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SP-45-99
October 7, 1999

99-TC-10-06
Mr. Richard B. Provencher, Director
Miamisburg Environmental Management Project
U.S. Department of Energy
P.O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Art Kleinrath
SUBJECT: DE-AC24-97OH20044
Transmittal of Operable Unit 1 Annual Report

Dear Mr. Provencher:

BWO is pleased to submit an annual report on the operation & maintenance of the Operable Unit 1 Groundwater Treatment Systems. The report summarizes the operation of the two systems, the Groundwater Pump & Treat System and the Soil Vapor Extraction/Air Sparge System. This is the first of an intended series of annual reports and therefore includes more than one year of operations:

Pump & Treat - February 18, 1997 through calendar year 1998
SVE/AS - December 18, 1997 through calendar year 1998

This is not an FFA milestone and no formal regulatory review is required. If any comments are received then BWO will keep them on file and incorporate responses by modifying the next annual report.

If you have further questions regarding the report, please do not hesitate to contact Mark Spivey at (937) 865-3709.

Sincerely,

John B. Price
Project Manager, Soils Project

/lkl
cc: DCC w/o attachments
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OU 1 Annual Report

Pump & Treat, Air Sparge, and Soil Vapor Extraction

System Start through December 1998

Volume 1 of 2

Mound Plant
Miamisburg, OH

August 1999

Department of Energy
Ohio Field Office

Prepared by the Soils Project of
BABCOCK & WILCOX OF OHIO

OU-1 Annual Report
Pump and Treat, Air Sparge, and Soil Vapor Extraction
Systems Start through December 1998

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OU-1 Annual Report
Pump and Treat, Air Sparge, and Soil Vapor Extraction Systems Start through December 1998

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Executive Summary

Operable Unit One (OU-1), or Area B as it was originally called, occupies approximately 4 acres in the southwestern portion of the Mound Plant. It encompasses the historic landfill, the site sanitary landfill, the overflow pond, and the three plant production wells situated in the Buried Valley Aquifer (BVA). A Remedial Investigation (RI) focused on groundwater contamination. Volatile Organic Compounds (VOCs) have been detected and monitored in the groundwater in Area B.

The OU-1 BVA is characterized by low-level chlorinated solvent contamination of a shallow, wedge-shaped, anaerobic, highly permeable, sandy-gravel aquifer. This is a designated sole source aquifer that provides drinking water for many cities along the Miami River, as well as the Mound Plant. The major contaminants of concern are PCE, TCE, and DCE. Remediation of this area is complicated by the location of the engineered landfill over a portion of the site.

The Mound Plant was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priority List, in 1989. As part of the Mound CERCLA process, a Federal Facility Agreement (FFA) was signed between the Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA) and Ohio EPA. The agreement required DOE to produce a Remedial Investigation Feasibility Study (RI/FS) report, which is based on remedial investigative fieldwork. As a result of the RI process DOE and the U.S. EPA and Ohio EPA signed a CERCLA Record of Decision (ROD) for a remediation remedy to control groundwater VOC contamination in OU-1, and in the adjacent Buried Valley Aquifer (BVA).

The ROD specifies a pump-and-treat system as the remediation remedy to control groundwater VOC contamination in OU-1. In consideration of the estimated amount of time required for the pump-and-treat system to contain the contaminants until eventual termination, the Innovative Technology Remediation Demonstration (ITRD) group was contacted and asked to work with the Mound ER Program to review and evaluate applicable innovative remediation technologies and suggest enhancements to a site-selected baseline pump-and-treat system. The ITRD group is an advisory group composed of DOE, EPA, industry, and regulatory agency representatives.

Based on detailed engineering assessments and cost and performance evaluations, the ITRD group identified two technologies for application at the site. The two technologies are air sparging and soil vacuum extraction (AS/SVE). It has been estimated that clean up could be achieved in approximately three years, based upon simultaneous operation these systems.

Due to a time differential associated with the implementation of the remediation methods the pump-and-treat system has been operating the longest. The pump-and-treat system, from February 18, 1997 to December 31, 1998, has removed an estimated 19 pounds of contaminants from the aquifer. The SVE system has removed an estimated 2,500 pounds of contaminants, from December 18, 1997 to December 31, 1998. Both systems are anticipated to continue remediation efforts and could be shut down as early as December 2000.

1.0 Introduction

Operable Unit One (OU-1), or Area B as it was originally called, occupies approximately 4 acres in the southwestern portion of the Mound Plant. It encompasses the historic landfill, the site sanitary landfill, the overflow pond, and the three plant production wells. The Mound Plant began a periodic water-sampling program for Volatile Organic Compounds (VOCs) in 1984. Under the Environmental Restoration (ER) Program, a Remedial Investigation (RI) was started in 1987 and focused on groundwater contamination. Since 1986, VOCs have been detected and monitored in the groundwater in Area B. An extended discussion of Area B history, including waste disposal and construction activities, is provided in the OU-1 RI Report, Section 1, March 1994.

The OU-1 BVA is characterized by low-level (1 ppm) chlorinated solvent contamination of a shallow, wedge-shaped, anaerobic, highly permeable, sandy-gravel aquifer. This is a designated sole source aquifer that provides drinking water for many cities along the Miami River, as well as the Mound Plant. The major contaminants of concern are PCE, TCE, and DCE. Meandering lenses of glacial till, fill, and sand and gravel sit above the water table and contain the same contaminants, generally in the range of 100 ppb but in some areas to levels as high as 7-25 ppm. Remediation is further complicated by the location of the engineered landfill over a portion of the site.

As a result of the VOC contamination found in OU-1 groundwater, the Mound Plant was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priority List, in 1989. As part of the Mound CERCLA process, a Federal Facility Agreement (FFA) was signed between the Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA) and Ohio EPA. The FFA agreement required DOE to produce a Remedial Investigation Feasibility Study (RI/FS) report, which is based on remedial investigative fieldwork. As a result of the RI process, which took approximately 3 years (1992-1995), DOE and the U.S. EPA and Ohio EPA signed a CERCLA Record of Decision (ROD) for a remediation remedy to control groundwater VOC contamination in OU-1, and in the adjacent Buried Valley Aquifer (BVA).

The ROD specifies a pump-and-treat system as the remediation remedy to control groundwater VOC contamination in OU-1. In consideration of the treatment time required for the pump-and-treat system to remediate the site, two additional systems were selected for expedition of contaminant removal. An air sparging/soil vacuum extraction (AS/SVE) system were the selected technologies for deployment. It has been estimated that clean up could be achieved in approximately three years, based upon simultaneous operation these systems.

2.0 Scope/Purpose of Report

This report is the first annual report written covering the remedial activities in OU-1. Since the treatment of VOCs officially began on February 18, 1997 with the implementation of the pump-and-treat system, this report will cover the activities associated with the OU-1 area from that date to December 31, 1998. These activities include, but are not limited to, system design/construction description, system maintenance (including preventative and problems/failures), sampling, measurements on system operating parameters, and VOC mass removal calculations. The purpose of this annual report is to gather together, in one place, a ready reference of all of the aforementioned data into a coherent package.

3.0 Groundwater (ROD)

A groundwater contaminant plume emanates southward from the OU-1 landfill and travels toward the Mound Plant water wells. The primary contaminants of concern are cis-1,2-dichloroethene; trans-1,2-dichloroethene; tetrachloroethene; tetrachloromethane; 1,1,1-trichloroethane; trichloroethene; trichlorofluoromethane; chloroform, and vinyl chloride. The chosen remedial method for containment and removal of VOC contaminants was a pump-and-treat system. The pump-and-treat system will prevent further migration of affected groundwater, and treat extracted water to acceptable levels for disposal.

A remedial design was developed for the (pump and treat system which consists of) extraction and monitoring wells and an air stripper system. The extraction and monitoring wells for the OU-1 remediation project were installed in 1996, and the installation of the air stripper and associated equipment was completed and operation started on February 18, 1997. The first 180 days of operation was under a Treatability Test. Operation of the facility following the Treatability Test period has been conducted in accordance with the Authorization to Discharge. The effluent from the treatment facility is also known as Outfall 003. The monitoring for VOC contamination in OU-1 is ongoing and part of the Mound Plant Environmental Monitoring Program. Based upon the pump-and-treat monitoring results, the system is fulfilling the criterion set forth by the ROD. Due to the aforementioned, the ROD was considered to be fully implemented.

In consideration of the treatment time required for the conventional pump-and-treat system to remediate the site, which included waiting for any contaminate suspended in the unsaturated zone to naturally migrate to the BVA, additional treatment systems were required to expedite the process. The pump-and-treat, on its own, would take more than an estimated 30 years to achieve completion. Two additional systems, based upon pilot studies conducted at Mound, were selected for expedition of contaminant removal. With the implementation of these technologies it has been estimated that clean up could be achieved in approximately three years. Further discussion of the ROD enhancement systems is in section 4.0.

3.1 Pump-and-Treat System Description

The pump-and-treat system extracts the affected groundwater, treats the affected groundwater in a low-profile air stripper, and discharges the treated effluent to a storm drain. The storm drain was installed in 1996 as part of the Miami-Erie Canal remediation and passes along the West boundary of OU-1. The pump-and-treat system consists of a system of pumps, tanks, valves, instruments and electrical controls. The system layout is depicted graphically in Attachment A.

The three extraction wells pump at a combined rate of approximately 110 gallons per minute (gpm). The initial VOC concentrations in the extracted groundwater before (the pump-and-treat system was operational) were 274 μg/L cis-1,2-dichrloroethene; 3.2 μg/L trans-1,2-dichloroethene; 125 μg/L tetrachloroethene; 3.4 μg/L tetrachloromethane; 0.7 μg/L 1,1,1-trichloroethane; 86 μg/L trichloroethene; 5.4 μg/L trichlorofluoromethane; 43 μg/L chloroform, and 3.6 μg/L vinyl chloride. These concentrations represent the initial untreated water concentrations below ground. The air stripper reduces the water concentrations before discharge. The air concentration of the contaminants of concern is below OSHA air regulatory limits.

The extraction well pumps are located within each extraction well. The pumps are 480 volt three phase submersible Grundfos pumps (a ½ HP in extraction well number 412 and a 1 HP in 413 and 414). The pipelines conveying the water are constructed of schedule 80 PVC plastic and are attached via a pitless adapter through each well casing. Most of the pipe run is approximately three feet below grade, but a small portion of the pipe run where the pipe enters the side of the building is aboveground. Two check valves, one in the top of each pump and one in each influent line in Building 300, assures that water cannot flow backward to a well. A valve in each influent line can be adjusted to achieve the desired flow rate from each well. The aboveground portion of the influent piping, outside of Building 300, is heat traced and insulated to prevent freezing during very low temperatures. The influent pipes join together at a manifold system inside Building 300.

Each well contains three level control transducers operating with 120 volts. These transducers feed a switch that prevents the well pump from running dry. The pumps could become damaged if they are run without proper water flow. When the individual water level drops below the low-level switch, the coinciding pump stops. The well automatically restarts when water level rises above the operating-level switch and after a programmable reset period elapses. The reset period is controlled by a timer, which eliminates the possibility of cycling of the well pump too rapidly. The aforementioned timer(s) are located inside of the system control cabinet within Building 300.

Each influent line, from the extraction wells, has individual flow meters to measure the rate of flow from each well, and totalizers integrate individual flow rates to record total flow to date. If a well's flow rate drops without explanation, test the transmission pipe for leakage. Water samples can be collected from sampling ports that are located on each influent line as well as the influent manifold (composite sample) and effluent. These

ports allow for monitoring of influent and effluent water quality. After the influent manifold, the water flows into a low-profile air stripper.

The air stripper uses a series of four (4) stainless steel trays with perforated bottoms for the distribution of water, which is met with a countercurrent of forced air. Water enters at the top of the stripper through a diffuser and follows a "U" pattern in each tray while air enters at the bottom. The air stripper blower accomplishes the air induction at the bottom of the stripper and forces the air up through the perforated trays aerating the water (ie. Removing VOCs from the water) as it travels the channels downward. The system is equipped with air pressure switches and a differential air pressure indicator. The pressure switches shuts off the blower in the case of low or excessive pressure at the air injection point of the stripper. The shutdown of the blower by a pressure switch activates the appropriate alarm and shuts down the three well pumps. A typical cause of excessive pressure is fouling of the stripper tray air holes, indicating a need to clean the trays. A typical cause of low pressure would be the loss of the large port cover.

The water, following treatment in the trays, collects in the air stripper sump. This sump is equipped with an alarm, which is sounded if a high-level indicator is triggered within the stripper sump. If the high level alarm is actuated the well pumps are all shut down as well as the air stripper blower is shut down. The water in the sump is transported by air pressure into a gravity-flow effluent pipe. The effluent pipe is constructed as an inverted "U" trap of schedule 80 PVC plastic and is adjustable to optimize the water level in the air stripper sump. The effluent pipe flows below-grade to a storm drain that runs along the West boundary of OU-1.

A floor sump inside of Building 300 collects spilled water. Spilled water can be manually returned to the stripper by bailing or by the electric sump pump. An alarm is sounded if a high-level indicator is triggered in the floor sump. Simultaneously, the well pumps are all shut down, which then in turn causes the stripper to shut down.

The treatment system is equipped with an automated dialer and enunciator, which is activated upon any alarm condition. The automatic dialer will call up to eight numbers seeking acknowledgement of the alarm condition. If the alarm condition is not acknowledged, the automatic dialer will continue to cycle through the programmed call list until it receives an acknowledgement. Once the alarm is acknowledged, the alarm condition must be rectified within four hours or the automated dialer will resume automatic calling again.

3.2 System Maintenance

Regular inspection and maintenance of the pump-and-treat system is required for continued effective operation. Regular activities include those performed weekly, monthly, quarterly, and annually. The following describes the maintenance required for the pump-and-treat system. Maintenance and monitoring activities are to be logged in the system logbook, which resides in Building 300. A copy of the aforementioned logbook can be found in Attachment B.

3.2.1 Air Stripper

Note readings on all measuring devices (e.g., temperature, pressure, etc.) weekly.

Note flow rate indicated on all flow meters weekly.

Check and change as required the air stripper blower intake filter monthly.

Check and clean/change as required the Building 300 air intake filters (located on the East side) monthly.

Ensure metering pump is working properly on a daily basis and change sequestering agent as required.

Note any alarms. Determine the underlying cause of the alarm. Perform necessary maintenance or adjustment to resolve the underlying cause. Reset the alarm. Perform as required.

Check lubrication on electric blower motor on the air stripper quarterly.

Periodically disassemble gauges and meters and clean according to manufacturer's directions as needed.

Periodically check trays for fouling and clean openings to permit uniform flow of air through stripper trays, or change trays. Perform as indicated by differential pressure gauge.

Determine the underlying cause of any new noises or vibrations then correct the underlying cause as needed.

3.2.2 Pumps

Well pumps do not require regularly scheduled maintenance. Pumps should be pulled on an annual basis to clean biological fouling from intake screens. If an influent line does not produce sufficient flow, check its throttle valve and electrical connection. If flow remains insufficient, replace the entire well pump assembly. If well continues to fail to produce sufficient water, contact a hydrogeologist to diagnose the problem and determine a solution.

3.2.3 Sensors

The water level sensors/transducers located in each of the extraction wells, to protect from pumping when water levels are too low, should be removed annually and inspected. Following inspection, the sensors should be cleaned or replaced prior to re-installation into the extraction well.

The Telog water level recorder transducers should have their calibration checked annually. At this time the protective cap should be cleaned to open any clogging holes. The single channel Telog recorder units should have the desiccant changed quarterly while the multi-channel Telog recorder units should have the desiccant changed monthly. The desiccant packs can be regenerated prior to their next use by baking at 150°C (302°F) for three (3) hours. The recorder batteries require changing approximately every eight (8) months.

3.3 Compliance Monitoring

The VOC contaminants of concern (COC) have been monitored monthly on both the influent and effluent. The influent data shows that the pump-and-treatment system is being effective in the removal of the COCs from the groundwater by the rate of which the concentration of contaminants present in the influent is dropping. The effluent data demonstrates the effectiveness of the air stripper in removing the COCs from the water being treated and demonstrates compliance to the Authorization to Discharge from Outfall 003. The Environmental Safeguards and Compliance group performs the monitoring of and monthly reporting on "OU1 Authorization to Discharge Monitoring Results". This report is sent to the DOE and OEPA. A sample group of these reports is contained in Attachment C. A synopsis of the VOC COC data and Water Measurement data are in Attachment D.

3.4 System Performance

The Pump-and-treat system performance is assessed by three different metrics. The first metric is based upon COC mass removal and mass removal rate. Second, the system uptime verses down time is assessed. Third, the hydraulic containment of the contaminant plume/area is assessed. When these three factors are maximized, then the system is operating in an acceptable manner.

3.4.1 Mass Removal

Mass Removal calculations are based upon the analytical test results obtained from the Environmental Safeguards and Compliance group. Examples of the analytical results are contained in Attachment E. The influent COC concentration (reported in ug/L) is mathematically fitted, with respect to liters of water pumped from the extraction wells. The mathematical algorithm fitting is accomplished with TableCurve 2D version 4. The equation that best represents the data is selected and integrated with respect to liters of water pumped from the extraction wells and multiplied by the conversion factor of $2.205*10^{-9}$ which converts from micrograms to pounds. The individual COC calculated pounds removed are then summed together to obtain total pounds of VOCs removed. An Example of this can be found in Attachment F. This calculation is performed on a monthly basis, approximately.

3.4.2 Uptime/Downtime

The pump-and-treat system is to be on and pumping as much as humanly possible. It is the primary system that contains the contaminant plume and ensures regulatory compliance. The compliance boundaries are the West and South plant roads. DOE has also established the uptime as an Award Fee related item for B&WO. The monthly goal for system is to have greater than 95% running time. This goal was seldom reached in the beginning since the air stripper had to be shut down, taken apart, holes manually opened, and trays pressure washed due to calcium carbonate fouling. Alternatives were investigated to alleviate the need of manually cleaning the system every two to three weeks. Further elaboration on this is within the following sections.

The system experienced a pump failure in well 412 on 3/6/97. A new pump was purchased and installed on 3/24/97. The defective pump was repaired under warranty and stored in Building 300 as a spare. This is a ½ horse power pump and would not be able to be readily utilized in either well 413 or well 414.

The pump-and-treatment system was shut down from 8/25/98 10:00 to 8/28/98 11:30 and from 9/16/98 9:48 to 9/18/98 13:55 for treatment of the Air Sparge system wells for fouling. The treatment used was Nu-Well 110 Dry Acid by U.S. FILTER/Johnson Screens. An acid enhancer, Nu-Well 310, by the same company was also utilized. The system was turned off to minimize migration of the product during treatment. During the 9/16/98 shut down the well screen to extraction well 414 was treated as well.

The extraction well pump for 414 was pulled, cleaned, and tested from 9/2/98 9:30 to 9/8/98 12:15. The compelling factor for this action was the reduced pumping rate of well 414, down to approximately 28 gallons per minute from originally pumping at 41 gallons per minute.

Additional down periods for filter cleaning/replacement, lubrication, power outages, etceteras can be gleaned from the system logbook copy in Attachment B.

3.4.2.1 System Cleaning

From the systems start on 2/18/97 to 3/16/98, the pump-and-treat system operated without the use of a sequestering agent. Due to the water chemistry, the system had to be manually cleaned 15 times due to calcium carbonate fouling of the air passages. The cleaning dates can be found in the copy of the system logbook in Attachment B. From 3/16/98 to 3/18/98 the system was down for annual inspection and cleaning. The extraction pumps were pulled and cleaned as well as the water level sensors. Also during this period the air stripper was disassembled and thoroughly cleaned and reassembled with new gaskets.

3.4.2.2 Sequestering Agent

The use of a sequestering agent was researched and Drewsperse 752 Antifoulant was identified as the most cost-effective treatment that the EPA would approve for use. Upon receiving EPA approval, a metering pump and the Drewsperse were put into use on 3/18/98. The product is metered in at a rate of approximately 1.5 gallons per day. The Drewsperse, in a 55-gallon drum, requires replacement approximately monthly. Since that time the system has not required a manual disassembly for cleaning.

3.5 Hydraulic Containment

A six-month monitoring program was conducted to assess the hydraulic containment of the groundwater contamination plume within the western and southern compliance boundaries. This was accomplished by collecting water level data from 20 monitoring wells to evaluate the potentiometric surface and local hydraulic gradients in the OU-1 area. Local hydraulic gradients are determined by conducting three point evaluations using monitoring wells that straddle the compliance boundary. Two sets of three monitoring wells are currently being utilized to determine if hydraulic containment is achieved; wells 0417, 0305 and 0410 are used to verify containment at the southern boundary, and wells 0422, 0423 and P003 are used to verify containment at the western boundary.

The results of the monitoring show that the system is effectively capturing the contamination. The initial pump-and-treatment capture zone monitoring reports, performed by Terran Corporation, are in Attachment G, the Final Report on the Implementation of Operable Unit 1 Record of Decision.

The system continues to be assessed on a monthly basis with a three-point calculation performed on data obtained from wells West and South of the capture zone. The wells used to determine the inward gradient along the West compliance boundary are 422, 423, and P003. The wells used to determine the inward gradient along the South compliance boundary are 305, 410, and 417. These results can be found in the FFA Monthly Report. Examples of the Determination of Local Hydraulic Gradients are in Attachment H.

The system, with respect to the effect to the BVA, is also monitored. This monitoring is performed with Telog data loggers connected to pressure transducers located in wells P001, P003, P005, 313, 370, 412, 413, 414, 415, 416, 417, 418, 422, and 423. The pressure transducers are the means used to determine the BVA water level elevation based upon the water column pressure upon the transducer and knowing the transducer depth with respect to elevation. This data is downloaded on a monthly basis and evaluated. The data is stored to the Common area of the ER server at K:\Shared\2400 and Telogers directories, depending upon the data recorder. Examples of the recorder data can be found in Attachment D.

