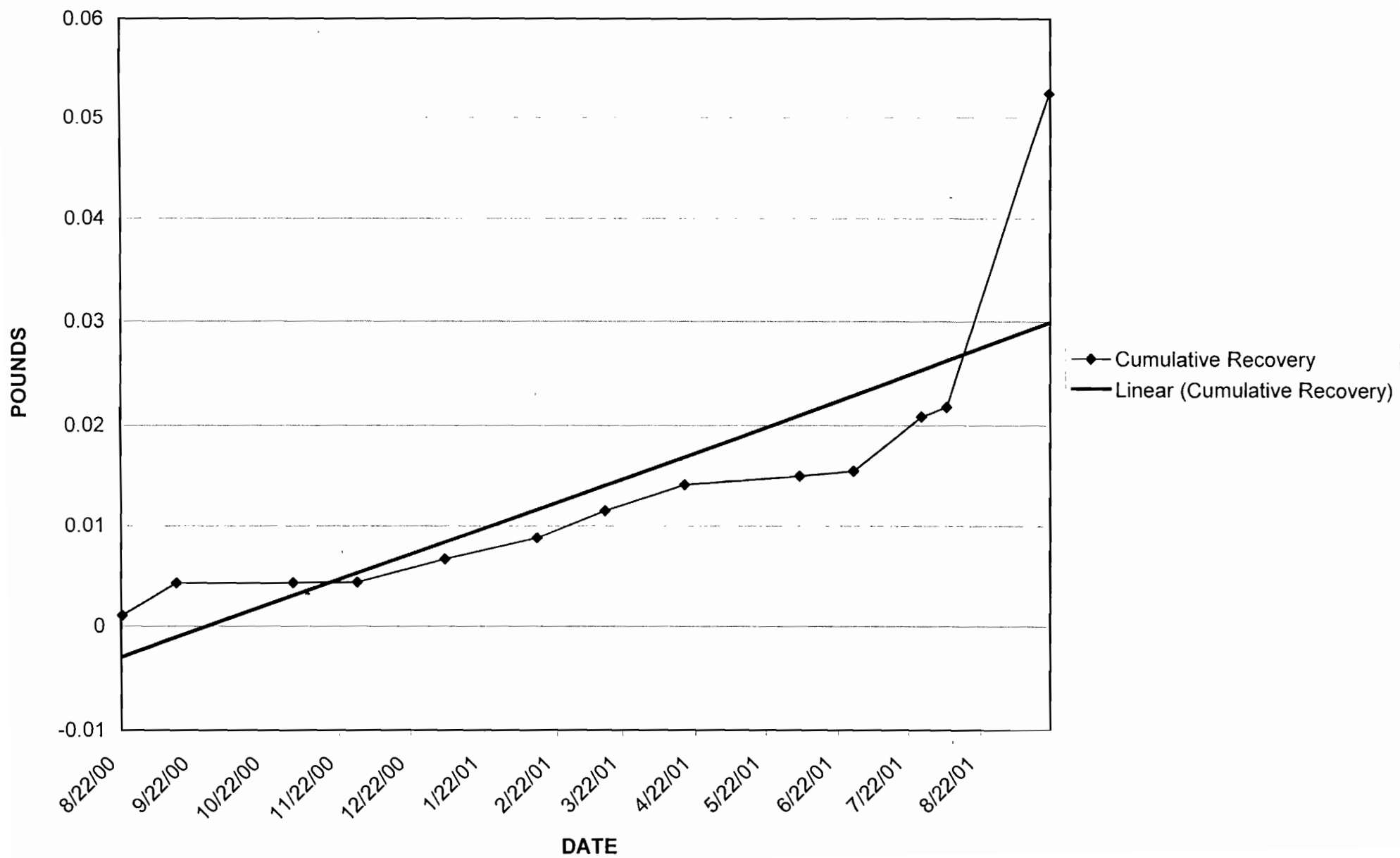
GROUND WATER RECOVERY N-PROPYLBENZENE



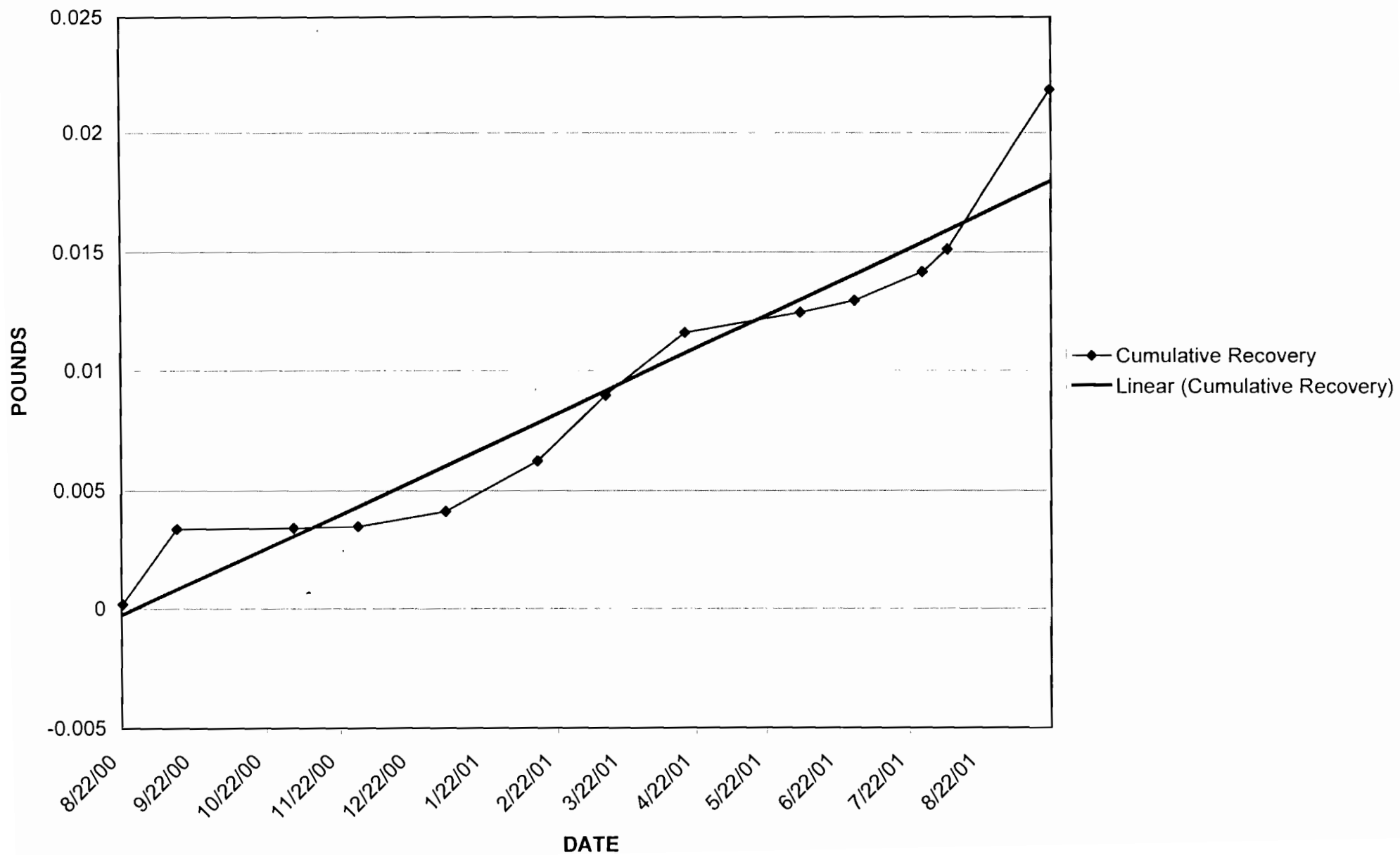
GROUND WATER RECOVERY 4-ISOPROPYLTOLUENE



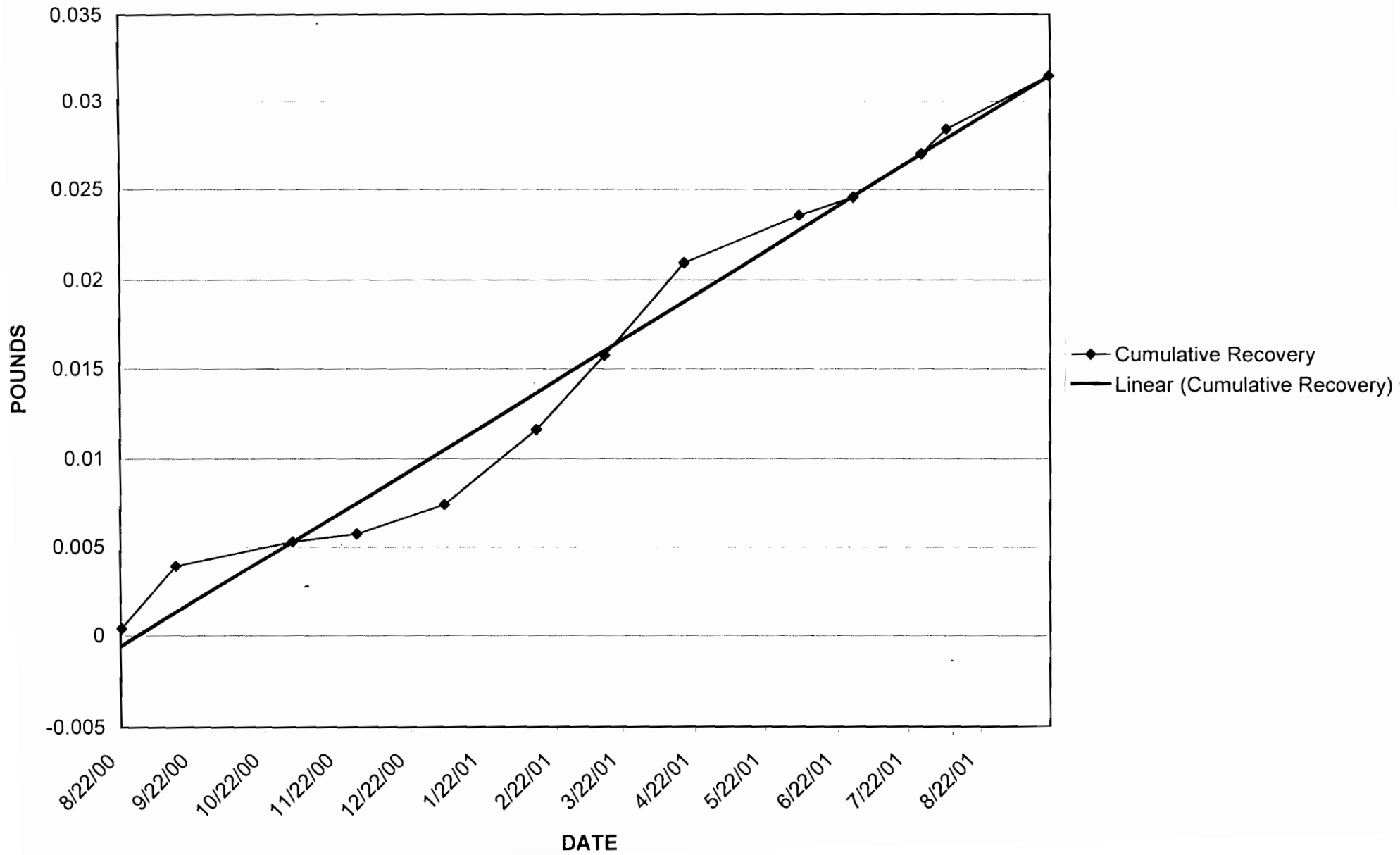
GROUND WATER RECOVERY SEC-BUTYLBENZENE



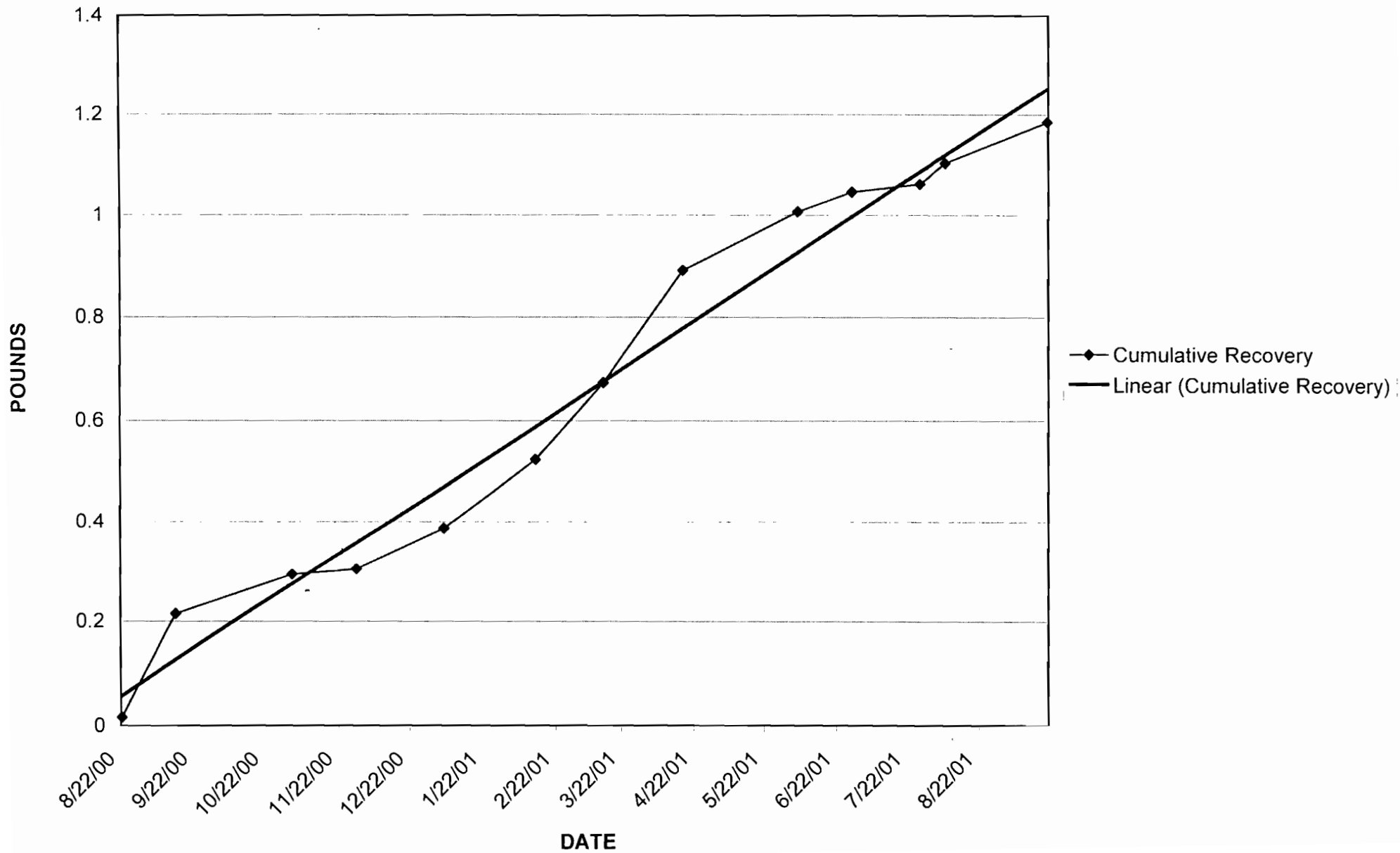
GROUND WATER RECOVERY TERT-BUTYLBENZENE



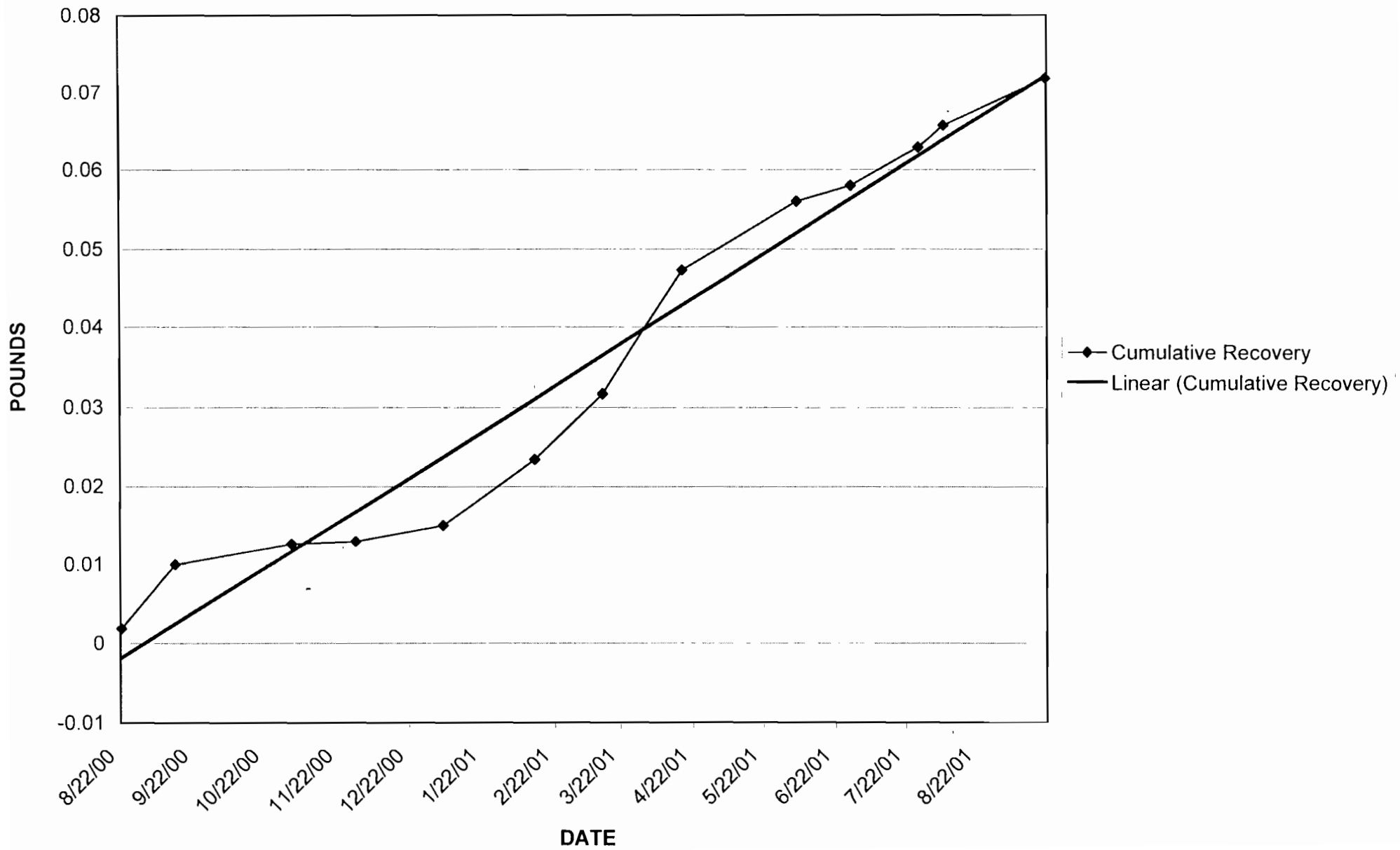
GROUND WATER RECOVERY TETRACHLOROETHENE



GROUND WATER RECOVERY TOLUENE



GROUND WATER RECOVERY TOTAL XYLENES



APPENDIX C

Date & Time	DPVE Blower Hours	DPVE Blower Cycles	DPVE Transfer Pump (hrs.)	DPVE Transfer Pump Cycles	Air Stripper (hrs.)	Air Stripper Cycles	Air Stripper Transfer Pump (hrs.)	Air Stripper Transfer Pump (cycles)	Solenoid Valve #1 (hrs.)	Solenoid Valve #1 (cycles)	Solenoid Valve #2 (hrs.)	Solenoid Valve #2 (cycles)	Solenoid Valve #3 (hrs.)	Solenoid Valve #3 (cycles)	Solenoid Valve #4 (hrs.)	Solenoid Valve #4 (cycles)	Solenoid Valve #5 (hrs.)	Solenoid Valve #5 (cycles)	Solenoid Valve #6 (hrs.)	Solenoid Valve #6 (cycles)	Solenoid Valve #7 (hrs.)	Solenoid Valve #7 (cycles)
8/22/2000 13:15	228.3	90	73	490	147	435	48	1111	45	188	164	162	93	97	145	116	120	115	160	149	82	101
9/14/2000 19:49	450.8	180	147	980	295	870	97	2222	89	376	328	323	187	195	289	231	240	231	320	298	163	202
11/2/2000 17:05	605.2	245	200	1337	402	1186	132	3030	122	512	448	441	255	266	395	315	327	314	436	407	222	275
11/29/2000 8:31	953.2	384	314	2094	630	1858	207	4747	190	803	701	691	399	416	618	494	512	493	684	637	348	431
12/4/2000 18:59	1013.6	408	334	2228	670.3	1977	219.7	5050	202.6	854	746.1	735	424.4	443	657.5	525	544.9	524	727.3	678	370.7	458
12/4/2000 19:07	1013.7	409	334	2228	670.3	1978	219.7	5050	202.6	854	746.1	736	424.4	443	657.5	525	544.9	524	727.3	678	370.7	458
12/6/2000 21:28	1021.3	415	337	2258	677.6	1988	221.1	5173	202.8	857	755.1	738	431.6	445	664.7	526	552	525	734.5	679	377.8	459
12/7/2000 21:06	1044.2	419	345.6	2324	696.2	2040	224.4	5444	203.8	870	777.9	740	447.9	449	687.8	531	568.4	527	757.3	682	400.6	462
12/9/2000 20:04	1091.2	419	358.9	2429	727.4	2142	229.5	5862	205.7	893	824.9	740	447.9	449	734.8	531	568.4	527	804.3	682	447.6	462
12/10/2000 15:11	1110.3	419	364.2	2472	739.9	2184	231.5	6029	206.5	903	844	740	448	451	753.8	532	569.9	529	823.4	683	466.7	463
12/12/2000 21:20	1162.3	421	381.1	2606	778.4	2306	238.2	6542	208.5	928	885.6	746	450	457	795.3	540	611.4	535	865	689	508.3	469
12/13/2000 19:24	1184.3	421	387.5	2656	793.3	2354	241	6729	209.4	939	907.6	747	450.1	458	817.4	540	611.4	535	886.9	690	530.2	470
12/14/2000 20:35	1209.5	421	395.1	2716	810.9	2414	244.3	6950	211.4	962	913.3	748	469.5	459	842.6	540	630.8	536	912	690	536	471
12/15/2000 12:06	1225	421	399.5	2752	821.5	2449	246.3	7079	212.5	976	928.9	748	469.5	459	858.1	540	630.8	536	927.6	690	551.5	471
12/17/2000 20:29	1281.4	421	416.7	2892	862	2571	254.2	7559	216.9	1028	985.3	749	469.5	459	914.5	540	630.8	536	984	690	551.6	471
12/21/2000 20:48	1377.8	421	449.1	3178	940.4	2749	270.5	8415	227.7	1116	1043.9	751	515.4	461	1010.8	540	646.5	537	1080.3	691	589.2	474
12/26/2000 12:58	1489.9	421	506.4	3574	1048.2	2848	303.1	9651	241	1216	1156.1	751	515.5	461	1010.9	540	646.5	537	1192.4	691	589.2	474
12/27/2000 9:11	1504.6	421	513	3626	1062.2	2869	307	9792	242.8	1230	1176.3	751	515.5	461	1031	541	646.5	537	1212.7	691	589.2	474
12/27/2000 9:45	1505.1	422	513.3	3628	1062.8	2870	307.2	9798	243	1231	1176.9	751	515.6	462	1031.4	541	646.5	537	1213.2	691	589.2	474
12/27/2000 21:16	1516.6	422	519.2	3669	1073.9	2881	311	9916	244.3	1241	1188.4	751	515.6	462	1042.9	542	646.5	537	1224.7	691	589.2	474
12/28/2000 19:28	1538.8	422	530.4	3747	1095.3	2901	318.3	10109	247	1261	1210.6	751	515.6	462	1065.1	542	646.5	537	1247	691	589.2	474
12/29/2000 21:35	1565	422	541.7	3826	1117.6	2940	327.6	10220	253.5	1300	1236.7	751	515.6	462	1091.2	542	646.5	537	1273.1	691	589.2	474
12/29/2000 22:37	1566	422	541.9	3827	1118.2	2941	327.8	10222	253.9	1302	1236.9	752	515.6	462	1092.3	542	646.5	537	1274.1	691	589.2	474
12/31/2000 10:31	1596.1	422	549.5	3884	1135.4	2998	335.4	10279	261.4	1347	1236.9	752	515.6	462	1128.2	542	646.5	537	1310	691	589.2	474
12/31/2000 10:58	1596.5	423	549.7	3885	1135.8	2999	335.7	10281	261.5	1348	1237.3	753	515.6	462	1128.6	542	646.5	537	1310.5	691	589.2	474
12/31/2000 13:08	1598.6	423	549.8	3886	1136.1	3000	335.8	10282	263.6	1350	1239.4	754	515.6	462	1128.8	542	646.5	537	1312.6	691	589.2	474
12/31/2000 14:41	1599	423	549.9	3887	1136.4	3001	335.9	10283	263.7	1350	1239.5	754	515.6	462	1130.2	543	646.5	537	1314.2	691	589.2	474
12/31/2000 18:07	1602.4	424	549.9	3888	1136.7	3002	336	10287	267.1	1351	1242.9	755	515.6	462	1130.2	543	646.5	537	1317.6	691	589.2	474
12/31/2000 18:51	1602.7	424	550	3889	1136.9	3003	336	10288	267.3	1351	1243	755	515.6	462	1130.9	544	646.5	537	1318.3	691	589.2	474
1/1/2001 15:55	1608.2	425	550.2	3892	1137.4	3005	336.1	10290	288.3	1352	1264	756	515.6	462	1131	544	646.5	537	1339.4	692	589.2	474
1/2/2001 20:25	1613.6	428	550.5	3898	1138.7	3009	352.6	10300	316.5	1355	1280.6	757	515.7	464	1131	544	646.5	538	1367.9	692	589.2	474
1/4/2001 22:38	1616.8	436	552.5	3914	1141.8	3013	354.3	10341	360.7	1357	1283.2	758	515.7	464	1133.3	545	646.5	538	1418.1	692	589.2	474
1/4/2001 22:55	1617.1	436	552.6	3914	1142.1	3013	354.4	10342	360.8	1359	1283.5	758	515.7	464	1133.6	545	646.5	538	1418.4	692	589.2	474
1/6/2001 10:23	1652.6	436	570.5	4020	1174.2	3065	371	10468	369.6	1412	1318.9	758	515.7	465	1169.1	545	646.5	538	1453.9	692	589.2	474
1/7/2001 10:32	1656.8	436	572.4	4032	1177.9	3072	372.8	10480	370.7	1419	1343.1	758	515.7	465	1193.2	545	646.5	538	1478	692	589.2	474
1/7/2001 12:26	1658.6	437	572.5	4034	1178.4	3074	373	10484	372.4	1420	1345	758	515.9	466	1195.1	545	646.5	538	1479.9	692	589.2	474
1/7/2001 17:53	1664.1	437	572.7	4036	1179	3076	373.3	10486	377.9	1420	1350.4	758	515.9	466	1200.6	545	646.5	538	1485.4	692	589.2	474
1/7/2001 18:24	1664.5	438	572.9	4038	1179.4	3077	373.5	10489	378.1	1421	1350.9	758	516	467	1201.1	545	646.5	538	1485.9	692	589.2	474
1/8/2001 13:32	1683.6	438	576	4056	1184.7	3087	374.8	10579	393.7	1427	1370.1	758	520.4	469	1220.2	545	646.6	539	1505	692	589.2	474
1/8/2001 20:49	1690.9	438	580.3	4081	1192	3088	376.3	10714	394.8	1440	1377.4	758	520.5	469	1227.5	545	646.6	540	1512.3	692	596.5	475
1/8/2001 20:58	1691.1	438	580.4	4081	1192.2	3088	376.3	10718	394.8	1440	1377.5	758	520.5	469	1227.7	545	646.6	540	1512.5	692	596.6	475
1/9/2001 20:47	1714.9	438	591.2	4165	1215.7	3111	380.1	11066	398.2	1481	1377.7	759	544.2	470	1251.5	545	670.4	541	1512.5	692	620.4	475
1/10/2001 20:24	1738.5	438	601.6	4247	1239	3135	383.7	11395	401.6	1522	1377.7	760	567.9	471	1275.1	546	694	542	1512.5	692	644.1	476
1/11/2001 19:04	1761.2	438	609.3	4311	1257.7	3199	386.4	11642	404.8	1560	1377.7	761	567.9	471	1297.8	546	694.1	542	1535.1	693	666.7	476
1/13/2001 18:34	1808.7	438	628.6	4470	1303	3309	393.1	12262	411.6	1642	1377.7	761	567.9	471	1345.3	546	741.5	543	1582.6	693	714.3	476
1/15/2001 21:17	1859.4	438	653.1	4636	1351.7	3393	401.6	13040	419	1729	1428.4	762	567.9	471	1395.9	546	741.5	543	1633.3	693	714.3	476
1/16/2001 7:14	1869.4	438	653.3	4638	1352.2	3395	401.7	13047	428.9	1729	1438.3	762	567.9	471	1395.9	546	741.5	543	1643.3	693	714.3	476

System Operational Data
Champion Products, Inc.
Perry, New York
Delta Project No: S098-009