3.6 Notable Installation Events

During the installation of the pump-and-treat system, namely the drainage control and extraction wells 413 and 414, the historical drum burial site for approximately 2,500 thorium-contaminated drums were physically verified. These drums reside in the southwest corner of the land fill area. Approximately 30 drums intermingled with soil were removed to facilitate the installation of drainage controls and the pump-and-treat system.

The first of the drums was unearthed during the OU-1 drainage control installation on August 28, 1996. The drum identified as "#2 Drum" is the last drum unearthed during the utility trench creation for the extraction wells on October 10, 1996. The #1 Drum, based upon field measurements performed by the RCTs in the OU-1 area, is representative of the approximate 30 drums excavated and removed for disposition. The #2 Drum, based upon field measurements performed by the RCTs in the OU-1 area, is the radiologically hottest drum found.

The two drums (#1 and #2) were retained for further investigation. These drums were relocated to the area where Building 21 was in the process of D&D. This area was selected due to the same Thorium-232 contamination and the fact that the Building 21 area would be cleaned up in the D&D process of the area. Associated documentation for the radiological samples taken during the installation process are contained in Attachment I.

4.0 Soils (ROD Enhancement)

The Innovative Technology Remediation Demonstration (ITRD) group; an advisory group composed of DOE, EPA, industry, and regulatory agency representatives; was contacted and asked to work with the Mound ER Program to review and evaluate applicable innovative remediation technologies and suggest enhancements to a site-selected baseline pump-and-treat system.

Based on detailed engineering assessments and cost and performance evaluations, the ITRD group identified two technologies for application at the site. The two selected technologies were high vacuum extraction for treatment of the contaminated fill and till material and air sparging/soil vapor extraction for treatment of the contaminated soil and ground water in the high permeability aquifer. Pilot-studies of both technologies were completed in April 1996. The results were very encouraging, with both systems showing quick and cost-effective contaminant removal capabilities.

Based on the pilot system results, the Mound ER Program decided to install a full-scale air sparging/high vacuum extraction (AS/SVE) system. Construction of the full-scale system started in April 1997 and was completed in November 1997. The system consists of 23 air sparging and 17 vapor extraction wells divided into two zones that can be operated alternately. The soil vapor extraction system is designed to operate at a vacuum of up to 18 inches of mercury (at intake to blowers) and a flow rate of approximately 500-cfm. The sparging system is designed to operate at nominally 150 cfm. After initial trial operations, the system became operational December 18, 1997.

4.1 System Description (AS/SVE)

The AS/SVE system relies on mass transfer of VOC contaminants from the dissolved-, sorbed-, and non-aqueous-phases to a gaseous phase that is extracted under negative pressure in the subsurface by the soil vapor extraction system. This mass transfer occurs, in accordance with the partitioning laws and vapor densities of the individual contaminant constituents, under a pressure gradient from the deep subsurface, created by the air sparging system, to a negative pressure in the vadose zone, created by the soil vapor extraction system.

The air sparging system operates by injecting air, under pressure, through a diffuser screen into the aquifer through conventionally constructed wells. A Sutorbilt 5H blower accomplishes the air production, which is belt driven by a 25-horse power 480 volt 3 phase electric motor. The air intake to the blower is filtered ambient air from outside of Building 301. The blower compresses the air which is fed to either the northern or southern section of the treatment area (Zone 1 or Zone 2 respectively). The diffuser screen, at each air sparge well, forces the air stream into very small bubbles (approximately 50 microns each) just above bedrock. The dissolved-phase and any non-aqueous- and sorbed-phase contamination below the water table should partition into these injected bubbles and be carried up to the vadose zone. In the vadose zone, these gaseous-phase contaminants mix with the soil gas.

The soil vapor extraction system consists of conventionally constructed extraction wells screened above the water table. These wells are connected via manifold to vacuum pumps that create a negative pressure in the vadose zone. Contaminants present as non-aqueous- and sorbed phase are volatilized and mixed with existing soil gas and gaseous-phase contaminants driven upward into the vadose zone from the air sparging system. Contaminated soil gas is extracted via the SVE wells and transported to the offgas treatment system, which is granular activated carbon (GAC). A unique attribute of the vapor extraction system is the use of a relatively high vacuum extraction vacuum, approximately 13 inches of mercury at the wells, to remove VOCs from relatively low permeability, $1x10^{-7}$ cm/sec, fill and till soils.

General system design parameters were based on two pilot studies conducted at Mound OU-1. The Radian Corporation and Groundwater Technology pilot test reports document the results of these studies. The installed system is divided up into North and South subsystems. The North subsystem has six SVE wells (two were installed during the ITRD pilot study), well points installed in each of the five French drains to function as SVE wells, and fourteen AS wells (six of which were installed at a 45 degree angle (approximately) to sparge the area that is under the landfill). The South subsystem has six SVE wells and nine AS wells. The system can operate with either the North or the South AS and SVE subsystems for variable time periods. Each of the AS and SVE wells has a valve to adjust injection or extraction air flows and pressures as needed to optimize system operation.

Additional details about the AS/SVE construction are found in "Groundwater Treatment System: Air Sparging/Soil Vapor Extraction" United States Department of Energy Mound Plant Final Design Submission R. E. Wright Project No. 97548, March, 1997. The layout of the AS/SVE treatment system is shown in Attachment J. ITRD conference call summaries are contained it Attachment K.

A Sutorbilt 5LP (Model: GAELDPA) and Sutorbilt 6LP (Model: GAFLDPA are used in a two stage system to provide for the Soil Vapor Extraction system. Both the 5LP and 6LP are driven by a 50-horse power 480 volt 3 phase electric motor. The 6LP blower is the lead blower with its effluent going through a heat exchanger prior to going into the 5LP blower. The system influent goes through a liquid knock out tank, a coalescing filter, an air filter, and carbon filtration prior to input to the 6LP blower. The average influent temperature to the 6LP blower was approximately 60 degrees Fahrenheit. The average effluent temperature of the 6LP blower was approximately 213 degrees Fahrenheit. . The average effluent temperature of the 5LP blower was approximately 217 degrees Fahrenheit.

The average system vacuum, prior to blowers, was approximately –18 inches of mercury gauge. The average system flow (5LP+6LP) was approximately 536 standard cubic feet per minute. The 6LP operates at 1,667 revolutions per minute while the 5LP operates at 2,368 revolutions per minute. The system has two two-inch vacuum relief valves, prior to the intake of the 5LP and 6LP blowers, that actuates between –18.5 and –19.0 inches of mercury gauge.

4.2 System Maintenance

Regular inspection and maintenance of the AS, SVE, and Gas Chromatography (GC) systems is required for continued effective operation. Regular activities include those performed daily, weekly, monthly, and quarterly as well as on an as needed basis. The following describes the maintenance required for the aforementioned systems. Maintenance and monitoring activities are to be logged in the system logbook (which resides in Building 300), in the system calendar book (which resides with the Technician or Engineer), and in the system data tracking spreadsheets (residing on the ER server in the K:\SHARED\SPIVEY\ITRD directory). Example copies of the aforementioned can be found in Attachment L, M, and N respectively.

4.2.1 AS

Record readings on all system measuring devices (e.g., temperature, pressure, magnehelic, etc.) within the treatment building daily.

Grease blower every 500 hours (every 3 weeks) of operation.

- Change synthetic oil in blower every 6,000 hours of operation (every 8 months).
- Check and clean/change as required the blower intake filter monthly.
- Record AS well readings monthly and rebalance if necessary, Attachment P.
- Ensure drive belt tension and alignment is correct, adjust as required.
- Change blower drive belts as required due to wear.
- Grease electric blower motor quarterly.
- Note any alarms or reading discrepancies. Determine the underlying cause of the alarm/reading. Perform necessary maintenance or adjustment(s) to resolve the underlying cause. Perform as required.
- Periodically disassemble gauges and meters and clean according to manufacturer's directions as needed.
- Periodically check AS wells for fouling and clean to permit proper flow of air through sparge points. Perform as indicated by differential pressure (flow) and pressure gauges.
- Determine the underlying cause of any new noises or vibrations then correct the underlying cause as needed.

4.2.2 SVE

The SVE lubrication records are kept in a calendar-planning book. A copy of the book can be found in Attachment M. A consolidation of just the lubrication information is in Attachment O.

Record readings on all system measuring devices (e.g., temperature, pressure, magnehelic, etc.) within the treatment building daily.

Grease blower every 500 hours (every 3 weeks) of operation.

Change synthetic oil in blower every 6,000 hours of operation (every 8 months).

Check and clean/change as required the intake filters monthly.

Record individual SVE and Piezometer well readings monthly and rebalance if necessary, Attachment P.

Ensure drive belt tension and alignment is correct, adjust as required.

Change blower drive belts as required due to wear.

Grease electric blower motor quarterly.

Note any alarms or reading discrepancies. Determine the underlying cause of the alarm/reading. Perform necessary maintenance or adjustment(s) to resolve the underlying cause. Perform as required.

Periodically disassemble gauges and meters and clean according to manufacturer's directions as needed.

Determine the underlying cause of any new noises or vibrations then correct the underlying cause as needed.

Drain excess water from carbon tank with wet vacuum as required.

Change Virgin Grade Vapor Phase Carbon as needed.

4.2.3 GC

Record measurement and maintenance activities performed in the system logbook.

Replace calibration and carrier gas cylinders when pressure reaches 250 and 500 pounds respectively.

Drain water from coalescing filter prior to pulling a sample for GC analysis.
Clean intake check valve as required.

Bake oven out at manufactures recommended temperature as indicated by measurement performance.

Periodically set automatic modes to run overnight pulling sample from room to purge input lines and reduce residual carryover.

Replace Tedlar bags as required due to degradation in integrity with use.

Note any alarms or reading discrepancies. Determine the underlying cause of the alarm/reading. Perform necessary maintenance or adjustment(s) to resolve the underlying cause. Perform as required.

Determine the underlying cause of any new noises or vibrations then correct the underlying cause as needed.

4.3 Monitoring

The objective of the monitoring performed on the AS/SVE system is to support the monitoring plan that the ITRD group (which included B&WO personnel) agreed upon. This will ensure that adequate and appropriate data are collected to help optimize the system operation and support evaluation of the cost and performance of the AS/SVE system. Specific objectives include:

Characterizing changes in subsurface hydrogeology and contamination over time,

Quantifying the mass removal rates for VOCs achieved by the AS/SVE system,

Quantify the cost of removal in units appropriate to the manner of operation,

Facilitate optimization of the system,

Assess potential interaction with other remedial system components,

Assess the ability of the SVE system to capture contaminants volatilized by the AS system,

Identify hydraulic impacts under different operating scenarios, and

Meet any regulatory requirements for data collection and system performance

One objective of the monitoring and data collection plan is to ensure that adequate and appropriate data are collected to allow evaluation of the AS/SVE systems ability to remove VOCs and chlorinated VOCs from all contaminated media in the subsurface. To best accomplish this evaluation, an understanding of the existing contamination and site characteristics is required. Soil samples were collected during system installation to evaluate the extent and nature of contamination and to refine the understanding of the site geology and hydrology. Groundwater and soil gas samples were collected and analyzed prior to system start-up to further refine the initial site contamination and geochemistry. The period before start-up and system acceptance is referred to as T_0.

Once the system had began operating, additional data was collected to evaluate performance and to allow optimization of operations. A number of issues that are of concern in this system include:

The possible formation of an air pocket under a confining glacial till layer that lies atop the groundwater.

The possible formation of preferential pathways for air bubbles in the saturated zone which may hinder system performance.

The ability of the SVE wells to capture contaminants mobilized by the air sparging system.

The effective radius of influence of the SVE wells with large variability in soil air permeability between wells.

The impact of atmospheric air introduced by air sparging on the groundwater geochemistry (e.g. formation of calcite and iron precipitates) and aquifer transmissivity.

The impact of groundwater mounding on the existing hydrodynamics of the site.

The frequency with which the system should be cycled between north and south subsystems.

Once the system construction was completed, a thirty-day start-up period began under the responsibility of the installation contractor. The purpose of this was to insure all the equipment that was installed worked correctly as per the design and to provide a training period for Mound personnel. In addition, the system vacuum/pressures and flow rates were balanced to the extent practicable in order to maximize system performance. This was accomplished by varying the applied vacuum/pressure at each well and adjusting the cycle time on the north and south subsystems to maximize contaminant removal rates. After the system was accepted by Mound, the system was put into continuous operation under Mound personnel responsibility.

4.3.1 Sampling

Activity: Soil Sampling.

Purpose: Identify nature and extent of soil contamination. Characterize site stratigraphy and place AS and SVE screened intervals and create 3-D maps of site geology and contamination.

Locations: AS well locations.

Sampling Method: Split spoon samples collected at ~4' intervals.

Analytical Method: SW846, off-site contract lab and analysis in on-site mobile lab.

Frequency: Once during AS well installation.

Comments: Complete, October 1997.

Activity: Groundwater Sampling - Static. (Part of Mound's Quarterly Monitoring)

Purpose: Monitor groundwater contamination concentrations over time.

Locations: Thirteen existing monitoring wells (313, 422, 370, 397, 373, 308, 423, 415, 416, 417, 410, 305, and 418).

Sampling Method: Dedicated bladder pumps or bailers.

Analytical Method: SW-846, off-site contract lab.

Frequency: T_0 Time zero) prior to operation of the AS/SVE system. Quarterly, thereafter.

Comments: Samples collected while pump-and-treat wells are operating.

Activity: Soil Gas Sampling – Static, Attachment Q.

Purpose: Monitor soil gas concentrations over time.

Locations: SVE Extraction wells and vadose zone piezometers

Sampling Method: Purge well volume and capture in Tedlar bag or Summa canister.

Analytical Method:Tedlar bag: On-site Sentex Systems, Inc. continuous monitor Gas Chromatograph (GC).

Summa Canister: TO-14 off-site contract lab.

Frequency: T_0 (Time zero) prior to operation of the AS/SVE system and Quarterly, thereafter. Also, after change in SVE system (vacuum or flow in any extraction wells).

Comments: Samples collected with SVE system not active on well being sampled. Portable GC capable of measuring target contaminants at MDL of ~1 ppm.

Activity: Soil Vapor Extraction System Monitoring, Attachment R.

Purpose: Measure mass of contaminants removed as a function of system operations.

Locations: Extraction manifold(s), between GAC#1 and GAC#2, and post GAC#2.

Sampling Method: Automated vapor sample from extraction manifolds.

Analytical Method: GC/micro argon ion detector (10-ppb sensitivity).

Frequency: Once per cycle/day. Possible short term tests with higher frequency to facilitate system optimization (cycle length).

Comments: Sentex Systems, Inc. Sentoscan System.

Activity: Groundwater Extraction Well Monitoring.

Purpose: To assess AS/SVE impacts on groundwater extracted by pump and treat system.

Locations: Three existing extraction wells.

Sampling Method: Traditional, samples from each operating extraction well.

Analytical Method: SW-846 off-site contract lab

Frequency: Monthly.

Comments: Sept. 1997 and earlier samples were composites from all three extraction wells.

4.3.2 Tracer Test

Activity: Tracer Test –AS/SVE Vapor Capture/Mobility.

Purpose: To determine if AS vapors are being effectively captured by SVE wells and if there is potential off-site mobilization of contaminants beyond SVE capture zone.

Locations: Inject tracer into AS system. Collect soil gas samples from SVE well Influent header and monitor additional wells with screens open above water table.

Sampling Method: Slow purge gas sampling.

Analytical Method: On-site GC for halon 1211.

Frequency: Once, during a low water table condition.

Comments: Measure of relative AS vapor capture efficiency for individual SVE wells. Check to see if AS and SVE operate properly in tandem. Tracer detection in wells outside the radius of influence would indicate potential for off-site migration of contaminants. See the AS/SVE Tracer Test Plan in Attachment Z.

4.3.3 Radius of Influence (ROI)

Activity: Radius of Influence of SVE wells.

Purpose: To establish zone of capture of SVE wells.

Locations: Two SVE wells with existing piezometers located nearby, till and non-till locations (e.g. EW-N-6, EW-N1, EW-N7, EW-N9), and a French drain.

Method: Subsurface soil vacuum at radial distances from SVE well.

Frequency: Once in FY98.

Comments: See Attachment S.

4.3.4 System Optimization

Activity: AS Well Pneumatic Performance.

Purpose: Establish baseline AS well performance (sparge flow rates).

Locations: AS wells.

Method: Establish pressure/flow performance curves for AS wells.

Frequency: Complete during startup phase, postponed to 1999 due to fouling.

Comments: Fluctuations in water table elevations can alter flow rates.

Activity: AS System Pneumatics.

Purpose: Monitor air injection pressures/flows on AS system as well as individual well performance.

Locations: AS header and each injection well.

Method: Pressure gauge and Pitot tube/Magnahelic or thermal anemometer.

Frequency: Daily on header, monthly on each well (subject to being shortened to weekly), and after any change in system.

Comments: None.

Activity: SVE Individual Well Pneumatic Performance

Purpose: Establish baseline well performance for use in system balancing and performance optimization (contaminant extraction rate).

Locations: Selected SVE wells.

Method: Establish vacuum/flow performance curves for each type SVE well.

Frequency: Once

Comments: Can estimate soil permeability over the screened interval for each well.

Activity: SVE System Pneumatics, Attachment T and P.

Purpose: To monitor the vacuum and flows from each extraction well.

Locations: SVE header, all extraction well locations, and all Piezometer well locations.

Method: Vacuum gauge and Pitot tube/Magnahelic or thermal anemometer.

Frequency: Daily on header, monthly on each well (subject to being shortened to weekly), and after any change in system.

Comments: None.

4.4 System Performance

The systems performance is assessed by two metrics. Fist, the system is evaluated upon the amount of time it is actively remediating verses the amount of time the system is down (off or not actively remediating), which is known as Uptime/Downtime. Second, the system is evaluated upon the amount of contaminants that are removed from the area being remediated, which is known as Mass Removal.

4.4.1 Uptime/Downtime

The SVE system is operated and monitored by B&WO and overseen by the customer (DOE) based upon the amount of time it is in operation. This is an attribute that is considered by the customer as part of the award fee that is earned by B&WO on a quarterly basis. Each month the uptime is reported via the FFA Monthly Report. An example of the data reported is contained in Attachment U. Typically the system would be down only for maintenance events described in section 4.2; however, unforeseen equipment failures contribute to this number as well. It is at the discretion of the customer as to whether the latter will be considered when evaluating the system performance.

The SVE system is interlocked with the Pump-and-Treat (P&T) system air stripper. This means that in order for the SVE system to run the P&T system must be active, or running. If for any reason the P&T system is shut down (i.e., cleaning of air stripper trays) the SVE system is consequently down. This is necessary due to the transport of liquids from the SVE Condensate knockout (KO) tank, that potentially contain contaminants, to the air stripper for treatment.

The SVE system was shut down on seven occasions for spent carbon removal and replenishment. On each of the aforementioned occasions the system was off for approximately six (6) hours each. Also, during this reporting period the large SVE blower (6LP) experienced a failure on 10/21/98, which necessitated the replacement of the blower and drive belts. This failure resulted in the system being down for approximately 360 hours. The 6LP failure was attributed to bypassing the carbon and going with direct emission, since the influent contaminant concentration was low enough to meet EPA standards. Due to the amount of moisture still in the influent, the blower became encrusted with calcium carbonate residue that resulted in the seizing of the blower.

The system total remediation run time for the reporting period was 325 days. If the downtime is adjusted not to include the 6LP failure, the total uptime for the reporting period is 340 days (approximately 90%). A more detailed breakdown of the system uptime/downtime can be gleaned from the copy of the system logbook and calendar book in Attachment L and M respectively.

4.4.2 Mass Removal

Mass removal, for the remediation system, can be estimated in many ways. Two different methods of estimation are utilized for the SVE system. First, Sandia National Laboratory (SNL) method estimates the VOCs removed based upon mathematically fitted functions and an hour by hour calculation of contaminants removed. This method induces a slight positive bias due to calculating on an hourly basis, however it is negligible when compared to other possible errors and variables within the system. SNL calculations can be found in Attachment R.

Second, Mound calculations for mass removal is based upon the analytical test results obtained from Summa and GC data. Examples of the Summa analytical results are contained in Attachment V. The influent contaminant concentration (in PPM) is mathematically fitted, with respect to zone running time. The mathematical algorithm fitting is accomplished with TableCurve 2D version 4. The equation that best represents the data is selected and integrated with respect to running time with Mathcad Professional version 7. Two conversion factors are used in the calculation. First, 24.5 is used to convert to mg/m^3. Second, 6.2428E-8 is used to convert to lbs/ft^3. The individually calculated pounds removed for each contaminant are then summed together to obtain total pounds of VOCs removed. An Example of this can be found in Attachment W.

It should be noted that the SVE system was ran on Zone 1 for only 0.7 hours between October 15, 1998 and December 31, 1998. Due to this, the mass removal as calculated on October 15, 1998 for Zone 1 will be used for the end of year estimate. Mass removal calculations are typically performed on a monthly basis, approximately. As time progresses and mass removal rates decline the frequency of calculations will lessen.

The approach utilized by SNL and Mound are the same. The only difference is that SNL uses an Excel spreadsheet to calculate verses Mound choosing to use Mathcad to integrate the entire period. Both approaches end up with numbers in good agreement. The two independent calculations act as a cross check on the results obtained. Mound estimates that approximately 2,494 pounds of contaminants were removed by the SVE system from December 18, 1997 to December 31, 1998. SNL estimates that approximately 2,597 pounds of contaminants were removed by the SVE system from December 18, 1997 to December 31, 1998. The two estimation techniques are in agreement with each other, to within 4%.

4.4.3 Notable Events

While the installation contractor was operating the system, carbon saturation was achieved and went undetected until February 4, 1998. On this date the system was shut down until the carbon was changed out on February 12, 1998. See Attachment X for the calculations and reporting of this event.