Date & Time	DPVE Blower Hours	DPVE Blower Cycles	DPVE Transfer Pump (hrs.)	DPVE Transfer Pump Cycles	Air Stripper (hrs.)	Air Stripper Cycles	Air Stripper Transfer Pump (hrs.)	Air Stripper Transfer Pump (cycles)	Solenoid Valve #1 (hrs.)	Solenoid Valve #1 (cycles)	Solenoid Valve #2 (hrs.)	Solenoid Valve #2 (cycles)	Solenoid Valve #3 (hrs.)	Solenoid Valve #3 (cycles)	Solenoid Valve #4 (hrs.)	Solenoid Valve #4 (cycles)	Solenoid Valve #5 (hrs.)	Solenoid Valve #5 (cycles)	Solenoid Valve #6 (hrs.)	Solenoid Valve #6 (cycles)	Solenoid Valve #7 (hrs.)	Solenoid Valve #7 (cycles)
1/16/2001 19:26	1881.6	438	658.4	4671	1362	3412	403.5	13208	432.9	1745	1450.5	762	580.1	472	1408.1	547	753.7	544	1655.5	693	714.3	476
1/16/2001 22:12	1884.3	438	658.5	4672	1362.3	3413	403.5	13211	435.7	1746	1453.3	762	580.1	473	1408.1	547	753.7	544	1655.5	693	714.3	476
1/20/2001 22:23	1980.5	438	696.5	4929	1437	3542	416.8	14401	467.7	1874	1549.5	763	676.3	474	1504.3	548	753.7	544	1751.7	694	810.4	477
1/21/2001 20:49	2003	438	697	4934	1438.5	3546	417	14418	489.9	1875	1571.9	763	676.5	475	1504.5	548	753.7	544	1751.9	694	810.6	477
1/23/2001 20:38	2050.8	438	712.5	5033	1468.4	3597	422.4	14906	513.5	1924	1583.4	763	712.9	476	1541	549	790.2	545	1788.4	695	810.6	477
1/25/2001 20:01	2098.2	438	728.2	5147	1503.2	3711	427.9	15413	527.8	1981	1592.7	820	713.1	476	1541.1	549	790.3	545	1835.7	695	810.6	477
1/26/2001 23:34	2125.7	438	736.8	5213	1522.8	3769	431	15685	536	2014	1592.8	820	740.5	477	1568.5	550	790.3	545	1863.3	695	810.6	477
1/30/2001 20:33	2218.7	438	782.3	5512	1602.4	3881	447	17078	563.8	2125	1685.7	821	740.6	477	1568.6	550	790.3	545	1863.5	695	810.6	477
1/30/2001 21:35	2219.5	439	782.5	5514	1602.9	3884	447.1	17083	564	2126	1685.7	821	740.6	477	1568.6	550	790.3	545	1864.5	696	810.6	477
2/1/2001 22:22	2250.1	441	794.3	5591	1627.4	3954	451.3	17354	566.1	2151	1692	849	742.7	503	1574.8	575	792.3	569	1870.6	720	816.6	502
2/3/2001 10:08	2281	443	807.8	5681	1650.2	3959	456.2	17528	577	2170	1727.6	851	742.8	504	1574.8	576	792.3	569	1896.9	723	816.6	502
2/4/2001 18:35	2282.2	444	808.4	5686	1651.5	3960	456.4	17537	577.1	2171	1760.1	851	742.8	504	1574.8	576	792.3	569	1929.3	723	816.6	502
2/4/2001 18:38	2282.2	444	808.4	5686	1651.5	3960	456.4	17537	577.1	2171	1760.1	851	742.8	504	1574.8	576	792.3	569	1929.4	723	816.6	502
2/4/2001 18:41	2282.2	444	808.4	5686	1651.5	3960	456.4	17537	577.1	2171	1760.2	851	742.8	504	1574.8	576	792.3	569	1929.4	723	816.6	502
2/4/2001 20:00	2282.2	444	808.4	5686	1651.5	3960	456.4	17537	577.1	2171	1761.5	851	742.8	504	1574.8	576	792.3	569	1930.8	723	816.6	502
2/4/2001 20:29	2282.6	446	808.8	5688	1651.9	3961	456.6	17542	577.1	2171	1761.9	852	742.8	504	1574.8	576	792.3	569	1931.2	724	816.6	502
2/14/2001 19:12	2318.6	470	832.2	5842	1687.6	3983	465.2	18294	590.9	2179	1987.4	858	764.5	540	1622.1	579	813.5	602	1976.5	727	836.6	536
2/15/2001 20:46	2329.5	482	834.8	5888	1695.7	4011	466.4	18393	592	2203	1987.4	858	764.5	540	1647.7	579	813.5	602	1999.7	728	836.6	536
2/17/2001 10:27	2367.2	482	850	6049	1733.3	4012	473.3	18875	597.4	2365	2024.8	859	764.5	540	1685.3	579	813.5	602	2037.4	728	836.6	536
2/18/2001 21:11	2401.9	482	868.2	6207	1768	4012	481.8	19440	602.5	2514	2059.6	859	764.5	540	1720.1	579	813.5	602	2072.2	728	836.6	536
2/20/2001 19:48	2448.5	482	877.1	6310	1794.4	4115	486.2	19737	609.2	2714	2059.6	859	764.5	540	1766.7	579	813.5	602	2118.8	728	883.2	537
2/25/2001 18:21	2538	484	893.8	6502	1840.2	4167	494.8	20249	651.3	3097	2101.5	862	764.5	540	1885.2	580	813.5	602	2237.3	729	883.5	537
2/27/2001 19:55	2587.1	486	899.7	6572	1857.8	4227	498.1	20408	658.8	3307	2101.5	862	767.9	541	1934.7	581	813.5	602	2286.9	729	883.5	537
3/2/2001 22:59	2662	487	925.4	6873	1930.4	4321	514.1	21013	669.7	3628	2101.5	862	842.9	541	2009.8	581	813.5	602	2362	729	883.5	537
3/3/2001 9:04	2667.7	487	927	6892	1935	4332	515.1	21049	675.1	3654	2101.6	863	843.1	541	2010	581	813.5	602	2372	729	883.5	537
3/3/2001 22:21	2680.9	488	929.7	6924	1943.1	4362	517.1	21113	677.1	3710	2101.6	863	843.1	541	2023.1	582	826.6	603	2385.3	729	883.5	537
3/5/2001 21:34	2718.3	489	939.4	7038	1971.1	4439	524	21336	682.7	3870	2101.6	863	843.1	541	2058.3	583	861.6	604	2432.5	729	895.5	538
3/14/2001 21:30	2763.8	511	952.1	7190	2007.4	4590	533.2	21642	694.3	4052	2103.6	884	843.9	563	2230.8	586	862.5	627	2604.6	738	1060.2	563
3/15/2001 19:38	2785.9	511	957.2	7249	2022.7	4649	536.8	21761	710.1	4115	2104.6	948	845	626	2252.9	586	863.5	690	2626.7	738	1061.2	626
3/17/2001 8:37	2810.6	511	962.4	7307	2038	4708	540.3	21878	740	4186	2105.8	1018	846.2	697	2289.9	586	864.7	761	2663.7	738	1062.4	697
3/17/2001 9:02	2811	513	962.5	7308	2038.3	4709	540.3	21880	740.3	4187	2105.8	1019	846.2	698	2290.4	586	864.7	762	2664.1	738	1062.4	698
3/18/2001 20:06	2812.6	513	962.9	7313	2039.7	4714	540.6	21890	774.9	4192	2105.9	1025	846.3	703	2325.4	586	864.8	767	2699.2	738	1062.5	703
3/20/2001 20:35	2846.5	517	971.3	7411	2064.9	4815	546.5	22085	813.7	4288	2107.5	1123	847.9	800	2373.9	586	866.4	864	2747.7	738	1064.1	799
3/21/2001 22:51	2872.2	518	977.7	7487	2083.8	4890	550.9	22233	832.6	4362	2108.7	1196	849.1	873	2400.2	586	867.6	937	2773.9	738	1065.4	873
3/22/2001 22:01	2890.9	520	982.3	7545	2098.2	4947	554.1	22339	849	4415	2109.7	1251	850	927	2423.3	586	868.5	991	2797.1	738	1066.2	927
3/24/2001 21:37	2938.5	521	994.9	7689	2134.8	5089	562.8	22625	884.7	4558	2112	1393	852.4	1069	2470.9	586	870.9	1133	2844.7	738	1066.2	927
3/25/2001 21:41	2962.6	521	1001.2	7761	2153.2	5161	567.2	22769	902.7	4630	2113.2	1466	853.6	1142	2495	586	872.1	1206	2868.8	738	1066.2	927
3/26/2001 22:19	2987.2	521	1007.7	7835	2172.3	5235	571.9	22917	921.2	4704	2114.5	1540	854.8	1216	2519.7	586	873.3	1279	2893.4	738	1066.2	927
3/28/2001 19:11	3032.1	521	1019.6	7960	2205.1	5360	580.6	23167	951.2	4884	2117.5	1719	857.8	1395	2564.5	586	876.3	1459	2938.3	738	1066.2	927
3/30/2001 21:40	3082.6	521	1032.3	8094	2240.3	5493	590.9	23357	984.8	5086	2120.8	1921	861.2	1597	2615	586	879.7	1661	2988.8	738	1066.2	927
3/31/2001 8:54	3089.9	521	1034.7	8121	2247	5505	593.1	23383	989.7	5116	2121.3	1951	872.3	1599	2626.2	587	880.2	1690	2989.4	766	1066.2	927
3/31/2001 11:51	3092.8	523	1035.3	8131	2249.1	5513	593.7	23393	991.6	5129	2121.5	1962	872.6	1610	2629.1	589	880.4	1702	2992.2	767	1066.2	927
4/2/2001 19:55	3147.8	523	1047.8	8263	2283.7	5645	606.2	23525	1033.9	5383	2125.7	2217	876.8	1864	2684.2	589	884.6	1956	3047.3	767	1066.2	927
4/4/2001 22:23	3193.9	523	1058.3	8373	2312.7	5755	617.5	23634	1069.4	5595	2129.3	2430	880.3	2077	2734.7	589	888.1	2168	3097.7	767	1066.2	927
4/5/2001 20:40	3208	525	1061.7	8411	2322.5	5793	621.3	23672	1080.2	5660	2130.4	2495	881.4	2142	2757	589	889.2	2233	3120	767	1066.2	927
4/9/2001 21:32	3220.9	528	1065.3	8451	2332.6	5828	624.3	23746	1174.3	5694	2210.5	2529	882	2181	2774.2	591	889.9	2272	3137.3	768	1066.2	927
4/10/2001 19:28	3242.7	529	1071.5	8524	2351	5900	629.3	23847	1192.6	5767	2211.7	2602	883.3	2254	2796.2	591	891.1	2344	3159.3	768	1066.2	927

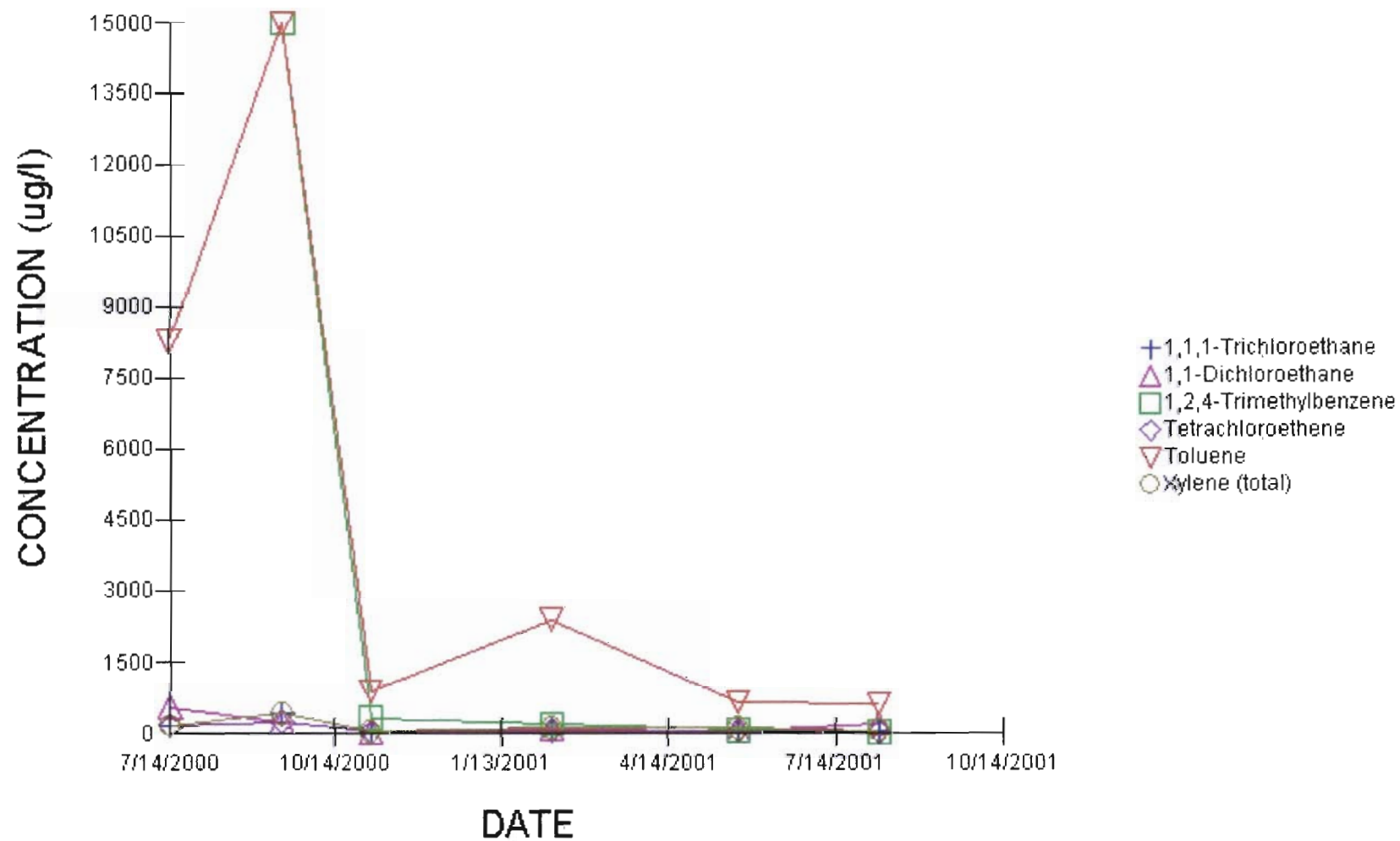
System Operational Data
Champion Products, Inc.
Perry, New York
Delta Project No: S098-009

Date & Time	DPVE Blower Hours	DPVE Blower Cycles	DPVE Transfer Pump (hrs.)	DPVE Transfer Pump Cycles	Air Stripper (hrs.)	Air Stripper Cycles	Air Stripper Transfer Pump (hrs.)	Air Stripper Transfer Pump (cycles)	Solenoid Valve #1 (hrs.)	Solenoid Valve #1 (cycles)	Solenoid Valve #2 (hrs.)	Solenoid Valve #2 (cycles)	Solenoid Valve #3 (hrs.)	Solenoid Valve #3 (cycles)	Solenoid Valve #4 (hrs.)	Solenoid Valve #4 (cycles)	Solenoid Valve #5 (hrs.)	Solenoid Valve #5 (cycles)	Solenoid Valve #6 (hrs.)	Solenoid Valve #6 (cycles)	Solenoid Valve #7 (hrs.)	Solenoid Valve #7 (cycles)
4/12/2001 21:37	3291.9	532	1091.6	8729	2398.2	5935	641.4	24339	1209	5831	2231.6	2603	914.9	2319	2797.4	656	922.7	2409	3179.3	768	1066.2	927
4/14/2001 22:41	3340.9	532	1102.3	8847	2428.6	6053	645.6	24714	1209	5831	2231.6	2603	963.9	2319	2797.4	656	971.7	2409	3179.3	768	1066.2	927
4/16/2001 11:57	3378.2	532	1108.2	8913	2445.5	6119	647.9	24915	1209	5831	2231.6	2603	1001.2	2319	2834.6	657	1009	2409	3179.3	768	1066.2	927
4/16/2001 21:22	3386	535	1110	8936	2450.2	6135	649	24968	1211	6297	2232.2	2614	1006.9	2329	2844	657	1014.7	2419	3183.7	769	1066.6	937
4/17/2001 21:45	3404	537	1114.3	8984	2462.2	6181	652	25059	1219.1	6346	2232.6	2625	1007.2	2342	2868.4	657	1015	2430	3208.1	769	1066.9	947
4/20/2001 22:31	3458.3	542	1130.7	9173	2508.1	6311	658.6	25646	1261.4	6543	2239.3	2829	1013.9	2543	2941.2	657	0	0	0	0	0	0
4/20/2001 23:07	3458.7	542	1130.8	9174	2508.5	6312	658.6	25649	1261.5	6544	2239.5	2831	1014	2545	2941.3	657	1021.8	2633	3281.1	769	1067	948
4/22/2001 12:46	3468.2	543	1133.4	9203	2516.2	6341	659.7	25740	1261.5	6544	2239.5	2832	1017.2	2641	2978.9	658	1024.9	2728	3318.6	770	1067	948
4/22/2001 21:49	3477.2	544	1135.9	9229	2522.9	6367	660.8	25824	1261.5	6544	2239.5	2832	1020.1	2731	2988	658	1027.9	2817	3327.7	770	1067	948
4/23/2001 6:37	3486	544	1138.1	9253	2529.1	6390	661.8	25899	1261.5	6544	2239.5	2832	1023.1	2819	2996.8	658	1030.8	2905	3336.5	770	1067	948
4/23/2001 21:26	3500.8	544	1142	9296	2540.1	6423	663.6	26026	1264.4	6632	2242.5	2921	1026	2908	3011.6	658	1033.8	2994	3351.3	770	1067	948
4/23/2001 21:34	3500.9	544	1142	9296	2540.1	6423	663.6	26026	1264.5	6633	2242.5	2922	1026	2909	3011.7	658	1033.8	2995	3351.5	770	1067	948
4/24/2001 20:22	3518.1	545	1145.9	9342	2551.6	6467	665.5	26151	1273	6685	2244.2	2973	0	0	0	0	0	0	0	0	0	0
4/25/2001 22:22	3535.8	547	1150.6	9397	2565.4	6520	667.9	26303	1282	6738	2246	3026	1029.5	3015	3060.5	658	1037.3	3100	3400.2	770	1067	948
4/28/2001 23:13	3582.2	550	1160.6	9510	2593.9	6628	673.2	26607	1306.2	6860	2250.1	3148	1033.5	3140	3133.4	658	1041.4	3221	3473.1	770	1067	948
4/29/2001 22:01	3603.1	551	1164	9547	2603.4	6664	675.5	26682	1318.7	6910	2251.7	3198	1035.2	3191	3156.2	658	1043	3271	3495.9	770	1067	948
4/29/2001 22:04	3603.1	551	1164	9548	2603.4	6665	675.5	26683	1318.7	6910	2251.7	3198	1035.2	3191	3156.3	658	1043	3271	3496	770	1067	948
4/30/2001 21:24	3626.4	552	1166.4	9575	2610.3	6691	677.6	26710	1335.3	6978	2253.9	3265	1037.4	3258	3179.6	658	1045.3	3338	3519.3	770	1067	948
5/1/2001 6:22	3627.2	552	1166.5	9576	2610.6	6692	677.6	26710	1335.9	6980	2254	3268	1037.5	3261	3188.6	658	1045.3	3338	3528.3	770	1067	948
5/1/2001 21:09	3634.8	553	1167.3	9588	2613.3	6704	678.4	26720	1349.4	7000	2254.7	3287	1038.2	3281	3203.4	658	1045.3	3338	3543.1	770	1067	948
5/3/2001 7:09	3661.3	556	1172.5	9650	2628.3	6762	681.9	26838	1379	7066	2256.9	3353	1040.4	3347	3237.3	658	1045.3	3338	3577.1	770	1067	948
5/4/2001 21:30	3699.7	556	1178.2	9712	2644.3	6823	684.5	27026	1408.5	7154	2259.8	3441	1043.3	3435	3275.7	658	1048.2	3426	3615.4	770	1067	948
5/6/2001 21:04	3740.3	556	1184.5	9780	2662.2	6891	687.5	27229	1435.5	7236	2262.5	3523	1046	3517	3323.3	658	1050.9	3508	3663	770	1067	948
5/6/2001 21:07	3740.3	556	1184.5	9780	2662.3	6892	687.5	27229	1435.5	7236	2262.5	3523	1046	3517	3323.3	658	1050.9	3508	3663	770	1067	948
5/10/2001 22:15	3837.3	559	1199.5	9947	2704.9	7057	697.1	27595	1499.5	7466	2270.2	3752	1048.6	3595	3420.5	658	1053.5	3587	3760.2	770	1072	1100
5/11/2001 21:08	3846.1	559	1200.5	9959	2708.1	7070	697.6	27624	1504.8	7492	2271.1	3779	1048.6	3595	3443.4	658	1053.5	3587	3783.1	770	1072.8	1126
5/12/2001 22:07	3864.8	560	1203.7	10000	2717.4	7106	699.4	27718	1516	7548	2272.9	3835	1048.6	3595	3468.3	658	1053.5	3587	3808	770	1074.7	1182
5/13/2001 22:30	3876.7	561	1206.4	10030	2725.1	7136	700.7	27804	1522	7578	2273.9	3865	1049.6	3625	3492.7	658	1054.5	3616	3832.4	770	1075.7	1212
5/16/2001 21:31	3890.7	564	1208.2	10052	2730.4	7157	701.6	27862	1529	7613	2275.1	3900	1050.8	3662	3563.7	658	1055.7	3651	3903.5	770	1076.9	1247
6/5/2001 22:00	3903.2	574	1210.9	10085	2738.5	7191	703.2	27940	1535.1	7658	2276.2	3932	1051.8	3697	3712.5	666	1056.8	3684	4052.2	778	1078	1281
6/6/2001 21:15	3926.5	574	1216	10143	2753.4	7248	706.5	28056	1546.8	7716	2278.2	3990	1053.7	3755	3735.7	666	1058.7	3742	4075.5	778	1079.9	1339
6/7/2001 22:13	3948	575	1220.5	10195	2766.5	7299	709.7	28156	1558.3	7766	2279.8	4040	1055.4	3806	3760.7	666	1060.4	3792	4100.4	778	1081.6	1389
6/9/2001 10:02	3980.7	577	1227.4	10273	2786.2	7373	715	28287	1578.8	7848	2282.6	4122	1056.1	3828	3796.5	666	1061.1	3812	4136.3	778	1084.3	1471
6/9/2001 21:52	3981.7	577	1227.6	10276	2786.9	7375	715.2	28289	1579.4	7850	2282.7	4125	1056.1	3828	3808.4	666	1061.1	3812	4148.1	778	1084.4	1474
6/9/2001 21:57	3981.7	577	1227.6	10276	2787	7376	715.2	28290	1579.4	7850	2282.7	4125	1056.1	3828	3808.4	666	1061.1	3812	4148.2	778	1084.4	1474
6/12/2001 21:16	4017.6	582	1235.7	10366	2810	7463	720	28521	1637.7	7943	2286.2	4217	1056.1	3828	3879.8	666	1061.1	3812	4219.5	778	1087.5	1568
6/12/2001 21:27	4017.8	582	1235.7	10366	2810	7463	720	28521	1637.8	7943	2286.2	4218	1056.1	3828	3879.9	666	1061.1	3812	4219.7	778	1087.5	1568
6/13/2001 21:12	4041.5	582	1241.1	10426	2825.4	7523	723.2	28668	1652.6	8003	2289.2	4277	1056.1	3828	3903.7	666	1061.1	3812	4243.4	778	1089.5	1628
6/18/2001 21:12	4161.5	582	1268.4	10723	2902.7	7819	737.4	29444	1727	8300	2304.6	4576	1056.1	3828	4023.7	666	1061.1	3812	4363.5	778	1099.9	1925
6/19/2001 21:57	4186.3	582	1273.9	10781	2917.8	7877	739.3	29580	1741.2	8357	2308.4	4633	1056.1	3828	4048.4	666	1061.1	3812	4388.2	778	1102.8	1982
6/22/2001 22:23	4258.7	582	1290	10946	2961.7	8042	746	29799	1783	8524	2319.6	4800	1056.1	3828	4120.9	666	1061.1	3812	4460.7	778	1111.1	2150
6/23/2001 11:06	4271.5	582	1290	10946	2961.7	8042	746	29799	1789.8	8552	2332.1	4801	1056.5	3855	4122	693	1061.5	3839	4473.4	778	1112.5	2177
6/23/2001 11:46	4272.1	582	1290	10946	2961.7	8042	746	29799	1789.9	8552	2332.8	4801	1056.5	3856	4122	694	1061.5	3840	4474	778	1112.6	2178
6/23/2001 12:52	4273.2	583	1290	10946	2961.7	8042	746	29799	1789.9	8552	2332.8	4801	1056.6	3859	4123.1	695	1061.6	3843	4475.1	778	1112.7	2181
6/28/2001 22:53	4309.2	607	1300.7	11077	2989.8	8112	797.9	30063	1817.1	8586	2350	4804	1109.2	3863	4198.5	696	1108.8	3859	4550.6	787	1143.3	2216
6/29/2001 22:05	4332.4	607	1301.1	11082	2991.2	8118	798.2	30074	1822.8	8620	2350	4804	1109.2	3863	4221.7	696	1108.8	3859	4573.8	787	1166.5	2216
6/30/2001 10:21	4344.7	607	1301.3	11084	2991.7	8120	798.3	30078	1826	8639	2350	4804	1109.2	3863	4234	696	1108.8	3859	4586	787	1178.8	2216

System Operational Data
Champion Products, Inc.
Perry, New York
Delta Project No: S098-009

Date & Time	DPVE Blower Hours	DPVE Blower Cycles	DPVE Transfer Pump (hrs.)	DPVE Transfer Pump Cycles	Air Stripper (hrs.)	Air Stripper Cycles	Air Stripper Transfer Pump (hrs.)	Air Stripper Transfer Pump (cycles)	Solenoid Valve #1 (hrs.)	Solenoid Valve #1 (cycles)	Solenoid Valve #2 (hrs.)	Solenoid Valve #2 (cycles)	Solenoid Valve #3 (hrs.)	Solenoid Valve #3 (cycles)	Solenoid Valve #4 (hrs.)	Solenoid Valve #4 (cycles)	Solenoid Valve #5 (hrs.)	Solenoid Valve #5 (cycles)	Solenoid Valve #6 (hrs.)	Solenoid Valve #6 (cycles)	Solenoid Valve #7 (hrs.)	Solenoid Valve #7 (cycles)
7/1/2001 20:38	4379	607	1301.3	11084	2991.7	8120	798.3	30080	1834.5	8690	2350	4804	1109.2	3863	4268.3	696	1108.8	3859	4620.3	787	1213.1	2216
7/2/2001 21:47	4404.1	607	1301.3	11084	2991.7	8120	798.3	30080	1840.8	8728	2350	4805	1109.2	3863	4293.4	696	1108.8	3859	4645.5	787	1238.2	2217
7/3/2001 19:48	4426.1	607	1301.8	11090	2993.2	8126	798.7	30092	1846.3	8761	2350	4805	1109.2	3863	4315.4	696	1108.8	3859	4667.5	787	1260.2	2217
7/5/2001 21:09	4475.5	607	1303.2	11107	2997.4	8143	799.7	30125	1858.7	8835	2350	4805	1109.2	3863	4364.8	696	1108.8	3859	4716.9	787	1309.6	2217
7/8/2001 10:56	4537.3	607	1311.7	11203	3022	8239	805.2	30332	1874.2	8928	2350	4805	1109.2	3863	4426.6	696	1108.8	3859	4778.7	787	1371.4	2217
7/9/2001 21:55	4572.3	607	1317.4	11268	3038.6	8304	809.3	30462	1882.8	8980	2350	4805	1109.2	3863	4461.6	696	1108.8	3859	4813.6	787	1406.4	2217
7/11/2001 21:02	4619.4	607	1324.8	11349	3059.7	8386	814.4	30624	1894.7	9051	2350	4805	1109.2	3863	4508.7	696	1108.8	3859	4860.8	787	1453.5	2217
7/15/2001 21:24	4715.7	608	1339.2	11505	3100.3	8543	823.6	30977	1918.6	9195	2350	4805	1109.2	3863	4605.1	696	1108.8	3859	4957.1	787	1549.9	2217
7/18/2001 21:03	4787.4	608	1353.4	11669	3141.8	8707	830.5	31468	1936.6	9303	2350	4805	1109.2	3863	4676.7	696	1108.8	3859	5028.8	787	0	0
7/18/2001 21:09	4787.4	608	1353.4	11669	3141.8	8707	830.5	31469	1936.6	9303	2350	4805	1109.2	3863	4676.8	696	1108.8	3859	5028.9	787	1621.6	2217
7/23/2001 21:58	4908.3	608	1374.2	11909	3202.6	8947	840.4	32187	1966.8	9484	2350	4805	1109.2	3863	4797.6	696	1108.8	3859	5149.7	787	1742.4	2217
7/29/2001 21:05	5048.3	611	1391.4	12102	3251.7	9138	848.6	32760	2001.9	9694	2350	4805	1109.2	3863	4940.8	698	1108.8	3859	5292.8	792	1837	2297
8/1/2001 22:25	5121.6	611	1401.5	12214	3280.5	9250	853.3	33096	2020.2	9804	2350	4805	1109.2	3863	5014.1	698	1108.8	3859	5366.2	792	1910.3	2298
8/5/2001 14:14	5209.4	612	1411.7	12330	3309.7	9365	858	33439	2042.2	9936	2350	4805	1109.2	3863	5101.9	698	1108.8	3859	5454	792	1998.2	2298
8/12/2001 21:18	5378.6	616	1431.7	12556	3367.3	9591	868.5	34100	2050.1	9984	2350	4805	1126.8	4075	5277	698	1108.9	3860	5629.1	792	2173.2	2298
8/14/2001 21:52	5427.1	616	1436.2	12605	3380.1	9640	871	34232	2062.2	10058	2350	4805	1132.9	4148	5325.6	698	1108.9	3860	5677.7	792	2221.8	2298
8/17/2001 8:11	5485.4	617	1440.8	12657	3393.7	9693	873.8	34361	2076.8	10145	2350	4805	1133	4149	5383.9	698	1116.1	3948	5736	792	2280.1	2298
8/20/2001 21:48	5571.1	617	1445.4	12708	3406.7	9744	876.7	34471	2098.2	10274	2350	4805	1133	4149	5394.6	826	1116.2	3948	5821.6	792	2365.8	2298
8/23/2001 20:59	5642.2	617	1449.7	12757	3419.2	9793	879.7	34569	2115.9	10380	2350	4805	1133	4149	5403.5	933	1116.2	3948	5892.8	792	2436.9	2298
8/27/2001 20:37	5737.6	619	1453.8	12805	3431.2	9841	882.1	34696	2139.8	10524	2350	4805	1133	4149	5415.5	1076	1116.2	3948	5988.4	793	2532.6	2299
9/4/2001 21:06	5803	619	1453.8	12806	3431.2	9841	882.1	34697	2156.3	10623	2350	4805	1133	4149	5423	1174	1124	4046	6180	793	2725	2299
9/10/2001 21:48	5937	620	1459.6	12871	3447.9	9906	885.7	34848	2190	10827	2359	4914	1142.1	4259	5440.5	1376	1171	4197	6325.6	6794	2869.8	2300
9/24/2001 20:39	6271.1	622	1466.1	12944	3466.4	9979	889.5	35042	2274.6	11327	2547.8	5165	1183.8	4759	5578.8	1711	1213.4	4697	6513.4	1044	3094	2301
9/27/2001 20:30	6342.9	9622	1468.1	12966	3472	1001	891.4	35604	2292.5	11434	2556.9	5272	1192.8	4867	5650.6	1712	122.4	4805	6585.2	1045	3103.3	2409
10/2/2001 21:45	6463	623	1472.9	13023	3485.7	10057	894.7	35218	2322.8	11616	2572	5455	1192.8	4867	5771.8	1712	1222.4	4805	6706.5	1045	3118.4	2590