The on-site GC experienced numerous problems with respect to it being implemented. The first problem was communication between sample ports when not actively sampling. This resulted in moisture being drawn from Zone 1 and 2 through the sampling valve header and into sample port/point 4 (drawing from lower vacuum to higher vacuum). The installing check valves in each of the sample lines at the GC rectified this. An inline coalescing filter was also put inline with each sampling point to prevent moisture introduction to the GC. The main board was replaced upon several occasions due to component failures. Also, the GC exhibited biases due to sampling under vacuum conditions as well as calibrating with a gas cylinder under minimal pressure. The first argon replacement cylinder was contaminated and required replacement by the supplier. Details to the aforementioned and additional information can be gleaned from the Attachments.

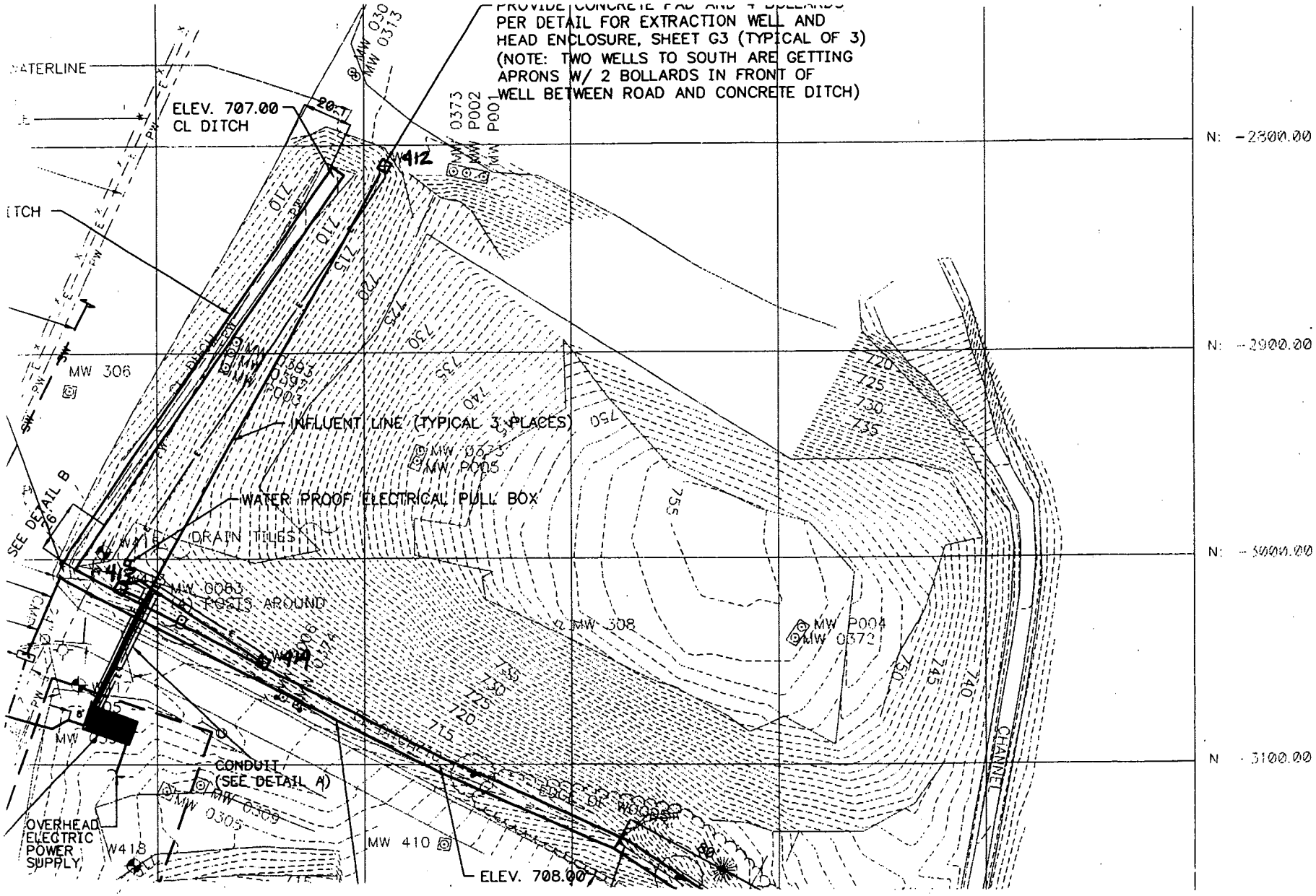
The AS system also exhibited indications that fouling of the well screens was occurring during the first months of operation. This necessitated the treatment of the wells to reestablish proper system flow. Information with respect to this event can be obtained from Attachment Y.

The restart of the AS system has been delayed due to a request from the EPA to attempt to quantify the additional contaminant removal due to AS. This requires a stable influent contamination level prior to the initiation of the AS, as well as operation of the GC in purge and trap mode in order to detect the estimated small contaminant influent increase that is expected from air sparging. The AS is expected to resume in 1999.

5.0 System Operations Projections

Based upon the mass removal curves, which are obtained from the mathematical evaluation of the data to date, the system operation projections were estimated. These projections, as to the time remaining for remedial action for each system, are estimates based upon available data and assumptions that conditions will remain relatively the same. With the aforementioned taken into consideration, it is anticipated that the P&T will continue full time remediation until October 1999, at a minimum. When cleanup COC levels (agreed upon in concert with the EPA, DOE, ITRD, and B&WO) are achieved, cycling of the system will be initiated to assess if there will be any rebound effects. By extrapolation of the mathematical functions for the SVE system, it is estimated that it will take an additional three years of remediation to get the majority of the COCs in the soil below their respective reporting limit.

The ITRD group will be performing further evaluations with respect to the practical levels that can be achieved. These levels will be determined as to the residual threat to the groundwater and keeping the contamination levels to below the MCLs for the COCs within the compliance boundary. It is anticipated that these derived levels will be attained much sooner than those mathematically projected. It is anticipated that the systems could be shut down as early as December 2000, provided that there is not substantive rebound effect. Miamisburg Environmental Management Project (MEMP), in conjunction with regulators, will oversee and evaluate progress verses ROD compliance as well as the technical performance of the system.


PROVIDE CONCRETE PAD AND 4 BOLLARDS
PER DETAIL FOR EXTRACTION WELL AND
HEAD ENCLOSURE, SHEET G3 (TYPICAL OF 3)
(NOTE: TWO WELLS TO SOUTH ARE GETTING
APRONS W/ 2 BOLLARDS IN FRONT OF
WELL BETWEEN ROAD AND CONCRETE DITCH)
ELEV. 707.00
CL DITCH
MW 306
INFLUENT LINE (TYPICAL 3 PLACES)
WATER PROOF ELECTRICAL PULL BOX
DRAIN TILES
SEE DETAIL B
TOATS AROUND
MW 308
MW P004
MW 0372
CONDUIT
(SEE DETAIL A)
OVERHEAD
ELECTRIC
POWER
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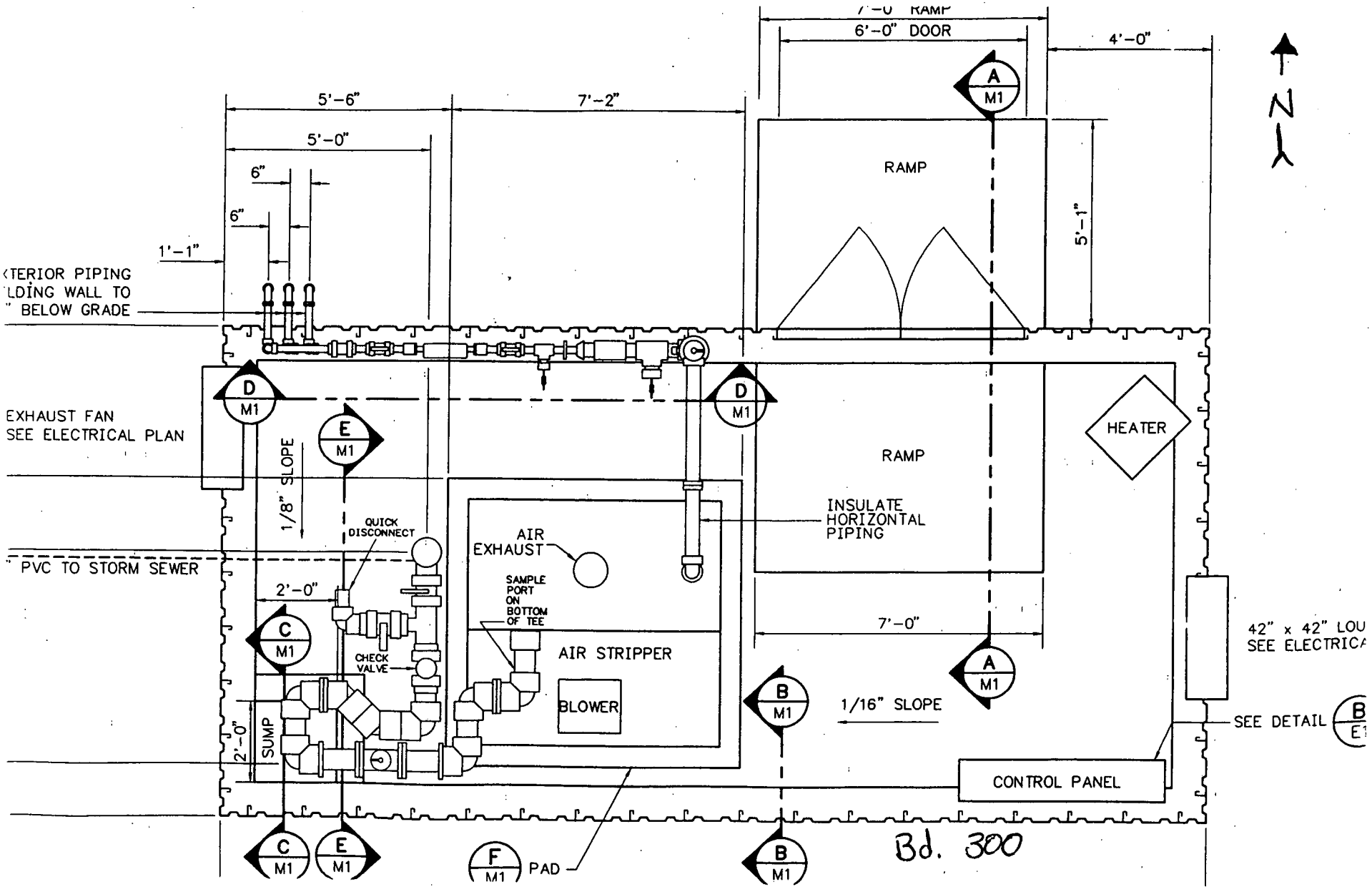
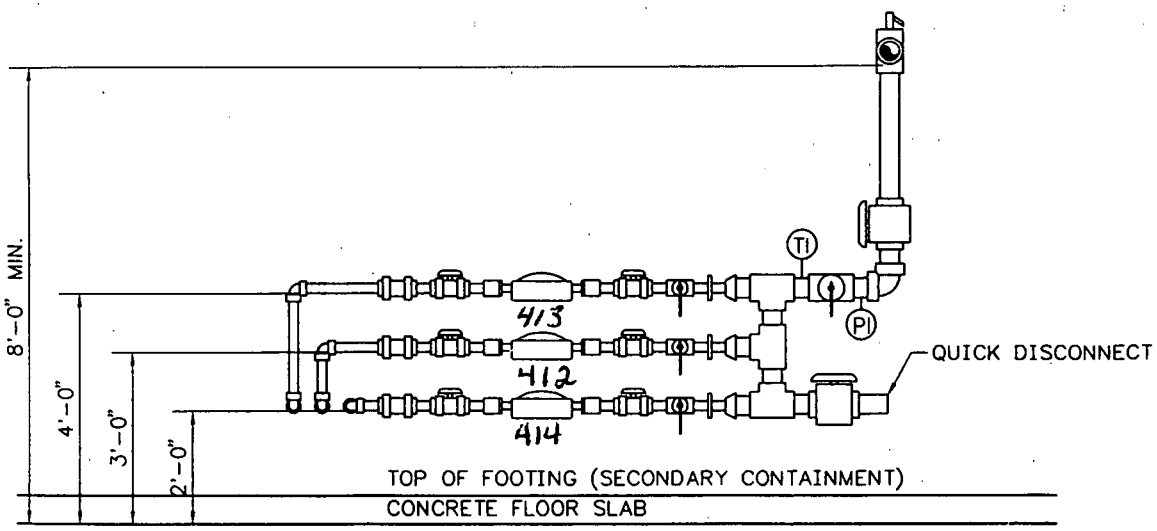
N: -3000.00
N -3100.00

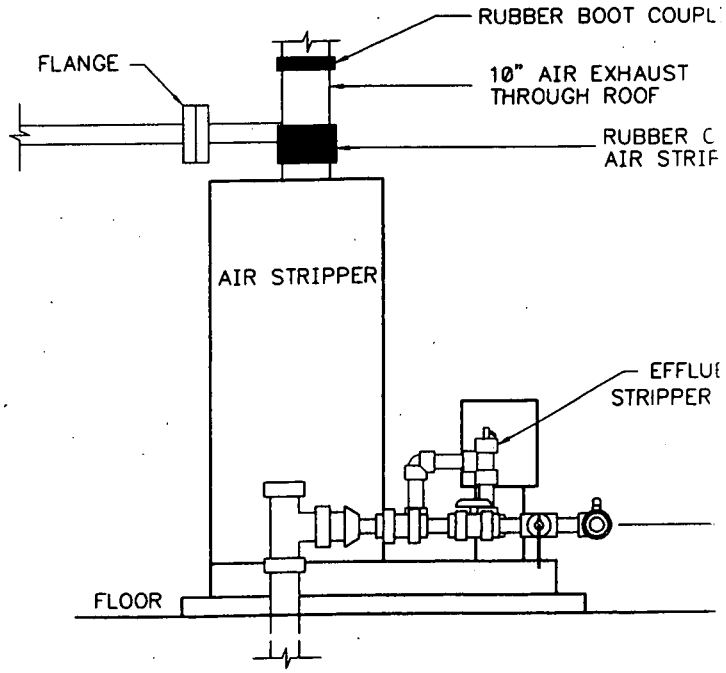

7'-0" RAMP
6'-0" DOOR
4'-0"
N
5'-6"
7'-2"
5'-0"
6"
6"
1'-1"
RAMP
5'-1"
TERIOR PIPING
LDING WALL TO
" BELOW GRADE
EXHAUST FAN
SEE ELECTRICAL PLAN
1/8" SLOPE
QUICK DISCONNECT
" PVC TO STORM SEWER
2'-0"
CHECK VALVE
SUMP
2'-0"
AIR EXHAUST
SAMPLE PORT ON BOTTOM OF TEE
AIR STRIPPER
BLOWER
RAMP
INSULATE HORIZONTAL PIPING
HEATER
7'-0"
1/16" SLOPE
42" x 42" LOU
SEE ELECTRICA
SEE DETAIL
CONTROL PANEL
PAD
A M1
B M1
C M1
D M1
E M1
F M1

Bd. 300

MECHANICAL PLAN
1/2" = 1'-0"

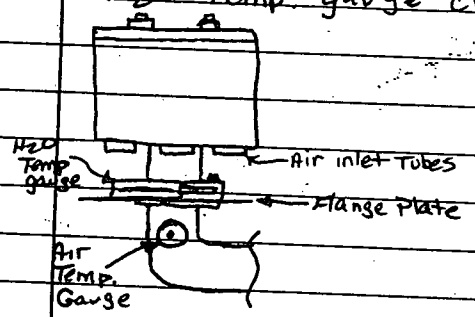


SECTION D/M1
1/2" = 1'-0"



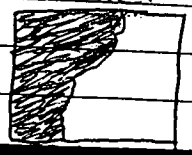
SECTION E/M1
1/2" = 1'-0"

2-18-97 System Started at approx. 13:25 hrs
Flow meter readings at start up:
413 = 11,300 gal.
412 = 5,200 gal.
414 = 12,900 gal.
15:02 413 = 15,415 gal.
15:03 412 = 7,576 gal.
15:04 414 = 16,922 gal.
inlet H_2O pres. = 10 psi
15:05 inlet H_2O Temp. = 60°F Reading suspect.
inlet Air Temp = 65°F
15:07 Stripper Sight Tube H_2O level between ink pen marks
15:21 Stripper Dif. Pres. = 18" WC
15:35 H_2O Temp. gauge check, comp. to Air Temp gauge



H_2O Temp. gauge = 70°F
Air Temp. gauge = 66°F
∴ H_2O Temp gauge ≈ 4°F biased high

15:40 413 = 17,050 g, 43.03 gpm
15:41 412 = 8,512 g, 24.63 gpm
15:42 414 = 18,489 g, 41.24 gpm
E.T. = 38 min based on 15:02, 15:03, & 15:04 readings resp.
15:43 inlet H_2O pres. = 11 psi
inlet H_2O Temp = 60°F (≈ 56°F corr.)
inlet Air Temp = 65°F
Dif. Pres. = 18" WC
15:45 Moisture in sump (Bldg.) detected. H_2O being ejected via Air Relief Valve drain to sump. No other visible leaks.
15:50 Pumps quick cycled to attempt sealing of air relief valve
Air Relief Valve leakage in sump!



Mark Sainey

2-18-97

15:55 Pumps turned off, tapped on Air Relief valve with pitless adapter tool to perhaps dislodge any material

413 = 17,688g
412 = 8850g
414 = 19,017g
} Values on Meters after pump power down

15:58 Pumps restarted

Leakage appears to have slowed significantly

Will observe on 2-19-97 AM to further assess

Mark Spivey

2-19-97 05:55: Leak spotted on left connection to well 413 Flow meter

05:59 413 = 53,845g. - 17688g = 36157g/841 min = 42.99 gpm

06:00 412 = 29,580g. - 8850g = 20730g/842 min = 24.62 gpm

06:01 414 = 53,609g. - 19017g = 34592g/843 min = 41.03 gpm

06:06 inlet H_2O Temp. = 60°F (≈ 56°F Corr.)

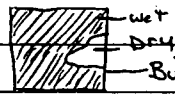
inlet H_2O Pres. = 11 psi

06:07 inlet Air Temp = 60°F

Stripper Dif. Pres. = 18" WC

06:08 Stripper Sump level sight tube H_2O between pen marks

Note: Air Relief Valve appears to have stopped leaking



06:40 Called Time and Temp., Air Temp. = 52°F

10:00 Contacted Al Fraley of NewCo Frebco. He will get a plumber in to fix inlet leak on 413.

10:22 413 = 65,146g - 17688g = 47458g / 1104 min = 42.99 gpm

10:24 412 = 36,083g - 8850g = 27233g / 1106 min = 24.62 gpm

10:25 414 = 64,435g - 19017g = 45418g / 1107 min = 41.03 gpm

Total H_2O Flow = 108.64 gpm (≈156,439 g/24 hr)

10:27 inlet H_2O Temp = 60°F (≈ 56°F Corr.)

10:28 inlet H_2O Pres. = 11 psi

inlet Air Temp. = 64°F

10:29 Stripper Dif. Pres = 18" WC

Stripper Sump H_2O level sight tube = H_2O between pen marks

10:30 Placed plastic on pipe insulation to protect from leaking H_2O. Decided to wait to remove insulation. Met with Ron Paulick who took sample from SP-5. Note: He let H_2O drain on floor prior to sampling capture, ran into sump

Mark Spivey

2-19-97

11:00 Voice
in to
Weg
12:31 413 =
12:32 412 =
12:33 414 =
12:34 inlet H
inlet
inlet
Stripper
Stripper
12:36 Air Relie
15:41 413 = 7
15:42 412 = 4
15:43 414 = 7
15:44 inlet H_2O
inlet H_2
inlet A
Stripper
Stripper
15:46 A drople
no sign
leak be
16:15 Talked
gauge,
Mark
2-20-97
06:39 413 = 11
06:40 412 = 66
06:41 414 = 11
06:42 inlet H_2O
inlet H_2O
06:45 inlet Air
Stripper
Stripper
H_2O fro
by Envir
Buildin

2-19-97	
11:00	Voice mail Rec. from Al Fraley (Freboo) Bob will be in tomorrow morn. to Fix any leaks. Talked to Don Weglage about GPS of newer OU-1 inst. will do 2/20.
12:31	413 = 70690 g - 17688g = 53002g / 1233 = 42.99 gpm
1232	412 = 39238 g - 8850g = 30388g / 1234 = 24.63 gpm
12:33	414 = 69688 g - 19017g = 50671g / 1235 = 41.03 gpm
12:34	inlet H_2O Temp = 60°F (≈ 56°F Corr.)
	inlet H_2O Pres. = 11 psi
	inlet Air Temp = 60°F
	Stripper Dif. Pres. = 18" WC
	Stripper Sump level sight tube = OK, H_2O between pen marks
12:36	Air Relief looks like it is no longer leaking
15:41	413 = 78851g - 17688g = 61163g / 1423 min = 42.98 gpm
15:42	412 = 43919g - 8850g = 35069g / 1424 min = 24.63 gpm
1543	414 = 77480g - 19017g = 58463g / 1425 min = 41.03 gpm
15:44	inlet H_2O Pres = 11 psi
	inlet H_2O Temp = 60°F (≈ 56°F Corr.)
	inlet Air Temp = 60°F
	Stripper Dif. Pres. = 18" WC
	Stripper Sight tube for H_2O level = OK, between marks
15:46	A droplet of H_2O spotted on Air Relief discharge line - no significant additional H_2O in Building Sump. leak before 413 flow meter still active
16:15	Talked to Deb Flatter, AKA, About changing H_2O Temp gauge and getting key + white tape from Chuck on 2/20 AM.
	Mark Spivey
2-20-97	
06:39	413 = 117411 g
06:40	412 = 66056 g
06:41	414 = 114292 g
06:42	inlet H_2O Temp = 60°F (≈ 56°F Corr.)
	inlet H_2O pres = 11 psi
06:45	inlet Air Temp = 48°F
	Stripper Dif. Pres. = 18.25" WC
	Stripper Sump H_2O level = OK, between marks
	H_2O from SP-5 was drained to floor during sample grab by Environmental. Air Relief looks like it is no longer leaking.
	Building Sump drying. Mark Spivey

2-20-97

07:20 System shut down to fix leaks, insulation removed — 0625

413 = 119168 g

412 = 67042 g

414 = 115888 g — 0627

Dismantled 413, 412, & 414 Teflon & dope applied.

System intermitent start to test for leaks

Insulation put back on pipes and system restarted

09:40 System restarted @ values above (7:20).

inlet H_2O Temp = 59°F (≈ 55°F Corr)

inlet H_2O pres. = 11 psi — ~~6-25-97~~ 0622 2-25-97

inlet Air Temp = 52°F

Stripper dif. pres = 18.25" WC

09:44 413 = 119522 g - 119350 g = 172 g / 4 min = 43 gpm

09:45 412 = 67268 g - 67146 g = 122 g / 5 min = 24.4 gpm

09:46 414 = 116307 g - 116059 g = 248 g / 6 min = 41.33 gpm

14:08 413 = 130827 g - 119168 g = 11659 g / 268 min = 43.50 gpm

14:09 412 = 73745 g - 67042 g = 6703 g / 269 min = 24.92 gpm

14:09 414 = 127085 g - 115888 g = 11197 g / 269 min = 41.62 gpm — ~~6-26-97~~ 0616 2-26-97

14:10 inlet H_2O Temp = 59°F (≈ 55°F Corr)

inlet H_2O Pres = 11 psi

inlet Air Temp = 59°F

Stripper Dif Pres = 18.25" WC

Stripper Sump H_2O level = OK, between marks

Mark Spivey

2-22-97

10:46 413 = 245413 g - 119522 g (2-20-97 (9:44-9:46)) = 125891 g / 2942 min = 42.79 gpm — 2-27-97 ~~6-27-97~~ 0625

10:47 412 = 139567 g - 67268 g = 72299 g / 2943 min = 24.57 gpm

10:48 414 = 236782 g - 116307 g = 120475 g / 2944 min = 40.92 gpm

10:50 inlet H_2O Temp = 59°F (≈ 55°F Corr)

inlet H_2O Pres = 11 psi

inlet Air Temp = 52°F

Stripper Dif Pres = 18.5" WC

Stripper Sump H_2O level = OK, Avg @ Lower ink pen mark

11:02 No signs of Air Relief Valve leakage

Appears that 414 inlet after flow meter and before ball valve has slow leak. will follow up on Monday 2/24. Mark Spivey

2-24-97

0625 413 = 357473g
412 = 204019g
414 = 344229g

0627 inlet H_2O Temp = 57°F (≈ 53°F corr)
inlet H_2O Pres = 11psi
inlet air temp = 39°F
stripper dif pres = 18" WC
stripper sump H_2O level = OK, just below lower ink mark
D. Hess

~~6-25-97~~ 0622 2-25-97
413 = 418535 g − 357473 g = 61062
412 = 239157 g − 204019 g = 35138
414 = 402886g − 344229g = 58657 TL = 154857
inlet H_2O temp = 57°F (≈ 53°F corr)
" " pres. = 11psi
" air temp = 37°F
stripper dif pres. = 19.5" WC
stripper sump H_2O level = OK

~~6-26-97~~ 0616 2-26-97
413 = 480051 − ~~357~~418535 = 61516 g
412 = 274553 − 239157 = 35396 g
414 = 462050 − 402886 = 59164 g
TL = 156076g
inlet H_2O temp = 58°F (≈ 54°F corr)
" " pres = 11psi
" AIR temp = 47°F
stripper dif pres = 19.5" w.c
stripper sump H_2O level = OK

2-27-97 ~~6-27-97~~
0625 413 = 541689 − 480051 = 61638
412 = 309987 − 274553 = 35434
414 = 521250 − 462050 = 59200
TL = 156272
inlet H_2O temp = 58°F (≈ 54°F corr)
" " pres = 11psi
" AIR temp = 62°F
stripper dif. pres = 19.2" WC
Stripper sump H_2O level = OK

6 2:27 703 off
735 ON Repair leaks

2-27-97 07:03	system shut down to fix leak on 414 inlet	3-10-97 8:00	well 41
	after flow meter. Inspection / clean out ports		Restart
	removed. Air Readings taken by Chris for IH		Shut d
	Buildup noted on top of Tray 1, Top & bottom of	15:00	Re Start
	tray 2, and bottom of Tray 3. Inverted "U" trap		25 seco
	raised 3". This should put the normal operating		3-11-9
	range between bottom and middle black marks	0646	412 -
	Top black mark is system shutdown. System		413 -
	checked for leaks.		414 -
07:35 to 07:40	System Restarted		inlet
08:21	413 = 545189 g		inlet
08:22	412 = 312015 g		inlet
08:23	414 = 524683 g		stripp
	inlet H_2O Temp = 59°F (≈55°F corr.)		sight
	inlet H_2O Pres = 11 psi	3-12-97	System Do
08:24	inlet Air Temp = 63°F		413 = 133
	Stripper Dif. Pres. = 19.25" WC		412 = 54
			414 = 128
3-6-97	413 = 975425	7:08	System R
0640	412 = 547170		valves
	414 = 939560		inlet Pre
	inlet H_2O temp = 56°F		" Temp
	inlet H_2O Press = 10		Dif Pres
	inlet Air temp		inlet Air
	Stripper Diff Press = 24		Probable
			5 pm.
	Well 412 Shutdown		413: 133
3-10-97	413 = 1233418		10.175
0610	412 = 547203 (dial not operating (gauge))	13:56	System
	414 = 1196202		disrupte
	inlet H_2O temp = 56°F (corr ≈ 52°F)		413 = 13
	inlet air temp = 52°F		412 = 54
	inlet air pressure = 2.5, 5" psi		414 = 130
	sight tube = below first mark	13:55	System

3-10-97	Well 412 = 547203g set Starter ~~trip~~ Amp to 1.5
8:00	Restarted at 07:41 Ran 30 seconds then
	Shut down 547215
15:00	Re Started in Hand position 547215 stopped in approx
	25 seconds @ 547227
	3-11-97
0646	412 - * not operating
	413 - 1306186 - 1238418 = 67762 45.91gpm
	414 - 1262315 - 1196202 = 66113 44.79gpm
	inlet H_2O Temp = 56°F (≈ 52°F)
	Inlet H_2O Pres = 9 psi
	inlet air temp = 54°F
	stripper dif. pres. = 26" WC
	sight tube = barely visible
3-12-97	System Down
	413 = 1334210
	412 = 547265
	414 = 1289660
7:08	System Restarted 412 shut down after ≈ 25 seconds
	Valves 3 & 4 closed
	inlet Pres = 9PSI
	" Temp = 56°F
	Dif Pres = 27" H_2O Col.
	inlet Air temp = 55°F
	Probable cause of shutdown was a power drop at approx.
	5 pm. This is confirm. with meter readings:
	413: 1334210 - 1306180 = 28030 / ~~1476~~ mins 45.91 = 610.54 min
	10.175 hrs .175 · 60 ≈ 11 min ∴ 10:11 + 6:46 = @16:57 hrs
12:56	System Shut down due to power being
	disrupted. Work being perform. on 2nd Pole on hill:
	413 = 1350200
	412 = 547275
	414 = 1305294
13:55	System Restarted

3-13-97

0627 413 = 1395818
412 = *not operating
414 = 1349882
inlet H_2O Temp = 56°F (≈ 58°F)
inlet H_2O Pres = 9psi
inlet air temp: 59°F
stripper dif. pres = 27.5"
Sight tube = not on gauge

11:45 System Shut down until maint. on Stripper perf. Dif Pres. too high

3-18-97 System Restarted

4:06 PM

4:11 413 = 1410475
414 = 1364280
412 = Ran for ≈ 25 seconds stopped @ 547305
H_2O temp = 56°F
Press. = 9 PSi
Diff Press = 18" WC
inlet Air Temp = 52°F

0635 3-19-97
413 = 1450358
414 = 1403211
412 = *
H_2O temp = 56°F ~~(≈ 58°F)~~ New Temp. Gauge
inlet press. = 9psi
inlet air temp = 46°F
stripper diff. press = 18" WC
sight tube = okay, between marks

3-20-97

0700 413 = 1517370
414 = 1469755
inlet H_2O = 56°F
inlet Pres. = 9psi
Diff pres. = 18" WC
inlet air temp = 51°F
sight tube = OK

3-20-97 System
413 = 1
412 = 0
414 =
Restar
During
like H_2
Straight
Senses

3-24-97
0640 413 =
414 =
412 =
inlet H_2
inlet
diff
inlet
sight

1511 System
413: 18
412: 54
414: 17

1530 Restart
3-25-97
0626 413 = 1
414 =
412 =
inlet H_2
inlet pr
inlet ai
diff pre
sight tu

3-20-97 System Shutdown @ 13:24
413 = 1535000
412 = 547306
414 = 1485988
Restart @ 14:25
During Shutdown Pulled 412. comm. looks like H_2O got into motor caseria pin holes:
Straighted exhaust of stripper
Sensers for 412 Short by length of pump.

3-24-97
0640 413 = 1778121
414 = 1723687
412 = not operatin.
inlet H_2O temp = 54°F
inlet press = 7 psi
05 diff press = 18.5" w.c.
inlet air temp = 44°F
Sight tube = OK

1511 System Shut down to install 412 temp pump
413: 1801394
412: 547306
414: 1746428
1530 Restart system all pumps running

3-25-97
0620 413 = 1840235
414 = ~~569425~~ DH 1784152
412 = 569425 MRB 8/13/97 ~~24.66 gpm~~
inlet H_2O temp = 56°F
inlet press. = 11 psi
inlet air temp = 59°F
diff press. = 19" W.C.
sight tube = OK

3-26-87

0700 413 = 1903760
412 = 605768 24.66 gpm
414 = 1845782
inlet H_2O temp = 56°F
inlet H_2O press. = 11 psi
inlet air temp = 56°F
diff press = 19.5" w.c
sight tube = OK

3-27-97

0700 413 = 1966050
412 = 641440
414 = 1906232
inlet H_2O temp = 56°F
inlet H_2O press - 11 psi
inlet air temp = 54°F
diff. press = 19.9" w.c
sight tube = OK

0820 413: ≈ 43 gpm (1 min check with stop watch)
412: ≈ 25 gpm "
414: ≈ 41 gpm "

Calculated:
413 = 1966050 - 1903760 = 62290 / 1440 = 43.26 gpm
412 = 641440 - 605768 = 35672 / 1440 = 24.77 gpm
414 = 1906232 - 1845782 = 60450 / 1440 = 41.98 gpm
Total for 24 hours = 110.01 gallons / min * 1440
= 158,414 gallons / day

3-31-97 413 ~~777~~ 2212140 246090 gals pumped
0615 412 782975 141535 gals pumped
RP 414 2145070 238838 gals pumped
inlet H_2O temp ~~[illegible]~~ 56°F.
inlet H_2O press 11 psi
inlet air temp 50°F
diff air press 21"
sight tube OK

4-1-97
0625

4-2-97
0645

4-2-97

4-3-97

4-7-97
0705 413
412
414
inle
inle

4-1-97 413 2274570 62430 gals pumped
0625 ~~412414~~ 2205600 60530 gals. pumped
~~414/412~~ ~~2205~~ 818900 35925 gals pumped
inlet H_2O Press 11psi
inlet H_2O Temp 56°F
inlet Air temp 45°F
diff Air press 21.5
sight tube OK ½ to 2/3

412 pumping slowly

4-2-97
0645 413 = 2337750
412 = 855315
414 = 2266865
inlet H_2O temp = 56°F
inlet H_2O press = 11psi
inlet air temp = 49°F
diff air press 22" wc
sight tube OK

4-2-97

Shut down system @ 0922 for cleaning

4-3-97 Well 0413 Flowmeter is 02344141 @ 1009
" 0412 " " " 00858971 @ 1009
" 0414 " " " 02873031 @ 1009
Inlet H_2O temp 56°F
Inlet H_2O press 10 psi
Inlet Air Temp 57°F
Diff Air Press 19 ~~psi~~ inches of H_2O
Sight Tube O.K.

4-7-97
0705 413 = 2581385
412 = 995760
414 = 2502329
inlet H_2O temp = 54°F
inlet H_2O press. = 11psi

inlet air temp = 52°F
~~inlet~~ diff press = 19" wc
sight tube = OK

4-8-97

0642 413 = 2642030
412 = 1030805
414 = 2560909
inlet H_2O temp = 56°F
inlet H_2O press = 11psi
diff press = 19"wc
inlet air temp = 49°F
sight tube = OK

0640 4-9-97
413 = 2703911
412 = 1066552
414 = 2670705
inlet H_2O temp = 55°F
inlet H_2O press = 11psi
diff. press = 19.2"wc
inlet air temp = 40°F
sigh tube = OK

4-10-97
0630 413 = 2765000
412 = 1101862
414 = 2679735
inlet H_2O temp = 55°F
inlet press = 11psi
diff. press = 19.2"wc
inlet air temp = 42°F
sight tube = OK

4-14-97
0713 413 = 3013343
412 = 1245360
414 = 2919450
inlet H_2O temp = 55°F
" " press = 11psi
diff. press = 19.2" w.c
inlet air temp = 44°F
Sight tube = OK

9:20 System s
why diff
when m
of seal

4-15-97
0655 413 =
412 =
414 =
inlet H
" a
diff
inlet
~~inte~~ s

0645 4-16-9
413 :
412 :
414 -
inlet H_2O
" An
Diff. pres
inlet pr
sight t

9:50 System S
412 = 13
413 = 31
414 = 3

10:07 Restarte

4-17-97
0655 412 =
413 =
414 =
inlet H
inlet
inlet

9:20 System shut down for approx 8 min to investigate why diff press. is not building as previously. Check when restart to see if problem was with prime of seal pots. MB

4-15-97

0655 413 = 3073760
412 = 1279995
414 = 2977787
inlet H_2O temp = 55°F
" air temp = 46°F
diff press. = 19.5" wc
inlet press = 11 psi
~~inte~~ sight tube - OK

0645 4-16-97
413 : 3134640 60880 gals
412 : 1314850 34855 gals
414 - 3036540 58753 gals
inlet H_2O Temp : 57°F / 14°C
" Air Temp : 56°F
Diff press. : 19.5"
inlet press - 11 psi
sight tube - OK

9:50 System Shut down to inspect Trays
412 = 1319308
413 = 3142396
414 = 3044011

10:07 Restarted Δt = 17 min.

4-17-97

0655 412 = 1349651
413 = 3195615
414 = 3095409
inlet H_2O temp = 55°F
inlet H_2O press = 11 psi
inlet air temp = 50°F

diff press = 19.5" w.c
sight tube = OK

4-21-97

0645 412 = 1489815

413 = 3439841

414 = 3331010

inlet H_2O temp = 56°F

inlet press = 11psi

inlet air temp = 59°F

diff. press = 19.5" w.c

sight tube = OK

System Shut down for cleaning @ ≈ 10:50 AM

~~412~~ 412 = 1495720

413 = 3450121

414 = 3340910

4-22-96

2:08 PM System Restarted

2:25 PM 412 = 1496115

413 = 3450840

414 = 3341605

inlet H_2O Temp 56°F

inlet H_2O Press = 11 psi

inlet Air Temp = 62°F

diff Press = 18.25" W.C.

Sight Tube = OK

4-23-97

0640 412 = 1519640

413 = 3492441

414 = 3381802

Inlet H_2O temp = 55°F

inlet H_2O press = 11psi

inlet air temp = ~~18.2" w~~ 58°F

diff press = 18.2" w c

Sight tube = OK

4-24-97 unacknowledged alarm - [redacted]

0655 412 = 1554115 inlet H_2O temp = 56°F

413 = 3553582 inlet H_2O Press = 11psi

414 = 3440860 inlet air temp = 54°F

sight tube = OK ~~inlet~~ diff press = 18.2" w.c.

4-28

0735 412 =

413 =

414 =

inlet

inlet

inlet

diff

sight

4-29

0615 412

413

414

inlet

inle

inle

inle

sigh

4-30

0700 412 =

413 =

414 =

Inle

inle

inlet

inlet

sight

5-1-9

0705 412 =

413 =

414 =

inlet

inlet

inlet

"

sight

4-28-97

0735 412 = 1694005

413 = 3799553

414 = 3678192

inlet H_2O temp = 56°F

inlet H_2O press = 10 psi

inlet air temp = 60°F

diff press = 18.5" w.c.

sight tube = OK

4-29-97

0615 412 = 1726831

413 = 3857110

414 = 3733641

inlet H_2O temp = 56°F

inlet H_2O press = 11 psi

inlet air temp = 54°F

inlet air press = 18.8" wc

sight tube = OK

4-30-97

0700 412 = 1762685 24.14 gpm

413 = 3919915 42.29 gpm

414 = 3794122 40.73 gpm

inlet H_2O press = 11 psi

inlet H_2O temp = 56°F

inlet air temp = 54°F

inlet air press = 18.7" wc

sight tube = OK

5-1-97

0705 412 = 1797660

413 = 3981178

414 = 3853085

inlet H_2O temp = 56°F

inlet H_2O temp = 11 psi

inlet air temp = 58°F

" " press = 18.8" wc

sight tube = OK

5-5-97

0640 412 = 1936991 inlet air temp = 54°F
413 = 4224828 inlet diff. press = 19"wc
414 = 4087205 sight tube = OK
inlet H_2O temp = 56°F
inlet H_2O press = 11psi

5-6-97

0715 412 = 1972800 inlet air temp = 60°F
413 = 4297585 inlet diff. press = 19"wc
414 = 4147411 sight tube = OK
inlet H_2O temp = 56°F
inlet H_2O press = 11psi

5-7-97

0645 412 = 2007157 inlet air temp = 54°F
413 = 4347649 inlet diff press = 19"wc
414 = 4204963 sight tube = OK
inlet H_2O temp = 56°F
inlet H_2O press = 11psi

5-8-97

0714 412 = 2043061 air temp = 60°F
413 = 4410442 diff. press = 19"wc
414 = 4265050 sight tube = OK
inlet H_2O temp = 56°F
inlet H_2O press = 11psi

5-12-97

0700 412 = 2183041 air temp = 60°F
413 = 4655242 diff press = 19"wc
414 = 4498512 sight tube = OK
inlet H_2O temp = 56°F
inlet H_2O press = 11psi

5-13-97

0630 412 = 2217680
413 = 4715800
414 = 4556100

5-13

0715 412 =
413 =
414 =
inlet
inlet
inlet
diff p
sight

5-14-9

0912 System
412:
413. 4
414: 4
inlet H2
inlet H
inlet a
diff pre
sight t

0926 Restar
0932 412 :
413 4
414 4
inlet H
inlet H
inlet A
diff pre
sight tu

5-15-97

0700 412 =
413 = 4
414 = 4
inlet
inlet
inlet
diff pr

5-13-97

0715 412 = 2253682
413 = 4778651
414 = 4615754
inlet H_2O temp = 56°F
inlet H_2O press = 11 psi
inlet air temp = 54°F
diff press = 19" w.c.
sight tube = OK

5-14-97

0912 System Shut down to change intake air filter
412: 2256453
413. 4783574
414: 4620422
inlet H_2O temp = 56°F
inlet H_2O press = 11 psi.
inlet air temp = 62°F
diff press = 19.2" wc
sight tube = ok

0926 Restarted Down time = 14 min.
0932 412: 225660
413 47838 32
414 46206 70
inlet H_2O temp = 56°F
inlet H_2O press = 11 psi
inlet Air temp = 62°F
diff press = 19.3" wc
sight tubl = ok

5-15-97

0700 412 = 2287682 Sight tube = OK
413 = 4838816
414 = 4672860
inlet H_2O temp = 56°F
inlet H_2O press = 11 psi
inlet air temp = 58°F
diff press = 19.3" wc

5-19-97

0705 412 = 2426810

413 = 5084285

414 = 4904890

inlet H_2O temp = 56°F

inlet H_2O press = 11psi

inlet air temp = 68°F

inlet diff press = 19.5" w.c

sight tube = OK

* lots of condensation on stripper + floor

5-20-97

0700 412 = 2461425

413 = 5145300

414 = 4962328

inlet H_2O temp = 56°F

inlet H_2O press = 11psi

inlet air temp = 60°F

inlet diff press = 19.5" w.c

sight tube = OK

5-21-97

0635 412 = 2496588

413 = 5207240

414 = 5020560

inlet H_2O temp = 56°F

inlet H_2O press = 11psi

air temp = 60°F

diff press = 19.8" wc

5-22-97

0630 412 = 2530362

413 = 5266750

414 = 5076450

inlet H_2O temp = 56°F

inlet H_2O ~~temp~~ press = 11psi

air temp = 56°F

diff press = 19.9" WC

sight tube = OK

5

0705 412 =

413 =

414 =

inlet

inlet

diff.

sight

0700 412

413

414 =

5

0710 412

413

414

6

0720 412 =

413 =

414 =

6

0715 412

413

414

6

0640 412

413

414 =

inlet

"

inlet

inlet

sight

5-27-97

0705 412 = 2705250
413 = 5574213
414 = 5364211
inlet H_2O press. = 11psi
inlet air temp = 62°F
diff. press = 19.4" wc
sight tube = OK

5-28-97

floor 0700 412 = 2739648
413 = 5634652
414 = 5420557

5-29-97

0710 412 = 2774680
413 = 5696242
414 = 5477905

6-2-97

0720 412 = ~~5994~~ 2914522
413 = 5942203
414 = 5706238

6-3-97

0715 412 = 2949843
413 = 6004128
414 = 5767834

6-4-97

0446 412 = 2985756
413 = 6066722
414 = 5822261
inlet H_2O pess = 11psi
" " temp = 56°F
inlet air temp = 60°F
inlet diff press = 20" wc
sight tube = ok