APPENDIX D



TITLE:
CONCENTRATION VS. TIME: DVE-101
CHAMPION PRODUCTS COMPANY
PERRY, NEW YORK

DWN:
HLW

CHKD:

DATE:
11/21/01

DES.:

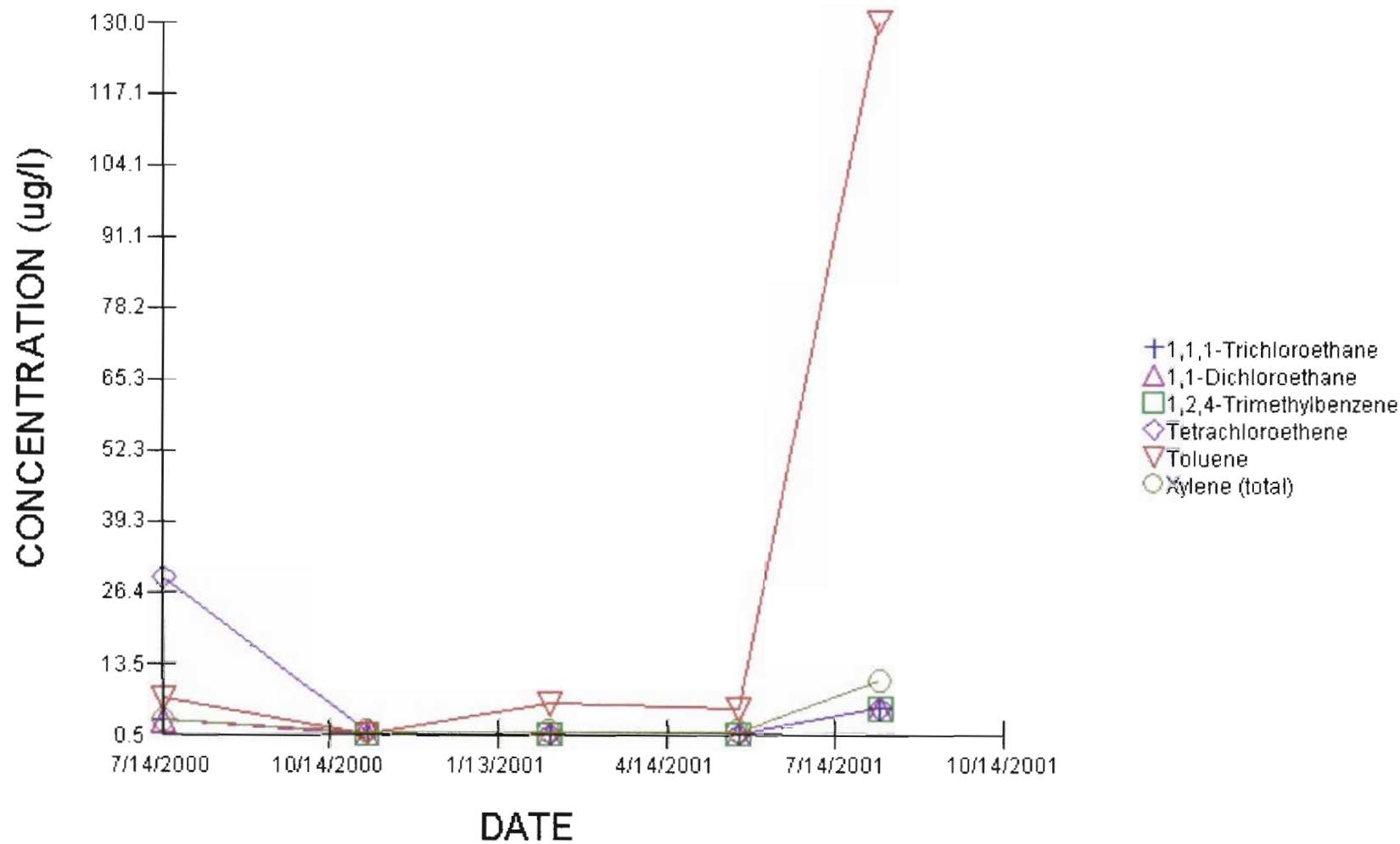
APPD:

REV.:

PROJECT NO.:

S098-009

FIGURE NO.:



TITLE:
CONCENTRATION VS. TIME: DVE-102
CHAMPION PRODUCTS COMPANY
PERRY, NEW YORK

DWN:
HLW

CHKD:

DATE:
11/21/01

DES.:

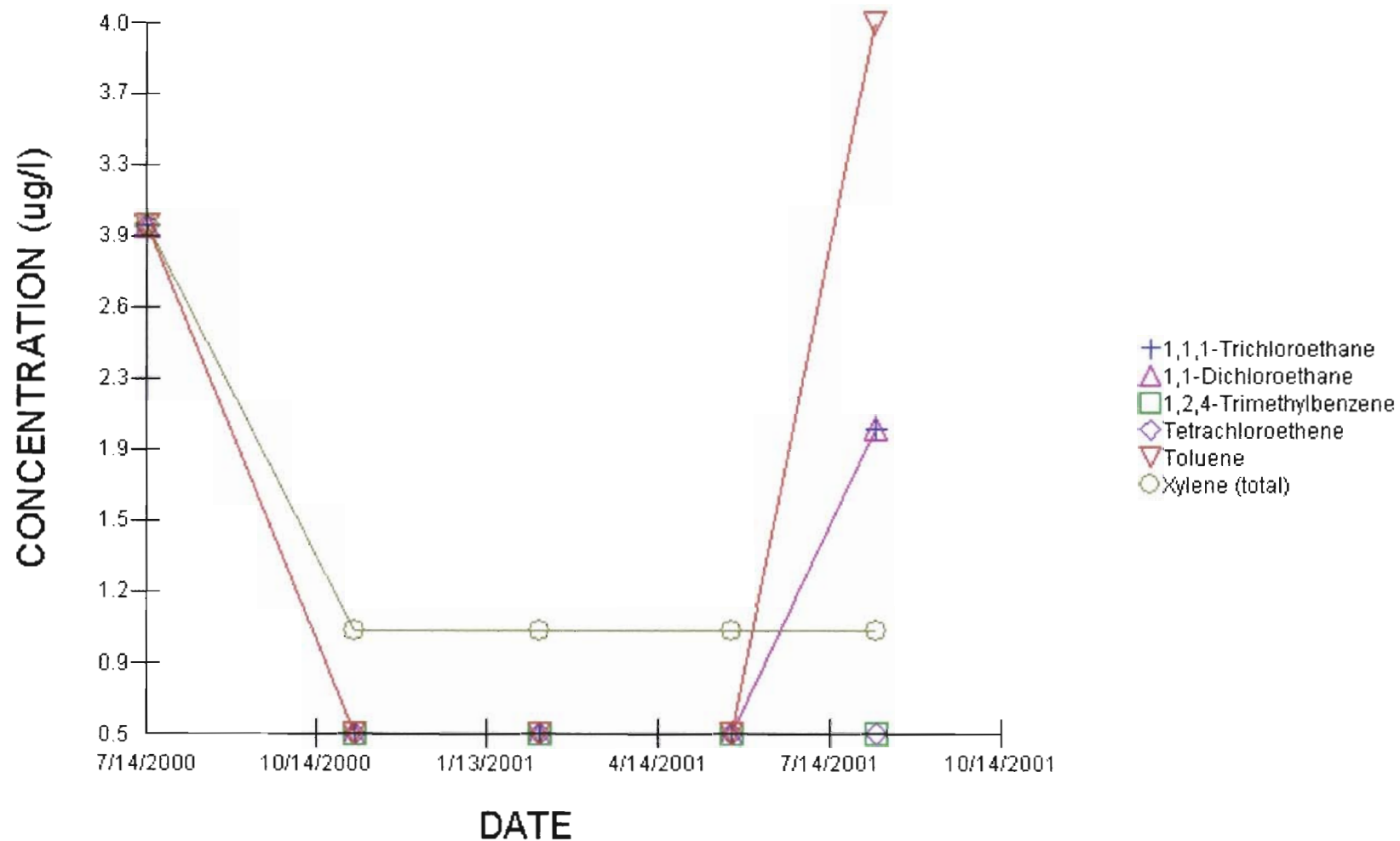
APPD:

REV.:

PROJECT NO.:

S098-009

FIGURE NO.:



TITLE:

CONCENTRATION VS. TIME: DVE-103
CHAMPION PRODUCTS COMPANY
PERRY, NEW YORK

DWN:
HLW

CHKD:

DATE:
11/21/01

DES.:

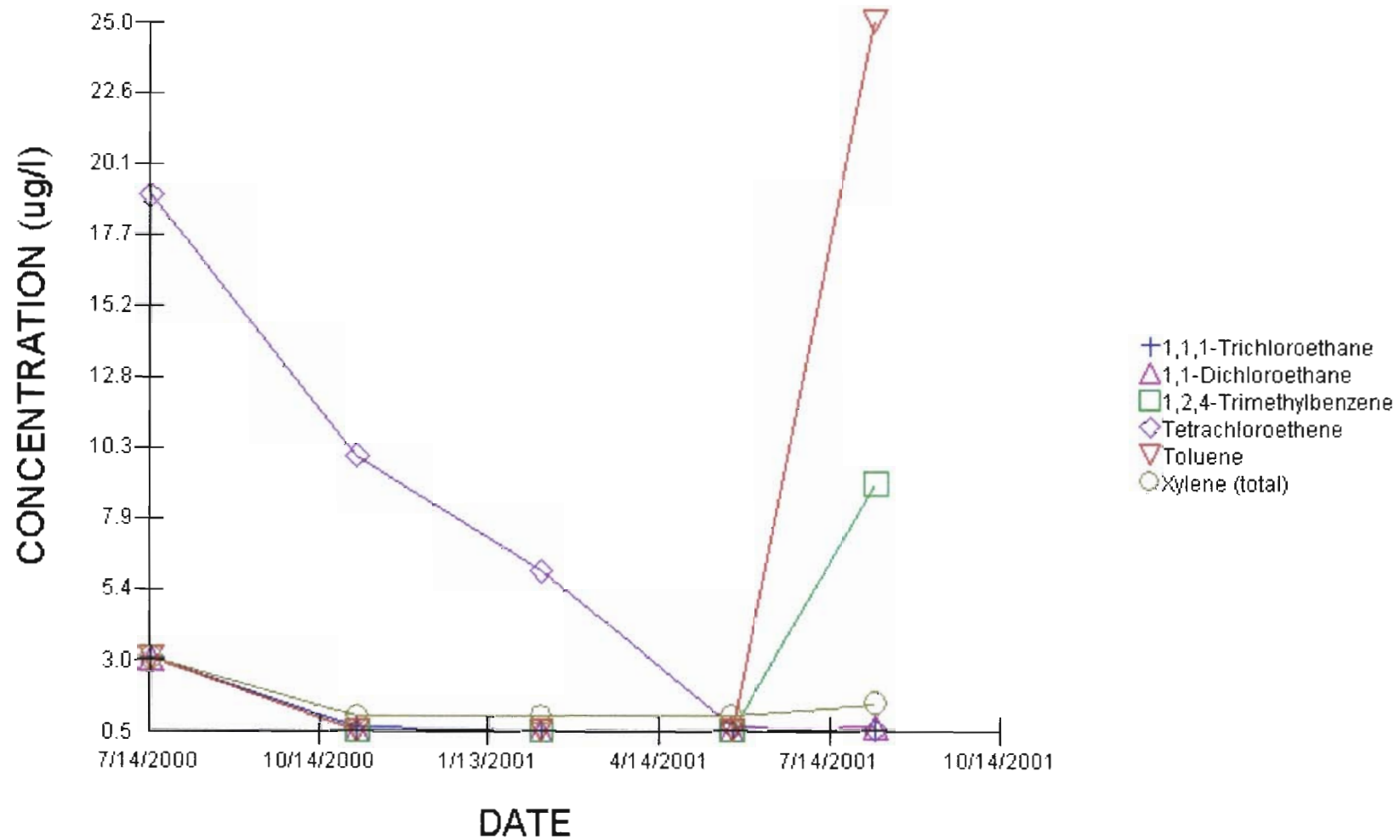
APPD:

REV.:

PROJECT NO.:

S098-009

FIGURE NO.:



TITLE:
CONCENTRATION VS. TIME: DVE-104
CHAMPION PRODUCTS COMPANY
PERRY, NEW YORK

DWN:
HLW

CHKD:

DATE:
11/21/01

DES.:

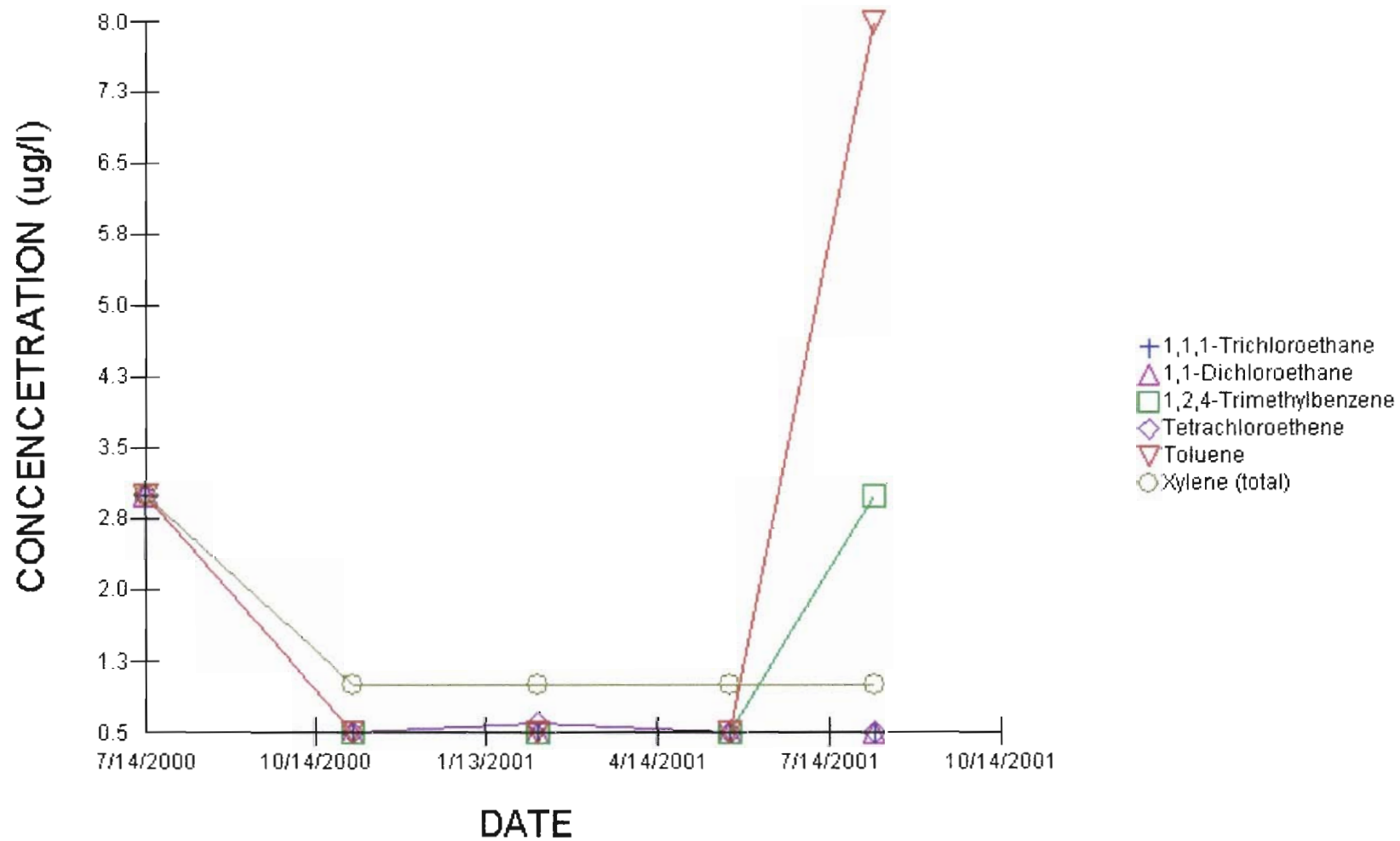
APPD:

REV.:

PROJECT NO.:

S098-009

FIGURE NO.:



TITLE:
 CONCENTRATION VS. TIME: DVE-105
 CHAMPION PRODUCTS COMPANY
 PERRY, NEW YORK

DWN:
 HLW

CHKD:

DATE:
 11/21/01

DES.:

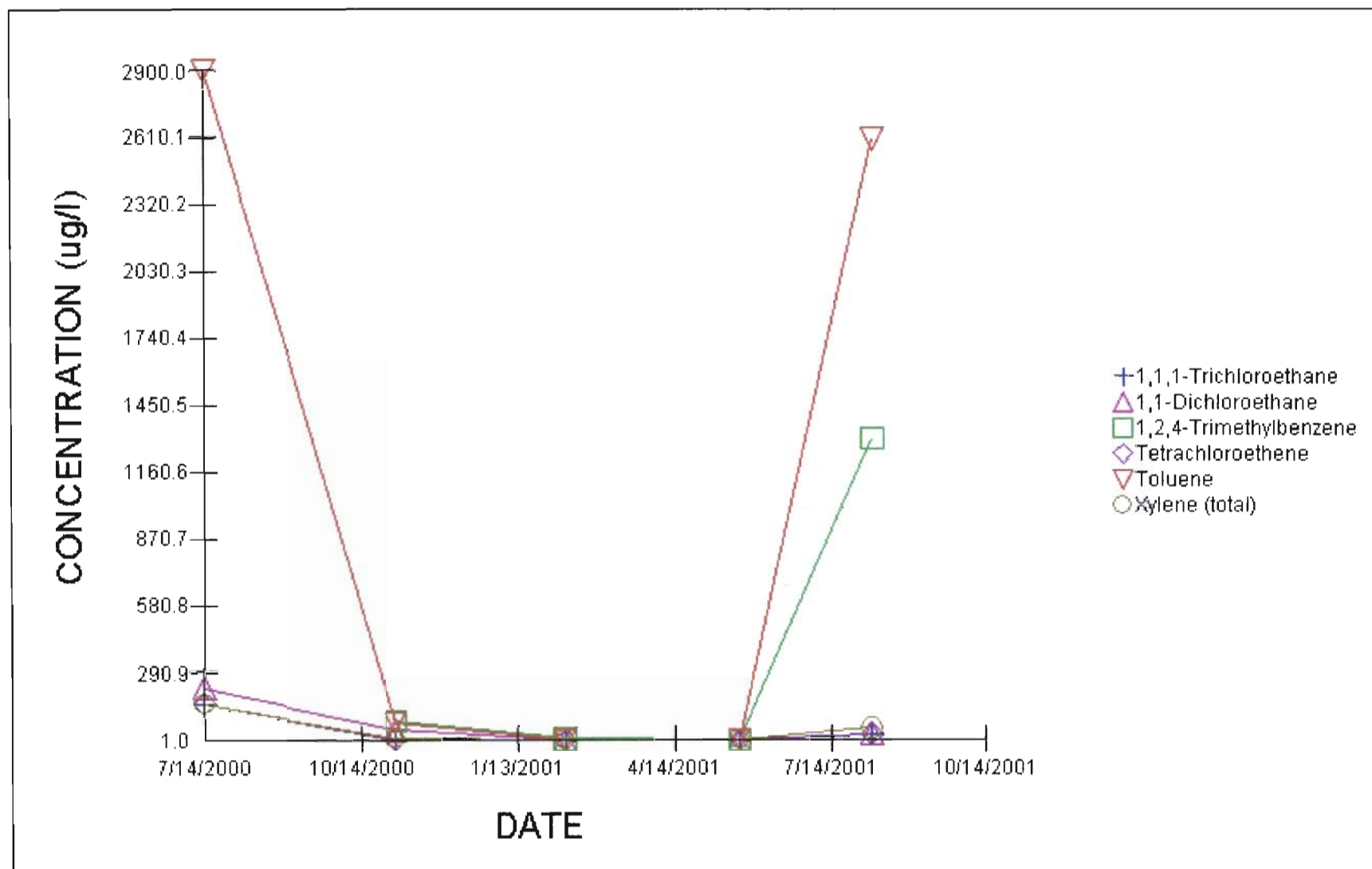
APPD:

REV.:

PROJECT NO.:

S098-009

FIGURE NO.:



TITLE:

CONCENTRATION VS. TIME: DVE-106
CHAMPION PRODUCTS COMPANY
PERRY, NEW YORK

DWN:
HLW

CHKD:

DATE:
11/21/01

DES.:

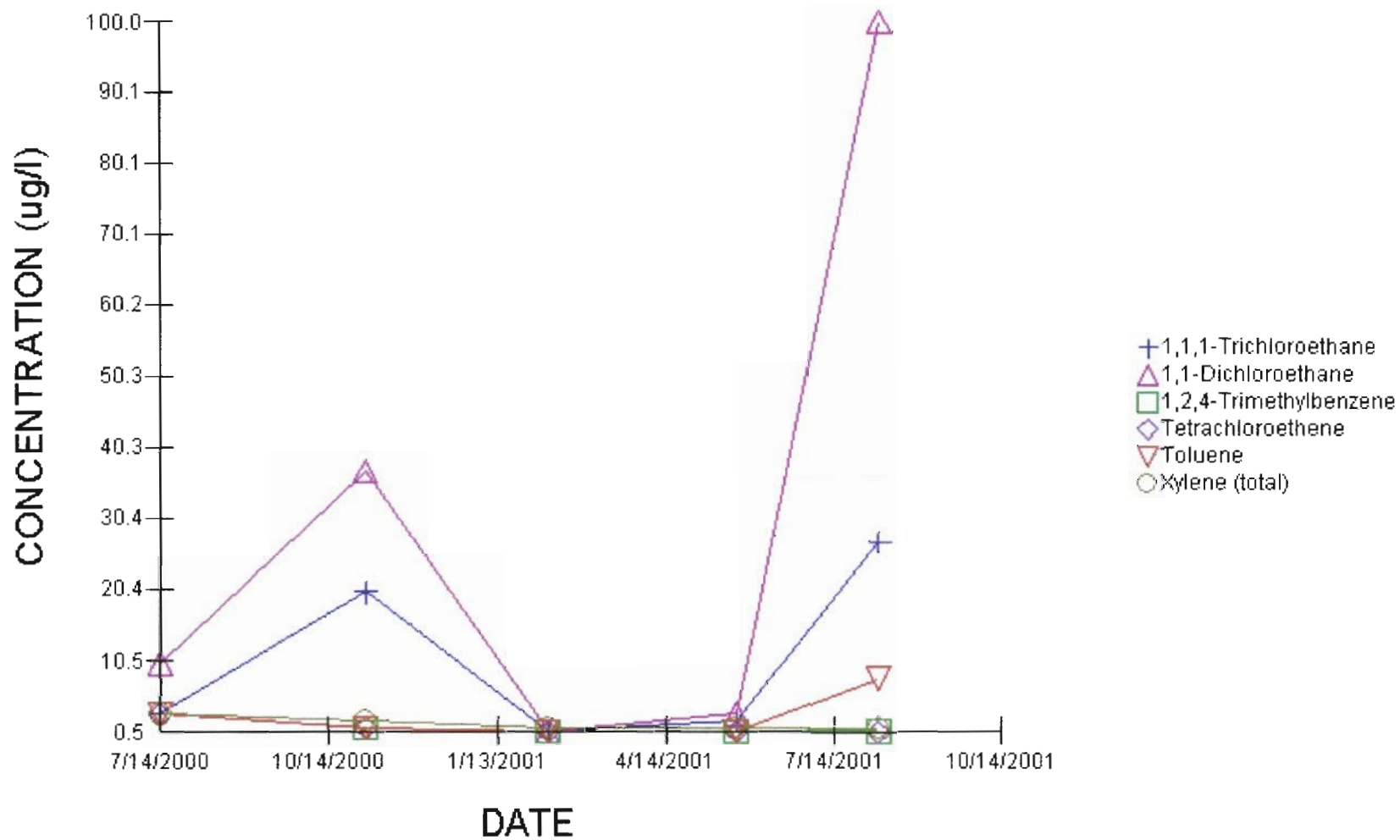
APPD:

REV.:

PROJECT NO.:

S098-009

FIGURE NO.:



TITLE:

CONCENTRATION VS. TIME: DVE-107
CHAMPION PRODUCTS COMPANY
PERRY, NEW YORK

DWN:
HLW

CHKD:

DATE:
11/21/01

DES.:

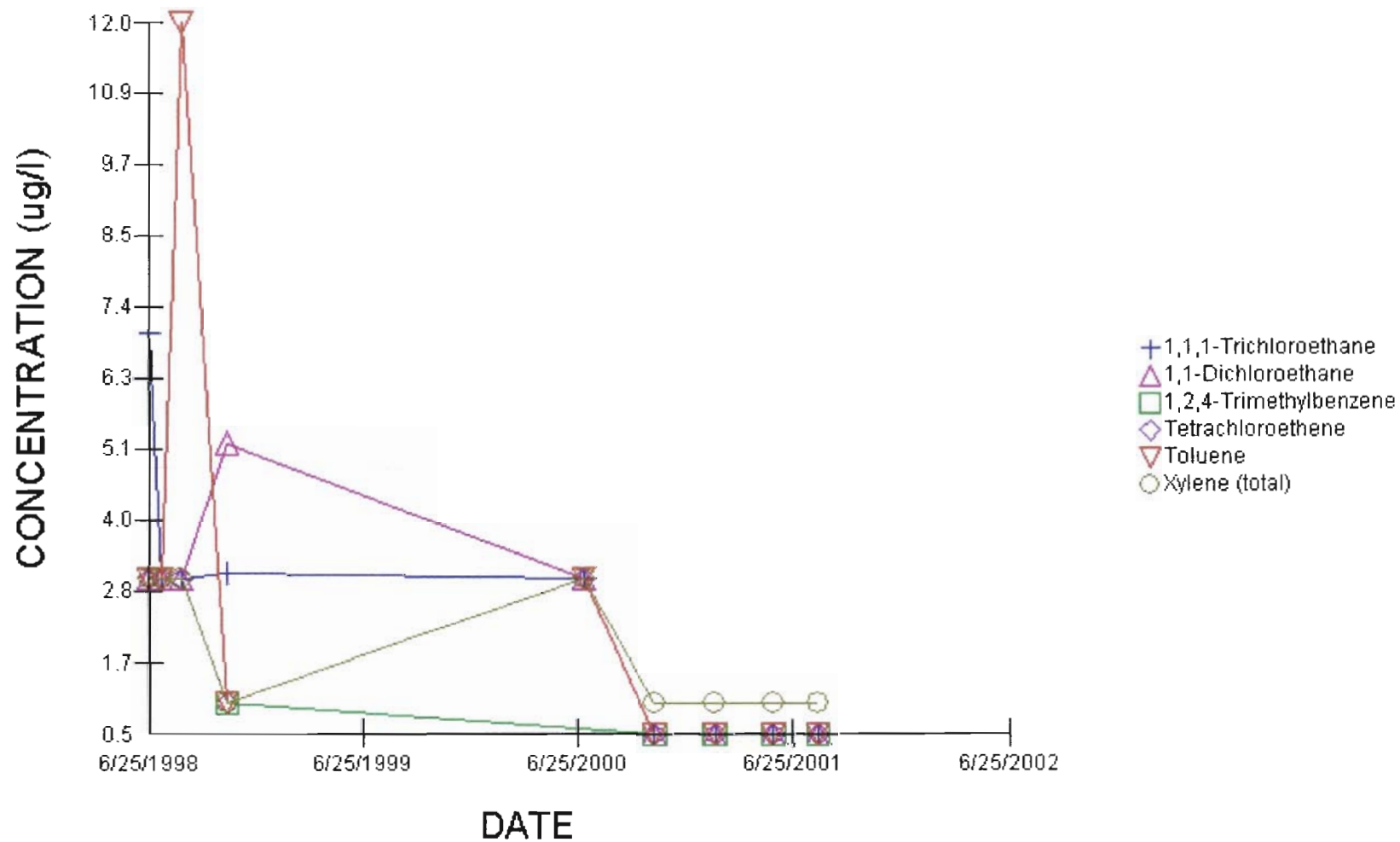
APPD:

REV.:

PROJECT NO.:

S098-009

FIGURE NO.:



TITLE:
CONCENTRATION VS. TIME: MW-102
CHAMPION PRODUCTS COMPANY
PERRY, NEW YORK

DWN:
HLW

CHKD:

DATE:
11/21/01

DES.:

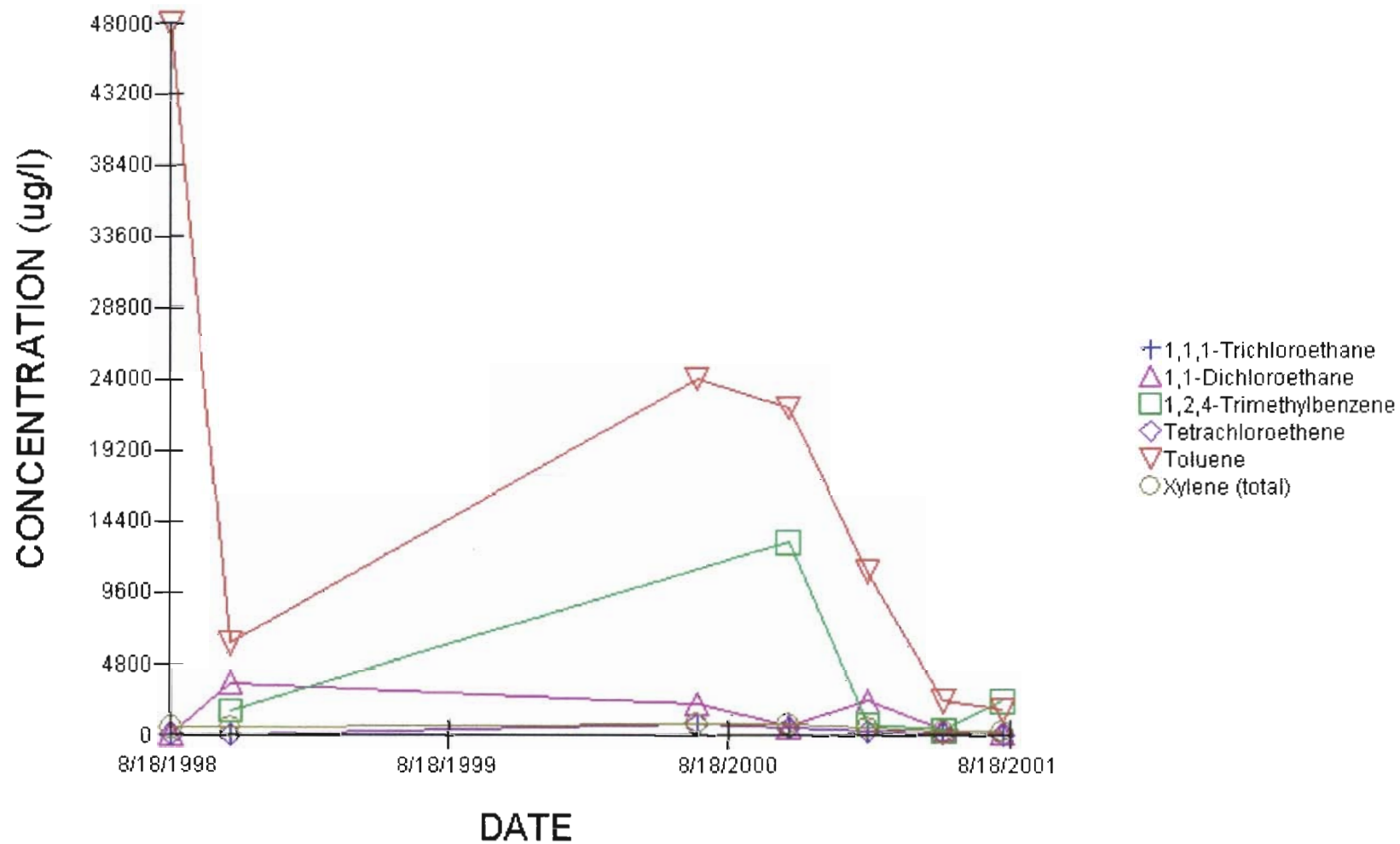
APPD:

REV.:

PROJECT NO.:

S098-009

FIGURE NO.:

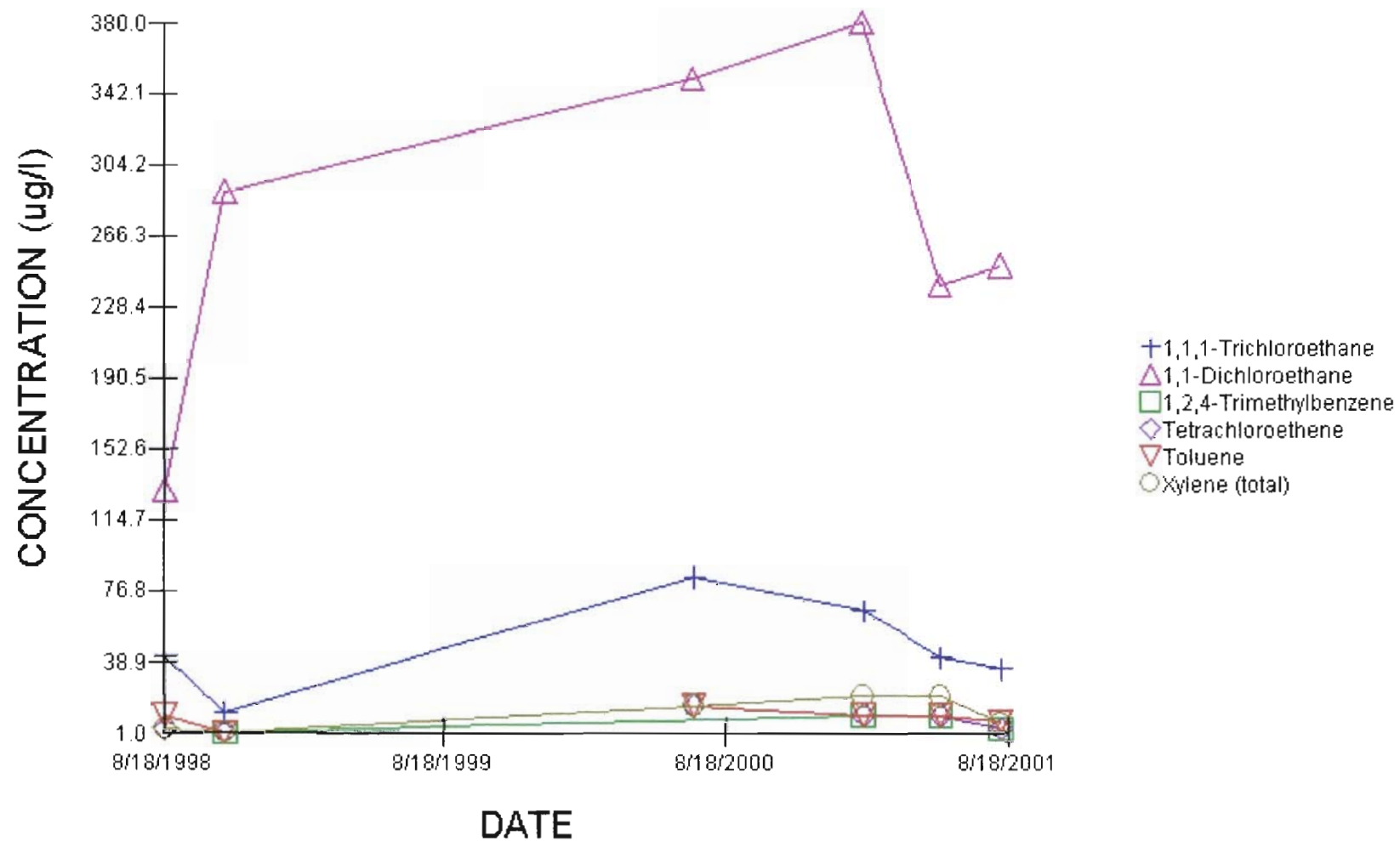


TITLE:
 CONCENTRATION VS. TIME: MW-106
 CHAMPION PRODUCTS COMPANY
 PERRY, NEW YORK

DWN:
 HLW
 CHKD:
 DATE:
 11/21/01

DES.:
 APPD:
 REV.:

PROJECT NO.:
 S098-009
 FIGURE NO.:



TITLE:
CONCENTRATION VS. TIME: MW-107
CHAMPION PRODUCTS COMPANY
PERRY, NEW YORK

DWN:
HLW

CHKD:

DATE:
11/21/01

DES.:

APPD:

REV.:

PROJECT NO.:

S098-009

FIGURE NO.:

APPENDIX E

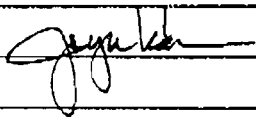
Site Health and Safety Plan

POST ON SITE**CLASS III Petroleum SITE HEALTH AND SAFETY PLAN**

Prior to initiating field activities, the Site Safety Officer (SSO) or Project Manager must review the Site Health and Safety Plan (SHSP) with all members of the field crew, including Delta employees and subcontractors. All field team members working in the contamination zone, or who may be exposed during the course of their work, shall have completed OSHA 40-hour HAZWOPER and annual refresher training (29 CFR 1910.120), CPR and First Aid training. When required by the local regulatory authority, copies of training certificates, CPR/First Aid cards, and respirator fit-test documentation shall be maintained on-site. Each O&M team member must review the SHSP and sign and date the Acknowledgement Agreement on page 16 of the plan. Each subcontractor employee and visitor must review the SHSP and sign, date, and describe their affiliation on page 17 of the plan. The signed plan is to be kept in the field for the duration of the project and returned to the project file upon completion of field activities.

SHSPs may be revised or rewritten for different phases of a project, if site activities are distinctly different, if areas of differing hazard are involved, or as information about contaminants and hazards changes. Changing conditions may justify either increasing or decreasing SHSP restrictions and action levels, depending upon the additional information generated.

O&M PROJECT NUMBER **S098-009-5****I. GENERAL INFORMATION**

Client:	Sara-Lee Corporation	Site Owner:	Champion Products, Inc.
Site Name:	Champion Products, Inc	Claim Number:	N/A
Site Address:	200 X North Main Street, Perry, New York 14530		
Project Manager:	Joyce Koker		
Plan Prepared by:	Terri Morris	Date:	10/15/01
Approved by:		Date:	10/22/01
Revised by:		Date:	
Revision Approved by:		Date:	

Objectives: Perform remedial activities; monthly operation and maintenance of remediation system.

Place date(s) in appropriate box(es) for current phase(s) of site activities.

Site Activities	Soil Borings	Monitoring Well Installation	Tank Removal	Soil Excavation	Recovery Well Installation	Pilot Tests	Treatment System Construction	Soil and Ground Water Sampling	O&M
Site Assessment									
Remedial Investigation	7/98	7/98						7/98	
Site Remediation Activities					7/00	4/00	7/00	monthly	monthly

II. EMERGENCY CONTINGENCY PLAN

A. LOCAL EMERGENCY TELEPHONE NUMBERS (provide area code):

Ambulance	911
Hospital Emergency Room	(716) 786-2233
Poison Control Center	911
Fire Department	911 / (716) 237-2050 – Perry Village Fire Dept.
Police Department	911 / (716) 237-5445 – Perry Village Police Dept.
Hazardous Materials Response Unit	911

Note: If you list 911, check to be sure it is activated in the site area and determine whether it is enhanced.

Is 911 enhanced? Yes ☒ No ☐

B. EMERGENCY ROUTES:

Hospital* Name: Wyoming County Community Hospital Phone number: (716) 786-2233
 Hospital Address: 400 N. Main Street, Warsaw, NY 14569
 Directions to nearest hospital: Make a left out of the parking lot onto Main Street travel approximately one mile to route 246 turn right and travel approximately two miles to route 20A, turn left and travel approximately ten miles to the signal light at the intersection of route 20A and Main Street turn left and proceed to the hospital. (see attached map)
 Estimated driving distance: 15 miles
 Estimated driving time: 25 minutes

Does hospital accept chemically contaminated patients? Yes ☒ No ☐

* Hospital should be notified immediately if an injury occurs which requires medical attention.

INSERT MAP OF HOSPITAL ROUTE(S) AS LAST PAGE OF SITE HEALTH & SAFETY PLAN.

C. SITE RESOURCES:

Water supply available on site:	Yes	☒	No	☐	
Telephone available on site:	Yes	☒	No	☐	
Bathrooms available on site:	Yes	☒	No	☐	
Electricity available on site:	Yes	☒	No	☐	
Other resources available on site:	Yes	☐	No	☐	If "yes", identify: _____

For each "no", identify the closest available resource and provide directions: _____

D. EMERGENCY CONTACTS:**PHONE NUMBER (provide area codes)**

			Work	Home
1.	Project Manager:	Joyce Koker	(262) 827-4802	
2.	Sr. Consultant	Steve Zbur	(412) 487-7703	(724) 449-9029
3.	Site Contact:	Joe Galarneau	(716) 237-6111	
4.	Regulatory Consultant:	Maurice Moore, NYDEC	(716) 851-7220	
5.	O&M Contact	Jason Butler	(716) 237-5940	
6.				
7.				
8.				
9.				
10.				

E. PROJECT HEALTH AND SAFETY TEAM:Team Members (list)

Project Manager:	Joyce Koker
Public Information:	Steve Zbur (CORE Environmental)
O&M on-site Personnel: (On-site personnel are responsible for O&M site health and safety.)	Jason Butler (Butler Construction)
	Ron Jenkins (CORE Environmental)
O&M Site Safety Officer:	Ron Jenkins

F. PERIMETER ESTABLISHMENT:

Map/Sketch attached: Yes ☒ No ☐ Site secured: Yes ☐ No ☒

Perimeter identified: Yes ☒ No ☐ Zone(s) of Contamination identified: Yes ☒ No ☐

Prevailing wind direction, if known: westerly

In the event of an emergency incident, the site project team will meet at:
facility entrance along North Main Street

Evacuation routes & procedures, if applicable:

N/A

G. WORK ZONES:

An exclusion zone, contamination reduction zone and support zone will be identified for each site or site activity. Zones will be marked with yellow **CAUTION** tape or cones, as needed. No person will be allowed in the exclusion zone or contamination reduction zone without approval from the O&M Site Safety Officer.

H. SITE SECURITY:

When work scheduling requires that an excavation be left open overnight, security fencing will be erected to restrict access to the site or work zones described in Section II.G.

I. **SITE MAP:** attach in front of Hospital Route Map at end of completed Site Health and Safety Plan.

III. SITE CHARACTERIZATION

A. Summary of Previous Site Investigation(s):

Phase I / Phase II Environmental Assessments, Initial Remedial Investigation – Chlorinated VOCs and mineral spirits identified in soil and ground water.

B. Source of Previous Site Investigation Information:

Delta Environmental

C. General Facility Description:

Gasoline Service Station ☐ Refinery ☐ Bulk Terminal ☒ Other warehouse/printing

Description: Active ☒ Closed/Abandoned ☐

Site Activities (operations on-site, products, raw materials used, etc.):

print screen of athletic apparel for sports teams and retail sale

How many years has the site been operating? Since 1958

Was the site used by previous owners?: Yes ☒ No ☐

Describe previous site activity:

similar to current use, print screening of apparel

Surface cover on-site includes:

☐ Soil/bare ground	☐ Clay caps	☐ Plastic cover
☒ Grass	☒ Paving/asphalt	☒ Water bodies
☒ Woods	☐ Swamp	☐ Brush/scrub
☒ Buildings	☐ Unpaved roads	☐ Other

Approximate site surface area: _____ sq. ft. or 10 _____ acres

Percentage of surface area:	paved	5	%
	vegetated	3	%
	bare soil		%
	buildings	92	%

Potential for dust generation on-site: High ☐ Medium ☐ Low ☒

Any site access restrictions: Yes ☐ No ☒

Fenced/locked ☐ Posting (signs) ☐ Security guards ☐

Is there evidence of public access to the site? Yes ☒ No ☐

If "yes," describe: public access roads

D. Regulatory Contacts:

Are regulatory agencies involved with the site? Yes ☒ No ☐

If "yes," are they: federal? ☐ state? ☒ local? ☒

Name	Agency	Phone (incl. area code)
Maurice Moore	NYDEC	(716) 851-7220
Martin Doster	NYDEC	(716) 851-7000
James Charles	NYDEC	(716) 851-7050
Andrew English	NYDEC	(518) 457-0315
Gary Bonarsky	Wyoming Cty. Dept of Health	(716) 786-8894
John McMahon	NYDEC	(716) 851-7000

IV. WASTE CHARACTERIZATION

A. Waste/Contaminant Type(s) Liquid ☒ Soil ☒ Solid ☐ Sludge ☐ Gas ☐

Characteristic(s): ☐ Corrosive ☒ Ignitable ☐ Radioactive ☐ Explosive
☒ Volatile ☒ Toxic ☐ Reactive ☒ Flammable
☐ Unknown ☐ Other (describe) _____

B. Major Spills/Releases:

Type	Date	Chemical	Quantity	Contaminated Media*
unknown				

(*air, surface water, soil, or ground water)

Free Product: Yes ☐ No ☒ Dissolved: Yes ☒ No ☐

Have removal actions occurred? Yes ☒ No ☐

If "yes," describe: _____

Soil excavation from northwest parcel of property in June 1999. Disposal of approximately 643 tons of soil containing residual petroleum products at BFI, Niagara Falls, NY.

Is there evidence that contaminants present could cause vapor problems in structures on-site?

Yes ☐ No ☒ If "yes," is building mechanically ventilated? Yes ☐ No ☐

Exhaust Ventilation

General Building Ventilation

C. Chemicals/Waste Stored On-site (including petroleum products):

		How Many?	Size?	Chemical?
☒	Drums	20-30	55-gallon	waste solvents, soil cuttings
☒	Tanks	1	1,000-gallon	water with ink remover & degradant
☐	Vats			
☐	Surface impoundments			
☐	Pits/landfills			
☐	Other			

Identify all chemical products O&M will use or store on site:

Alconox, isopropyl alcohol

Material Safety Data Sheets (MSDSs) are **required** for site chemicals. Please indicate where MSDSs can be found for this site:

☐ MSDS Log/Binder ☒ Attached.

V. REMEDIATION SYSTEM INFORMATION (complete when applicable)

Has system been installed? Yes ☒ No ☐

Describe: dual phase extraction system

Enclosed per codes? Yes ☒ No ☐
Ventilated? Yes ☒ No ☐
If "Yes," Explosion-proof? Yes ☐ No ☒
Blower systems on a timer? Yes ☒ No ☐

Have sound level surveys been conducted on site? Yes ☐ No ☒

If "Yes," record range of survey results and approximate distance from source:

dBA	Source	Distance from Source	Date

Check all energy sources on the remediation site:

☒ Electrical ☐ Mechanical ☐ Other (describe) _____
☐ Thermal ☐ Hydraulic
☐ Chemical ☐ Pneumatic

NOTE: If there is more than **1 energy source** on site, **written, equipment-specific Lockout/Tagout Procedures are required!**

Written Lockout/Tagout Procedure required? Yes ☒ No ☐ Where is it located? Attached _____

VI. HAZARD EVALUATION

Identify all chemicals that are present or are suspected of being present on site and list their maximum concentrations in soil/water. Information on hazardous properties is listed in **Appendix A**. For chemicals not shown in **Appendix A**, enter the hazardous property information in the spaces provided and attach a Material Safety Data Sheet.

Chemical Name	TLV/PEL	Maximum Concentration in Soil (P)	Maximum Concentration in Water (P)	Health Hazards/ Comments
		See attached tables		See Appendix A & attached NIOSH info.
			-	

(P) = results pending

Potential Hazards (check boxes that apply to the site):

☐	corroded containers	☐	visible leachate	☐	underground tanks
☒	overhead electric lines	☒	underground utilities	☐	surface tanks
☐	visible soil contamination	☐	odors	☐	observed tanks
☐	observed free product	☐	dust	☐	confined spaces
☐	open lagoons	☐	open pits		
☒	air stack emissions	☒	on-site surface water contamination		
☐	visible on-site releases	☐	off-site surface water contamination		
☐	visible off-site releases	☐	interior building contamination		
☐	visible on-site erosion	☐	no obvious hazards		

VII. PERSONAL PROTECTION & MONITORING EQUIPMENT GUIDELINES

A. PERSONAL PROTECTION:

Level of Protection: B ☐ C ☐ D ☒ (with modifications)

Modifications:

1. All personnel working in the exclusion zone must wear hardhat, safety shoes, safety glasses and/or face shield.
2. Nitrile gloves and tyvek/saranex suit should be worn if contact with contaminated water or soil is likely.
3. Hearing protection must be worn if noise levels prevent normal conversation at a distance of three feet.
4. No smoking, eating, or drinking is allowed in the exclusion or contamination reduction zones.
5. No personnel are to enter or approach any excavation area where there is a danger of wall collapse or confined space entry.
6. Respiratory protection is dependent on conditions listed in Section VII.B.3, page 10.

B. SURVEILLANCE EQUIPMENT AND MATERIALS:

1. Calibration

The photoionization detector (PID) or flame ionization detector (FID) will be calibrated before and after field activities by a qualified individual.

2. Frequency

The breathing zone of O&M employees on-site will be monitored every hour (at a minimum) and recorded in the O&M fieldbook. Monitoring should be conducted during tasks which may result in exposure to vapors.

3. Instrumentation

Instrument	Reading	Action Taken
Photoionization detector (HNU) or Flame ionization detector (OVA)	Total Org. Vapors Bkgrd - 2 ppm 2 - 10 ppm 10 - 500 ppm >500 ppm	Level D. Work may continue. Level D. Collect benzene detector tubes. Level C. Air-purifying respirator with organic vapor canisters. Collect benzene detector tubes. Leave area. Contact Health & Safety Sr. Specialist.
Benzene colorimetric detector tubes	0 - 0.5 ppm 0.5 - 10 ppm >10 ppm	Level D. Work may continue. Level C. Air-purifying respirator with organic vapor canisters. Leave area. Contact Health & Safety Sr. Specialist.
Explosion Meter	< 10% of LEL 10 - 20% of LEL > 20% of LEL	Work may continue. Evaluate inhalation potential. Work may continue. Eliminate all ignition sources, increase monitoring frequency, consider use of ventilation. Work must stop!
Oxygen Meter	< 19.5% O ₂ 19.5% to 23.5% O ₂ >23.5% O ₂	Leave area. Reenter only with SCBA. Work may continue. Investigate causes of changes above/below 21%. Work must stop. Ventilate before returning and retest atmosphere. O ₂ -rich atmospheres pose explosion hazards.
Hydrogen Sulfide (H ₂ S) Colorimetric Tubes or Monitors-- Some states with high regional H ₂ S have special, local monitoring requirements.	0-5 ppm 5-10 ppm >10 ppm	Continue working. Requires Level B including supplied air respirator or SCBA. Increase monitoring frequency. Supplied air respirator required due to poor warning properties and toxicity.
Sound Level Meter	< 85 dBA 85 - 90 dBA > 90 dBA	Suggest wearing hearing protection when it is necessary to raise voice to be heard at distance of 3 feet. Hearing protection required. Install warning signs for fixed noise sources. Hearing protection required. Employer must have Hearing Conservation Program.

C. FIRST AID EQUIPMENT AND PROCEDURES:

1. First Aid Equipment:

Standard first aid kit (sized for number of individuals on-site).

Portable eye wash (appropriate for number of individuals on-site).

2. First Aid Procedures:

Ingestion: Follow instructions from Poison Control Center or the MSDS.

Inhalation: Move victim to fresh air. Seek medical attention if needed.

Dermal Exposure: Remove contaminated clothing. Wash thoroughly with soap and water.

A first aid kit will be provided on-site for use in case of minor injuries. A portable eye wash will also be provided, and if a worker suffers a chemical splash in the eye, the field team will be instructed to flush the eye for 15 minutes and arrange for off-site medical treatment immediately. Workers will also be instructed to thoroughly wash with soap and water any unprotected skin which comes in direct contact with contaminated soil or water.

Workers providing CPR or First Aid should use Universal Precautions to control possible exposure to bloodborne and infectious agents. Report all CPR or First Aid assistance to the Health and Safety Sr. Specialist immediately.

3. Site Emergencies:

In the event of a fire or explosion, evacuate the site immediately and call the appropriate emergency phone numbers listed in Section II.A, page 2.

In case of a spill, try to contain with clean dirt, if feasible, and call the local fire department or hazardous materials response (HAZMAT) unit. Phone numbers are listed in Section II.A, page 2.

Have procedures for remediation system shutdown or emergency procedures been provided to site owner or manager?

☐

Yes

☒

No

(Applies to sites with remediation systems in place).

VIII. SAFETY STANDARD OPERATING PROCEDURES

A. CHEMICAL HAZARDS:

A photoionization detector (PID) or flame ionization detector (FID) will be used to measure the relative concentration of hydrocarbon vapors. Monitoring for exposure to benzene vapors may be done using activated charcoal tubes and vacuum pumps, vapor badges, or benzene colorimetric tubes in the breathing zone when working with heavily contaminated soil or water. Action limits for use of respiratory protective equipment are outlined in Section VI.B above. All respiratory protection equipment shall be NIOSH/MSHA-approved and use shall conform to OSHA 29 CFR 1910.134. A written Respiratory Protection Program detailing selection, use, cleaning, storage, medical monitoring, training and fit-testing of respiratory protective equipment is maintained at the Delta office.

In addition to being inhalation hazards, hydrocarbon compounds can also be absorbed through the skin. Skin contact with liquid hydrocarbons or fuel hydrocarbon-bearing soil should be prevented. In situations where sampling would result in direct skin contact with hydrocarbon liquids, saturated soil or contaminated equipment, nitrile gloves will be worn.

Drilling or digging may also liberate pockets of hydrogen sulfide (H₂S). While the characteristic "rotten egg" odor of H₂S is detectable at levels as low as 0.0005 ppm, prolonged detection is unreliable due to its olfactory fatigue properties. In open air on a typical petroleum remediation site, risk from exposure to H₂S is minimal. However, should H₂S be encountered, workers shall be instructed to stop drilling/digging and move to an upwind location until the vapors have dissipated, as measured by

H₂S colorimetric detector tubes or other direct-reading instruments. The bore hole or excavation will be immediately backfilled.

A combination explosimeter/oxygen (O₂) meter will be available on-site to monitor the levels of flammable gases, such as petroleum vapors and methane. An explosimeter should also be used by a subcontractor to verify that the atmosphere inside an underground storage tank has been inserted prior to allowing the tank to be removed.

B. PHYSICAL HAZARDS:

1. Mechanical hazards: cuts, abrasions, contusions; slips, trips, falls; being struck or entrapped by moving parts of heavy equipment or falling objects. Such hazards will be minimized by keeping the work area free of equipment and debris that could cause slips, trips or falls and maintaining a safe distance from heavy equipment and moving machinery parts.

2. Electrical hazards: possible excavation of unanticipated electrical cables and potential contact by heavy equipment with overhead power lines during drilling and excavation. Maintain at least 20 feet clearance from overhead power lines. If unavoidably close to overhead or buried power lines, turn power off and lock out circuit breaker. All equipment will be properly locked/tagged out when required by the Energy Lockout/Tagout Program and Safe Electrical Work Policy and Procedure for O&M Project Work. Avoid standing in water when operating electrical equipment.

3. Traffic hazards: Petroleum site work frequently necessitates working in parking lots, streets or other areas with vehicular traffic. In such instances, the work team will be issued neon traffic safety vests and will use traffic cones and/or barricades as necessary to prevent collisions between pedestrians and motor vehicles.

4. Open excavations: When scheduling or work conditions necessitate leaving excavations open overnight, security fencing will be erected to restrict access to the site or work zones described in Section II.G, page 4, will be erected

C. UTILITIES:

A minimum of 48 hours prior to excavating, Underground Service Alert or the state equivalent:

[Name] UFPO (Underground Facilities Protection Organization)

[Phone #] (800) 962-7962

will be contacted and informed of the scheduled field activities. The underground service locator company will identify which underground utilities (e.g. electrical, gas, sewer, water, telephone, cable TV) are present and will notify their respective owners. The utilities will be located by their owners. Prior to drilling, post holes or probing to a depth of 5 feet will be done where feasible to ensure no utilities, lines or tanks are in the way.

Has the utility service locator company been notified? Yes ☐ No ☒

Confirmation #, if applicable: UFPO will be notified before all drilling/excavation activities

D. WORK LIMITATIONS (time of day, weather, heat/cold stress):

In high ambient temperatures (especially in conjunction with high humidity), follow heat-stress precautions. Drink plenty of cool water and/or electrolyte-replacement beverages (e.g., Gatorade). Take frequent breaks in areas out of direct sunlight and remove protective clothing during breaks. Check the resting pulse and increase the number of breaks if the pulse does not return to normal during work breaks. If possible, alter work schedules so that work may be conducted during cooler parts of the day (i.e., early morning or evening). Work may only progress during daylight hours or under conditions of adequate lighting.

Symptoms of heat exhaustion and heat stress include:

- Profuse sweating or complete cessation of sweating;
- Changes in skin color;
- Increased respiration;
- Vision problems, confusion;
- Body temperatures in excess of 100°F; and
- Increased heart rate.

Any member of the work team who exhibits these symptoms should immediately be removed from the area and observed while resting in a shaded area after removal of impervious or restrictive clothing and after consumption of cool water or electrolyte fluid. If symptoms persist, immediate medical attention shall be sought.