	6-5-97	0709	412
0654	412 = 3022943		413
	413 = 6131694		414
	414 = 5883026		
		1300	Filt
	6-9-97		- Pe
0710	412 = 3169218	1600	- Du
	413 = 6387282		
	414 = 6121983		6-
	sight tube = ok	0710	412
	inlet H_2O press = 11psi		413
	inlet H_2O temp = 56°F		414
	inlet diff press = 21" wc		inlet
	inlet air temp = 60°F		Inlet
			inlet
9:32	System Shut Down for L.O.To. of 412		diff
	2" PVC Pipe leaking underground		sight
	412 = 3172713		
	413 = 6393385	1425	Syst
	414 = 6127682		work
9:48	System Restart for 413 & 414 only		412 =
10:00	412 Restarted		413 =
11:40	412 Shut down @ 3174963		414 =
1:32	Restart 412	1430	Sam
		1532	Re
	6-10-97		6-17-9
0635	412 = 3201422	0738	412 =
	413 = 6450757		413 =
	414 = 6181272		414 =
	6-11-97		6-18 =
0700	412 = 3236704 24.08 gpm	0708	412 =
	413 = 6513357 42.73 gpm		413 =
	414 = 6239652 39.85 gpm		414 =
			6-19-9
		0720	412 =
			413 =
			414 =

6-17-97

0709 412 = 3272721
413 = 6576950
414 = 6299012 41 gpm (40.97)

1300 Filter cleaning
- PRE-FILTER WASHED AND REPLACED.
1600 - OUTSIDE FILTERS WASHED AND REPLACED.

6-16-97

0710 412 = 3415062
413 = 6828309
414 = 6532956
inlet H_2O temp = 56°F
Inlet H_2O press = 71 psi
inlet air temp = 68°F
diff press = 21" WU
sight tube = OK

1425 System shut down for LOTO - Power run to work trailer.
412 = 3425690
413 = 6847014
414 = 6550302
1430 Sampler paused
1532 Restart

6-17-97

0738 412 = 3449335
413 = 6889215
414 = 6589420

6-18-97

0708 412 = 3484110
413 = 6951022
414 = 6646572

6-19-97
0720 412 = 3519412 24.31 gpm
413 = 7013702 43.17 gpm
414 = 6704315 39.76 gpm

6-23-97

0720 System down
412 = 3614795
413 = 7182075
414 = 6958900

6-24-97

1230 Brought pump and tank to drain water high level alarm

1440 Restart.
Diff pressure ~ 20"
temp air inlet 88°
water temp 56°
water pressure 11 psi
sight tube OK

6-25-97

0710 412 = 3638881
413 = 7275150
414 = 6898325
inlet press - 11psi
inlet H_2O temp 56°F
diff press = 20"
air temp = 70°
sight tube = OK

6-26-97

0640 412 = 3673168
413 = 7285623
414 = 6953562 39.2 gpm

6-30-97

0715 412 = 3814261
413 = 7534261
414 = 7179312

7-1-97

0730 412 = 3849552 24.25 gpm
413 = 7596418 42.72 gpm
414 = 7235562 38.66 gpm

7-2-97

0300 System
level.
if they
purge t
could b
conjunct
still dr
effluent
not ha
412 = 3
413 = 76
414 = 7
H_2O temp
H_2O press
Air temp
DiH press
Sight Tube

0339 ★ Sampler
★ Sampler
Note No
than ga
will ingc

0640 412 = 3878
413 = 7647
414 = 7281
System
No Readin
because th
entry wit
Environme
to purge

7/3/97
Air Stripper
To tank a
and hose
Shutdown

7-2-97

0300 System Shut down due to High Sump level. Will call and ask Environmental if they have continued to let sample ports purge to floor prior to sampling. If so could be a contributing factor in conjunction with condensation. Stripper still dripping & condensation on effluent line + upper trays ∴ could not have been off long.

412 = 3878286
413 = 7647008
414 = 7281397
H_2O temp reading 57°F
H_2O press reading 0 psi nominal
Air temp = 70°F
Diff press = 0.5" H_2O
Sight Tube = Full

0339 ★ Sampler took Sample -
★ Sampler paused! ★
Note No Readings recorded in log other than gallons/well for 6/26, 6/30, & 7/1 will inquire why.

Mark Spinney

0640 412 = 3878287
413 = 7647008
414 = 7281358
System off.
No Reading other than flow were recorded because they remained the same as last entry with readings on 6/25.
Environmental is not allowing ports to purge to floor as requested not to.

7/3/97
Air Stripper Sump and building sump drained to tank and disposed of VIA SD SUMP PUMP and hose left to drain in future prior to Shutdown MRB

7-3-97

1413 412 = 3882690
413 = 7654882
414 = 7288438
H_2O Temp = 56°F
inlet Press = 10 psig
Stripper diff. press = 20.5" wc
inlet Air Temp = 80°F
Checked Sampler - Restarted Sampling

7-7-97

412 = 4012225
413 = 7884450
414 = 7495375
H_2O temp = 56°F
inlet press H_2O = 10psi
diff. press = 21" wc
inlet air temp = 65°F
sight tube = ok

7-3-97

11:10 Restart System

7-8-97

412 = 4047045

413 = 7945960

414 = 7556552

inlet H_2O temp = 56°F

inlet air temp = 65°F

diff. pressure = 21" wc

inlet H_2O ~~temp~~ press ~~press~~ = ~~50~~ 11 psi

sight tube = OK

sump = OK

7-9-97

412 = 4081582 23.98

413 = 8006925 42.34

414 = 7605071 37.86

everything checked all-OK

sump - OK

7-10-97

412 = 4116198

413 = 8067875

414 = 7659415

every thing checked all conditions stable-

sump - 1/3 of way on pump

7-14-97 412 = 4258680 (142482)

413 = 8319830 (251955)

414 = 7883180 (223765)

618202 gal.

diff press = 21"

inlet H_2O temp 56°F

inlet air temp 77°F

inlet H_2O press 10 psi

Sump 6-8" of water

10:10 Shut system off for Cleaning - Replaced Seals & air filter & pre-filter

1646

0700

0705

0630

0700

7-15-9

Restar

7-16-97

Sampler

diff pre

inlet air

inlet H.

Sight tu

412 = 42

413 = 4

414 = 79

7-17-97

every th

412 = 43

413 = 84

414 = 7

7-21-9

412 =

413 =

414 =

inlet H

inlet h

inlet a

diff pre

Sight t

Sump = c

7-22-97

412 = 448

413 = 87

414 = 82

Sump -

everything

7-15-97

1646 Restart System

7-16-97

0700 Sampler started
diff press = 18" wc
inlet air = 68°F
inlet H_2O press = 11psi
Sight tube = OK
412 = 4280152
413 = 4358072
414 = 7916932

7-17-97

23.98
2.34
7.86

0705 everything checked - OK
412 = 4314630
413 = 8419221
414 = 7970785

7-21-97

0630 412 = 4452168
413 = 8662580
414 = 8183912
inlet H_2O temp = 56°F
inlet H_2O press = 11psi
inlet air temp = 65°F
diff press = 18" wc
Sight tube = OK
sump = close to top of pump

tions stable-
mp

618202 gal.

7-22-97

0700 412 = 4487315 23.91
413 = 8724752 42.29
414 = 8238078 36.85
Sump - OK
everything else checked - OK

wing - Replaced

7-23-97

412 = 4522215

413 = 8786450

414 = 8291660

everything checked - OK

Sump - up above pump

7-24-97

0700 412 = 4556605

413 = 8847250

414 = 8344250

sump level - above pump

everything else - OK

7-28-97

412 = 4694775

413 = 9091275

414 = 8551960

inlet H_2O temp = 56°F

inlet H_2O press = 10psi

diff. press = 18" wc

inlet air = 70°F

sight tube = OK

Sump = pumping out

7-29-97

0705 412 = 4729287

413 = 9152263

414 = 8603395

everything checked = OK

7-30-97

All OK - RB

7-31-97

412 = 4797945

413 = 9273625

414 = 8704900 ≈ 35.24 gpm

All - OK

8-

412 =

413 =

414 =

Sump

diff

air t

inlet

"

8-

0710 412 =

413 =

414 =

Evening

8-

0708 All

412 =

413 =

414 =

8-

0705 412 =

413 =

414 =

8-11

0705 412 =

413 =

414 =

sump

diff p

air te

inlet

inlet

* sight

8-4-97

412 = 4936155
413 = 9518052
414 = 8907735
Sump = OK
diff press = 18" wc
air temp = 70°F
inlet H_2O press = 10 psi
" " temp = 56°F

8-5-97

0710 412 = 4970570
413 = 9578855
414 = 8957705 ~~34~~
Everything - OK

8-6-97

0708 All parameters - OK
412 = 5005065 23.99 gpm
413 = 9639770 42.36 gpm
414 = 9007552 34.66 gpm

8-7-97

0705 412 = 5039600 all - OK
413 = 9057230 parameters
414 = 9700740

8-11-97

0703 412 = 5177425
413 = 9944005
414 = 9252950
sump = OK
diff press = 18" wc
air temp = 70°F
inlet H_2O temp = 56°F
inlet H_2O press = 11 psi
* sight tube = on top mark

8-12-97

0705 412 = 5211980 23.95 gpm

413 = 10004970 42.22 gpm

414 = 9301310 33.41 gpm

all parameters - OK

8-13-97

0710 412 = 5246725

413 = 10066240

414 = 9349785 33.55 gpm

all parameters - OK

sump level - almost above pump

Well 414 pumping only @ 33.55gpm H_2O level

in 414 is 30.05' from Top of Case to Water

8-14-97

0649 412 = 5280675 33650

413 = 10126050 59810 } 140865

414 = 9397190 47405

all parameters - OK

8-18-97

0708 412 = 5419700 139025

413 = 10370940 244890 = 575615

414 = 9588890 191700

all parameters - OK

1326 System Shut Down for cleaning

412 = 5428507

413 = 10386471

414 = 9600940

1442 Restart System 8-19-97

8-20-97

0705 412 = 5452055 32355

413 = 10428666 57720 = 135075

414 = 9633890 45000

all parameters - OK

0700 8-21-

all p

412 =

413 =

414 =

8-25

0710 412 =

413 =

414 =

all p

815 8-26-

412

413

414

Diff

air

H_2O

H_2O

sight

sump

705 8-27

412

413

414

all

0655 8-28-

412

413

414

all

8-21-97

0700 all parameters - OK

412 = 5486315 = 34260
413 = 10489770 = 61110 } 143 035
414 = 9681555 = 47665

8-25-97

0710 412 = 5624025 137710
413 = 10735245 245475 } 573175
414 = 9871545 189990

all parameters - OK

level

Water

815 8-26-97

412 5659480 35455
413 10798470 63225 } 147335
414 9920200 48655

0865

Diff press 18"
air temp 67° F
H_2O temp 57° F
H_2O press 10 psi
sight tube - near midline
sump 3-4" fuzzed
General condensation

705 8-27-97

412 5692340 32860
413 10857070 58600 } 136460
414 9965200 45000

all parameters ok.

135075

0655 8-28-97

412 5726400 34060
413 10917730 ~~[illegible]~~ 60660 } 141180
414 10011660 46460

all parameters ok.

9-2-97

0710
412 = 5899340 — 172940
413 = 11225750 — 308020 = 715860
414 = 10246560 — 234900
all parameters - OK
condensation on floor

9-3-97

0700
412 = 5933575 — 34735
413 = 11286615 — 60865 = 141300
414 = 10292760 — 46200
all parameters - OK

9-4-97

0610
412 = 5967130 — 33555
413 = 11346325 — 59620 = 138395
414 = 10337980 — 45220
all parameters - OK

0930
9-8-97

412	6109610	142480	586395
413	11599450	253125	
414	10528770	190790	

Diff press. 18.5
Air temp 67° F
H_2O temp 57° F
H_2O press 10 psi
Sight tube near middle mark
general condensation

0650
9-9-97

412	6140420	30810	126490
413	11654100	54650	
414	10569800	41030	

All parameters ok

9-10-97
0620 412
413
414
9-11-97
0705 412 = 6
413 = 117
414 = 10
all par
9-15-
0830 412 = 6
413 = 12
414 = 10
Sump
sight t
inlet
inlet
diff p
inlet a
9-16-97
0700 412 =
413 =
414 =
all par
9-17-97
0630 412 =
413 =
414 =
all par
9-18-9
0708 412 = 6
413 = 12
414 = 10
all param

9-10-97

0630 412 = 6174379 33959
413 = 11714300 60200 = 139829
414 = 10614970 45175

9-11-97

0705 412 = 6209960 35581
413 = 11777380 63080 = 145911
414 = 10662220 47250
all parameters - ok

9-15-97

0830 412 = 6350030 140070
413 = 12025750 248370 = 573800
414 = 10847582 0 185360
Sump - OK
sight tube - OK
inlet H_2O temp = 56°F
inlet H_2O press = 10 psi
diff. press = 19" wc
inlet air temp = 62°F

9-16-97

0700 412 = 6382840 32810
413 = 12083740 57990 = 133870
414 = 10890650 43070
all parameters - OK

9-17-97

0630 412 = 6417700 34860
413 = 12145289 61549 = 142004
414 = 10936245 45595
all parameters - OK

9-18-97

0708 412 = 6451925
413 = 12206275
414 = 10991235
all parameters - OK

33555
57620 = 138395
45220

586395

190990

126490

9-22-97 0745

412 6590400 138475
413 12452800 246525 } 565590
414 11161825 180590

inlet H_2O temp 57°F
inlet H_2O press. 10 psi
Diff press 19.5
air temp. 60°F
sight tube - between lower & mid marks
sump - ok

0918 Shut down system for cleaning. Changed pre-filter & air intake filter. ~~Changed~~ Cleaned vent filter.
1720 Turned system back on.

9-23-97 0730

412 6613100 22700
413 12493225 40425 } 92660
414 11191360 29535

inlet H_2O temp - 57°F
inlet H_2O press - 10 psi
Diff Press. - 19
Air temp - 65°F
sight tube - between lower & mid marks
sump - ok

9-24-97 0715

412 6647100 34,000
413 12553940 60,715 } 139015
414 11235660 44,300

all parameters ok

9-25-97 0726
412
413
414
All p

9-29-97 065
412 =
413 =
414 =
inlet
inlet
air tem
diff
Sump
Sight

9-30-97
0710 412 = 6
413 = 1
414 = 1
all p

10-1-97
0705 412 =
413 =
414 =
all p

10-2-97
0645 412 =
413 =
414 =
all p

9-25-97 0720

412	6681700	34,600	141330
413	12615700	61,760	
414	11280630	44,970	

All parameters ok

9-29-97 0650

412 =	6818750	137,050	558645
413 =	12859965	244,265	
414 =	11457960	177,330	

inlet H_2O temp = 56°F
inlet H_2O press = 10 psi
air temp = 62°F
diff press = 19+ w.c.
Sump = OK
Sight tube = OK

9-30-97

0710 412 =	~~12777305~~ 6853925	35075	142595 =
413 =	12922305	62340	
414 =	11503140	45180	

all parameters - OK

10-1-97

0705 412 =	6888295	34470	139690
413 =	12983340	61035	
414 =	11547325	44185	

all parameters - OK

10-2-97

0645 412 =	6922570	34275	= 139450
413 =	13044360	61020	
414 =	11591480	44155	

all parameters - OK

10-6-97

0920 412 = 7064280 - 141710
413 = 13295640 - 251280 } 574235
414 - 11772725 - 181245

diff. press = 20" wc
inlet air temp = 68°F
inlet H_2O temp - 56°F
inlet H_2O press - 10psi
sump = OK
sight tube = OK

10-7-97

0710 412 = 7095400 31520
413 = 13351440 55800 = 127350
414 = 11812785 40000

all parameters - OK

10-8-97

0645 412 = 7129785 33985
10-8-97 413 = 13411630 60190 } 137225
414 = 11855835 43050

all parameters - OK

0625 412 - 7164020 34235
413 - 13472230 60600 } 138050
10-9-97 414 - 11899050 43215

All para OK

10-13-97 530
412 7301190 97615
413 13714745 172585 } 392130
414 12070630 121930 + 159135
551265

All Para - OK

10-14-97 412 - 7334635 - 33445
445 413 - 13774035 - 59290 } 134405
414 - 12112300 - 41670

All para - OK

10-15-97
560

10-16-97
450

10-20-97

10-21-97
500

10-22-97
600

1150

1555

diff
inl
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412
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414
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in
413 =
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414
Sus

	10-15-97	412 - 7370295	35660	
	560	413 - 13836920	62885	142690
574235		414 - 12156445	44145	
		All para - OK		
		diff press - 20 wc		
		inlet Air temp 54°F		
		inlet H_2O temp - 48°F		
		inlet H_2O press. 10		
		Sump OK		
		Sight tube OK		
	10-16-97	412 7404675	34380	
	450	413 13897900	60980	138060
= 127352		414 12199145	42700	
		all OK		
	10-20-97	412 - 7543145	- 138470	
		413 - 14142925	- 245025	554780
85		414 - 12370440	- 171285	
20 137225				
50		diff. 20 w		
		inlet Air 60°F		
		inlet H_2O temp 58°F		
138050		Inlet H_2O Press. 10		
5.		Sump - OK		
		Sight Tube - OK		
	10-21-97	412 - 7577370	- 34225	
	500	413 - 14203550	- 60625	137140
		414 - 12412730	- 42290	
35 392130		All para's OK		
+ 159135	10-22-97	412 - 7611885	- 34515	
551265	600	413 - 14264955	- 61405	138885
		414 - 12455695	- 42965	
		All OK		
134405	1150	Stripper Shut down for Bd 32ϕ Electric tie in.		
		413 = 14282340		
		412 = 7621653		
		414 = 12467694		
	1555	System Restarted		Mark [illegible]

10-23-97 412 - 7640630 - 28745
510 413 - 14316225 - 51270 > 115670
414 - 12491350 - 35655
All para's OK
10-27-97 412 - 7778900 - 138270
445 413 - 14563105 - 246,880 > 556260
414 - 12662460 - 171110
diff press - 22 wc
Inlet Air Temp - 60°F
Inlet H_2O Temp - 48°F
Inlet H_2O Press - 10 psi
Sump - OK
Sight Tube - OK
10/27 Shut down System @ 0815 for cleaning.
Cleaned blowers outer + inner filter + Buildings
outside filter, cleaned Air Stripper. Turned System
back on @ 1730
10-28-97 412 - 7799635 - 20735
430 413 - 14600285 - 37180 > 83600
414 - 12688145 - 25685
All para's - OK
10-29-97 412 - 7834325 - 34690
413 - 14662165 - 61880 > 139350
414 - 12730925 - 42780
All para's OK
10-30-97 412 - 7867615 - 33290
400 413 - 14721565 - 59400 > 133545
414 - 12771780 - 40855
All para - OK
11-3-97 412 - 8006570 - 138955
445 413 - 14969330 - 247,765 > 556,210
414 - 12941270 - 169,490

11-3-97
d
I
I
I

11-4-97
420 412 -
413 -
414 -
All
425 11-5-97
412
413 -
414 -
All
420 11-6-97
412
413 -
414 -
All p

705 Am System
System cl
412: 811
413: 151
414: 13
11-7-97 System R
Filters cl
16:15 Sampler R
412 = 8113281
413 = 15159556
414 = 13069800
Inlet Air te
Inlet H_2O
Inlet H_2O
~~Inlet~~ diff P

11-3-97 (Cont)

diff press 23 wc
Inlet Air Temp 55° F
Inlet H_2O Temp 58°F
Inlet H_2O Press 10 psi
Sump OK
Sight tube - OK

11-4-97

420 412 - 8040370 - 33800
413 - 15029605 - 60,275 > 135,075
414 - 12982270 - 41,000
All paras - OK

425 11-5-97

412 - 8074895 - 34525
413 - 15090960 - 61,355 > 137,385
414 - 13023775 - 41,505
All - OK

420 11-6-97

412 - 8109010 - 34115
413 - 15151900 - 60,940 > 135,950
414 - 13064670 - 40,895
All paras - OK

705 Am System Shut down for heater installation and System cleaning by Terran.
412: 8113067
413: 15159146
414: 13069508

11-7-97 System Restarted after reassembly @ 16:05
Filters cleaned

16:15 Sampler Restarted
412 = 8113281
413 = 15159556
414 = 13069803
Inlet Air temp = 60°F
Inlet H_2O temp = 56°F
Inlet H_2O Press = 10 PSIG
~~Inlet~~ diff Press = 18" WC, Sump = ok, Sight tube ok

11-10-97 4:35 AM

412 - 8199575 - 90565
413 - 15313840 - 161,940 } 361,935
414 - 1317 4100 - 169,430

diff. press 18 w.c.
Inlet Air Temp 57. F.
Inlet H_2O Temp 48 F
Inlet H_2O Press 10 psi
Sump OK
Sight Tube OK

820 AM System Shut down for electrical work i.e. additional heater installation

412: 8204956
413: 15323445
414: 13180486

Restart @ 1335

11-11-97 4:20 AM

412 - 8225925 - 26350
413 - 15360995 - 47145 } 105295
414 - 13205900 - 31,900

All para's - OK

System Shut Down at 10:38 for additional work in control box i.e. Failure Comm. Tie ins for 307 ~~Fail Safe for 307~~ condensate interlock

412 = 8235020
413 = 15377272
414 = 13216827

System Restarted @ 16:20 hrs

11-12-97 - 430

412 - 8252320 - 26,395
413 - 15408235 - 47250 } 105,670
414 - 13237925 - 32,025

All para's OK

11-13-97 - 430

412 - 8286680 - 34360
413 - 15469700 - 61465 } 137,575
414 - 13279675 - 41750

All para's OK

11-17-97 4:3
412
413
414 -
diff
Inle
Inle
Inlet
Su
Si
Si

11-18-97 . 4:
412 -
413 -
414 -
All pa

11-19-97 4:
412 -
413 . 1
414 . 1
All p

11-20-97
412 -
413 -
414 -
All p

11-24-97 4:
412 - 8
413 - 16
414 - 1
diff p
Inlet A
Inlet t
Inlet H
Supp
Sight -

65
940 } 361,935
4

un for electrical
er installation

50
45 } 105285
0

30 for additional
ure Comm. Tie ins for 301
~~safety for 301 condensate~~
interlock

20 hrs
5
0 } 105670
-5

} 137,575

11-17-97 430A

412 - 8424100 - 137,420
413 - 15715200 - 245,500 } 550,340
414 - 13447095 - 167,420
diff press 19 w.c.
Inlet Air Temp 57 F
Inlet H_2O Temp 47 F
Inlet H_2O Press 10 psi
Sump OK
Sight tube OK

11-18-97 425AM

412 - 8458475 - 34375
413 - 15776525 - 61325 } 137405
414 - 13488800 - 41705
All para OK

11-19-97 430A

412 - 8492840 - 34365
413 - 15837780 - 61255 } 137,120
414 - 13530300 - 41500
All para's OK

11-20-97 425A

412 - 8527495 - 34655
413 - 15899335 - 61555 } 137,370
414 - 13571460 - 41160
ALL para's OK

11-24-97 435A

412 - 8665715 - 138220
413 - 16445730 - 246395 } 547,550
414 - 13734395 - 162935
diff press 19 wc
Inlet Air Temp 64 °F
Inlet H_2O Temp 58 °F
Inlet H_2O Press 10 psi
Sump OK
Sight tube OK

11-25-97 415A

412 8699625 - 33910

413 16206160 - 60,430 > 133,845

414 13774000 - 39,605

All fans OK

11-26-97 430

412 8734710 - 35085

413 16268590 - 62430 > 138,805

414 13815290 - 41290

All fans OK

12-1-97 410

412 8907665 - 172,955

413 16575860 - 307,270 > 676180

414 14011255 - 195,965

Diff press 22 w.c.