In cold temperatures, especially when combined with high wind, follow hypothermia precautions:

- Take frequent work breaks in a wind-sheltered area;
- Dress in removable layers of insulated clothing to prevent sweating;
- Carry protective water-proof gear and use it before getting wet;
- Drink warm liquids; and
- Monitor co-workers for signs of shivering, incoordination, or confusion. Workers exhibiting these signs should be removed from the work area and placed in a heated warming shelter.
- Frost-bite (superficial or deep tissue) can occur on any exposed skin at temperatures of 30.2°F or colder.
- If available clothing does not give adequate protection to prevent hypothermia or frostbite (which can occur on any exposed skin), work should be modified or suspended until adequate clothing is made available or until weather conditions improve.

If extreme cold conditions are encountered, follow the ACGIH TLV booklet's "work-warming regime" recommendations, taking an appropriate number of breaks in a heated warming shelter.

E. FIRE AND EXPLOSION HAZARDS:

During the course of underground storage tank removal, drilling, or remediation of petroleum impacted soil or ground water, the potential for fire and explosion of flammable vapors exists. Extreme caution should be taken to monitor for the presence of flammable vapors or conditions which could create flammable conditions. Explosimeters are available for this monitoring and action levels are defined in Section VII.B page 10. Fire extinguishers must be available on all sites with the potential for flammable vapors or electrical fires (i.e., systems, control panels). Use of fire extinguishers by employees trained in their use is limited to employee rescue or extinguishing relatively small, controllable fires. Delta does not expect or require its employees to fight fires.

In the event of a fire or explosion, the following action plan should be followed:

Shut down equipment and shut off all supply lines immediately if this can be done safely.

Evacuate the immediate area. At this point you may not know if a soil vapor fire has started or if a supply line, natural gas line, etc. has been hit. Tank, supply line, or remediation system fires are extremely hazardous and precautions must be taken to evacuate the area immediately.

Call 911 to notify the fire department. O&M employees are not trained fire brigades. Every fire should be treated as an emergency. Even if the fire is extinguished by site personnel, professional fire departments should evaluate the situation to ensure that the danger is over and that a fire will not reoccur.

Evaluate the situation to identify the source of the flammable vapors and to assess the danger to employees, the public and property. From a safe distance, try to determine if the fire is due to a ruptured supply line, ignited soil vapors or methane, or is electrical. This information should be communicated to the fire department. Small fires from known sources (i.e., engine fires, electrical panel fires, etc.) may be extinguished if the employee can do it without high risk. A soil vapor fire may eventually burn itself out. Soil stockpiles must be placed away from nearby structures and property lines. Extinguishing fires in fuel vapor-laden soils with clean soil may be possible. **Employees or subcontractors shall not enter an excavation to attempt to extinguish a fire.**

F. NOISE/HEARING PROTECTION:

Workers shall be instructed in the recognition of noise hazards and shall be provided, and trained in the use of, hearing protective devices. Hearing protective devices shall be worn when working around heavy equipment, particularly drill rigs, or when background noise is so high that a worker has to shout to be heard at a distance of 3 feet.

G. LEVELS OF PROTECTION:

Work on typical petroleum remediation sites can usually be performed in Level D protection: hard hat, steel-toed work shoes/boots, cotton coveralls or long-sleeved shirts and long pants, eye protection, hearing protection, and gloves if needed.

If monitoring equipment or site conditions indicate the need to upgrade the level of protection to Level C, air-purifying respirators with organic vapor canisters (or other appropriate cartridges), Tyvek coveralls with hoods, chemical resistant inner and outer gloves, and disposable boot covers will be donned.

At no time will a O&M employee conduct work on any site requiring Level A protection. On worksites requiring Level B protection, workers will be provided with additional training and equipment. A Contact Health & Safety Sr. Specialist must be on-site at all times while Level B work is being conducted.

H. DECONTAMINATION PROCEDURE:

Level: B. ☐ C. ☐ D. ☒

Contamination may result from walking through contaminated soils or liquids, splashing liquids during sampling, use of or contact with contaminated equipment, or contact with air contaminants. Due to the volatile nature of petroleum hydrocarbons that may be encountered during drilling, hand-augering and sample collection procedures, the need to decontaminate equipment and vehicles will be minimal. Field team workers will be instructed to observe the following precautions to assure contaminants will not remain in contact with their skin.

- Tools, equipment and personnel will be decontaminated using procedures appropriate for the level of personal protection worn.
- All contaminated, disposable clothing (e.g., Tyvek suits, gloves and disposable boot covers) will be properly bagged for disposal and left on site.
- All personnel will be instructed to wash hands, face, neck and forearms at the end of the work shift and to shower at the end of the workday.

No eating or drinking will be permitted in the immediate vicinity of heavy equipment and/or drilling and excavating activities.

No smoking is permitted on any O&M site at any time.

Special decontamination requirements: _____

none

I. CONFINED SPACES:

If entry into a confined space is necessary, a Confined Space Entry Permit must be completed and authorized, and confined space entry procedures followed. Detailed information on O&M's Confined Space Entry classification system, entry procedures and permitting system can be found in the O&M Health & Safety Manual.

Does this site have any permit-required confined spaces? Yes

☐

No

☒

J. INVESTIGATION-DERIVED MATERIAL DISPOSAL:

Soil cuttings and well development or sampling water shall be placed in 55-gallon drums on-site. Disposal methods of drummed soil and water will be determined based on laboratory analytical data. Proper disposal is the responsibility of the responsible party.

K. EXCAVATIONS:

All soil excavation and utility trenching is to be undertaken in strict conformance with all applicable local, state, and federal regulations.

Entry into excavated areas or trenches is allowed only when:

- 1) shoring, sloping and spoil pile placement is in conformance with 29 CFR 1926 Subpart P, and
- 2) personal protection and monitoring, as detailed in this Site Health and Safety Plan, has been implemented.

IX. ACKNOWLEDGMENT AGREEMENT

O&M ENTERPRISES, INC. EMPLOYEE SITE HEALTH AND SAFETY PLAN REVIEW RECORD

I acknowledge that I have read and understood the contents of this Site Health and Safety Plan and I agree to abide by all provisions as set forth.

Signature

Date _____

This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. A vertical margin line is present on the left side, creating a narrow left margin. The paper appears to be from a notebook or a standard ruled sheet.

SITE: _____

[illegible]

PETROLEUM CLASS III SHSP--HAZARDOUS PROPERTY INFORMATION

Material	Water Solubility A & B	Specific Gravity ^C	Vapor Density ^D	Flash Point °F ^E	Vapor Pressure mm/Hg ^F	%LEL/ %UEL ^G	LD 50 mg/kg ^H	TLV-TWA <i>PEL</i> ^I	IDLH Level ^J	Recommended Respiratory Protection/Max. Use Concentration <i>Odor Threshold</i> ^K	Hazard Property ^L	Dermal Toxicity ^M	Acute Exposure Symptoms ^N
Acetone	Miscible	0.790	2.0	0	180 (20 °C)	2.5/12.8	5800	750 ppm 1000 ppm 550 ppm <i>proposed TLV</i>	20,000 ppm	½/OV/1000 ppm 100 ppm	B	DEJ (Eye)	BEFKMN
Acrolein	40%	0.841	1.94	-15	210 (20 °C)	2.8/31	46	0.1 ppm 0.1 ppm	2 ppm	Supplied air Poor warning .21 ppm	BCDE	BEJ	ADKMN
Acrylonitrile (Vinyl cyanide)	7%	0.800	1.9	32	100 (23 °C)	3.0/17	78	2 ppm (Skin) 2 ppm (Skin)	500 ppm	½/OV/20 ppm FF/OV/100 ppm 21.4 ppm-Rapid fatigue	BCDEG	DGI	BFGKLMN
Ammonia	34%	0.771	.059	Not Appl.	8.5 atm (20 °C)	15/28	350	25 ppm 50 ppm	300 ppm	½/AM/250 ppm FF/AM/<500 ppm 46.8 ppm	CD	DFI	MN
Arsine	20%	1.689	2.7	Not Appl.	11,000 (20 °C)	5.1/78	3	0.05 ppm 0.05 ppm	6 ppm	Supplied air Warning unknown	BCDG	DG	BCDEFGKL MNQ
Asbestos	Insoluble	3.1-3.25	Not Appl.	Not Appl.	0 (20 °C)	NA/NA	Not Avail.	* 0.1 f/cc	Not Appl.	½/HEPA/2 f/cc FF/HEPA/10 f/cc	G		
Benzene	0.18%	0.877	2.77	12	75 (20 °C)	1.2/7.8	930	10 ppm 1 ppm <i>(0.5 ppm - skin proposed TLV)</i>	3000 ppm	½/OV/10 ppm FF/OV/50 ppm PAPR/OV 100 ppm 4.68 ppm	BCDGI	DGJ (Eye)	BCDEFHIKM NOR
Bromoform	0.1%	2.890	8.7	Not Appl.	5 (20 °C)	NA/NA	1147	0.5 ppm (Skin) 0.5 ppm (Skin)	None Estab.	½/OV/5 ppm FF/OV/25 ppm 1-6 mg/m ³	CDE		BCDKHNP
Butane	0.006%	0.579	2.07	-76	760 (20 °C)	1.6/8.4	None Estab.	800 ppm	None Estab.	Supplied Air Poor Warning 0.16 ppm	B (Simple Asphyxi- ant)		
Calcium hydroxide	1.85%	2.24	Not Appl.	Not Appl.	0 (20 °C)	NA/NA	7340	5 mg/m ³ 5 mg/m ³ <i>(Respirable)</i>	None Estab.	½/DM/50 mg/m ³ FF/DM/250 mg/m ³	A	DJ (Skin, Eye)	N
Carbon monoxide	2%	1.250 g/l	0.97	Not Appl.	>35 atm (20 °C)	12.5/75	None Estab.	25 ppm 50 ppm	1500 ppm		BC (Chem. Asphyxi- ant)		CEFKMP
Carbon tetrachloride	0.08%	1.594	5.32	Not Appl.	91.3 (20 °C)	NA/NA	2350 ppm	5 ppm (Skin) 10 ppm	300 ppm	Supplied Air Poor Warning	CDG	DF	CDP

Material	Water Solubility A & B	Specific Gravity ^C	Vapor Density ^D	Flash Point °F ^E	Vapor Pressure mm/Hg ^F	%LEL/ %UEL ^G	LD 50 mg/kg ^H	TLV-TWA PEL ^I	IDLH Level ^J	Recommended Respiratory Protection/Max. Use Concentration Odor Threshold ^K	Hazard Property ^L	Dermal Toxicity ^M	Acute Exposure Symptoms ^N
										>10 ppm			
Chloro- benzene	0.05%	1.106	3.88	82	11.8 (25 °C)	1.3/9.6	2290	10 ppm 75 ppm	2400 ppm	1/2OV/100 ppm FF/OV/500 ppm 0.21 ppm	BCDI	CFI	BCFIKMNOP R
Chloroform	0.5%	1.483	4.12	Not Appl.	158.4 (20 °C)	NA/NA	908 ppm	10 ppm 50 ppm (Ceiling)	1000 ppm	Supplied Air Poor Warning 205-307 ppm	CDG		BCEIKLN
Chromic acid	61.7%	2.70	Not Appl.	Not Appl.	0 (20 °C)	NA/NA	Not Avail.	0.05 mg/m ³ as Cr 0.1 mg/m ³ (Ceiling)	30 mg/m ³	1/2DM/0.01 mg/m ³ FF/DM/0.05 mg/m ³	ACEG	DI	MN
Cyanides	Soluble	1.52	Not Appl	Not Appl.	0 (20 °C)	NA/NA	Varies w. Cmpd.	5 mg/m ³ 5 mg/m ³ (Ceiling)	50 mg/m ³	Supplied Air Poor Warning	CD	CFI	FLNPQ
1,1-Dichloro- ethane	0.6%	1.175	3.44	2	230 (25 °C)	5.4/11.4	725	100 ppm 100 ppm	4000 ppm	Supplied Air Questionable Warning 49-1359 ppm	BCD	BEH	ABHIMNO
1,2-Dichloro- ethane (ethylene dichloride)	0.9%	1.257	3.42	56	62 (20 °C)	6.2/16	670	10 ppm 50 ppm	1000 ppm	Supplied Air Poor Warning	BCDGI	CFJ	BFHIMN
1,1-Dichloro- ethylene (vinylidene chloride)	0.25%	1.213	3.25	-2	591 (25 °C)	7.3/16	200	5 ppm	None Estab.	Supplied Air Poor Warning 190 ppm	BCDGI	CFI	BFIMNO
Diesel Fuel	Insoluble	0.81-0.90	NA	130	NA	0.6-1.3 6-7.5	None Estab.	350 mg/m ³ Proposed TLV	None Estab.	0.7 ppm	BCD	CI	BCDFHIKLM NP
Ethyl benzene	0.014%	0.867	3.66	70	10 (26 °C)	0.8/6.7	3500	100 ppm 100 ppm	2000 ppm	1/2OV/1000 ppm 140 ppm	BCDI	CFI	BFHIKLMNP R
Ethyl bromide	0.914%	1.461	3.76	-4	467 (25 °C)	6.8/8.0	1350	5 ppm (Skin) 200 ppm	3500 ppm	1/2OV/50 ppm FF/OV/250 ppm 1-5 ppm	BCD	CEI	BCDEIKMN OR
Ethylene glycol	Miscible	1.114	2.14	232	0.06 (20 °C)	3.2/21.6	4700	100 ppm (Ceiling) None Estab.	None Estab.	1/2OV-DM/500 ppm FF/OV-DM/1000 ppm 0.1-40 ppm	C	CEH	BEFHK
Gasoline	Insoluble	0.72-0.76	3-4	-50	Var.	1.4/7.6	None Estab.	300 ppm	None Estab.	1/2OV/1000 ppm .25 ppm	BCD	CI	BCEFHIKLM NP
Hexane	0.002%	0.660	2.97	-9	150	1.1/7.5	28,710	50 ppm	5000 ppm	Supplied Air Poor Warning	BDI	CEH	BCDEFHIKM NP

Material	Water Solubility A & B	Specific Gravity ^C	Vapor Density ^D	Flash Point °F ^E	Vapor Pressure mm/Hg ^F	%LEL/ %UEL ^G	LD 50 mg/kg ^H	TLV-TWA PEL ^I	IDLH Level ^J	Recommended Respiratory Protection/Max. Use Concentration Odor Threshold ^K	Hazard Property ^L	Dermal Toxicity ^M	Acute Exposure Symptoms ^N
					(25 °C)			500 ppm	ppm	65-248 ppm			NP
Hydrochloric acid	67%	1.05	1.27	Not Appl.	40.5 atm (20 °C)	NA/NA	900	5 ppm (Ceiling) 5 ppm (Ceiling)	100 ppm	1/AG/50 ppm FF/AG/<100 ppm 1-5 ppm	AE	DFJ	MN
Hydrogen sulfide	0.4%	1.539 g/l	1.19	Not Appl.	17.6 atm (20 °C)	4/44	Not Avail.	10 ppm 20 ppm (Ceiling)	300 ppm	Supplied Air 0.0047 Fatigue	BCD (Chem. Asphyxi-ant)	DGJ	BCDMNP
Isopropyl alcohol	Miscible	0.785	2.08	53	44 (25 °C)	2/12.7	5045	400 ppm 400 ppm	12,000 ppm	1/OV/1000 ppm 43 ppm	BEI	CEH	FMP
Kerosene	Insoluble	0.83-1.0	4.5	100-165	5	0.7/5.0	None Estab.	350 mg/m ³ Proposed TLV	None Estab.	1 ppm	CD	CI	BCDFHIKLM NP
MTBE (methyl tertiary butyl ether)	Moderate	0.74	Unavibl.	-16	245 (25 °C)	1.6/8.4	2.96 g/kg	40 ppm None Estab.	None Estab.	Unavailable	BD	A	BFK
Methane	Soluble	0.717 g/l	.554	369	40 atm (-86.3 °C)	5/15	Not Appl.	None Estab. None Estab.	Not Appl.	Supplied Air if O ₂ < 19.5% 200 ppm	BC (Simple Asphyxi-ant)	DGJ	CDHINP
Methyl chloride	0.5%	.916	2.47	<32	3800 (20 °C)	8.1/17.4	1800	50 ppm (Skin) 100 ppm	10,000 ppm	Supplied Air Warning Unknown	BCDGI	DFH	BCDEFIJKL OR
Methylene chloride	2%	1.135	2.93	Unk.	380 (22 °C)	13/23	1600	50 ppm 25 ppm	5000 ppm	Supplied Air Poor Warning	CDEGI	CFI	BCIKMNR
Methyl ethyl ketone (MEK)	28%	0.805	2.41	16	77.5 (20 °C)	1.4/11.4	2737	200 ppm 200 ppm	3000 ppm	1/OV/1000 ppm 1-30 ppm	BI	CEI	BCFIN
Naphthalene	Insoluble	1.145	4.42	190	.23 (25 °C)	.9/5.9	490	10 ppm 10 ppm	500 ppm	1/OV/100 ppm FF/OV/<500 ppm	C	CGI	BKLNQ
Nitric acid	Miscible	1.503	2.3	Not Appl.	47.6 (20 °C)	NA/NA	Not Avail.	2 ppm 2 ppm	100 ppm	Supplied Air	ACEI	CFJ	MN
Perchloro-ethylene (tetrachloro-ethylene)	0.02%	1.623	5.7	Not Appl.	18.47 (25 °C)	NA/NA	2629	25 ppm 100 ppm	500 ppm	Supplied Air Poor Warning 47 ppm	CDGI	DEI	BCDFHIKLM NP
Phenol	9%	1.058	3.24	175	0.351	1.7/8.6	317	5 ppm (Skin)	250	1/OV-DM/50 ppm	BC	DGI	MN

Material	Water Solubility A & B	Specific Gravity ^C	Vapor Density ^D	Flash Point °F ^E	Vapor Pressure mm/Hg ^F	%LEL/ %UEL ^G	LD 50 mg/kg ^H	TLV-TWA PEL ^I	IDLH Level ^J	Recommended Respiratory Protection/Max. Use Concentration Odor Threshold ^K	Hazard Property ^L	Dermal Toxicity ^M	Acute Exposure Symptoms ^N
					(25 °C)			5 ppm (Skin)	ppm	FF/OV-DM/<250 ppm			
PCBs (poly-chlorinated biphenyl; as chlorodiphenyl)	Insoluble	1.934	4.46	Not Appl.	155 (25 °C)	NA/NA	1010 ppm	0.5 mg/m ³ (Skin) (54% Chlorine) 0.5 mg/m ³ (Skin) (54% Chlorine)	5 mg/m ³	Supplied Air Warning Unknown 100-140 ppm	GI	CH	MN
Sulfuric acid	Miscible	1.841	3.4	Not Appl.	1 (145 °C)	NA/NA	2140	1 mg/m ³ (Skin) 1 mg/m ³	80 mg/m ³	1/2AG-DM/10 mg/m ³ FF/AG-DM/50 mg/m ³ Eye Protection Required	EI	DJ	MN
1,1,2,2-Tetrachloroethane	0.3%	1.587	5.79	Not Appl.	9 (30 °C)	NA/NA	800	1 ppm (Skin) 5 ppm (Skin)	150 ppm	Supplied Air Poor Warning	CDG	CEI	BCFHIKMNP
Tetraethyl lead	Insoluble ^B	1.653	8.6	199	0.2 mm (20 °C)	1.8/ Unkn	12.3	0.10 mg/m ³ (Skin) 0.075 mg/m ³ (Skin)	40 mg/m ³	Supplied Air Warning Unknown	CG	CFI	N
Tetramethyl lead	Insoluble ^B	1.999	6.5	100	22.5 mm (20 °C)	Unkn/ Unkn	105	0.15 mg/m ³ (Skin) 0.075 mg/m ³ (Skin)	40 mg/m ³	Supplied Air Poor Warning	CG	CFI	N
Toluene	0.05	0.866	3.2	39	21 (20 °C)	1.27/7	2000	50 ppm (Skin) 200 ppm	2000 ppm	1/2OV/500 ppm FF/OV/1000 ppm 0.17-40 ppm (300-400 ppm)--Olfactory Fatigue	BCI	BHE	BEFHIKLMN OPQ
1,1,1-Trichloroethane (TCA)	0.4%	1.338	4.63	Unk.	100 (20 °C)	7.5/12.5	9600	350 ppm 350 ppm	1000 ppm	Supplied Air Questionable Warning	CDI		BCFHINP
Trichloroethylene (TCE)	0.16%	1.465	4.53	90	57.8 (20 °C)	8/10.5	5650	50 ppm 100 ppm	1000 ppm	Supplied Air Poor Warning	BCGI	DJ	BFKNP
Vinyl chloride	0.1%	.911	2.15	-108	2660	3.6/33	500	5 ppm 1 ppm	Not Avail.	Supplied Air Poor Warning	BDEGI	DGI	CFHIN
Xylenes	Insoluble	0.868	3.68	63-81	9mm (20 °C)	1.1/6.6-7.0	5000	100 ppm 100 ppm	1000 ppm	1/2OV/<1000 ppm	BCI	CFI	BEFHIKLMN P

Inorganic Metals (as dust/mist)

Material	Water Solubility A & B	Specific Gravity ^C	Vapor Density ^D	Flash Point °F ^E	Vapor Pressure mm/Hg ^F	%LEL/ %UEL ^G	LD 50 mg/kg ^H	TLV-TWA PEL ^I	IDLH Level ^J	Recommended Respiratory Protection/Max. Use Concentration <i>Odor Threshold</i> ^K	Hazard Property ^L	Dermal Toxicity ^M	Acute Exposure Symptoms ^N
Arsenic	Insoluble ^B	5.727	2.6	NA	0 (20 °C)	Flam. dust/NA	763	0.01 mg/m ³ 0.01 mg/m ³	100 mg/m ³	½/HEPA/0.1 mg/m ³ FF/HEPA/0.5 mg/m ³	B(Dust) CGI		ACDGHLMN OQR
Beryllium	Sl. in hot H ₂ O	1.85	Not Applic.	NA	0 (20 °C)	NA/NA	.496 IV	0.002 mg/m ³ 0.002 mg/m ³	10 mg/m ³	½/HEPA/0.005 mg/m ³ FF/HEPA/0.025 mg/m ³	B(Dust) CG		M
Cadmium	Insoluble ^B	8.65	3.9	NA	0 (20 °C)	Flam. dust/NA	225	0.01 mg/m ³ 0.005 mg/m ³	50 mg/m ³	½/HEPA/50 mg/m ³ FF/HEPA/250 mg/m ³	B(Dust) CGI		M
Chromium	Insoluble ^B	7.14	Not Applic.	NA	0 (20 °C)	NA/NA	27,500	0.5 mg/m ³ (Metal & Cr III compounds) 1 mg/m ³ (Metal/insoluble salts)	Not Avail.	½/HEPA/5 mg/m ³ FF/HEPA/25 mg/m ³	Explosive powder		MN
Copper	Insoluble ^B	8.94	Not Applic.	NA	0 (20 °C)	NA/NA	Not Avail.	1 mg/m ³ 1 mg/m ³	Not Avail.	½/HEPA/10 mg/m ³ FF/HEPA/50 mg/m ³	B (Powder)		MN
Lead	Insoluble ^B	11.34	Not Applic.	NA	0 (20 °C)	NA/NA	Varies w. Cmpd.	0.05 mg/m ³ 0.05 mg/m ³	700 mg/m ³	½/HEPA/0.5 mg/m ³ FF/HEPA/2.5 mg/m ³	B(Dust) CI		ACDGHOR
Mercury	0.28 mmoles	13.534	6.95	NA	2 X 10 ⁻³	NA/NA	20-210	0.025 mg/m ³ 0.1 mg/m ³ (Ceiling)	28 mg/m ³	½/MERC-HEPA/0.5 mg/m ³ FF/MERC-HEPA/2.5 mg/m ³	CI		AGLMNQ
Nickel	Insoluble ^B	8.90	Not Applic.	NA	0 (20 °C)	NA/NA	Not Avail.	1 mg/m ³ (Metal/insoluble compounds) 1 mg/m ³	Not Avail.	Supplied Air Warning Unknown	GI		CDGKMNQ
Silver	Insoluble ^B	10.49	Not Applic.	NA	0 (20 °C)	NA/NA	Not Avail.	0.1 mg/m ³ (Metal) 0.01 mg/m ³	Not Avail.	½/HEPA/0.1 mg/m ³ FF/HEPA 0.5 mg/m ³	B(Dust)I		N
Thallium	Insoluble ^H	11.85	7.09	NA	1 (825 °C)	NA/NA	Not Avail.	0.1 mg/m ³ (Skin) 0.1 mg/m ³ (Skin)	20 mg/m ³	½/DM/1 mg/m ³ FF/HEPA/5 mg/m ³	B(Dust)		ADGLNOQ
Zinc oxide (dust)	0.016%	5.607	2.82	NA	0 (20 °C)	NA/NA	7950	10 mg/m ³ (Dust) 5 mg/m ³ (Respirable dust)	600 mg/m ³	½/DM/100 mg/m ³ FF/DM/500 mg/m ³	C		N

APPENDIX A

PETROLEUM CLASS III SHSP--HAZARDOUS PROPERTY INFORMATION

Explanations and Footnotes

- A. Water solubility expressed as 0.2 g means 0.2 grams per 100 grams of water at 20 °C. Water solubility is expressed in different terms in different references. Many references use the term "insoluble" for materials that will not readily mix with water, such as gasoline. However, most of these materials are water soluble at the part per million or part per billion level. Gasoline, for example, is nearly insoluble and will be found as a discrete layer on top of the ground water. But certain gasoline constituents, such as benzene, toluene, and xylene, will also be found in solution in the ground water at the part per million or part per billion level.
- B. Solubility of metals depends on the compound in which they are present.
- C. Specific gravity is the ratio of the density of a substance to the density of a reference substance. For solids and liquids, the reference substance is water; for gases, the reference substance is air. Specific gravity is expressed in units of g/cc (for solids and liquids) or g/l (at 0 °C and 760 mm Hg) for gases.
- D. Vapor density is the weight/unit volume expressed as grams/cubic centimeter liquids.
- E. Flash point is the temperature at which a liquid or volatile solid gives off sufficient vapor to form an ignitable mixture with the air. Flash points may be determined by the open cup method or closed cup method. Several chlorinated hydrocarbons exhibit no flash point in the conventional sense, but will burn in the presence of high energy ignition sources or will form explosive mixtures at temperatures above 200 °F.
- F. Vapor pressure is the pressure at a given temperature of a vapor in equilibrium with its liquid or solid form. It is expressed as mm Hg at 1 atm. Temperatures vary...see chart.
- G. Lower explosive limit (LEL) and Upper explosive limit (UEL) are the minimum and maximum concentrations of a gas or vapor in air which will support flame. LEL and UEL are expressed as % in air at ambient or room temperature.
- H. LD₅₀ is the quantity of a substance administered by ingestion that is necessary to kill 50% of the test animals exposed to it within a specified time.
- I. Threshold limit value as a time-weighted average (TLV-TWA) is the concentration for a normal 8-hr workday and 40-hr work week to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. Values reported are the current ACGIH Threshold Limit Value-Time Weighted Average (TLV-TWA) and OSHA Permissible Exposure Limit (PEL). All PELs are based on pre-1989 values, per OSHA's 1993 decision to vacate the 1989 PELs.
- J. Immediately Dangerous to Life and Health (IDLH) concentrations represent the maximum concentrations from which, in the event of a respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
- K. Recommended Respiratory Protection/Max. Use Concentration is used to show the limits for respirator style and contaminant concentration. The codes in the table refer to the following:
- ½ = Half-face, air-purifying respirator
FF = Full-face, air-purifying respirator
OV = Organic vapor canisters
HEPA = High Efficiency Particulate Air canisters
PAPR = Powered Air-purifying Respirator
- The Odor Threshold is the lowest concentration at which one may detect an odor or experience a warning effect such as taste, eye irritation, etc., which varies with individual susceptibility.