Inlet Air Temp 62 F

Inlet H_2O Temp 58 F

Inlet H_2O press 10 psi

Sump OK

Sight Tube OK

12-2-97 420

412 - 8942630 - 34965

413 16637940 - 62,080 > 138,150

414 14052360 - 41,105

All fans OK

12-3-97 415

412 - 8977270 - 34640

413 - 16699405 - 61,465 > 137,305

414 - 14093560 - 41,200

All fans OK

1332 System Shut down to tie in condensate line from Bd. 301

412 = 8990379

413 = 16722676

414 = 14109156

1632 Restart System

12-4-97 420

412 - 90

413 · 167

414 - 141

All fa

0750 System

412 = 9010

413 = 167

414 = 1413

0950 System

12-5-97

~ 9:00 System

412 = 90

413 = 16

414 = 14

1235 System

12-8-97

0930 Samples and

412 = 9109

413 = 1693

414 = 1423

12-8-97

412 - 91

413 - 16

414 - 14

diff

Inl

Inl

Inl

Su

Si

0840 System

412 = 91

413 = 16

414 = 14

Restart

12-4-97 420

412 - 9005520 - 28250

413 · 16749755 - 56350 > 112900

414 - 14127860 - 34300

All para's OK

0750 System Shut down to change check valve

412 = 9010565

413 = 16758771

414 = 14134062

0950 System Restarted

12-5-97

~ 9:00 System Shut down to repair ✓ valve in 201

412 = 90439 63

413 = 16818222

414 = 14175072

1235 System Restarted

12-8-97

0930 Sampler was overflowing. Reset Sampler and collected.

412 = 9109280 - 103770

413 = 16935050 - 185,295 > 416048

414 = 14254840 - 126,980

12-8-97

412 - 9134810 - 25530

413 - 16980535 - 45485 > 101,675

414 - 14285500 - 30,660

diff press - 26 wc

Inlet Air Temp 60°F

Inlet H_2O Temp 28°F

Inlet H_2O Press 7 psi

Sump ok

Sight Tube OK

0840 System Shut down for cleaning

412 = 9140885

413 = 16991376

414 = 14292763

Restarted 1700 hrs

10 > 133,945 05

85 30 > 138,803 0

5 0 > 676180 5

1

5

> 138,150

10 65 > 137,305 00

in condensate

12-9-97 420
412 - 9157075 - 22,265
413 - 17020265 - 39,730 } 88,005
414 - 14312510 - 27,010
All para's OK

12-10-97 420
412 - 9191605 - 34530
413 - 17081790 - 61,525 } 137,210
414 - 14353665 - 41,155
All para's OK

12-11-97 0500
412 = 35645
413 = 63460 = 141800
414 = 42695
all parameters - ok

12/12/97 8:15
System Shut down for cleaning
412: 9265854
413: 17213907
414: 14442087

12-15-97 430A
412 - 9351630 - 124380
413 - 17366530 - 221280 } 492,685
414 - 14543385 - 147025
diff press 18wc
Inlet Air Temp 57 F
Inlet H_2O Temp 58F
Inlet H_2O Press 7 psi
Sump ok
Sight tube ok

12-16-97
412-
413 -
414 -
All

12-17-97 0
412 =
413 =
414 =
a

12-18-97
412 =
413 =
414 =
all

12-22-97 4
412 -
413 - 1
414 - 1
d
I
I
I
S

12-23-97
412 - 96
413 - 17.
414 - 14:
All

12-29-97 445
412 - 98
413 - 182
414 - 150
diff p
Inlet A
Inlet

12-16-97 325A

412 - 9384145 - 32515

413 - 17424555 - 58025 > 128,750

414 - 14581595 - 38,210

All para's OK

12-17-97 0508

412 = 9421485 - 37310

413 = 17491030 - 66475 > 147900

414 = 14625680 - 44085

all parameters - ok

12-18-97

412 = 9456850 - 35365

413 = 17553550 - 62520 > 138395

414 = 14666190 - 40510

all parameters - OK

12-22-97 430

412 - 9594865 - 138015

413 - 17796990 - 243440 > 538890

414 - 14823625 - 157435

diff press 19 wc

Inlet Air Temp 58 F

Inlet H_2O Temp 58 F

Inlet H_2O Press 6 psi

Sump - OK

Sight Tube - OK

12-23-97 420

412 - 9629585 - 34720

413 - 17858155 - 61165 > 135115

414 - 14862855 - 39230

All para's OK

12-29-97 445

412 - 9840910 - 211325

413 - 18229895 - 371,730 > 808695

414 - 15088495 - 225,640

diff press 25 wc

Inlet Air Temp 61 F

Inlet H_2O Temp 58 F

Inlet H_2O Press 6 PSI

Sump OK

Sight Tube OK

12-31-97 System Shut down due to
1400 high diff press. = 25.5" H_2O. Paused
Sampler and Called Terran.

Terran put bleach in each well to treat biological
growth on pumps ~ 1 gal / well.
412 = 9917279
413 = 18364335
414 = 15169714

1-3-98 System restarted @ 1315

1-5-98 430A
412 - 9974270 - 133360
413 - 18465085 - 235200 > 517945
414 - 15237880 - 149385
diff press 17 w.c.
Inlet Air Temp 65 F
Inlet H_2O Temp 48 F
Inlet H_2O Press 7 PSI
Sump OK
Sighttube OK

1-6-98 430A
412 - 10009090 - 34820
413 - 18526645 - 61560 > 137640
414 - 15279140 - 41260
All para's OK

1-7-98 412 - 10043990 - 34900
413 - 18588290 - 61645 > 137835
414 - 15320430 - 41290
All para's OK

1-8-98 415
412 - 10078535 - 34545
413 - 18649400 - 61,110 > 137,240
414 - 15362015 - 41585
All para's - OK

1-12-98 4
412
413
414-
di
I
I
I

1-13-98
412
413
414-
All

1-14-98
412
413
414-
All

1-15-98
412 -
413
414-
All p

1-16-98 diff p
7:33 inlet
H_2O T
Inlet H
ISCO =
Sight
7:38 412 =
413 =
414 =

n due to
H_2O. Paused
n.
MS
l to treat biological

1-12-98 425
412 - 10221495 - 142960
413 - 18901480 - 252080 > 571,435
414 - 15538410 - 176395
Diff press 18wc
Inlet Air Temp 57°F
Inlet H_2O Temp 48°F
Inlet H_2O Press 7psi
Sump OK
Sight Tube OK

1-13-98 430
412 - 10257690 - 36195
413 - 18964910 - 63430 > 144385
414 - 15583170 - 44760

517945
All parts OK

1-14-98 415
412 - 10293550 - 35860
413 - 19027820 - 63010 > 143330
414 - 15627630 - 44460
All parts OK

1-15-98 425
412 - 10329880 - 36330
413 - 19091640 - 63720 > 145,000
414 - 15672580 - 44950
> 137640
All parts OK

1-16-98 diff press = 20" H_2O sump-ok
7:33 inlet Air temp = 62°F
H_2O Temp = 58°F
> 137835
Inlet H_2O Press = 7psi
ISCO = Full
Sight tube - ok
7:38 412 = 10370935
413 = 19163700
> 137240
414 = 15723350

1-19-98 430
412 - 10474510 - 144630
413 - 19345425 - 253785 > 577210
414 - 15851375 - 178795
diff press 21 wc
Inlet Air Temp 60°F
Inlet H_2O Tem 58°F
Inlet H_2O Press 7 psi
Sump OK
Sight Tube OK
1-20-98 330
412 - 10509830 - 34420
413 - 19405770 - 60345 > 137250
414 - 15893860 - 42485
All paras OK
1-21-98 420
412 - 10546490 - 37560
413 - 19471510 - 65740 > 149550
414 - 15940110 - 46250
All paras OK

0940 Shut down Air sparge & Air Stripper. PSI of Air Stripper is 22.5
Clean Stripper
1-22-98 425
412 - 10554250 - 7760
413 - 19485280 - 13780 > 31320
414 - 15949890 - 9780
System Shut Down
1-22-98 System Start Up 1610
1-26-98 425
412 - 10680225 - 125975 > 502290
413 - 19706260 - 220970
414 - 16105235 - 155345
Inlet Air Temp 60°F Inlet H_2O Press 7 psi
diff press 18 wc Sump OK
Inlet H_2O Temp 58F Sight tube OK

1-28-98
412
413
414
All
1-29-98 3
412 -
413 -
414 -
All
2-2-98 41
412 -
413 -
414 -
Inlet
dif
Inl
2-3-98 42
412
413
414 -
All
2-4-98 415
412 -
413 -
414 -
All
2-5-98 44
412
413 -
414 -
A

4630
03785 > 577210
795

4420
3445 > 137250
485

37560
65740 > 149550
46250

Average of Air
Stripper is 22.5

> 31320

1610

> 502290

let H_2O Press 7 psi
OK
Lt tube OK

1-27-98 410

412 - 10716850 - 25625
413 - 19778640 - 62380 > 131810
414 - 16149030 - 43795
All para's OK

1-28-98 420

412 - 10752000 - 36150
413 - 19831950 - 63310 > 143880
414 - 16193450 - 44420
All para's OK

1-29-98 355

412 - 10787230 - 35230
413 - 19893575 - 61625 > 140405
414 - 16236700 - 43250
All para's OK

2-2-98 410

412 - 10931050 - 143820
413 - 20145245 - 251670 > 571920
414 - 16413130 - 176430
Inlet Air Tem 64 F — Inlet H_2O press 7 psi
diff press 20 wc — Sump OK
Inlet H_2O Temp 58 F — Sight Tube OK

2-3-98 420

412 - 10967075 - 36025
413 - 20208390 - 63145 > 143335
414 - 16457285 - 44155
All para's OK

2-4-98 415

412 - 11002700 - 35625
413 - 20270675 - 62285 > 141555
414 - 16500930 - 43645
All para's OK

2-5-98 445

412 - 11039230 - 36530
413 - 20334635 - 63960 > 145350
414 - 16545670 - 44740
All para's OK

2/8/98	≈ 01:00 AM System Auto shutdown	2-18-98	
	due to high back pressure. In at 05:50		412
	to disable alarm. ISCO Container full.		413
	Terran due in on 2/9/98 Sampler		414
	should be paused until system		All
	restarted. Mark Sanney	2-19-98	
2-9-98	430 System Shutdown		412
			413
	412 - 11140951 - 101731		414
	413 - 20512821 - 178186 } 405052		All
	414 - 16670205 - 124535	2-23-98	
2-10-98	Unit cleaned restart 1500		412
			413
2-11-98	all parameters - OK		414
DH	412 = 11164685 -		Inlet
0700	413 = 20554880 -		Inlet
	414 = 16699795 -		Inlet
2-12-98	430		diff
	412 - 11196510 - 31825		Sight
	413 - 20610890 - 56090 } 127175		Sump
	414 - 16739055 - 39260	2-24-98	
	All PARAS OK		412
			413
2-16-98	412 = 11341358		414
	413 = 20866850		All
	414 = 16918030		
	inlet H_2O press = 7 psi	2-25-98	
	" " tem = 56°F		412
	inlet air tep = 56°F		413
	diff press = 19" wc		414
	sight tube -		All
2-17-98	all parameters - OK - DH	2-25-98 -	Au
	412 = 11376515		412
	413 = 20929126		413
	414 = 16961480		414

down
sure In at 05:50
Hainer full.
198 Sampler
ll system
Mark Sawey

> 405052

start 1500

> 127175

2-18-98 430
412 - 11409670 - 33155
413 - 20986560 - 58440 > 132550
414 - 17002435 - 40955
All para's OK

2-19-98 420
412 - 11444670 - 35000
413 - 21049320 - 61760 > 140005
414 - 17045680 - 43245
All para's OK

2-23-98 415
412 - 11587865 - 142795
413 - 21299720 - 251400 > 570885
414 - 17222380 - 176700
Inlet H_2O press - 7 psi
Inlet H_2O temp - 58° F
Inlet Air Temp - 60° F
diff press - 21 wc
Sight tube - OK
Sump OK

2-24-98 355
412 - 11622810 - 35345
413 - 21361850 - 62130 > 141205
414 - 17266110 - 43730
All para's OK

2-25-98 405
412 - 11658940 - 36130
413 - 21425335 - 63485 > 144395
414 - 17310890 - 44780
All para's OK

2-25-98 - Air Stripper Shutdown for cleaning 1400
412 = 11673683
413 = 21451246
414 = 17329013

2-26-98 400 3:

412 - 11673683 - 14743
413 - 21451246 - 25911 > 58777
414 - 17329013 - 18123
Shutdown

2-28-98 - restarted Airstripper 1600

3-2-98 3:30 3-10

412 - 11797955 - 124272
413 - 21670310 - 219064 > 497648
414 - 17483325 - 154312
19 - WC
Inlet Air Temp - 55°F. 3-
Inlet H_2O Press - 7 psi
Inlet H_2O Temp - 58°F
Sump + Sight Tube OK

3-3-98 330

412 - 11833960 - 36005 3-12-
413 - 21733790 - 63480 > 144140
414 - 17527980 - 44655
All PARA's OK

3-4-98 - 4:30 8:05

412 - 11870755 - 36795
413 - 21798680 - 64890 > 147315
414 - 17573610 - 45630
All PARA's OK

3-5-98 430

412 - 11906570 - 35815
413 - 21861890 - 63210 > 143385
414 - 17617970 - 44360
All PARA's OK

3-9-98 430

412 - 12048980 - 142410

413 - 22112520 - 250630 > 569005

414 - 17793935 - 175965

Inlet Air Temp 66°

Inlet H_2O Temp 58°

Inlet H_2O Press 7 psi

WC - 21

Sump + Sight Tube OK

3-10-98 410

412 - 12084290 - 35310

413 - 22174535 - 62015 > 140770

414 - 17837380 - 43445

all para's OK

3-11-98 355

412 - 12119600 - 35310

413 - 22236850 - 62315 > 141345

414 - 17881100 - 43720

all para's OK

3-12-98 405

412 - 12155550 - 35850

413 - 22300010 - 63160 > 143510

414 - 17925500 - 44400

All para's OK

8:05 please record each param. on Mon. + Thurs.

Inlet H_2O Temp = 58° F

" " Press = 7 PSI

Inlet Air Temp = 54° F

Magnehelic = 24.5" WC

Sight Tube x 1" above lower mark - OK

Sump = ok

412 = 24 gpm 1 min. Timed on Stop watch

413 = 44 gpm

414 = 32 gpm

System shutdown manually @ 14:55

high back pressure - @ 25" WC

412 = 12171702; 413 = 22328516; 414 = 17945439

58777

1600

497648

144140

147315

143385

3-16-98 System Shutdown 420

412 - 12171202 - 16152
413 - 22328516 - 28506) 64597
414 - 17945439 - 19939

3-18-98 System Start up 1900

3-19-98 320A

412 - 12183950 - 12248
413 - 22350300 - 21784) 49378
414 - 17960785 - 15346

Inlet H_2O Temp 58°F
Inlet H_2O Press 7 PSI
Inlet Air Temp 64°F
WC - 18
Sump + Sight Tube OK

8:00 - Drewsperse not pumping, surged pickup drop - started pumping
12:00 Same as at 8:00
1300 Sample port (effluent) closed - opened up with screwdriver
1600 Checked - hose pulse observed

3/20/98 06:00 checked Drewsperse metering - hose pulse observed looks like connection / check valve at input leaking!
12:00 IT is leaking - shut down - removed - Taped - Tightened and re-installed - No leak!
14:00 Looks like it is pumping.
16:00 " " " " "

3-23-98 400

412 - 12326700 - 142750
413 - 22603045 - 252745) 570530
414 - 18138520 - 175035

Inlet Air Temp - 60°F Inlet water Temp 58°F
WC - 18 Sump + Sight - OK
Inlet H_2O Press 7 psi

3-24-98
412 -
413 -
414 -
All p

3-25-98 40

412 - 1
413 - 22
414 - 18
All pa

3-26-98 4
412 -
413 -
414 -
All pa

3-30-98 3
412 - 1
413 - 2
414 - 18
Inlet H
Inlet H
Inlet A
W.C.

3-31-98 35
412 - 1
413 - 2
414 - 18
All p

4-1-98 40
412 -
413 - 2
414 - 1
All

420	3-24-98 400	
	412 - 12342120 — 35420	
64597	413 - 22665550 - 62505	141965
	414 - 18182560 - 44040	
up 1900	All para's OK	
	3-25-98 400	
	412 - 12397825 - 35705	
	413 - 22728500 - 62950	143045
49378	414 - 18226950 - 44390	
	All para's OK	
	3-26-98 400	
	412 - 12433505 - 35680	
	413 - 22791355 - 62855	142855
	414 - 18271270 - 44320	
	all para's OK	
ping, surged	3-30-98 330	
pumping	412 - 12576240 - 142735	
	413 - 23042720 - 251365	571285
closed - opened	414 - 18448455 - 177185	
	Inlet H_2O Temp - 58F	
ved	Inlet H_2O press - 7 psi	Sump + Sight - OK
- hose pulse observed	Intet Air Temp 70 F	
valve at input	W.C. 18	
	3-31-98 355	
down - removed -	412 - 12612280 - 36040	
- installed - No leak!	413 - 23106145 - 63425	144120
pumping.	414 - 18493110 - 44655	
	All para's OK	
	4-1-98 405	
	412 - 12648360 - 36080	
570530	413 - 23169680 - 63535	144315
	414 - 18537810 - 44700	
let water Temp 58°F	All para's OK	
p + Sight - OK		

4-2-98 420
412 - 12684340 - 35980
413 - 23233015 - 63335 > 143885
414 - 18582390 - 44580
All para's OK
10:07 System shut down for inspection
10:20 System restarted

4-6-98 430
412 - 12825420 - 141080
413 - 23482030 - 249015 > 565085
414 - 18757380 - 287490
Inlet Air Temp 60°F
W.C. - 14
Inlet H_2O Press 7 psi
Inlet H_2O Temp 58°F
Sump Sight - OK

4-7-98 355
412 - 12860490 - 34770
413 - 23545310 - 61280 > 139040
414 - 18860370 - 42990
All para's OK
4-7-98 0910 System Shut down for maint
Air Sparger also maint.
Clean filters, lube blowers
Restart 1400

4-8-98 350
412 - 12888760 - 28570
413 - 23593790 - 50480 > 114490
414 - 18835810 - 35440
All para's OK

4-9-98 355
412 - 1292
413 - 2365
414 - 1887
All para's

4-12-98 730 DH
412 - 130373
413 - 2385578
414 - 190202

4-13-98 415
412 - 1306
413 - 2391
414 - 19058
Inlet Air
WC - 19
Inlet H_2O
Inlet H_2O

4-14-98 350
412 - 131032
413 - 239722
414 - 191030
All para's

4-15-98 415
412 - 131409
413 - 240377
414 - 191489
All para

4-16-98 355
412 - 131743
413 - 241002
414 - 19193
all para's

[redacted]	4-9-98	355
		412 - 12924300 - 35540
143855		413 - 23656560 - 62770 } 142360
		414 - 18879860 - 44050
		All para's OK
inspection		
	4-12-98	730 DH
		412 - 13037315 - 113015
		413 - 23855780 - 199220 } 452575
080		414 - 19028200 - 140340
15 00 } 565085		
	4-13-98	415
		412 - 13068270 - 30955
		413 - 23910200 - 54420
		414 - 19058725 - 38525
		Inlet Air Temp 54°F
		WC - 19
		Inlet H_2O Press 8 psi Sump tank LT-OK
		Inlet H_2O Temp 58°F
	4-14-98	350
39040		412 - 13103580 - 35610
		413 - 23972800 - 62600 } 142505
		414 - 19103020 - 44295
down for maint		All para's OK
also maint.	4-15-98	415
lube blowers		412 - 13140930 - 36950
400		413 - 24037780 - 64980 } 147880
		414 - 19148970 - 45950
		All para's OK
} 114490		
	4-16-98	355
		412 - 13174350 - 35520
		413 - 24100245 - 62465 } 142140
		414 - 19193125 - 44155
		all para's OK