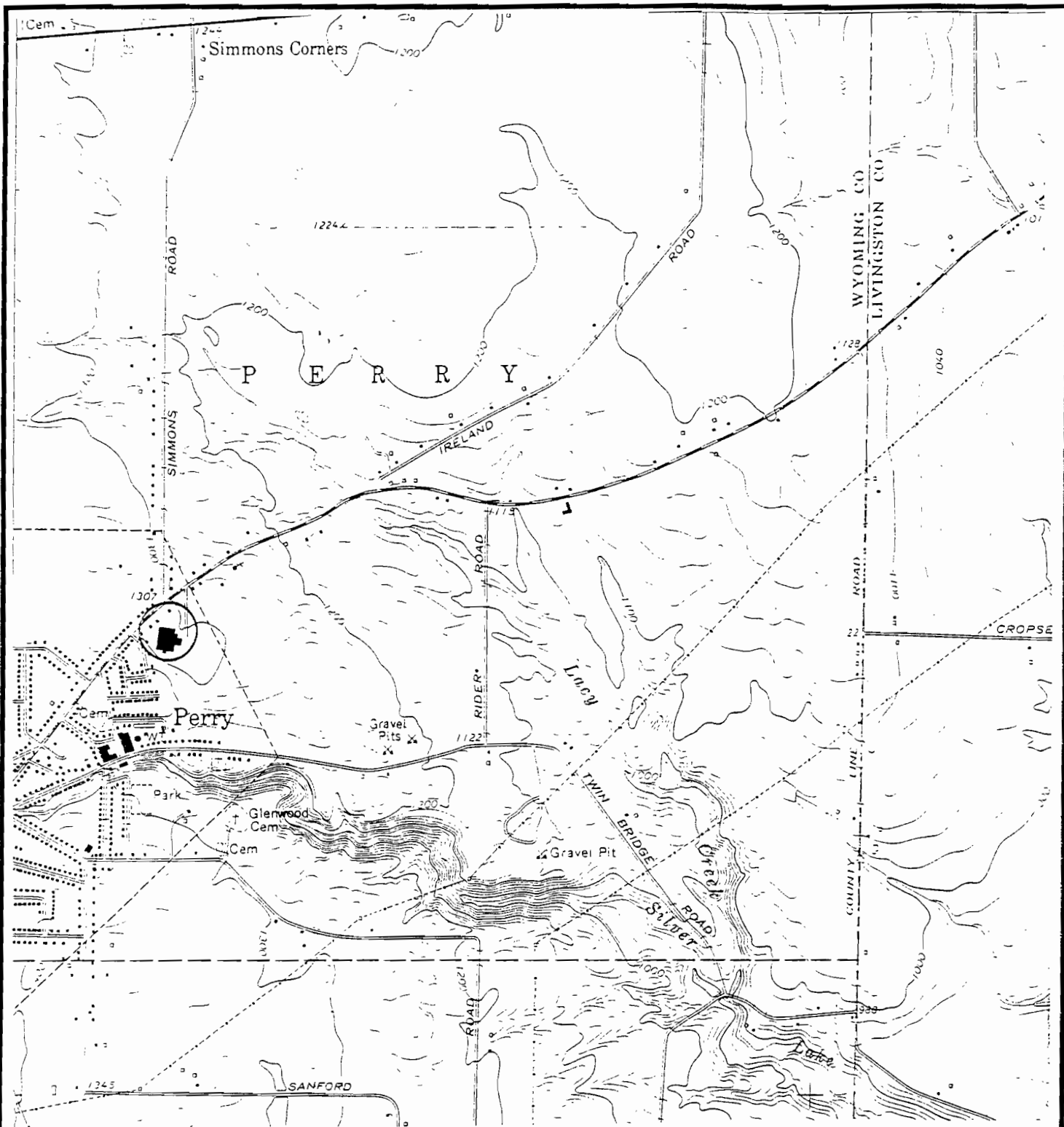
Appendix A
PETROLEUM CLASS III SHSP--
HAZARDOUS PROPERTY INFORMATION
Explanations and Footnotes
Continued...

- L. Hazard Property:
- | | | |
|---------------|-----------------|------------------------|
| A - Corrosive | E - Reactive | I - Reproductive Toxin |
| B - Flammable | F - Radioactive | |
| C - Toxic | G - Carcinogen | |
| D - Volatile | H - Infectious | |

Note: A reproductive toxin is a compound (chemical) that affects the reproductive organs (generally the sperm and eggs, but sometimes the physical structure of the testes or ovaries, too). It can affect the reproductive organs of males, females, or both; it can affect the reproductive organs of an adult or child; it can affect the reproductive organs of a developing fetus with or without affecting the mother.

- M. Dermal toxicity data is summarized in the following three categories:
- 1. **Skin Penetration**
A - negligible penetration (solid-polar)
+ B - slight penetration (solid-nonpolar)
++ C - moderate penetration (liquid/solid-nonpolar)
+++ D - high penetration (gas/liquid-nonpolar)
 - 2. **Systemic Potency**
E - Slightly Toxic (LD50 = 5 - 15 g/kg)
 Lethal dose for 70 kg adult = 1 pint to 1 quart
F - Moderately Toxic (LD50 = 0.5 - 5 g/kg)
 Lethal dose for 70 kg adult = 1 ounce to 1 pint
G - Extremely toxic (LD50 = 5 - 50 mg/kg)
 Lethal dose for 70 kg adult = 7 drops to 1 teaspoon
 - 3. **Local Potency**
H - slight - reddening of the skin
I - moderate - irritation/inflammation of skin
J - extreme - tissue destruction/necrosis

- N. Acute Exposure Symptoms
- | | | |
|----------------------------|---------------------------------------|---------------------|
| A - abdominal pains | B - central nervous system depression | O - tremors |
| C - comatose | D - convulsions | P - unconsciousness |
| E - confusion | F - dizziness | Q - vomiting |
| G - diarrhea | H - drowsiness | R - weakness |
| I - dyspnea | J - fever | |
| K - headache | L - nausea | |
| M - respiratory irritation | N - skin | |



NOTE: 1. MAP REPRODUCED FROM USGS 7.5 MINUTE
QUADRANGLE, MOUNT NORRIS, NEW YORK

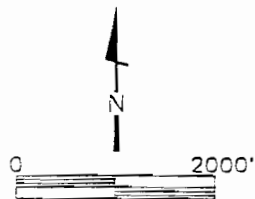


FIGURE 1
REGIONAL TOPOGRAPHIC MAP
CHAMPION PRODUCTS COMPANY
ROAD 2 & NORTH MAIN
PERRY, NEW YORK

PROJ. NO. S098-009	PREP. BY PH	DRAWN BY PH
DATE 04/24/98	REV. BY	SCALE 1" = 2000'



Delta
Environmental
Consultants, Inc.



[Yahoo! - Maps - Address Book - He](#)

[Y! Domains](#)
[Just 35 bucks!](#)

0% Intro APR for purchases
 See Terms & Conditions **VERY SMART!**
 Get a 30-second online response! **getsmart**

[Click here to visit www.getsmart.com](http://www.getsmart.com)

Welcome, Guest User

[Create My Locations - Sign I](#)

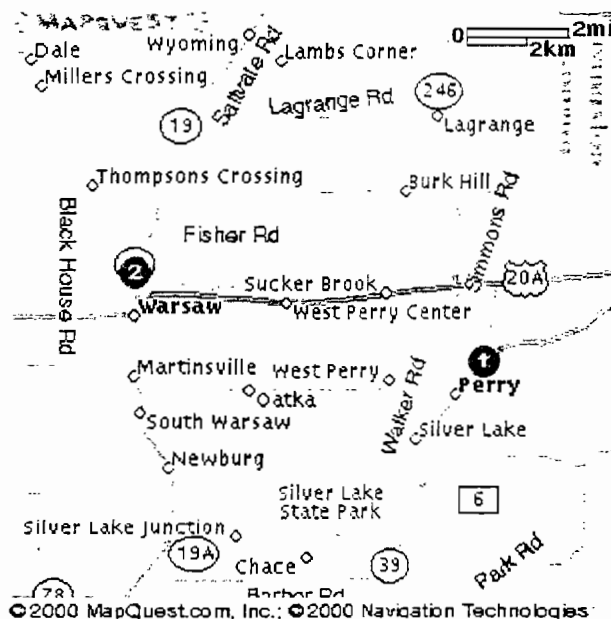
Yahoo! Yellow Pages

Starting from: 200 North Main Street, Perry, NY 14530-1225

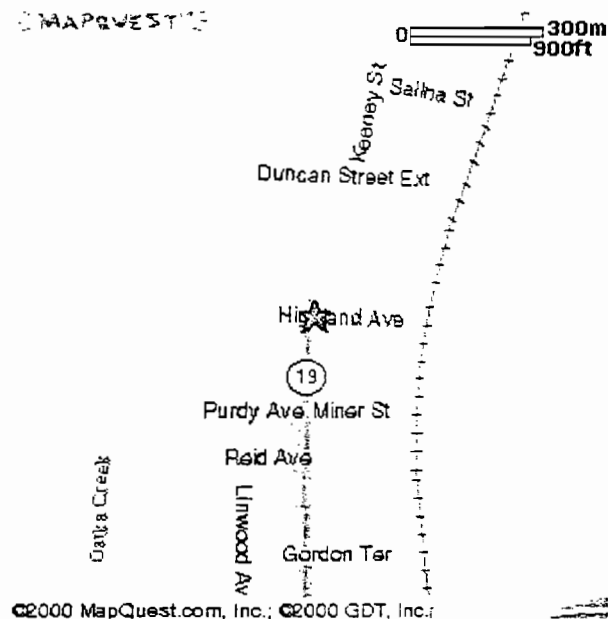
Arriving at: Wyoming County Community Hlth
 400 N Main St, Warsaw, NY 14569
 (716) 786-2233

Distance: 10.2 miles Approximate Travel Time: 19 mins

- [Email Directions](#)
- [Get Reverse Directions](#)
- [Text Only Driving Direction](#)



Full Route



Destination

Directions

	Miles
1. Start out going Northeast on NY-39 towards SIMMONS RD by turning right.	0.2
2. Turn LEFT onto SIMMONS RD .	1.5
3. Turn LEFT onto US-20A .	7.6
4. Turn RIGHT onto NY-19 .	0.9

When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.

Driving Directions

[New Location](#)

1 Enter a starting address
or select from My Locations

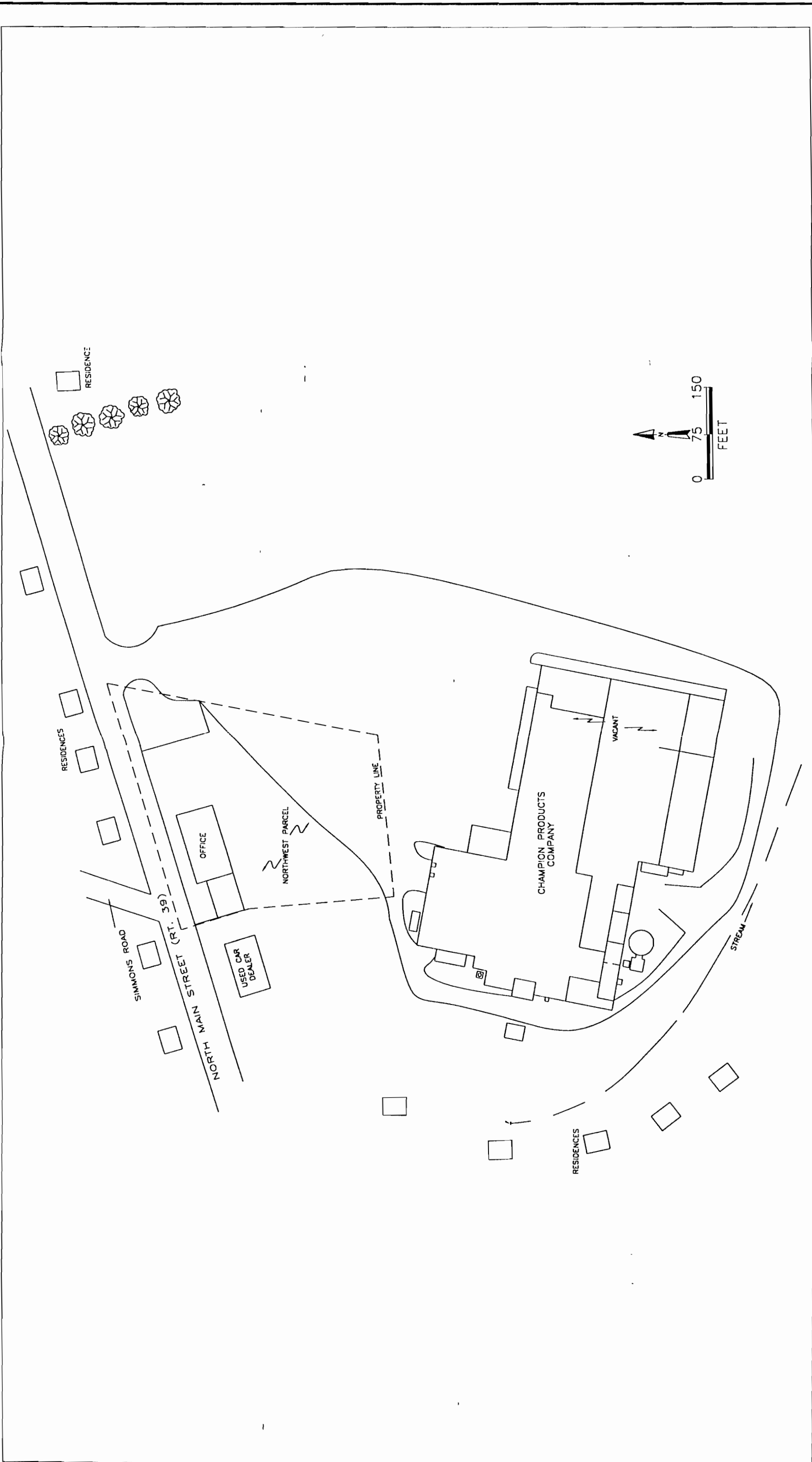
My Locations [Sign In](#)
(Address, Intersection or Airport Code)
 Address
 City, State or Zip
 Country

2 Enter a destination address
or select from My Locations

My Locations [Sign In](#)
(Address, Intersection or Airport Code)
 Address
 City, State or Zip
 Country

[Get Directions](#)

Copyright © 2001 Yahoo! Inc. All rights reserved.
[Privacy Policy](#) - [Terms of Service](#) - [Help](#)



 Delta Environmental Consultants, Inc.	TITLE: SITE LOCATION MAP CHAMPION PRODUCTS COMPANY PERRY, NEW YORK				DES.: HLW		PROJECT NO.: S098-009	
					CHKD.:			
					DATE:		FIGURE NO.:	
					4/22/99		1	

ALCONOX -- ALCONOX - DETERGENT, SURGICAL INSTRUMENT
MATERIAL SAFETY DATA SHEET
NSN: 6505008398894
Manufacturer's CAGE: 17534
Part No. Indicator: A
Part Number/Trade Name: ALCONOX

=====

General Information

=====

Item Name: DETERGENT, SURGICAL INSTRUMENT
Company's Name: ALCONOX INC
Company's Street: 215 PARK AVE S
Company's City: NEW YORK
Company's State: NY
Company's Country: US
Company's Zip Code: 10003
Company's Emerg Ph #: 212-473-1300
Company's Info Ph #: 212-473-1300
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 14AUG92
Safety Data Review Date: 28SEP92
MSDS Serial Number: BPXXV
Hazard Characteristic Code: NK

=====

Ingredients/Identity Information

=====

Proprietary: NO
Ingredient: ALCONOX
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: 1002102NX
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

=====

Physical/Chemical Characteristics

=====

Appearance And Odor: WHITE POWDER INTERSPERSED W/CREAM COLORED FLAKES-
ODORLESS
Boiling Point: N/A
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity: N/A
Evaporation Rate And Ref: NOT APPLICABLE
Solubility In Water: APPRECIABLE
Percent Volatiles By Volume: N/A

=====

Fire and Explosion Hazard Data

=====

Flash Point: NONE
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: WATER, CARBON DIOXIDE, DRY CHEMICAL, FOAM SAND/EARTH.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA AND FULL
PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: NONE.

=====

Reactivity Data

=====

Stability: YES
Cond To Avoid (Stability): NONE.
Materials To Avoid: AVOID STRONG ACIDS.
Hazardous Decomp Products: MAY RELEASE CARBON DIOXIDE GAS ON BURNING.

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: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: PROLONGED EXPOSURE TO DUST MAY IRRITATE
MUCOUS MEMBRANES.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT
Signs/Symptoms Of Overexp: SEE HEALTH HAZARDS.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES: FLUSH WITH PLENTY OF WATER FOR AT LEAST 15
MIN. SKIN: FLUSH WITH PLENTY OF WATER. INGEST: DRINK LARGE QTY OF WATER TO
DILUTE MATERIAL. GET MED ATTN FOR DISCOMFORT. INHAL: REMOVE TO FRESH AIR.
SUPPORT BRTHG (GIVE O*2/ARTF RESP) (FP N).

=====

Precautions for Safe Handling and Use

=====

Steps If Matl Released/Spill: MATERIAL FOAMS PROFUSELY, SHOVEL & RECOVER
AS MUCH AS POSSIBLE. RINSE REMAINDER TO SEWER. MATERIAL IS COMPLETELY
BIODEGRADABLE.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: SMALL QTY MAY BE DISPOSED OF IN SEWER. LARGE QTY
SHOULD BE DISPOSED OF ACCORDING TO LOCAL, FEDERAL & STATE REQUIREMENTS FOR
NON-HAZARDOUS DETERGENT.
Precautions-Handling/Storing: SHOULD BE STORED IN A DRY AREA TO PREVENT
CAKING.
Other Precautions: NO SPECIAL REQUIREMENTS OTHER THAN THE GOOD INDUSTRIAL
HYGIENE & SAFETY PRACTICES EMPLOYED WITH ANY INDUSTRIAL CHEMICAL.

=====

Control Measures

=====

Respiratory Protection: NIOSH/MSHA APPROVED DUST MASK.
Ventilation: LOCAL EXHAUST: NORMAL.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).
Other Protective Equipment: NOT REQUIRED.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

=====

Transportation Data

=====

Trans Data Review Date: 93053
DOT PSN Code: ZZZ
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI PSN Code: ZZZ
AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
Additional Trans Data: NOT REGULATED FOR TRANSPORTATION

=====

Disposal Data

=====

=====

Label Data

=====

Label Required: YES
Technical Review Date: 18SEP92
Label Date: 18SEP92
Label Status: G
Common Name: ALCONOX
Chronic Hazard: NO
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE: PROLONGED EXPOSURE TO DUST MAY IRRITATE
MUCOUS MEMBRANES. CHRONIC: NONE SPECIFIED BY MANUFACTURER.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: ALCONOX INC
Label Street: 215 PARK AVE S
Label City: NEW YORK
Label State: NY
Label Zip Code: 10003
Label Country: US
Label Emergency Number: 212-473-1300

VAN WATER & ROGER -- ISOPROPYL ALCOHOL - ISOPROPYL ALCOHOL,USP

MATERIAL SAFETY DATA SHEET

NSN: 6505002617256

Manufacturer's CAGE: 0AN91

Part No. Indicator: A

Part Number/Trade Name: ISOPROPYL ALCOHOL

=====

General Information

Item Name: ISOPROPYL ALCOHOL,USP

Company's Name: VAN WATER & ROGER

Company's Street: 2600 CAMPUS DR

Company's P. O. Box: 5932

Company's City: SAN MATEO

Company's State: CA

Company's Country: US

Company's Zip Code: 94403-2522

Company's Emerg Ph #: 800-424-9300

Company's Info Ph #: 714-364-2310

Distributor/Vendor # 1: CHEMICAL COMMODITIES AGENCY, INC.

Distributor/Vendor # 1 Cage: 60777

Record No. For Safety Entry: 001

Tot Safety Entries This Stk#: 005

Status: SD

Date MSDS Prepared: 01MAY93

Safety Data Review Date: 13OCT94

Supply Item Manager: CX

MSDS Preparer's Name: C.A.EISENHARD

Preparer's Company: CHEMICAL COMMODITIES AGENCY

Preparer's City: HIGHLAND

Preparer's State: CA

MSDS Serial Number: BVGJL

Specification Number: MIL-I-37443

Spec Type, Grade, Class: NONE

Hazard Characteristic Code: F3

Unit Of Issue: CN

Unit Of Issue Container Qty: 1.0 QT/946 ML

Type Of Container: UNKNOWN

Net Unit Weight: 1.65 LBS

NRC/State License Number: NONE

Net Propellant Weight-Ammo: NONE

=====

Ingredients/Identity Information

Proprietary: NO

Ingredient: ISOPROPYL ALCOHOL (SARA III) (PER SPEC, MATERIAL IS "ISOPROPYL ALCOHOL, N.F." FORMULATION COULD NOT BE FOUND.)

Ingredient Sequence Number: 01

Percent: PER N F

NIOSH (RTECS) Number: NT8050000

CAS Number: 67-63-0

OSHA PEL: 400 PPM/500 STEL

ACGIH TLV: 400 PPM/500STEL;9192

Other Recommended Limit: NONE DETERMINED

=====

Physical/Chemical Characteristics

Appearance And Odor: MEDICINAL ALCOHOLIC ODOR.

Boiling Point: 181F,83C

Melting Point: -127F,-88C

Vapor Pressure (MM Hg/70 F): 33

Vapor Density (Air=1): 2.07

Specific Gravity: 0.79

Evaporation Rate And Ref: 3.0 (BUTYL ACETATE=1)
Solubility In Water: 100%

=====

Fire and Explosion Hazard Data

=====

Flash Point: 53.0F, 11.7C
Flash Point Method: TCC
Lower Explosive Limit: 2.0
Upper Explosive Limit: 12.7
Extinguishing Media: WATER SPRAY, DRY CHEMICAL, CARBON DIOXIDE, ALCOHOL FOAM; DO NOT USE DIRECT WATER SPRAY.
Special Fire Fighting Proc: FIREFIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS & FULL PROTECTIVE CLOTHING. USE WATER SPRAY TO COOL NEARBY CONTAINERS & STRUCTURES THAT ARE EXPOSED.
Unusual Fire And Expl Hazrds: EXTINGUISH ALL NEARBY SOURCES OF IGNITION BECAUSE VAPORS MAY BE MOVED BY AIR CURRENTS TO IGNITION SOURCES DISTANT FROM THE HANDLING POINT.

=====

Reactivity Data

=====

Stability: YES
Cond To Avoid (Stability): HEAT, SPARKS AND OPEN FLAMES.
Materials To Avoid: STRONG OXIDIZERS, ALUMINUM, ACETALDEHYDE, CHLORINE, ETHYLENE OXIDE, HYPOCHLOROUS ACID, ALDEHYDES.
Hazardous Decomp Products: MAY LIBERATE CARBON MONOXIDE AND CARBON DIOXIDE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE

=====

Health Hazard Data

=====

LD50-LC50 Mixture: ORAL LD50 (RAT) IS UNKNOWN
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: INHALATION-IRRITATION OF NOSE & THROAT. EYES-IRRITATION, CORNEAL BURNS. PROLONGED EXPOSURE TO HIGH CONCENTRATIONS MAY CAUSE SEVERE OR FATAL CNS DEPRESSION.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT CARCINOGENIC.
Signs/Symptoms Of Overexp: INHALATION-HIGHER CONCENTRATIONS MAY CAUSE HEADACHE, VOMITING, COMA. EVEN HIGHER CONCENTRATIONS MAY CAUSE COMA OR DEATH. SKIN-DRYNESS, POSSIBLE DERMATITIS. INGESTION-LARGE AMOUNTS CAUSES HEADACHE, NAUSEA, VOMITING, STOMACH CRAMPS, UNCONSCIOUSNESS OR DEATH.
Med Cond Aggravated By Exp: PRE-EXISTING SKIN DISORDERS, EYE PROBLEMS, OR IMPAIRED RESPIRATORY FUNCTION MAY BE SUSCEPTIBLE.
Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NEEDED, SEEK MEDICAL ATTENTION. EYES: FLUSH WITH WATER FOR 15 MINUTES, GET MEDICAL ATTENTION. SKIN: WASH AREA WITH SOAP & WATER. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION. INGESTION: INDUCE VOMITING BY GIVING WATER, PREVENT ASPIRATION, GET IMMEDIATE MEDICAL ATTENTION.

=====

Precautions for Safe Handling and Use

=====

Steps If Matl Released/Spill: EXTINGUISH ALL IGNITION SOURCES. MAKE SURE ALL HANDLING EQUIPMENT IS ELECTRICALLY GROUNDED. FOR SMALL SPILLS MOP UP & PLACE IN D.O.T. APPROVED CONTAINERS.
Waste Disposal Method: CONSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES.
Precautions-Handling/Storing: KEEP AWAY FROM HEAT, SPARKS & OPEN FLAMES. STORE IN COOL, DRY, WELL-VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS. VENT CONTAINERS FREQUENTLY.

Other Precautions: MORE OFTEN IN WARM WEATHER, USE ONLY ON NON-SPARKING TOOLS AND ELECTRICALLY GROUND ALL EQUIPMENT WHEN HANDLING THIS PRODUCT. DO NOT USE PRESSURE TO EMPTY CONTAINERS. EMPTY CONTAINERS CAN HAVE RESIDUES, GASES & MISTS.

=====

Control Measures

=====

Respiratory Protection: BASED UPON CONTAMINATION LEVELS IN THE WORK PLACE. FOR EXAMPLE: HALF MASK AIR-PURIFYING CARTRIDGE RESPIRATORS OR SUPPLIED AIR RESPIRATORS.

Ventilation: LOCAL-MECHANICAL EXHAUST.

Protective Gloves: RUBBER GLOVES.

Eye Protection: SAFETY GOGGLES.

Other Protective Equipment: RUBBER APRON, RUBBER BOOTS, IMPERVIOUS CLOTHING.

Work Hygienic Practices: EYE WASH FOUNTAIN, QUICK DRENCH SHOWER.

Suppl. Safety & Health Data: AN MSDS WAS REQUESTED. CHEM COMMODITIES INFORMED US 12OCT94 THAT THEY HAD SUPPLIED VAN WATERS & ROGERS MATERIAL TO DPSC. MSDS COPIED FOR ANOTHER VWR WHICH HAD BEEN SUPPLIED BY CHEM COMMODITIES. -- MATERIAL PER SPEC IS "ISOPROPYL ALCOHOL, N.F.". FORMULATION COULD NOT BE FOUND. FORMULA IS THOUGHT TO BE 70%/30% WATER.

=====

Transportation Data

=====

Trans Data Review Date: 94286

DOT PSN Code: HWY

DOT Proper Shipping Name: ISOPROPANOL OR ISOPROPYL ALCOHOL

DOT Class: 3

DOT ID Number: UN1219

DOT Pack Group: II

DOT Label: FLAMMABLE LIQUID

IMO PSN Code: ITA

IMO Proper Shipping Name: ISOPROPANOL

IMO Regulations Page Number: 3244

IMO UN Number: 1219

IMO UN Class: 3.2

IMO Subsidiary Risk Label: -

IATA PSN Code: ONH

IATA UN ID Number: 1219

IATA Proper Shipping Name: ISOPROPANOL

IATA UN Class: 3

IATA Label: FLAMMABLE LIQUID

AFI PSN Code: ONH

AFI Prop. Shipping Name: ISOPROPANOL

AFI Class: 3

AFI ID Number: UN1219

AFI Pack Group: II

AFI Basic Pac Ref: 7-7

MMAC Code: NR

=====

Disposal Data

=====

=====

Label Data

=====

Label Required: YES

Technical Review Date: 13OCT94

Label Status: Z

Common Name: ISOPROPYL ALCOHOL

Special Hazard Precautions: LABEL FOR THIS PRODUCT IS SPECIFIED BY THE FDA, NOT OSHA!