4-20-98 440
412 - 13324740 - 148390
413 - 24360355 - 260110 > 594105
414 - 19378730 - 185605
Inlet Air Temp 57°F
WC - 19
Inlet H_2O Pres 7.5 psi
Inlet H_2O Temp - 47°F
Sump & Sight Tube OK

4-21-98 400
412 - 13360700 - 35960
413 - 24423810 - 62955 > 143925
414 - 19423740 - 45010
All pars OK

4-22-98 400
412 - 13397520 - 36820
413 - 24487800 - 64490 > 147385
414 - 19469815 - 46075
All pars OK

4-23-98 400
412 - 13434450 - 36930
413 - 24552480 - 64680 > 147,770
414 - 19515975 - 46160
All pars OK

4-27-98 10/20
412 - 13581950 - 147500
413 - 24810775 - 258295 > 589810
414 - 19699990 - 184015
Inlet Air Temp 61°F
WC. 18.5
Inlet H_2O Press 7.5 PSI
Inlet H_2O Temp 58°F
Sump & Sight Tube OK

4-28-98 400
412 - 13618
413 - 24874.
414 - 19745
All pars

4-29-98 420
412 - 136552
413 - 249393
414 - 19791180
All pars OK

10:55 System Shut
agent
412 = 13665
413 = 2495
414 = 19803

4-30-98 400
412 - 136652
413 - 249567
414 - 1980352

10:45 System Res
412 = 23
413 = 45
414 = 32

5-4-98 435
412 - 13802665
413 - 25195600
414 - 1997 5485
Inlet Air Temp
WC. 18
Inlet H_2O Press.
Inlet H_2O Temp
413 ≈ 44 gpm
412 ≈ 25 gpm
414 ≈ 33 gpm

7:30 added 5 gal
Drewsperse @

4-28-98 400

412 - 13618210 - 36260
413 - 24874380 - 63605 } 144935
414 - 19745060 - 45070

All pana's OK

4-29-98 420

412 - 13655270 - 37060
413 - 24939380 - 65000 } 148190
414 - 19791190 - 46130

All pana's OK

10:55 System Shut down for Maint - Filters/Sequestering agent

412 = 13665200
413 = 24956777
414 = 19803524

4-30-98 4:00

412 - 13665200 - 9930
413 - 24956777 - 17397 } 39661
414 - 19803524 - 12334

10:45 System Restart

412 = 23 gpm
413 = 45 gpm
414 = 32 gpm

5-4-98 435

412 - 13802665 - 137465
413 - 25195600 - 238823 } 548249
414 - 19975485 - 171961

Inlet Air Temp 68 °F
W.C. 18 Sump + Sight OK
Inlet H_2O Press. 7 PSI
Inlet H_2O Temp 58 °F
413 ≈ 44 gpm
412 ≈ 25 gpm
414 ≈ 33 gpm

7:30 added 5 gal bucket to 55 gal cont. (drum)
Drewsperse @ 29.5" ≈ 2" = 5 gal (will check w/ Ok)

143925

147385

147,770

589810

5-5-98 410
412 - 13838790 - 36125
413 - 25258155 - 62555 > 143110
414 - 20019915 - 44430
All para's ok
5-6-98 410
412 - 13875490 - 36700
413 - 25321830 - 63675 > 145350
414 - 20064890 - 44975
All para's OK
5-7-98 405
412 - 13812070 - 35580
413 - 25385400 - 63570 > 143660
414 - 20109400 - 44510
All para's ok
1600 Drewsperse 752 level : magnet grab at 27¼"
H_2O temp ≈ 58°F
H_2O press. ≈ 7.25 psi
dif press ≈ 18.25" wc
Air temp ≈ 69.5°F
Sight tube ≈ ½ + 1" above top mark - ok
Sump - ok 0.575"/gal Drewsperse
★ Note: update to HASP - Read & Sign ★
5-11-98 445
412 - 14061115 - 149045
413 - 25643220 - 257820 > 587825
414 - 20290360 - 180960
to.C. - 18.25
Inlet Air Temp 56° F
Inlet H_2O Press 7¼ psi Sump + Sight - OK
Inlet H_2O Temp 54° F
Drewsperse @ 24¼" ≈ 1.3 gal/day
412 ≈ 26 gpm
413 ≈ 44 gpm
414 ≈ 33 gpm

5-12-98
412 - 14
413 - 25
414 - 20
All pa
Drewspe
5-13-98 4
412 - 1
413 - 2
414 - 2
All para
Drewsp
5-14-98 30
412 - 141
413 - 258
414 - 204
All pa
0810
413 ≈ 45
412 ≈ 24.
414 ≈ 31.
H_2O Temp
H_2O press
Air Temp
Dif. Press
Drewspe
5-18-98 430
412 - 143
413 - 26
414 - 206
Inlet Air T
WC
Inlet H_2O
Inlet H_2

5-12-98 410

412 - 14097360 - 36245

413 - 25705880 - 62660 } 142900

414 - 20334355 - 43995

All para's OK

Drewsperse at 23¼" ≈ 1.7 gal adjusted pump

5-13-98 405

412 - 14134420 - 37060

413 - 25769950 - 64070 } 145920

414 - 20379145 - 44790

All para's OK

Drewsperse at 22½" ≈ 1.3 gal

5-14-98 300

412 - 14170000 - 35580

413 - 25831460 - 61510 } 139975

414 - 20422030 - 42885

All para's OK

0810

413 ≈ 45.0 gpm

412 ≈ 24.5 gpm

414 ≈ 31.0 gpm

H_2O Temp ≈ 58°F

A_{20} press ≈ 7.25 psig

Air Temp ≈ 68°F

Dif. Press ≈ 18.25" WC

Drewsperse @ 21.75" ≈ 1.3 gal/day

5-18-98 430

412 - 14320120 - 150120

413 - 26091060 - 259600 } 590070

414 - 20602380 - 180350

Inlet Air Temp 69°F

WC - 18¼ Sight + Sump OK

Inlet H_2O Press 7¼

Inlet H_2O Temp 58°F

143110

145350

143660

magnet grab at 27¼"

mark - OK

15"/gal Drewsperse

HASP - Read & Sign ★

587825

Sump + Sight - OK

≈ 1.3 gal/day

5-19-98 355
412 - 14356230 - 36110
413 - 26153520 - 62460 } 141690
414 - 20645500 - 43120
All para's OK

5-19-98 1200 - shut down for maintenance: cleaned filter

5.19.98 1230 - restart

5-20-98 400
412 - 14392370 - 36140
413 - 26216300 - 62780 } 142700
414 - 20689280 - 43780
All para's OK
Drawspouts @ 16.5"

5-21-98 400
412 - 14429260 - 36890
413 - 26280340 - 64040 } 145850
414 - 20734200 - 44920
All para's OK

5-26-98 410
412 - 14612300 - 183040
413 - 26598280 - 317940 } 722,700
414 - 20955920 - 221720
Inlet Air Temp 69°F
w.c. 1 1/4
Inlet H_2O Temp 58°F
Inlet H_2O Press 7 1/4
Sump + Sight - OK
15:30 Drawspouts @ 11.5"

5-27-98
412 - 14648720 - 34420
413 - 26661610 - 63330 } 143710
414 - 20999880 - 43960
All para's OK

5-28-98
412 -
413 -
414 -
All
6-1-98 4
412 -
413 -
414 -
Inlet
w.c
Inlet
Inlet
Sump
Drew
6-2-98 35
412 -
413 -
414 -
All p
6-3-98 4
412 -
413 -
414 -
All
6-4-98.
412 -
413 -
414 -
All
12:20
6-8-98 0610
Press.
Temp
Inlet
"
Sigh

[redacted]

9-28-98 400

412 - 14685410 - 36690

413 - 26725355 - 63745 } 144585

414 - 21044040 - 44160

All para's OK

6-1-98 420

412 - 14931990 - 146580

413 - 26979810 - 254955 } 576545

414 - 21219950 - 175510

Inlet Air Temp 67°F

W.C. - 18 1/4

Inlet H_2O Temp 58°F

Inlet H_2O Press 7 1/4

Sump unplugged Sight OK

Drewsperse @ 7"

6-2-98 350

412 - 14867750 - 35760

413 - 27041900 - 62090 } 140435

414 - 21242135 - 42585

All para's OK

6-3-98 405

412 - 14904565 - 36815

413 - 27105820 - 63920 } 144515

414 - 21305915 - 43780

All para's OK

6-4-98. 400

412 - 14940865 - 36300

413 - 27168810 - 62990 } 142420

414 - 21349045 - 43130

All para's OK

12:20 Drewsperse @ 4 1/4"

6-8-98 0610

Press. diff 18.5"

Temp. 60°F

Inlet H_2O temp 56°F

" " press 7 p.s.i.

Sight tube - OK

142700

145850

722,700

143710

6/8/98 9:25 System Shut down for Maint.

6/8/98 0945-1530 - Services on septems SK

6/8/98 1530 Septem started back up

6/8/98 0600 ALL OK -- DH

6/9/98 0600 ALL OK - DH

6/11 0550 ALL OK - DH

12:46pm

Sump pumped out

412 = 15198950

413 = 27618120

414 = 21654038

inlet H_2O temp = 58°F

" " Press = 7psig

" Air Temp = 70°F

Diff press = 18.2" H_2O Col. (left of indicator on 18")

Sight Tube - ok

Sump - ok

6/15 0538

Inlet H_2O Temp = 58°F

" " press = 7psi

Air Temp 70°F

" Diff Press = 18"

sight tube = ok

sump = needs pumped

6:35 sump pumped

Drewsperse @ 25 1/4"

412 = 15334695 ≈ 30 SPM

413 = 27855030 ≈ 45 SPM

414 = 2181480 ≈ 25 gpm

100 gpm

6/16 ar

0600

6/17 0604

10:5

6/18 0605

8:45

412

413

414

inlet

"

" 1

Diff.

Sigh

Sum

Dre

6-22-98

412

413

414

Inle

WC

Inle

Inle

Sight

6:30 Sump

Drew

6-23-98

412 - 1

413 - 25

414 - 22

All p

6-24-98

412

413

414

Drewsperse @

6/16 all OK - DH
0600
6/17 0604 All OK - DH
10:50 Drewsperse @ 23 1/2"
6/18 0605 all OK - DH
8:45
412 = 15449420 @ ≈ 26 gpm
413 = 28054075 @ ≈ 45 gpm
414 = 21950902 @ ≈ 30 gpm
inlet H_2O Temp ≈ 58°F
" " Press ≈ 7.25 psig
" Air Temp ≈ 71°F
Diff. Press ≈ 18.25" WC
Sight Tube = ok
Sump = 1/4 full - pumped empty
Drewsperse @ 22.75" remainder added → 24"
6-22-98 430
(left of indicator on 18")
412 - 15591950 - 146520
413 - 28300720 - 253570 } 573245
414 - 22115325 - 173.155
Inlet Air Temp 72°F
WC 18 1/4"
Inlet H_2O Press 7 1/4
Inlet H_2O Temp 58°F
Sight Tube OK Sump needs pumped
6:30 Sump pumped
Drewsperse @ 20.75"
6-23-98
412 - 15628795 - 36845
413 - 28344300 - 63580 } 143700
414 - 22142600 - 43275
All para's OK
6-24-98
412 = 15668920 - 40125
413 - 28433970 - 69670 } 157185
414 = 22209990 47390
Drewsperse @ 18.75" 157185

10 SPM
5 SPM
2.9 SPM
SPM

6-25-98
412 - 15702825 - 33905
413 - 28472700 - 58730 } 132345
414 - 22249700 - 39710
all PALAS OK
09:22 Sump pumped out
Drewsperse @ 18"
412 ≈ 27 gpm meter @ 15,711,330.
413 ≈ 44 gpm " 28,507,436.
414 ≈ 31 gpm " 22,259,665.
Total ≈ 102 gpm Monthly Measures
Inlet H_2O temp ≈ 58°F
" " press ≈ 7.25 psi
" Air temp ≈ 80°F
Diff Press ≈ 18.25" WC
Sight tubes ok
PE 1- Sump = ok
Massive Condensation Production!
6-29-98 4:30
412 - 15851325 - 148500
413 - 28750210 - 257510 } 579840
414 - 22423530 - 173830
Inlet Air Temp 74°F
WC - 18¼
Inlet H_2O Press 7¼
Inlet H_2O Temp 58°F
Sight Tube OK
Sump Needs pumped
6:45 Sump pumped Drewsperse @ 14.5"

6-29 1400 shut down for maintainance
1630 restarted Drewsperse Changed
6-30-98 400
412 - 15885370 - 34045
413 - 28809510 - 59300 } 133835
414 - 22464020 - 40490
All PALAS OK
Drewsperse @ 28.75"

7-1-98 405
412 - 1
413 - 2
414 - 22
All
7-2-98 4
412 - 15
413 - 28
414 - 22
All pal
DREWSP
(1600)
7-2-98 412 - 1
413 -
414 -
7-6-98 DREW
06:25 Sump P
412 - 16
06:35 413 - 2
414 - 2
7-7-98 Pressure
inlet AIR
inlet H_2O
" H_2O t
412 = 1611
413 = 292
414 = 227
7-7-98 0520
all - OK
412 = 1614
413 = 292
414 = 227

7-1-98 405
412 - 15921940 - 36570
413 - 28873490 - 63980) 144,440
414 - 22507910 - 43890
All PARAS OK
7-2-98 460
412 - 15959185 - 36245
413 - 28936760 - 63270) 142785
414 - 22551180 - 43270
All PARA'S OK
DREWSPERSE @ 27.25
(1600)
7-2-98 412 - 15976943
413 - 28969445
414 - 22573535

7-6-98 DREWSPERSE @ 23.5
06:25 SUMP PUMPED OUT
06:35 412 - 16110470
413 - 29202230
414 - 22731515

7-8-98 Pressure = 8 psi
inlet AIR = 80°F
Inlet H_2O = 7 psi
" H_2O temp = 56°F
412 = 16119750
413 = 29218420
414 = 22742425
7-7-98 0520
all - OK
412 = 16142770 - 23020
413 = 29258500 - 40080) 90195
414 = 22769520 - 27095

132,345

15,711,330.
28,507,436.
22,259,665.
Daily Measures

Production!

579840

Drewsperse @ 14.5"

Drewsperse Changed

133835

7-8-98 412 36,870
413 64,200 } 144,350
414 43,280
ALL PARAMETERS OK.

0645 DREWSPERSE @ 21.5
7-8-98 412 16181615
413 29326080
414 22815125

7-9-98 412 16216360 36,720
413 29386690 63,990 } 143,750
414 22855840 43,040
ALL PARAMETERS OK

0650 DREWSPERSE @ 20.5
7-9-98 412 16217970
413 29389340
414 22857720
1615 SUMP PUMPED OUT

7-13-98
0445 ~~H2~~
DIFF. PRESS. - 18" wc
AIR temp - 70°F
inlet H_2O temp - 56°F
inlet press - 7psi
Sight tube - OK
412 = 16360180 } 143820
413 = 29636820 } 250130 = 561410
414 = 23023300 } 167460
7-13-98 DREWSPERSE @ 17.0
0620 SUMP PUMPED OUT
412 = 16363170
413 29642025
414 23026830

7-14-98
5:00 412 16396
~~413~~ 2970
414 2306

Comp
NO So
7-14-98 DREWSPER
0640 412 - ~~29705~~
413 - 29705
414 - 2306
7-15-98
0625 412 - 164
413 - 2976
414 - 2311
0640 DREWSPERSE
412 - 1643
7-15-98 413 - 2976
414 - 2311
7-16-98 all - ok
0545 412 = 16
413 = 29
414 = 23
0630 DREWSPER
412 - 164
413 - 298
7-16-98 414 - 231
1615 SUMP PU
7-20-98 470
412 - 1661
413 - 3007
414 - 2331
Inlet Air T
WC - 18
Inlet H2
Inlet H2
Sump

7-14-98

5:00 412 16396700 — 36520
413 29701000 — 64,180
414 23065980 — 42,600

Comp Sampler Not Running
NO Sample 2cW

7-14-98 DREWSPERSE @ 16.0
0640 412 - ~~29705340~~ 16399560
413 - 29705340
414 - 23068920

7-15-98
0625 412 - 16435310 — 38610
413 - 29767610 — 66660
414 - 23110070 — 44170 — 149390

0640 DREWSPERSE @ 15.0
412 - 16435640
7-15-98 413 - 29768160 sample
414 - 23110480

7-16-98 all - ok
0545 412 = 16470425 — 35115
413 = 29828770 — 61160
414 = 23150450 — 40380 — 136655

0630 DREWSPERSE @ 14.0
412 - 16472230
413 - 29831810
7-16-98 414 - 23152540
1615 SUMP PUMPED OUT
7-20-98 470
412 - 16613875 - 142950
413 - 30077590 - 248820 — 553610
414 - 23312290 - 161840
Inlet Air Temp 71°F
WC -18
Inlet H2O Press 7 psi
Inlet H2O Temp 58°F
Sump + Sight OK

Pumped Sump
Drewsperse @ 1011

143,750

561410

7/20/98

13:13 System Shut down for Maint.
ISCO 2910 Halted (Resume on start)
412 = 16626490
413 = 30100418
414 = 23326885

1430 Restart System (maintenance completed - filters changed, drewsperse checked)

7-21-98 400
412 - 16646670 - 33295
413 - 30135680 - 58290 } 128865
414 - 23349770 - 37480
all gases ok

7-22-98 405
412 - 16682780 - 36110
413 - 30198755 - 63075 } 138490
414 - 23390075 - 40305
All gases ok

7-23-98 405
412 - 16718690 - 35910
413 - 30261530 - 62775 } 138110
414 - 23429500 - 39425
All gases ok

14:28
Drewsperse @ 7"
Sump Pumped
H_2O Temp = 58°F
a Press = 7 psig
Diff " = 18"
Inlet H_2O temp: 80°F
Sight tube ok

7-27-98 420A
412 - 16863400 - 144710
413 - 30514260 - 252730 } 560330
414 - 23592390 - 162890
Inlet Air Temp 73°F Inlet H_2O Press 7 PSI
W.C. -18 Inlet H_2O Temp 58°F
Sump + Sight Tube - OK Drewsperse @ 3½"

7-28-98
412 - 16
413 - 30
414 - 23
All p
Drewsp

7-29-98
412 - 16
413 - 30
414 - 23
All para

7-30-98
412 - 16
413 - 30
414 - 23
All para
Inlet H_2
" "
" Ai
Sys. Diff
monthly
412 = 16
413 = 3
414 = 23
Drewsp
Pumps S

7/30/98 Sump Pu
8-3-98 430 A
412 - 171
413 - 309
414 - 2386
Inlet Air
W.C. 18
Inlet H_2
Inlet H_2
Sump
8-3-98 DREWSP
Sump Pu

Maint.
(Resume on start)

rinse completed - filters
left in)

128565

139490

138110

0330

H2O Press 7 psi
H2O Temp 58°F
Drewsperse @ 3½"

7-28-98 420
412 - 16899620 - 36220
413 - 30577500 - 63240 } 139945
414 - 23632775 - 40385
All para's OK
Drewsperse @ ≈ 2½"
7-29-98 425
412 - 16935825 - 36305
413 - 30640930 - 63430 } 140110
414 - 23673150 - 40375
All para's OK
7-30-98 410
412 - 16971550 - 35625
413 - 30703120 - 62190 } 136580
414 - 23711915 - 38765
All para's OK
Inlet H2O temp = 58°F
" " Press = 7psig
" Air Temp = 70°F
Sys. Diff Press. = 18" WC
monthly measures:
412 = 16976940 ≈ 45 gpm
413 = 30712525 ≈ 26 gpm
414 = 23717700 ≈ 29 gpm
Drewsperse < 1" Changed to partial Drum 14½"
Pumps Shut off for Approx 10 min
7/30/98 SUMP PUMPED OUT @ 1600
8-3-98 430 A
412 - 17116655 - 145105
413 - 30956360 - 253240 } 550530
414 - 23863100 - 151185
Inlet Air Temp 69°F
W.C. 18
Inlet H2O press - 7 psi
Inlet H2O Temp - 58°F
Sump + Sight OK
8-3-98 DREWSPERSE at 11¾"
SUMP PUMPED OUT @ 07:30

72

8-4-98 425

412 - 17152835 - 36180

413 - 31019420 - 63060 > 134930

414 - 23858790 - 35690

All para's - OK

8-5-95 400

412 - 17188730 - 35895

413 - 31081960 - 62540 > 132885

414 - 23933240 - 34450

All paras OK

8/6/98 DREWSPERSE @ 9 3/4"

8-6-95 410

412 - 17225290 - 36560

413 - 31145625 - 63665 > 134715

414 - 23867730 - 34490

All para's OK

inlet H2O Temp = 58°F

" " Press = 6.5 psig

" Air Temp = 70°F

Stripper Diff Press = 18" wc

Sight tube + Sump ok

412 = Approx 27 gpm

413 = 45

414 = 29

DREWSPERSE @ 8½"

8-6-98 SUMP PUMPED @ 14:50

8-9-98 1000 Total flow 432210

412 - 117590

413 - 205190

414 - 113430

8-10-98 435

412 - 17369120 - 26240

413 - 31346575 - 45760 > 97275

414 - 24106435 - 25275

8/10-98 14:35

8-11-98 3

412 -

413 -

414 -

All

DREW

14:45 Inlet

"

"

Strip

Sign

8-12-98

412 -

413 -

414 -

All

14:45 DREW

8-13-98

412 -

413 -

414 -

All

8-13-98

1100

8-10-98 Inlet Air Temp 72° F
U.C. 18 Inlet H_2O Press. 7 psi
Inlet H_2O Temp 58° F
Sump needs pumped Sight-o K
Drewsperse @ 5"

134930

SUMP PUMPED @ 08:00
8/10-98 DREWSPERSE @ 4½"
14:45

132885

8-11-98 355
412 - 17404590 - 35470
413 - 31458265 - 64690 } 131295
414 - 24140570 - 34135
All PALAS OK

134715

DREWSPERSE @ 3½"
14:45 INLET H20 TEMP = 58
" " PRESS = 7 psig
" AIR TEMP = 78
STRIPPER DIN PRESS = 18"
SIGHT TUBE & SUMP OK
8-12-98 415
412 - 17441580 - 36990
413 - 31522955 - 64690 } 137220
414 - 24176110 - 35540
All PALAS OK
14:45 DREWSPERSE @ 2½"
8-13-98 350
412 - 17477200 - 35620
413 - 31585085 - 62130 } 131570
414 - 24209930 - 33820
All PALAS OK
8-13-98 Shut down Air Sparge & ~~DER~~
1100 Stripper for maint. Change
Drewsperse.