Label Name: VAN WATER & ROGER

Label Street: 2600 CAMPUS DR

Label P.O. Box: 5932

Label City: SAN MATEO
Label State: CA
Label Zip Code: 94403-2522
Label Country: US
Label Emergency Number: 800-424-9300

T/ 9
Ground Water Recovery Data
 Champion Products, Inc.
 Perry, New York
 Delta Project No. S098-009-5

	Sample Date	07/14/00	08/22/00	09/14/00	11/02/00	11/29/00	01/05/01	02/13/01	03/14/01	04/17/01	06/05/01	06/28/01	07/27/01	08/07/01	09/20/01
Average Flow (gallons/day)		0	1,810	1,520	328	1,126	3,296	10,821	3,605	6,027	1,680	4,186	4,085	3,324	614
Pump Hours		0	228.3	450.8	605.2	953.2	1626.9	2316.9	2756.3	3381.9	3903.2	4297.9	4975.8	5269.7	6169.3
1,1,1-Trichloroethane (ug/l)	8	24	120	16	26	15	2.5	32	5	12	10	7	5	5	
Recovery by Sample Date			0.001	0.009	0.003	0.002	0.011	0.015	0.019	0.019	0.006	0.004	0.008	0.002	0.003
Cumulative Recovery			0.001	0.010	0.014	0.016	0.026	0.041	0.060	0.079	0.085	0.089	0.098	0.100	0.103
1,1-Dichloroethane (ug/l)	29	49	120	48	45	22	2.5	12	11	6	6	14	5	5	
Recovery by Sample Date			0.003	0.011	0.004	0.004	0.017	0.021	0.008	0.012	0.006	0.002	0.010	0.004	0.003
Cumulative Recovery			0.003	0.014	0.018	0.022	0.039	0.060	0.068	0.080	0.086	0.088	0.098	0.101	0.104
1,2-Dichloroethane (ug/l)	3	5	50	1.5	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	5	
Recovery by Sample Date			0.000	0.004	0.001	0.000	0.001	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery			0.000	0.004	0.005	0.005	0.006	0.010	0.015	0.020	0.022	0.023	0.026	0.027	0.030
Benzene (ug/l)	1.5	610	50	1.5	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	5	
Recovery by Sample Date			0.022	0.042	0.001	0.000	0.001	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery			0.022	0.064	0.065	0.066	0.067	0.071	0.075	0.080	0.083	0.084	0.086	0.088	0.091
1,2,4-Trimethylbenzene (ug/l)	NS	290	400	59	72	66	2.5	21	5	2.5	2.5	46	270	350	
Recovery by Sample Date			0.010	0.026	0.001	0.003	0.017	0.002	0.012	0.003	0.001	0.001	0.022	0.051	0.107
Cumulative Recovery			0.010	0.036	0.037	0.041	0.058	0.060	0.071	0.074	0.075	0.075	0.098	0.148	0.256
1,3,5-Trimethylbenzene (ug/l)	NS	93	110	22	29	37	2.5	5	5	2.5	2.5	20	78	120	
Recovery by Sample Date			0.003	0.007	0.001	0.001	0.010	0.002	0.003	0.003	0.001	0.001	0.010	0.015	0.037
Cumulative Recovery			0.003	0.010	0.011	0.012	0.022	0.024	0.027	0.029	0.030	0.031	0.040	0.055	0.092
Isopropylbenzene (ug/l)	NS	13	50	1.5	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	33	
Recovery by Sample Date			0.000	0.003	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.001	0.010
Cumulative Recovery			0.000	0.004	0.004	0.004	0.004	0.007	0.009	0.012	0.013	0.013	0.014	0.015	0.026
Chloroethane (ug/l)	58	5	50	19	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	5	
Recovery by Sample Date			0.002	0.004	0.002	0.001	0.001	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery			0.002	0.006	0.007	0.008	0.009	0.014	0.018	0.023	0.026	0.027	0.029	0.030	0.033
cis-1-2-Dichloroethene (ug/l)	6	5	50	1.5	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	5	
Recovery by Sample Date			0.000	0.004	0.001	0.000	0.001	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery			0.000	0.004	0.005	0.005	0.006	0.011	0.015	0.020	0.023	0.024	0.026	0.027	0.030
Dichlorodifluoromethane (ug/l)	NS	5	50	1.5	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	5	
Recovery by Sample Date			0.000	0.003	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.001	0.002
Cumulative Recovery			0.000	0.003	0.003	0.003	0.004	0.006	0.009	0.012	0.012	0.013	0.014	0.015	0.017
Ethylbenzene (ug/l)	3	5	50	1.5	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	5	
Recovery by Sample Date			0.000	0.004	0.001	0.000	0.001	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery			0.000	0.004	0.005	0.005	0.006	0.010	0.015	0.020	0.022	0.023	0.026	0.027	0.030
Methyl-ethyl ketone (ug/l)	120	0	0	0	0	0	10	20	100	50	50	50	100	100	
Recovery by Sample Date			0.004	0.000	0.000	0.000	0.000	0.008	0.016	0.063	0.052	0.020	0.049	0.028	0.061
Cumulative Recovery			0.004	0.004	0.004	0.004	0.004	0.013	0.029	0.092	0.144	0.164	0.212	0.241	0.302

TA..... J
Ground Water Recovery Data
Champion Products, Inc.
Perry, New York
Delta Project No. S098-009-5

Sample Date	07/14/00	08/22/00	09/14/00	11/02/00	11/29/00	01/05/01	02/13/01	03/14/01	04/17/01	06/05/01	06/28/01	07/27/01	08/07/01	09/20/01
Average Flow (gallons/day)	0	1,810	1,520	328	1,126	3,296	10,821	3,605	6,027	1,680	4,186	4,085	3,324	614
Pump Hours	0	228.3	450.8	605.2	953.2	1626.9	2316.9	2756.3	3381.9	3903.2	4297.9	4975.8	5269.7	6169.3
Methylene chloride (ug/l)	3	26	50	1.5	9	30	2.5	5	5	2.5	2.5	11	5	5
Recovery by Sample Date		0.001	0.005	0.001	0.000	0.010	0.027	0.004	0.005	0.003	0.001	0.007	0.003	0.003
Cumulative Recovery		0.001	0.006	0.007	0.008	0.018	0.045	0.049	0.054	0.057	0.058	0.065	0.068	0.071
Naphthalene (ug/l)	NS	28	200	5	1.5	8	2.5	5	5	2.5	2.5	6	50	5
Recovery by Sample Date		0.001	0.013	0.000	0.000	0.002	0.002	0.003	0.003	0.001	0.001	0.003	0.009	0.002
Cumulative Recovery		0.001	0.014	0.014	0.014	0.016	0.018	0.021	0.024	0.024	0.025	0.028	0.037	0.039
n-Butylbenzene (ug/l)	NS	120	160	17	13	67	2.5	5	5	2.5	2.5	55	150	340
Recovery by Sample Date		0.004	0.010	0.000	0.001	0.017	0.002	0.003	0.003	0.001	0.001	0.027	0.028	0.104
Cumulative Recovery		0.004	0.015	0.015	0.016	0.033	0.035	0.038	0.040	0.041	0.042	0.068	0.097	0.201
n-Propylbenzene (ug/l)	NS	35	50	1.5	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	38
Recovery by Sample Date		0.001	0.003	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.001	0.012
Cumulative Recovery		0.001	0.004	0.004	0.005	0.005	0.007	0.010	0.013	0.014	0.014	0.015	0.016	0.028
4-Isopropyltoluene (ug/l)	NS	10	50	4	7	2.5	2.5	5	5	2.5	2.5	2.5	15	78
Recovery by Sample Date		0.000	0.003	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.003	0.024
Cumulative Recovery		0.000	0.004	0.004	0.004	0.005	0.007	0.009	0.012	0.013	0.013	0.015	0.017	0.041
sec-Butylbenzene (ug/l)	NS	29	50	1.5	1.5	9	2.5	5	5	2.5	2.5	11	5	100
Recovery by Sample Date		0.001	0.003	0.000	0.000	0.002	0.002	0.003	0.003	0.001	0.001	0.005	0.001	0.031
Cumulative Recovery		0.001	0.004	0.004	0.004	0.007	0.009	0.012	0.014	0.015	0.015	0.021	0.022	0.052
tert-Butylbenzene (ug/l)	NS	5	50	1.5	1.5	2.5	2.5	5	5	2.5	2.5	2.5	5	22
Recovery by Sample Date		0.000	0.003	0.000	0.000	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.001	0.007
Cumulative Recovery		0.000	0.003	0.003	0.003	0.004	0.006	0.009	0.012	0.012	0.013	0.014	0.015	0.022
Tetrachloroethene (ug/l)	6	5	50	6	4	2.5	2.5	5	5	2.5	2.5	2.5	5	5
Recovery by Sample Date		0.000	0.004	0.001	0.000	0.002	0.004	0.004	0.005	0.003	0.001	0.002	0.001	0.003
Cumulative Recovery		0.000	0.004	0.005	0.006	0.007	0.012	0.016	0.021	0.024	0.025	0.027	0.028	0.031
Toluene (ug/l)	440	5	3100	81	160	160	2.5	270	150	180	10	22	200	69
Recovery by Sample Date		0.016	0.199	0.079	0.011	0.082	0.137	0.149	0.219	0.115	0.038	0.016	0.042	0.082
Cumulative Recovery		0.016	0.215	0.294	0.304	0.387	0.524	0.673	0.892	1.007	1.045	1.060	1.102	1.185
Xylenes (ug/l)	25	27	100	5	3	5	5	10	20	5	5	5	10	10
Recovery by Sample Date		0.002	0.008	0.003	0.000	0.002	0.008	0.008	0.016	0.009	0.002	0.005	0.003	0.006
Cumulative Recovery		0.002	0.010	0.013	0.013	0.015	0.023	0.032	0.047	0.056	0.058	0.063	0.066	0.072
TOTAL RECOVERY		0.075	0.364	0.101	0.025	0.180	0.261	0.263	0.388	0.213	0.078	0.180	0.198	0.488
CUMULATIVE RECOVERY		0.075	0.439	0.539	0.564	0.744	1.005	1.268	1.657	1.870	1.949	2.128	2.327	2.815

ug/l = micrograms per liter

Indicates concentration is below the analytical detection limit. Reported value is 1/2 the method detection limit

Recovery calculations are based on the following formula:

$$\text{Recovery (lbs.)} = \text{Influent Concentration}^* (\text{ug/L}) \times \text{Flow}^* (\text{gal/day}) \times 3.78 (\text{L/gal}) \times 1/0.455 (\text{lbs/kg}) \times 1/1.00\text{E}+09 (\text{kg/ug}) \times \text{Pump Hours (hrs)} \times 1/24 (\text{day/hrs})$$

*Influent concentrations and Flow are based on a 2-month rolling average.

NIOSH Pocket Guide to Chemical Hazards

Cumene		CAS 98-82-8	
C ₆ H ₅ CH(CH ₃) ₂		RTECS GR8575000	
Synonyms & Trade Names Cumol, Isopropyl benzene, 2-Phenyl propane		DOT ID & Guide 1918 130	
Exposure Limits	NIOSH REL: TWA 50 ppm (245 mg/m ³) [skin]		
	OSHA PEL: TWA 50 ppm (245 mg/m ³) [skin]		
IDLH 900 ppm [10%LEL] See: 98828		Conversion 1 ppm = 4.92 mg/m ³	
Physical Description Colorless liquid with a sharp, penetrating, aromatic odor.			
MW: 120.2	BP: 306°F	FRZ: -141°F	Sol: Insoluble
VP: 8 mmHg	IP: 8.75 eV		Sp.Gr: 0.86
Fl.P: 96°F	UEL: 6.5%	LEL: 0.9%	
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.			
Incompatibilities & Reactivities Oxidizers, nitric acid, sulfur acid [Note: Forms cumene hydroperoxide upon long exposure to air.]			
Measurement Methods NIOSH 1501 See: NMAM or OSHA Methods			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH/OSHA Up to 500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/ (APF = 10) Any supplied-air respirator* Up to 900 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/ (APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*, (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/ (APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full			

facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma

Target Organs Eyes, skin, respiratory system, central nervous system

See also: INTRODUCTION See ICSC CARD: 0170 See MEDICAL TESTS: 0060

NIOSH Pocket Guide to Chemical Hazards

Ethyl chloride		CAS 75-00-3	
CH ₃ CH ₂ Cl		RTECS KH7525000	
Synonyms & Trade Names Chloroethane, Hydrochloric ether, Monochloroethane, Muriatic ether		DOT ID & Guide 1037 115	
Exposure Limits	NIOSH REL: Handle with caution in the workplace. See Appendix C (Chloroethanes)		
	OSHA PEL: TWA 1000 ppm (2600 mg/m ³)		
IDLH 3800 ppm [10%LEL] See: 75003		Conversion 1 ppm = 2.64 mg/m ³	
Physical Description Colorless gas or liquid (below 54°F) with a pungent, ether-like odor. [Note: Shipped as a liquefied compressed gas.]			
MW: 64.5	BP: 54°F	FRZ: -218°F	Sol: 0.6%
VP: 1000 mmHg	IP: 10.97 eV	RGasD: 2.23	Sp.Gr: 0.92 (Liquid at 32°F)
Fl.P: NA (Gas) -58°F (Liquid)	UEL: 15.4%	LEL: 3.8%	
Flammable Gas Class IA Flammable Liquid			
Incompatibilities & Reactivities Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium; oxidizers; water or steam [Note: Reacts with water to form hydrochloric acid.]			
Measurement Methods NIOSH 2519 See: NMAM or OSHA Methods			
Personal Protection & Sanitation Skin: Prevent skin contact (liquid) Eyes: Prevent eye contact (liquid) Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately (liquid) Skin: Water flush promptly (liquid) Breathing: Respiratory support Swallow: Medical attention immediately (liquid)	
Respirator Recommendations OSHA Up to 3800 ppm: (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination			

with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact

Symptoms Incoordination, inebriation; abdominal cramps; cardiac arrhythmias, cardiac arrest; liver, kidney damage

Target Organs Liver, kidneys, respiratory system, cardiovascular system, central nervous system

See also: [INTRODUCTION](#) See ICSC CARD: [0132](#)

NIOSH Pocket Guide to Chemical Hazards

Dichlorodifluoromethane		CAS 75-71-8
<chem>CCl2F2</chem>		RTECS PA8200000
Synonyms & Trade Names Difluorodichloromethane, Fluorocarbon 12, Freon® 12, Genetron® 12, Halon® 122, Propellant 12, Refrigerant 12		DOT ID & Guide 1028 <u>126</u>
Exposure Limits	NIOSH REL: TWA 1000 ppm (4950 mg/m ³)	
	OSHA PEL: TWA 1000 ppm (4950 mg/m ³)	
IDLH 15,000 ppm See: <u>75718</u>		Conversion 1 ppm = 4.95 mg/m ³
Physical Description Colorless gas with an ether-like odor at extremely high concentrations. [Note: Shipped as a liquefied compressed gas.]		
MW: 120.9	BP: -22°F	FRZ: -252°F
VP: 5.7 atm	IP: 11.75 eV	RGasD: 4.2
Fl.P: NA	UEL: NA	LEL: NA
Nonflammable Gas		
Incompatibilities & Reactivities Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium		
Measurement Methods NIOSH <u>1018</u> See: <u>NMAM</u> or <u>OSHA Methods</u>		
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
Respirator Recommendations NIOSH/OSHA Up to 10,000 ppm: (APF = 10) Any supplied-air respirator Up to 15,000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/ (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination		

with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite

Target Organs cardiovascular system, peripheral nervous system

See also: INTRODUCTION See ICSC CARD: 0048

NIOSH Pocket Guide to Chemical Hazards

1,2,4-Trimethylbenzene		CAS 95-63-6	
C ₆ H ₃ (CH ₃) ₃		RTECS DC3325000	
Synonyms & Trade Names Assymetrical trimethylbenzene, psi-Cumene, Pseudocumene [Note: Hemimellite is a mixture of the 1,2,3-isomer with up to 10% of related aromatics such as the 1,2,4-isomer.]		DOT ID & Guide	
Exposure Limits	NIOSH REL: TWA 25 ppm (125 mg/m ³)		
	OSHA PEL [†] : none		
IDLH N.D. See: IDLH INDEX		Conversion 1 ppm = 4.92 mg/m ³	
Physical Description Clear, colorless liquid with a distinctive, aromatic odor.			
MW: 120.2	BP: 337°F	FRZ: -77°F	Sol: 0.006%
VP(56°F): 1 mmHg	IP: 8.27 eV		Sp.Gr: 0.88
Fl.P: 112°F	UEL: 6.4%	LEL: 0.9%	
Class II Flammable Liquid			
Incompatibilities & Reactivities Oxidizers, nitric acid			
Measurement Methods None available See: NMAM or OSHA Methods			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, fatigue, dizziness, nausea, incoordination; vomiting, confusion: chemical pneumonitis (aspiration liquid)			
Target Organs Eyes, skin, respiratory system, central nervous system, blood			
See also: INTRODUCTION			

NIOSH Pocket Guide to Chemical Hazards

1,3,5-Trimethylbenzene		CAS 108-67-8	
C ₆ H ₃ (CH ₃) ₃		RTECS OX6825000	
Synonyms & Trade Names Mesitylene, Symmetrical trimethylbenzene, sym-Trimethylbenzene		DOT ID & Guide 2325 129	
Exposure Limits	NIOSH REL: TWA 25 ppm (125 mg/m ³)		
	OSHA PEL†: none		
IDLH N.D. See: IDLH INDEX		Conversion 1 ppm = 4.92 mg/m ³	
Physical Description Clear, colorless liquid with a distinctive, aromatic odor.			
MW: 120.2	BP: 329°F	FRZ: -49°F	Sol: 0.002%
VP: 2 mmHg	IP: 8.39 eV		Sp.Gr: 0.86
Fl.P: 122°F	UEL: ?	LEL: ?	
Class II Flammable Liquid			
Incompatibilities & Reactivities Oxidizers, nitric acid			
Measurement Methods None available See: NMAM or OSHA Methods			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)			
Target Organs Eyes, skin, respiratory system, central nervous system, blood			
See also: INTRODUCTION See ICSC CARD: 1155			

APPENDIX F

Correspondence with Perry Police Department

ON CORE LETTERHEAD

Chief Bob Guesno
46 North Main Street
P.O. Box 253
Perry, New York 14530

Subject: **Remediation System**
Champion Products, Inc.
DEC Site No. V00018-9
Perry, New York

Dear Chief Guesno:

The purpose of this letter is to follow-up you meeting with Mr. Ron Jenkins of November 19, 2001. During your meeting, Mr. Jenkins advised you of the presence of the remediation system along with the general operating procedures and potential hazards associated with the operation of the system.

We request that if vandalism or a fire occurs at the system that you contact either:

- Ron Jenkins (daytime: 412 487-7702, nights and weekends: 724 785-7679);
- Jason Butler (716) 237-5940; or.
- Stephen Zbur (daytime: 412 487-7703, nights and weekends: 724 449-9029).

If you have any questions or need additional information, please contact us.

Sincerely,

CORE Environmental Services, Inc.

Ron Jenkins
Project Manager

Stephen A. Zbur
President

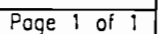
APPENDIX G:

Soil Boring and Well Construction characteristics



Project Number: S098-009	Site Id: MW-101
Project Name: Sara-Lee Perry	Location: PERRY, NEW YORK
Contractor: PARRATT-WOLFF	Elevation: 96.72'
Consulting Firm: DELTA ENVIRONMENTAL	Datum: Mean Sea Level
Logged By: RON JENKINS	Conductor Casing:
Date(s): 06/23/98 - 06/23/98	type: dia: 0.00in fm: 0.00' to: 0.00'
Purpose: Monitoring Well, Shallow	Blank Casing:
Drilling Method: Hollow Stem Auger	type: PVC dia: 2.00in fm: 0.0' to: 5.00'
Annular Fill:	Screens:
type: Bentonite Grout fm: 0.00' to: 3.00'	type: Slotted size: 0.010in dia: 2.00in fm: 5.00' to: 15.00'
type: Bentonite Pellets fm: 3.00' to: 4.00'	Remarks:
type: Sand Filter fm: 4.00' to: 15.00'	

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction
									MP. EL. 96.72
					0.0 ppm		OL	ORGANIC MATERIAL;SILT,RED-BROWN;TRACE CLAY	
					0.0 ppm		MH	SILT,RED-BROWN;TRACE CLAY	
					0.0 ppm		SM	SILT,RED-BROWN;TRACE SAND, FINE;TRACE GRAVEL,COARSE	
90					0.0 ppm		SM	MOIST	
	10				0.0 ppm		GP	GRAVEL,MED;TRACE SAND;TRACE SILT,RED-BROWN(WET)	
					0.0 ppm		CL	CLAY,LIGHT GRAY;TRACE GRAVEL,MED;TRACE BEDROCK (SHALE)	
							SP	SAND,LIGHT GRAY;TRACE GRAVEL	
							GC	GRAVEL,MED;TRACE SAND;TRACE SILT	
								END OF BORING	
80									
	20								
70									
	30								
60									





Project Number: S098-009

Site Id: MW-103

Project Name: Sara-Lee Perry

Location: PERRY, NEW YORK

Contractor: PARRATT-WOLFF

Elevation: 97.14'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: Mean Sea Level

Logged By: RON JENKINS

Conductor Casing:

e(s): 06/23/98 - 06/23/98

type:

dia: 0.00in fm: 0.00'

to: 0.00'

Purpose: Monitoring Well, Shallow

Blank Casing:

Drilling Method: Hollow Stem Auger

type: PVC

dia: 2.00in fm: 0.0'

to: 5.00'

Annular Fill:

type: Bentonite Grout

fm: 0.00'

to: 3.00'

type: Bentonite Pellets

fm: 3.00'

to: 4.00'

type: Sand Filter

fm: 4.00'

to: 15.00'

Screens:

type: Slotted

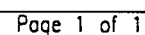
size: 0.010in

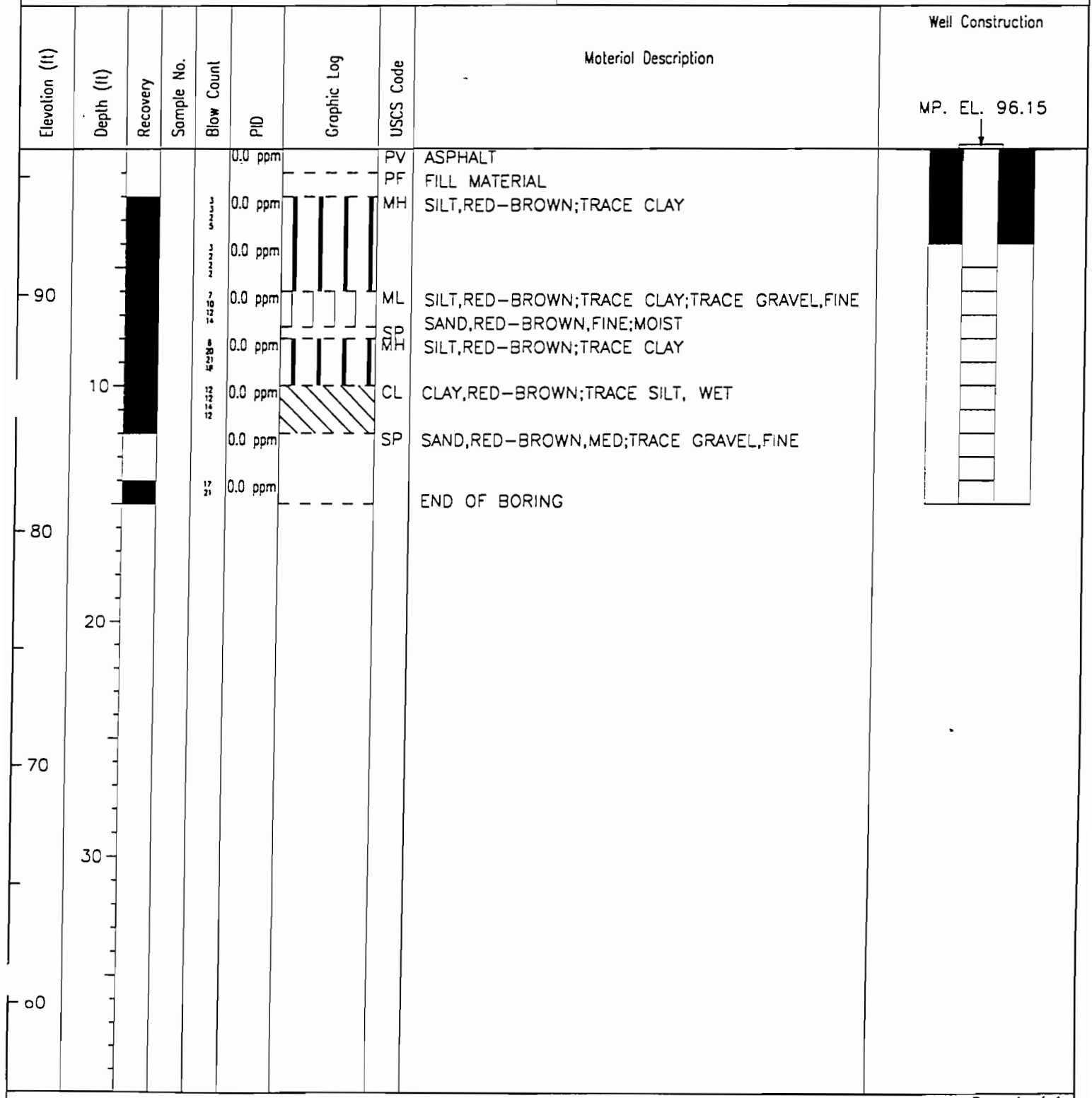
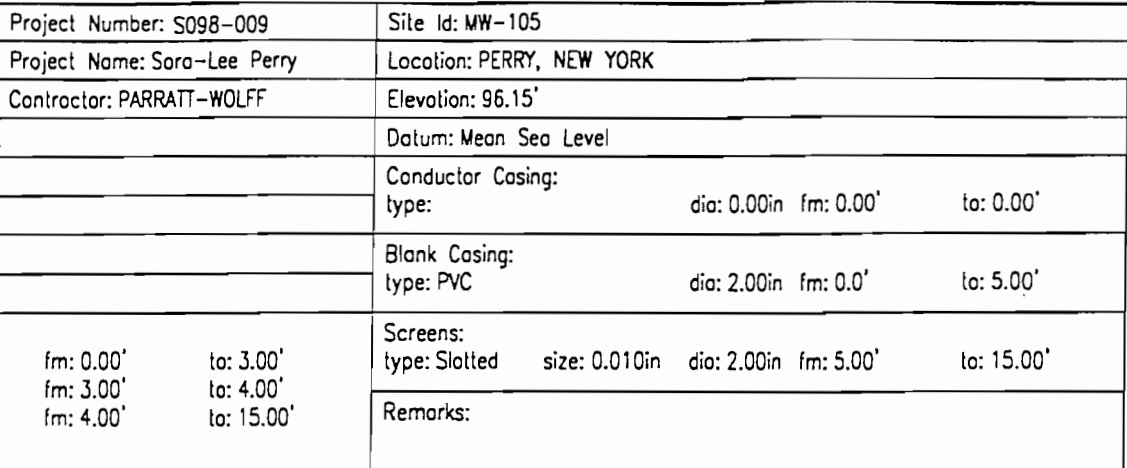
dia: 2.00in fm: 5.00'

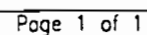
to: 15.00'

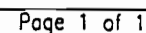
Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PIID	Graphic Log	USCS Code	Material Description	Well Construction
									MP. EL. 97.14
					0.0 ppm		PF	FILL;GRAVEL;SILT, RED-BROWN;COBBLES	
					0.0 ppm		SM	SILT,RED-BROWN;TRACE SAND,VERY FINE;TRACE GRAVEL,FINE	
					0.0 ppm		SM	SILT,RED-BROWN;CLAY,RED-BROWN;TRACE SAND,VERY FINE	
					0.0 ppm		SM	MOST SAND,RED-BROWN,VERY FINE;TRACE SILT,RED-BROWN;GRAVEL,MED	
90					0.0 ppm		SM	SAND,RED-BROWN,VERY FINE;SILT,RED BROWN;TRACE CLAY;TRACE GRAVEL	
	10				0.0 ppm		CH	CLAY,LIGHT GRAY TRACE BEDROCK CHIPS	
					0.0 ppm				
					0.0 ppm				
					0.0 ppm			END OF BORING	
80									
	20								
70									
	30								
60									









Project Number: S098-009		Site Id: MW-108				
Project Name: Sara-Lee Perry		Location: PERRY, NEW YORK				
Contractor: PARRATT-WOLFF		Elevation: 99.60'				
		Datum: Mean Sea Level				
		Conductor Casing:				
		type:		dia: 0.00in	fm: 0.00'	to: 0.00'
		Blank Casing:				
		type: PVC		dia: 1.00in	fm: 0.0'	to: 9.00'
fm: 0.00'	to: 7.00'	Screens:				
fm: 7.00'	to: 8.00'	type: Slotted	size: 0.010in	dia: 1.00in	fm: 9.00'	to: 19.00'
fm: 8.00'	to: 19.00'	Remarks:				

[illegible]



Project Number: S098-009

Site Id: MW-109

Project Name: Sara-Lee Perry

Location: Perry, New York

Contractor: PARRATT-WOLFF

Elevation: 99.52'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: Mean Sea Level

Logged By: RON JENKINS

Conductor Casing:

date(s): 08/17/98 - 08/17/98

type: dia: 0.00in fm: 0.00' to: 0.00'

Purpose: Monitoring Well, Shallow

Blank Casing:

Drilling Method: Hollow Stem Auger

type: PVC dia: 1.00in fm: 0.0' to: 5.00'

Annular Fill:

Screens:

type: Bentonite Grout

fm: 0.00' to: 3.00'

type: Bentonite

fm: 3.00' to: 5.00'

type: Sand Filter

fm: 5.00' to: 16.00'

type: Slotted size: 0.010in dia: 1.00in fm: 6.00' to: 16.00'

Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction
									MP. EL. 99.52
					0.0 ppm		CH		
					0.0 ppm		MH	SILT, RED-BROWN; TRACE CLAY	
					0.0 ppm		SP	BECOMES MOIST SAND, FINE; TRACE GRAVEL, MED; TRACE SILT	
90	10				0.0 ppm		GP	GRAVEL, FINE-COARSE; TRACE SAND, FINE; TRACE SILT, LIGHT GRAY WET	
					0.0 ppm		MH	SILT, RED-BROWN; TRACE CLAY, LIGHT GRAY; TRACE GRAVEL, FINE	
							SM	SAND, RED-BROWN, FINE-COARSE; SOME SILT; TRACE GRAVEL, FINE END OF BORING	
80	20								
70	30								
60									



Project Number: S098-009

Site Id: MW-110

Project Name: Sara-Lee Perry

Location: PERRY, NEW YORK

Contractor: PARRATT-WOLFF

Elevation: 100.47'

Consulting Firm: DELTA ENVIRONMENTAL

Dotum: Mean Sea Level

Logged By: RON JENKINS

Conductor Casing:

ite(s): 08/17/98 - 08/17/98

type: dia: 0.00in fm: 0.00' to: 0.00'

Purpose: Monitoring Well, Shallow

Blank Casing:

Drilling Method: Hollow Stem Auger

type: PVC dia: 2.00in fm: 0.0' to: 5.00'

Annular Fill:

type: Bentonite Grout

fm: 0.00' to: 3.00'

type: Bentonite

fm: 3.00' to: 4.00'

type: Sand Filter

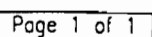
fm: 4.00' to: 15.00'

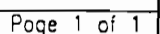
Screens:

type: Slotted size: 0.010in dia: 2.00in fm: 5.00' to: 15.00'

Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction
100									MP. EL. 100.47
							CH		
							MH	SILT,RED-BROWN;TRACE CLAY	
							SP	BECOMES MOIST	
					0.0 ppm		GP	SAND,FINE;TRACE GRAVEL,MED;TRACE SILT	
					0.0 ppm		MH	GRAVEL,FINE-COARSE;TRACE SAND,FINE;TRACE SILT,LIGHT GRAY WET	
								SILT,RED-BROWN,TRACE CLAY,LIGHT GRAY;TRACE GRAVEL,FINE	
								END OF BORING	
80	20								
70	30								







Project Number: S098-009

Site Id: MW-202

Project Name: Sara-Lee Perry

Location: PERRY, NEW YORK

Contractor: PARRATT-WOLFF

Elevation: 96.33'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: Mean Sea Level

Logged By: RON JENKINS

Date(s): 08/19/98 - 08/19/98

Certified By:

Conductor Casing:

Purpose: Monitoring Well, Deep

type: STL-Steel

dia: 4.00in

fm: 0.00'

to: 24.00'

Drilling Method: Hollow Stem Auger

Blank Casing:

type: PVC

dia: 2.00in

fm: 0.0'

to: 31.00'

Remarks:

Screens:

type: Slotted

size: 0.010in

dia: 2.00in

fm: 31.00'

to: 41.00'

Annular Fill:

type: Bentonite Grout

fm: 0.00'

to: 24.00'

type: Bentonite

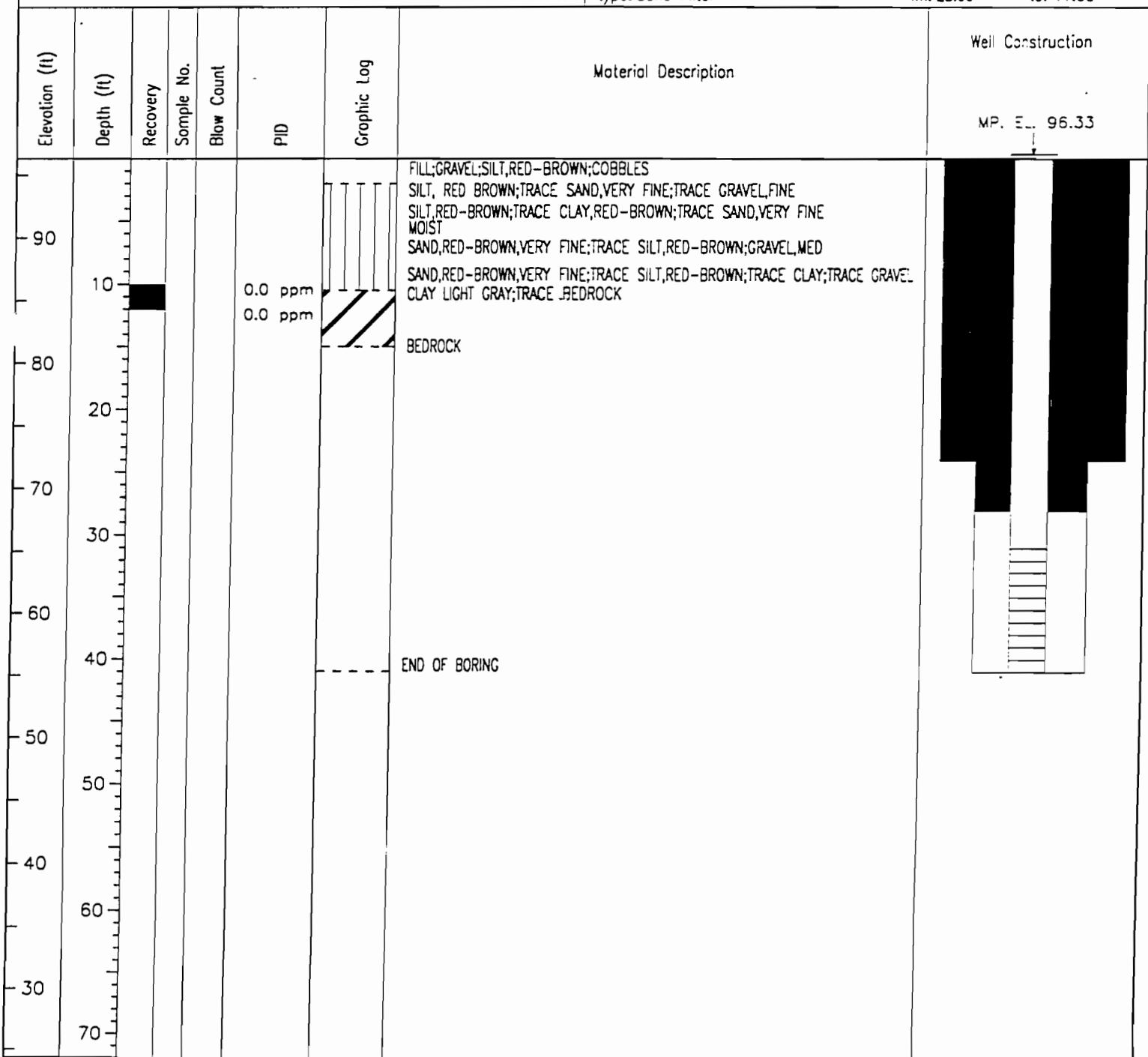
fm: 24.00'

to: 28.00'

type: Sand Filter

fm: 28.00'

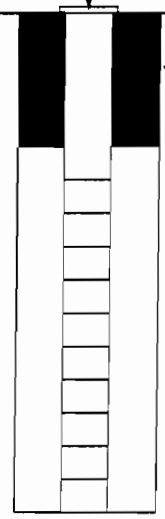
to: 41.00'





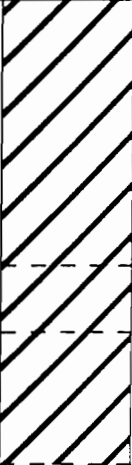
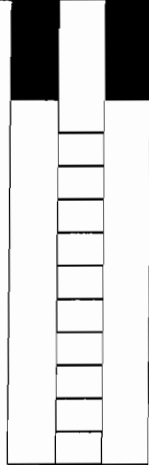
Project Number: S098-009	Site Id: MW-112
Project Name: Sara-Lee Perry	Location: PERRY, NEW YORK
Contractor: PARRATT-WOLFF	Elevation: 77.68'
Consulting Firm: DELTA ENVIRONMENTAL	Datum: Mean Sea Level
Logged By: RON JENKINS	Conductor Casing:
Date(s): 08/19/98 - 08/19/98	type: dia: 0.00in fm: 0.00' to: 0.00'
Purpose: Monitoring Well, Shallow	Blank Casing:
Drilling Method: Hollow Stem Auger	type: PVC dia: 2.00in fm: 0.0' to: 5.00'
Annular Fill:	Screens:
type: Bentonite Grout fm: 0.00' to: 3.00'	type: Slotted size: 0.010in dia: 2.00in fm: 5.00' to: 15.00'
type: Bentonite fm: 3.00' to: 4.00'	Remarks:
type: Sand Filter fm: 4.00' to: 15.00'	

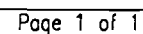
Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction
									MP. EL. 77.68
							MH	SILT, RED BROWN	
								STRONG HYDROCARBON ODOR;	
					84.0 ppm			BECOMES MOIST	
								END OF BORING	
70	10								
60	20								
50	30								
40									





Project Number: S098-009	Site Id: MW-113
Project Name: Sora-Lee Perry	Location: PERRY, NEW YORK
Contractor: PARRATT-WOLFF	Elevation: 75.25'
Consulting Firm: DELTA ENVIRONMENTAL	Datum: Mean Sea Level
Logged By: RON JENKINS	Conductor Casing:
Date(s): 08/19/98 - 08/19/98	type: dia: 0.00in fm: 0.00' to: 0.00'
Purpose: Monitoring Well, Shallow	Blank Casing:
Drilling Method: Hollow Stem Auger	type: PVC dia: 2.00in fm: 0.0' to: 4.00'
Annular Fill:	Screens:
type: Bentonite Grout fm: 0.00' to: 2.00'	type: Slotted size: 0.010in dia: 2.00in fm: 4.00' to: 14.00'
type: Bentonite fm: 2.00' to: 3.00'	Remarks:
type: Sand Filter fm: 3.00' to: 14.00'	

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction
									MP. EL. 75.25
							CH	CLAY, RED BROWN	
					48.8 ppm				
					0.0 ppm		CH	CLAY, RED-BROWN; TRACE SILT	
					0.0 ppm		CH	CLAY GRAY (TILL)	
								END OF BORING	
70									
	10								
60									
	20								
50									
	30								
40									
30									
20									
10									
0									





Project Number:	Site Id: MW-115
Project Name: Sara-Lee Perry	Location: PERRY, NEW YORK
Contractor: PARRATT-WOLFF	Elevation: 97.31'

Consulting Firm: DELTA ENVIRONMENTAL	Datum: Mean Sea Level

Designed By: RON JENKINS	Measuring Point: 97.31'

Date(s): 11/04/98 - 11/04/98	Conductor Casing: type: dia: 0.00in fm: 0.00' to: 0.00'

Purpose: Monitoring Well, Shallow	Blank Casing: type: PVC dia: 2.00in fm: 0.0' to: 10.00'

Drilling Method: Hollow Stem Auger	Screens: type: Slatted size: 0.010in dia: 2.00in fm: 10.00' to: 20.00'

Remarks:	Annular Fill: type: Bentonite Grout fm: 0.00' to: 7.00' type: Bentonite fm: 7.00' to: 8.00' type: Sand Pack (generic) fm: 8.00' to: 20.00'

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction
									MP. EL. 97.31'
					0.0 ppm		SM	Red, brown sand, fine-med; trace silt	
90	10				0.0 ppm		CL	TILL PIECES OF SHALE; TRACE GRAVEL; TRACE SILT; TRACE CLAY, RED BROWN SOIL SAMPLE SUBMITTED FOR LAB ANALYSIS 10-12 FEET	
					0.0 ppm			SATURATED	
80	20				0.0 ppm			END OF BORING	



Project Number: S098-009

Site Id: SB-05

Project Name: Soro-Lee Perry

Location: PERRY, NEW YORK

Contractor: PARRATT-WOLFF

Elevation: 0.00'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: Mean Sea Level

Logged By: RON JENKINS

Conductor Casing:

:(s): 05/27/98 - 05/27/98

type:

dia: 0.00in fm: 0.00'

to: 0.00'

Purpose: Soil Boring

Blank Casing:

Drilling Method: Hollow Stem Auger

type:

dia: 0.00in fm: 0.0'

to: 12.00'

Annular Fill:

type:

fm:

to:

type:

fm:

to:

type:

fm:

to:

Screens:

type:

size:

dia:

fm:

to:

Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction	
									Well Not Installed	
0					0.0 ppm		OL MH	ORGANIC MATERIAL SILT, RED BROWN; TRACE CLAY; TRACE GRAVEL, COARSE		
					0.0 ppm		SP MH	SAND, RED BROWN, VERY FINE SILT, RED BROWN; TRACE GRAVEL COARSE		
-10	10				0.0 ppm			SILT, LIGHT GRAY; TRACE CLAY; TRACE GRAVEL (WET) END OF BORING		
-20	20									
-30	30									
-40	40									



Project Number: S098-009	Site Id: SB-06
Project Name: Sara-Lee Perry	Location: PERRY, NEW YORK
Contractor: PARRATT-WOLFF	Elevation: 0.00'
Consulting Firm: DELTA ENVIRONMENTAL	Datum: Mean Sea Level
Logged By: RON JENKINS (s): 05/27/98 - 05/27/98	Conductor Casing: type: dia: 0.00in fm: 0.00' to: 0.00'
Purpose: Soil Boring	Blank Casing: type: dia: 0.00in fm: 0.0' to: 8.00'
Drilling Method: Hollow Stem Auger	Screens: type: size: dia: fm: to:
Annular Fill: type: fm: to: type: fm: to: type: fm: to:	Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction
									Well Not Installed
					0.0 ppm		OL MH SP MH SP	ORGANIC MATERIAL SILT,RED BROWN;TRACE CLAY SAND,RED BROWN,FINE SILT,RED BROWN;TRACE CLAY SAND,RED BROWN,COARSE;TRACE GRAVEL END OF BORING	
-10	10								
-20	20								
-30	30								



Project Number: S098-009

Site Id: SB-13

Project Name: Sara-Lee Perry

Location: PERRY, NEW YORK

Contractor: PARRATT-WOLFF

Elevation: 0.00'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: Mean Sea Level

Logged By: PATRICK HALLER

Conductor Casing:

te(s): 07/14/98 - 07/14/98

type:

dia: 0.00in fm: 0.00'

to: 0.00'

Purpose: Soil Boring

Blank Casing:

Drilling Method: Hollow Stem Auger

type:

dia: 0.00in fm: 0.0'

to: 14.00'

Annular Fill:

type:

fm:

to:

type:

fm:

to:

type:

fm:

to:

Screens:

type:

size:

dia:

fm:

to:

Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction
									Well Not Installed
							MH	SILT, RED BROWN; TRACE CLAY	
					20 ppm		SP	SAND, FINE; TRACE GRAVEL; MOIST	
-10	10				10.5 ppm				
					0.5 ppm				
								END OF BORING	
-20	20								
-30	30								



Project Number: S098-009

Site Id: SB-14

Project Name: Sarc-Lee Perry

Location: PERRY, NEW YORK

Contractor: PARRATT-WOLFF

Elevation: 0.00'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: Mean Sea Level

Logged By: PATRICK HALLER

Conductor Casing:

type: dia: 0.00' in fm: 0.00' to: 0.00'

Date(s): 07/14/98 - 07/14/98

Blank Casing:

type: dia: 0.00' in fm: 0.0' to: 12.00'

Purpose: Soil Boring

Drilling Method: Hollow Stem Auger

Annular Fill:

type: fm: to:

type: fm: to:

type: fm: to:

Screens:

type: size: dia: fm: to:

Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction
									Well Not Installed
							MH	SILT, RED BROWN; TRACE CLAY	
								END OF BORING	



Project Number: S098-009

Site Id: SB-15

Project Name: Sara-Lee Perry

Location: PERRY, NEW YORK

Contractor: PARRATT-WOLFF

Elevation: 0.00'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: Mean Sea Level

Logged By: PATRICK HALLER

Conductor Casing:

e(s): 07/14/98 - 07/14/98

type: dia: 0.00in fm: 0.00' to: 0.00'

Purpose: Soil Boring

Blank Casing:

Drilling Method: Hollow Stem Auger

type: dia: 0.00in fm: 0.0' to: 14.00'

Annular Fill:

type: fm: to:
type: fm: to:
type: fm: to:

Screens:

type: size: dia: fm: to:

Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction	
									Well Not Installed	
0					0.0 ppm		CH	SILT, RED-BROWN; TRACE CLAY		
					0.0 ppm		MH	BECOMES MOIST		
					0.0 ppm		SP	SAND, FINE; TRACE GRAVEL, MED; TRACE SILT		
					0.0 ppm		GP	GRAVEL, FINE-COARSE; TRACE SAND, FINE; TRACE SILT, LIGHT GRAY WET		
-10	10				0.0 ppm		MH	SILT, RED-BROWN; TRACE CLAY, LIGHT GRAY; TRACE GRAVEL, FINE		
					0.0 ppm			END OF BORING		
-20	20									
-30	30									
-40	40									



Project Number: S098-009

Site Id: SB-19

Project Name: Sara-Lee Perry

Location: PERRY, NEW YORK

Contractor: ZEBRA

Elevation: 0.00'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: Mean Sea Level

Logged By: RON JENKINS

Conductor Casing:

te(s): 08/18/98 - 08/18/98

type: dia: 0.00in fm: 0.00' to: 0.00'

Purpose: Soil Boring

Blank Casing:

Drilling Method: Hollow Stem Auger

type: dia: 0.00in fm: 0.0' to: 16.00'

Annular Fill:

Screens:

type: fm: to:

type: size: dia: fm: to:

type: fm: to:

Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PI0	Graphic Log	USCS Code	Material Description	Well Construction
									Well Not Installed
					0.0 ppm		PF	FILL;GRAVEL;SILT,RED-BROWN,COBBLES	
							MH	SILT,RED-BROWN;TRACE SAND,VERY FINE;TRACE GRAVEL,FINE	
					0.0 ppm			SILT,RED-BROWN;CLAY,RED-BROWN;TRACE SAND,VERY FINE	
							SM	MOIST SAND,RED-BROWN,VERY FINE;TRACE SILT,RED-BROWN;TRACE GRAVEL,MED	
					0.0 ppm			SAND,RED-BROWN,VERY FINE;TRACE SILT,RED-BROWN;TRACE CLAY;TRACE GRAVEL	
-10	10						CH	CLAY,UGHT GRAY;TRACE BEDROCK	
					0.0 ppm			END OF BORING	
-20	20								
-30	30								



Project Number: S098-009

Site Id: SB-20

Project Name: Sara-Lee Perry

Location: PERRY, NEW YORK

Contractor: ZEBRA

Elevation: 0.00'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: Mean Sea Level

Logged By: RON JENKINS

Conductor Casing:

e(s): 08/18/98 - 08/18/98

type: dia: 0.00in fm: 0.00' to: 0.00'

Purpose: Soil Boring

Blank Casing:

Drilling Method: Hollow Stem Auger

type: dia: 0.00in fm: 0.0' to: 14.00'

Annular Fill:

Screens:

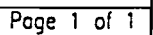
type: fm: to:

type: size: dia: fm: to:

type: fm: to:

Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction	
									Well Not Installed	
0					0.0 ppm		MH	SILT		
					0.0 ppm					
					0.0 ppm		SP	SAND, FINE, RED-BROWN; TRACE SILT		
-10	10				0.0 ppm			GRADING INTO TILL		
					0.0 ppm			SAND, MEDIUM, GRAY		
								END OF BORING		
-20	20									
-30	30									
-40										





Project Number: S098-009

Site Id: SB-22

Project Name: Sara-Lee Perry

Location: PERRY, NEW YORK

Contractor: PARRATT-WOLFF

Elevation: 0.00'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: Mean Sea Level

Lagged By: RON JENKINS

Conductor Casing:
type:

dia: 0.00in fm: 0.00'

to: 0.00'

Date(s): 11/03/98 - 11/03/98

Purpose: Soil Boring

Blank Casing:
type:

dia: 0.00in fm: 0.0'

to: 14.00'

Drilling Method: Hollow Stem Auger

Annular Fill:

type:

fm:

to:

type:

fm:

to:

type:

fm:

to:

Screens:

type:

size:

dia:

fm:

to:

Remarks:

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	PID	Graphic Log	USCS Code	Material Description	Well Construction	
									Well Not Installed	
0							MH	SILT, RED BROWN; TRACE CLAY		
-10	10				0.0 ppm		SP	SAND, FINE, RED BROWN; TRACE SILT		
					0.0 ppm			GRADING INTO TILL		
					0.0 ppm			SAND, MEDIUM, GRAY		
								END OF BORING		
-20	20									
-30	30									
-40	40									

APPENDIX H:

QA/QC manual

QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)
FOR
CHAMPION PRODUCTS, INC.
PERRY, NEW YORK

1.0 PROJECT SCOPE

Delta Environmental Consultants (Delta) was retained by Champion Products, Inc. to perform site investigation and remedial activities at the Perry, New York facility located at 200 North Main Street. Results of a Phase I and Soil and Ground Water Assessment conducted by Delta during May 1998 to present, indicated that a Remediation Workplan was required under the New York Voluntary Cleanup Program.

The purpose of the Phase I Assessment was to document current site conditions and determine areas of potential environmental concern from current or past property use. Based on the Phase I data, a soil and ground water investigation was performed to determine overall soil and ground water quality of the area property.

Site investigation activities were conducted in a phased approach, starting in the areas of known environmental impact and expanding gradually outward and increasing in depth until the lateral and vertical extent of the impact has been determined. The Remedial Activities included the following activities:

- Δ soil borings;
- Δ soil sampling;
- Δ monitoring well installation;
- Δ Geoprobe soil and ground water sampling;
- Δ surface water sampling;
- Δ steam sediment sampling;
- Δ ground water sampling;
- Δ laboratory analysis; and.
- Δ characterization and disposal of investigation derived wastes.

2.0 LABORATORY ANALYSIS

All soil and groundwater samples collected were submitted to Upstate Laboratories, Inc.. (ULI) a New York Department of Conservation (DEC) certified laboratory for analysis. Ms. Paula DeStefano supervised laboratory activities for ULI. ULI is located at 6034 Corporate Drive, East Syracuse, NY 13057-1017. ULI's DEC laboratory Certification Number is 10170.

3.0 PROJECT COORDINATION AND RESPONSIBILITIES

3.1 Environmental Consultant -Coordination and Sampling Activities

Delta will serve as the environmental consultant, and will assume responsibility for overall project coordination and coordination of sampling activities. Joyce Koker and Steve Zbur will handle overall project coordination and management, while Ron Jenkins and Heather Watson will oversee sampling activities, including quality assurance and quality control. A table summarizing the reporting hierarchy for the project is presented in Table 1.

3.2 Laboratory Activities

Paula DeStafano of ULI will oversee laboratory activities, including laboratory project management. Karen Holiday will oversee quality assurance and quality control for ULI.

Table 1

<u>Individual</u>	<u>Responsibility</u>	<u>Telephone Number</u>
Joyce Koker, Delta	Overall Project Coordination	(262) 827-4802
Steve Zbur, CORE	Senior Project Manager	(412)-487-7703
Ron Jenkins, CORE	Sampling Activities, QA and QC	(412)-487-7702
Heather Watson, CORE	Sampling Activities	(412)-487-7700
Paula DeStafano, ULI Labs	Laboratory Activities	(315)-437-0255
Karen Holiday, ULI Labs	QA/QC	(315)-437-0255

3.3 New York Professional Engineer

Mr. Bob Elliot, P.E. of Lu Engineers will serve as the New York Professional Engineer for the project. Mr. Elliot will review and sign all remediation design reports and the Final Remediation Construction Closeout Report.

4.0 ANALYTICAL METHODS/QUALITY ASSURANCE

Analyses performed for this project will use standard EPA analytical procedures for water and soil samples. When Standard EPA procedures are not available, modifications to EPA procedures will be used. EPA precision and accuracy criteria will be used as accepted criteria for assessing the precision and accuracy of the data generated.

The air in the breathing zone and soil samples will be screened using a photoionization detector (PID). The instruments will be calibrated at the beginning of each day, and at whatever additional times the field team determines is necessary.

5.0 SAMPLING PROCEDURES

5.1 Introduction

The field procedures included in the following sections contain a range of soil, and ground water investigative procedures. The following methods will be followed to minimize the potential for obtaining inadequate or inaccurate information.

5.2 Monitoring and Extraction Well Installation Procedure

Monitoring and extraction wells consist of flush jointed, threaded schedule 40 PVC pipe. The diameter of the monitoring wells are 2- 4 inches. Glue was not be used to construct these wells. The screened intervals vary from 5 feet to 25 feet depending on monitoring well type and soil conditions. No. 10 slotted screen (0.010 inch slot) was used in each 2 inch monitoring well, and No. 20 slotted screen (0.020 inch slot) was used for 4 inch monitoring wells. Each well is provided with a bottom cap. The sand pack consists of well sorted grains of quartz sand. The sand pack was emplaced by pouring sand slowly down the annular space between the well casing and the inside of the hollow stem auger. Depth to the top of the sand pack was measured following sand pack emplacement and hollow stem auger removal. A two-foot bentonite seal was placed above the sand pack. Grout was placed above the bentonite seal and was a mixture of type 1 portland cement grout (ASTM C150). The grout did not contain more than seven gallons of potable grade water per bag of cement. For monitoring wells with grout zones starting above the water table, the grout was emplaced by pouring from the surface, down the annulus of the borehole. For monitoring wells with grout zones starting below the water table, the grout was emplaced by the tremie pumping method. The tremie pipe was kept full, continuously, from start to finish of the grouting procedure with the discharge and the tremie pipe continuously

submerged in the grout until the zone being grouted is completely filled. A typical monitoring well construction detail is presented in Figure 2.

Monitoring wells were installed in the surficial aquifer to assess the horizontal extent of ground water contamination. These wells were installed using the hollow stem auger drilling method, or a combination of hollow stem auger and air rotary methods. The inside diameter of the borehole was large enough to permit 2 inches of annular space around the perimeter of the monitoring well screen. The wells were constructed with 5 to 15 feet of 2-inch diameter PVC screen and 2-inch PVC riser. Alternate methods were used to install monitoring wells within the building in locations that could not be readily accessed by the drilling rig. These methods included using a hand auger to advance the soil boring or the use of a Geoprobe to open a boring. Each well installed with the Geoprobe consists of 1-inch diameter PVC with 10 feet of screen.

Monitoring wells are provided with a steel locking above ground cover and a concrete pad for security. The wells are also provided with a locking expansion cap to prevent material from falling into the well.

The wells were developed after installation to eliminate fine material from the area of the well screen and allow for the collection of a sample which is free of suspended materials. Each well was developed by pumping and bailing. Wells were not developed using airlift methods in order to ensure that there will be no unnecessary volatilization of contaminants. Well development was considered complete when the water removed was free of fine sediments.

5.3 Ground Water Sampling

All monitoring wells were sampled from suspected cleanest to most contaminated in accordance with the following procedure

The following field sampling protocol will be followed:

- Step 1 - Measure water level.
- Step 2 - Purge well. A disposable polyethylene bailer was used to develop each monitoring well. A minimum of three to five well bore water volumes was evacuated from each monitoring well prior to sampling.
- Step 3 - Collect water samples. Water samples were collected using dedicated disposable polyethylene bailers.
- Step 4 - Prepare samples for transport. Samples were cooled to approximately 4 degrees Centigrade for transportation.
- Step 5 - Transport samples. Water samples were stored and transported to the specified laboratory, following all documentation and chain of custody procedures.
- Step 6 - Decontamination of field equipment.

Monitoring Well Purging: Monitoring well purging proceeded from the least to most contaminated monitoring well based on the PID readings or the latest analytical results. A minimum of three to five well volumes was purged from each monitoring well prior to sampling. If a monitoring well was purged dry before three to five well volumes were removed, sufficient time was allowed for ground water recovery so that a sample could be collected. All purge water was withdrawn from the top of the water column. The ground water pH, temperature, and conductivity were measured prior to, during and after purging with electronic instruments. Nitrile protective/non-reactive gloves were worn throughout the purging process. Purging equipment consisted of disposable polyethylene bailers with dedicated nylon rope. The purging pumps were used for developing/purging the deep monitoring wells.

Monitoring Well

Sampling Procedures:

Sampling was from the least to most contaminated well based on the latest analytical results. The ground water sample was collected with the purging bailer by slowly lowering the bailer into the upper portion of the water column in the well. The ground water was slowly poured from the bailer into laboratory supplied sampling containers. All ground water samples were collected within one (1) hour after well purging was completed.

5.4 Surface Water Sampling Procedures

Samples of the surface water will be collected from the unnamed tributary located in the southeastern portion of the site. Surface water samples will be collected by filling the sample jars directly from the stream. Samples will be collected in order from downstream to upstream to prevent the inclusion of sediment disturbed while moving along the streambed. The samples will be immediately placed on ice and kept chilled until submitted to the selected laboratory for analysis.

5.5 Stream Sediment Sampling Procedures

Samples of the stream sediment were collected from the unnamed tributary located in the southeastern portion of the site. Stream sediment samples were collected utilizing clean stainless steel sampling spoons to fill the sample jars. Samples were collected in order from downstream to upstream to prevent the inclusion of sediment disturbed while moving along the streambed. The samples were immediately placed on ice and kept chilled until submitted to the selected laboratory for analysis.

5.6 Drum Sampling Procedures

The drums of investigation derived waste (IDW) will be sampled to determine requirements for disposal. Drums of soil cuttings will be sampled by collecting a representative composite sample using stainless steel sampling spoons and hand augers. For deeper wells that required multiple drums to contain the cuttings the composite sample will be collected from all the drums filled at that location. Several shallow wells may be placed in a single drum therefore the number of drums of soil cuttings sampled will be less than the total number of wells.

Development/purge water and water collected from the decontamination pad will be also sampled to determine requirements for disposal. Drums of liquid investigation derived waste will be sampled using a disposable bailer. The IDW samples will be immediately placed on ice and kept chilled until submitted to the selected laboratory for analysis.

5.7 Decontamination Procedures

5.7.1 Drilling Equipment and Soil Screening Activities

Special precaution will be taken to minimize cross-contamination prior to mobilization and between soil borings, all drilling equipment and well materials will be steam cleaned between each borehole, or washed with organic free deionized water and Alconox detergent, rinsed with isopropyl alcohol and then finally rinsed with organic free deionized water. A decontamination zone was used to prevent wastewater generated by the decontamination procedure from impacting the soil. The decontamination water and sediment were collected and stored in 55-gallon drums on site for subsequent disposal.

5.7.2 Water Level Indicator

Before each water level measurement, water level measuring devices were first thoroughly scrubbed with Alconox soap and tap water followed by a rinse with isopropyl alcohol followed by two final rinses with organic free deionized water. Following final decontamination, this equipment was carefully stored to minimize any subsequent contamination.

5.7.3 Soil Sampling Spoons and Hand Auger

Before each use, the stainless steel soil sampling spoons and hand auger was first thoroughly scrubbed with Alconox soap and tap water followed by a rinse with isopropyl alcohol followed by two final rinses with organic free deionized water. Following final decontamination, this equipment was carefully stored to minimize any subsequent contamination.

5.7.4 Water Sampling Equipment

All bailers used to develop, purge and sample the ground water monitoring wells were single use disposable polyethylene bailers. Fresh nylon string will be used on each bailer. One bailer was used to purge and then sample each well per sampling event. The use of disposable bailers eliminated the need to decontaminate the bailers between each use. Small diameter monitoring wells were sampled using small diameter disposable bailers or disposable polyethylene tubing equipped with a foot valve. New polyethylene tubing and foot valves were used for each application eliminating the need to decontaminate the materials between each use.

6.0 CALIBRATION PROCEDURES AND FREQUENCY

Field equipment including pH meters, organic vapor monitors, temperature and conductivity meters, will be calibrated in accordance with the procedures provided in the operator's manual. The calibration procedures for laboratory equipment are included ULI's QA/QC Plan

7.0 CHAIN OF CUSTODY PROCEDURES

Sample bottles will begin at the laboratory with empty sample containers properly decontaminated by the laboratory, containing the appropriate preservative, sealed and ready for sampling.

Upon completion of ground water, soil, surface water and/or sediment sampling, a chain of custody log will be initiated. Chain of custody records will include the following information: project, project number, shipped by, shipped to, suspected hazard, sampling point, location, field identification number, date and time taken, sample type, number of containers, analysis required, sampler signature, etc. As few people as possible will handle the samples.

The chain of custody records will be shipped with the samples to the laboratory and upon arrival at the laboratory the samples will be checked in and signed in by the appropriate laboratory personnel. Laboratory identification numbers will be noted on the chain of custody record. A chain of custody will be turned over to the project manager and upon completion of the laboratory analysis, the completed chain of custody record will then be returned to the project manager. A copy of a typical chain of custody form and an example of a typical sampling jar label are included as Figures 3 and 4.

8.0 SAMPLE STORAGE PROCEDURES TO BE USED BY LABORATORY

The sample storage procedures to be used by ULI is included in their QA/QC Plan