97275

8/13/98 14:23

412 = 17492566 ≈ 25 gpm

413 = 31611885 ≈ 45 gpm

414 = 24224580 ≈ 28 gpm

H_2O Influent Temp = 58°F

" " Press = 6.75 psig

Air " Temp = 79.5°F

Diff Press = 18" H_2O Col

Sump = empty (Pumped)

Sight tube = ok (above or @ mid mark)

Drewsperse = freshly changed @ 29.5" + some in bucket

8-16-98

412 - 17589940 - 112740

413 - 31781930 - 196845) 415125

414 - 24315470 - 105540

All gages OK

8-17-98 430

412 - 17622925 - 32985

413 - 31835480 - 57550) 120255

414 - 24345190 - 29720

Inlet Air Temp 70°F

WC -18

Inlet H_2O Press 6 3/4 psi

Inlet H_2O Temp 58°F

Sump + Sight Tube - OK

SUMP PUMPED @ 08:10

DREWSPERSE @ 25 3/4"

412 = APPROX 27 gpm

413 = 45

414 = 26

8-18-98 400

412 - 17658620 - 35695

413 - 31901755 - 62275) 129540

414 - 24376760 - 31570

All gages OK

DREWSPERSE @ 24 1/2"

8-19-98 400

412 - 176

413 - 3194

414 - 2440

All gages

DREWSPER

8-20-98 300

412 - 1773

413 - 3202

414 - 2443

All gag

08:10 INLET H

" "

STRIPPER

INLET AIR

SIGHT TU

412 = A

413 =

414 =

DREWSPE

DREWSP

14:45 DREWSP

SUMP

8-24-98 430

412 - 178

413 - 322

414 - 2455

Inlet air

WC 1

Inlet H_2O

Inlet H_2O

07:40 412 = AP

413 =

414 =

SUMP PUM

DREWSPERS

8-19-98 400

412 - 17695175 - 36555

413 - 31965485 - 63730 } 131825

414 - 24408300 - 31540

All pumps OK

DREWSPERSE @ 23¼"

8-20-98 300

412 - 17730245 - 35070

413 - 32026655 - 61170 } 125970

414 - 24438030 - 29730

All pumps - OK

08:10 INLET H2O TEMP = 58

" " PRESS = 6.5 psig

STRIPPER DIH PRESS = 18

INLET AIR TEMP = 70 °F

SIGHT TUBE = OK (@ MID MARK)

412 = APPROX 27 gpm

413 = 45

414 = 23

DREWSPERSE @ 22¾

DREWSPERSE @ 22¼ ADDED 5 GAL.

14:45 DREWSPERSE @ 25"

SUMP PUMPED

8-24-98 430

412 - 17878535 - 148290

413 - 32284680 - 258025 } 525250

414 - 24556865 - 168935

Inlet Air Temp 73°F

WC 17¾ Supply Sight Tube-OK

Inlet H2O press 6½ psi

Inlet H2O Temp 58°F

07:40 412 = APPROX 28 gpm

413 = 45

414 = 22

SUMP PUMPED

DREWSPERSE @ 21½"

5 gpm

8 gpm

psig

F

@ mid mark)

29.5" + some in bucket

} 415125

} 120255

28:10

pm

} 129540

8-25-98 400

412 - 17914480 - 35945

413 - 32347150 - 62470 } 125 470

414 - 2458 4020 - 27055

All pans - ok

414 x 18 gpm

1600 System shut down for well maint. (AS)*

412: 17923453

413: 32362755

414: 24590676

1400 Sampler (ISCO) paused

Drewsperse @ 20.25" (New drum on std by)

8-26-98 400

412 - 17923453 - 8873

413 - 32362755 - 15605 } 31234

414 - 24590676 - 6656

Shutdown

8-27-98 400 System Shutdown

8:00 Monthly Measures

8-28-98 1130 System Start up *

Air Sparge point treatment

8-31-98 422

412 - 18021960 - 98507

413 - 32534540 - 171785 } 344311

414 - 24664695 - 74019

Inlet Air Temp 70° F

WC - 17 1/2

Inlet H_2O Press 6 psi

Inlet H_2O Temp 58° F

Sump + Sight tube ok

Drewsperse @ 17.5"

Sump pumped out

9-1-98 35

412 - 1

413 - 32

414 - 24

All pan

7:45

DREWSPERSE

9-2-98 4

412 -

413 - 3

414 - 2

All pan

9:31

Dr

15:46

9-3-98 35

412 - 1812

413 - 32

414 -

All pan

412 = A

413 =

414 =

DREWS

9-8-98 345

412 - 1

413 - 3

414 - 246

Inlet Air

W.C. 17

Inlet H_2O

Inlet H_2O

Sump S

08:10 DREWSPE

412 = APP

413 =

414 =

Sump

9-1-98 355

125470

412 - 18057820 - 35860

413 - 32596945 - 62405) 123250

414 - 24689680 - 24985

All gauges o/k

for well maint. (AS)*

7:45 well 414 shut off due to pump problem

DREWSPERSE @ 16¼"

9-2-98 400

412 - 18095990 - 38170

413 - 32662835 - 65890) 108178

414 - 24693798 - 4118

(new drum on std by)

All gauges o/k

9:31 Systems shut down for Maint by Terran (414)

31234

15:46 PVT restarted

9-3-98 350

412 - 18124060 - 28070

shutdown =

413 - 32711250 - 48415) 76485

414 - 0

All gauges o/k

412 = APPROX 27 gpm

413 = 46

414 = 0

start up *
treatment

DREWSPERSE @ 15"

9-8-98 345

34431

412 - 18314380 - 190320

413 - 33639590 - 328340) 518660

414 - 24693798 - 0

Inlet Air Temp 67°F

W.C. 17¼

Inlet H₂O Press 4¾ psi

Inlet H₂O Temp 58°F

Sump Sight tube o/k

08:10 DREWSPERSE @ 10"

412 = APPROX 28 gpm

413 = 47

414 = 0

SUMP PUMPED OUT

10:45 Tested Pump 414 - ok pumped well dry
Tested Level sensors - ok
11:55 Shut system down to check flow meter
12:15 Restarted 412 + 413

9-9-98 350
412 - 18351020 - 36640
413 - 33103170 - 63580) 120247
414 - 24705625 - 11827
All paras ok
414 Stops & Starts ? ok MB
Good observation! Has been looked into.
DREWSPERSE @ 9"

9-10-98 340
412 - 18387600 - 36580
413 - 33166910 - 63740) 120225
414 - 24725530 - 19905
All paras ok
DREWSPERSE @ 8"
SUMP PUMPED OUT

14:35
412 = APPROX 28 GPM
413 = 44
414 = 21

9-14-98 350
9-14-98 412
413
414
9-15-98 35
412 - 1
413 - 3
414 - 2
9-16-98 405
412 - 1
413 - 3
414 - 24
All
9:48
for
412
413
414
9-17-98 3
412 -
413 - 3
414 - 2
14:20 Sump
9-18-98 1355
9-21-98 Inlet
"
Inlet
Sight
Sump
412 -
413 -
414
13:40 DREWSPE
"

9-14-98 420
412 - 18535230 - 147630) 479465
413 - 33424255 - 257345
414 - 24800020 - 74490
Inlet Air Temp 68°F
W.C. 17%
Inlet H2O Press 5 psi
Inlet H2O Temp 58°F
Sump + Sight Tube OK
SUMP CHECKED OK
07:45 DREWSPERSE @ 4 1/4"

umped well Dry
-ok
=[illegible]eck flow meter

)112047

[illegible]s ? ok MB
been looked into.

)120225

)479465

9-14-98 412 = APPROX 27 gpm
413 = 44
414 = 18
9-15-98 355
412 - 13571370 - 36140
413 - 33487120 - 62865) 116060
414 - 24817075 - 17,055 All PARAS OK
9-16-98 405
412 - 18608260 - 36890
413 - 33551325 - 64205) 118230
414 - 24834210 - 17135
All PARAS - OK
9:48 Sampler Hautted Wells Shut down*
for treatment of 414 Screen
412 = 18,617,085
413 = 33,566,694
414 = 24,838,296
9-17-98 355
412 - 18617085 - 16825
413 - 33566795 - 15470) 36482
414 - 24838397 - 4187
14:20 SUMP CHECKED OK

9-18-98 1355 Restarted wells *
9-21-98 Inlet air 70°F.
" H_2O press 5 psi
Inlet air pass 18 W.C.
Sight tube - OK
Sump OK
412 - 18712560 - 95475
413 - 33734180 - 167385) 357085
414 24932625 - 94228
13:40 DREWSPERSE @ 25"
" @ 28" ADDED 5 GAL

9-22-98 0620 all OK
412 - 18748310 35750
413 - 33796650 62470 } 127925
414 - 24962330 29705
Inlet H2O temp = 58
0845 " " PRESS = 7 psig
STRIPPER DIH PRESS = 18
INLET AIR TEMP = 70°
SIGHT TUBE = OK (@ mid mark)
412 = APPROX 28 GAL PER MIN
413 = 45
414 = 32
DREWSPERSE @ 27¼"

09/23/98
0640 412 = 18784440 - 36130
413 = 33858710 - 62060 } 128285
414 = 24992425 - 30095
all - OK
1500 DREWSPERSE @ 26"

9-24-98
0640 ALL - OK
412 - 18820070 - 35630
413 - 33921145 - 62435 } 128930
414 - 25023290 - 30865
1550 DREWSPERSE @ 25¼" Down 4 hrs Maint.
SUMP PUMPED OUT
9-28-98 425
412 - 18956930 - 136860
413 - 34160420 - 239275 } 487716
414 - 25134871 - 111581
Inlet Air Temp 68°F Inlet H2O Temp 58°F
WC - 17¼ Sump + Sight - OK
Inlet H2O press 7 psi

9-28-98 07:30
9-29-98 07:12
9-30-98
9/30/98 1355
10-1-98
1355

412
413
414
DR
Su
412
413
414
A/
DR
98
412
413
414
A/
DR
1313
412
413
414
Inlet
Inlet
STRI
Inle
Sight
DREW
Sum
412
413
414
A
413
CHEC

127925

) mid mark)
per min

128285

128230

Down 4 hrs
Maint.

487716

Inlet H_2O Temp 58°
Temp & Sight - OK

9-28-98 412 = APPROX 27 GPM
07:30 413 = 45
414 = 32
DREWS PURGE @ 21¾"
SUMP CHECKED OK
9-29-98 355
412 - 18992315 - 35385
413 - 34222210 - 61790 } 124304
414 - 25162000 - 27129
All PARAS OK
07:12 DREWSPERSE @ 20¾"
9-30 98 355
412 - 19028230 - 35915
413 - 34285000 - 62790 } 126615
414 - 25189910 - 27910
All PARAS OK
DREWSPERSE @ 19¾"
9/30/98 13:30 MONTHLY MEASURES:
412 = 19045720 ≈ 27 gpm
413 = 34315615 ≈ 45 gpm
414 = 25203230 ≈ 32 gpm
Inlet H_2O Temp = 58
Inlet " PRESS = 7
STRIPPER DIA PRESS = 18
INLET AIR Temp = 80
Sight TUBE OK (above or @ mid mark)
DREWSPERSE @ 19½"
SUMP OK
10-1-98 410
412 - 19064610 - 36380
413 - 34348545 - 63545 } 126980
414 - 25217430 - 27520
All PARAS OK
1355 413 & 414 switched off for testing
CHECK SUMP OK

10-5-98-415
412 - 19208360 - 143750
413 - 34593380 - 244835) 507755
414 - 25338600 - 121170
Inlet Air Temp 66 °F
W.C. 18
Inlet H_2O Press 63/4 psi
Inlet H_2O Temp 58 °F
Sump + sight tube - OK
08:20 PUMPED SUMP OUT
DREWSPERSE @ 15 1/4"
412 = APPROX 28 2 GPM
413 = " 43
414 = 27
10-6-98 400
412 - 19243740 - 35380
413 - 34655300 - 61920) 128890
414 - 25370190 - 31590
All PARAS OK
DREWSPERSE @ 14 1/4"
10-7-98 410
412 - 19279915 - 36155
413 - 34718580 - 63280) 130865
414 - 25401600 - 31410
All PARAS OK
13:09 Drewsperse and Wells 412, 413, + 414 Shut off
for treatment of Air Sparge wells
412 = 19293167
413 = 34741773
414 = 25412915
Sampler & Blower left on due to potential
SVE H_2O intermitent influent.
Drewsperse @ 13"
SUMP PUMPED OUT

10-8-98 4
412 - 1
413 - 3
414 - 2
Syst
10-12-98
Syst
13:12
Drew
10-13-98
412 -
413 - 3
414 - 2
Inlet
W.C.
Inlet
Inlet
Sump
10-14-98 4
412 - 19
413 - 34
414 - 25
All para
@ 10:
@ 12:
10-15-98 350
412 - 19
413 - 34
414 - 25
All p
1330
13:51

	10-8-98 405
	412 - 19293167 - 13252
> 509755	413 - 34741773 - 23193 > 47760
	414 - 25412915 - 11315
	System Shut down
	10-12-98 415
	System Shutdown
	13:12 Restarted 412, 413, & 414
	Drew sparse @ 13.25"
	10-13-98 400
	412 - 19315155 - 21988
1	413 - 34786300 - 38527 > 83180
	414 - 25435580 - 22665
	Inlet Air Temp 64°F
	W.C. 18
	Inlet H_2O press 6.5 psi
> 128890	Inlet H_2O Temp 58°F
	Sump Sight - ok
	10-14-98 400
	412 - 19350880 - 35725
	413 - 34842820 - 62520 > 134725
	414 - 25472060 - 36480
> 130865	All pumps ok
	≈ 10:40 power Outage (Bird + Transformer = BOOM!
	≈ 12:14 Restart
+ 414 Shut off	10-15-98 350
Sparge wells	412 - 19383350 - 32470
	413 - 34899775 - 56955 > 122535
	414 - 25505170 - 33110
	All pumps - ok
due to potential	1330 System Shut down for Maint.
vent.	13:51 System Restarted Filters cleaned

10-19-98 400

412 - 19526470 - 14320

413 - 35150520 - 250745 } 524415

414 - 25635720 - 130550

Inlet Air Temp 62°F

WC 18

Inlet H_2O Press 6½ psi

Inlet H_2O Temp 58°F

Sump + Sight OK

Sump Checked OK

09:10 DREWSPERSE @ 7⅛"

412 = APP. 28 gpm

413 = 43

414 = 27

10-20-98 350A

412 - 19562330 - 35860

413 - 35213180 - 62660 } 129560

414 - 25646760 - 31040

All paras OK

DREWSPERSE @ 6¼"

10-21-98 400

412 - 19598590 - 36260

413 - 35276470 - 63290 } 130865

414 - 25698075 - 31315

All paras OK

DREWSPERSE 5¼"

10-22-98 305

412 - 19633380 - 34790

413 - 35337160 - 60690 } 124825

414 - 25727420 - 29345

All paras OK

Sump Checked OK

DREWSPERSE @ 4⅛"

10-26-98 42

412 - 1

413 - 3

414 - 25

Inlet

WC

Inlet

Inlet

Sump

412, 41

chan

Sump

10-27-98

412 19816 21

413 35656 1

414 - 25878

All p

DREWSPERS

412 =

413 =

414 =

10-28-98

412 - 19

413 - 3

414 - 2

All para

10-29-98 4

412 - 1

413 - 3

414 - 2

All pa

DREWSPERSE

412 = 19

413 = 35

414 = 25

Month

10-26-98 425

412 - 19781540 - 148160

45) 524415 413 - 35595490 - 258330) 529450

414 - 25550380 - 122960

Inlet Air Temp 56°F

WC - 18

Inlet H_2O Press 5 psi

Inlet H_2O Temp 58°F

Sump + Sight - OK

412, 413, 414 Shut Down 30 min for Drewsperse change @ 07:25

Sump CHECKED OK

10-27-98 400

412 19816215 - 34675

413 35656190 - 60700) 123505

414 - 25878310 - 27930

All paras OK

) 129560 DREWSPERSE @ 30½"

412 = APP. 27 gpm

413 = 46

414 = 26

10-28-98 355

) 130865 412 - 19852385 - 36170

413 - 35719255 - 63065) 128025

414 - 25907100 - 28790

All paras OK

10-29-98 410

412 - 19889965 - 36580

) 129825 413 - 35783125 - 63870) 128980

414 - 25935630 - 28530

All paras OK

DREWSPERSE @ 28¼"

412 = 19896430 ≈ 28 gpm

413 = 35796245 ≈ 44 " App.

414 = 25941435 ≈ 26 "

Monthly Measures

10/29/98 Inlet Air = 64
Stripper DIH Press = 18
Inlet H20 Temp = 58°
" " Press = 6 3/4 psig 11-9-98
Sight Tube = OK (@ mid mark) 412
Sump Checked OK 413
11-2-98 410 414
412 - 20033910 - 144945 Inl
413 - 36036080 - 252955 > 507235
414 - 26044965 - 109335 Inl
Inlet Air Temp 65°F Inl
WC 18 Su
Inlet H_2O Press 6 1/2 psi 08:30 Che
Intet H_2O Temp 58°F DREW
Sump + Sight OK 11-10-98
DREWS perse @ 24" 412
Checked Sump OK 413
11-2-98 400 414
412 - 20070165 - 36255 All
413 - 36099320 - 63240 > 126420 DRE
414 - 26071890 - 26925 11-11-98
All paras OK 412
11-4-98 350 413
412 - 20106280 - 36115 414
413 - 36162325 - 63005 > 125740 All
414 - 26098510 - 26620 DRE
All paras OK 412
Changed pump tubing 413
11-5-98 355 414
412 - 20142655 - 36375
413 - 36225840 - 63515 > 126585 Inle
414 - 26125195 - 26685 STR.
All paras - OK Inle
" 11
2:05 System shut down for water level Sign
measurements MBY
2:45 well 0413 on w/ blower

4:20 SYSTEM BACK ON FULL

MMY

11-9-98 426

MARK)

412 - 20285290 - 142635

413 - 36478615 - 252775 > 500370

414 - 26230155 - 104960

Inlet Air Temp 65°F

> 507235

WC 18

Inlet H_2O Press 4 3/4 psi

Inlet H_2O Temp 55°F

Sump & Sight - OK

08:30 Checked Sump OK

DREWSPERSE @ 17"

11-10-98 400

412 - 20320900 - 35610

413 - 36540780 - 62165 > 123115

414 - 26295495 - 25340

All gauges - OK

> 126420

DREWSPERSE @ 16"

11-11-98 410

412 - 20357500 - 36600

413 - 36604490 - 63710 > 125825

414 - 26281010 - 25515

> 125740

All gauges OK

DREWSPERSE @ 15"

412 = APP 27 gpm

413 = 47

414 = 23

> 126585

INLET AIR = 63

STRIPPER DIFF Press = 18

INLET H_2O Temp = 58°

" " Press = 6 3/4 psig

FOR MARK CHECK

SIGHT TUBE = OK (@ mid mark)

[redacted]

88

11-12-98 400
412 - 20393750 - 36250
413 - 36667535 - 63045) 124710
414 - 26306425 - 25415
All paras OK
DREWSPERSE = @ 14"
Sump Checked = OK

11-16-98 400
412 - 20539515 - 145765
413 - 36199750 - 252,215) 497345
414 - 26405790 - 99365
Inlet Air Temp 61°F
WC - 18
Inlet H_2O Press - 6½ psi
Inlet H_2O Temp - 58°F
Sump + Sight - OK
DREWSPERSE = @ 10"
Sump Checked = OK

11-17-98 355
412 - 20576185 - 36670
413 - 36582665 - 62,915) 121,805
414 - 26428010 - 22,220
All paras OK
DREWSPERSE = @ 9"
412 = APP 27 GPM
413 = 46
414 = 24
INLET AIR = 62
STRIPPER DIA PRESS = 18
INLET H20 TEMP = 58°
" " PRESS = 6½
SIGHT TUBE = OK (@ mid MARK)

11-18-98 400
412 - 20612670 - 36485
413 - 37045285 - 62620) 121,745
414 - 26450650 - 22640
All PARAS OK
DREWSPERSE = @ 8"

11-19-98 300
412 - 206478
413 - 37105610
414 - 2647278
All paras c
DREWSPERSE =
Sump Checked =

11-23-98 430
412 - 20796
413 - 373605
414 - 2655 54
Inlet Air T
WC - 18
Inlet H_2O T
Inlet H_2O T
Sump + Sig
Sump Checked
DREWSPERSE =
412 = APP.
413 =
414 =
INLET AIR
STRIPPER DIA
INLET H20 T
" " P
Sight Tube
412 = 20804
413 = 3737
414 = 2656
~~MONTHLY MA~~
Added Remo

11-23
09:40

11-24-98 350
412 - 2083244
413 - 3742206
414 - 2657785
All PARAS
DREWSPERSE =

11-19-98 300

412 - 20647800 - 35130

413 - 37105610 - 60325 } 117585

414 - 26472780 - 22130

All gages OK

DREWSPERSE = @ 7"

Sump Checked = OK

11-23-98 430

412 - 20796500 - 148700

413 - 37360500 - 254890 } 490250

414 - 26559440 - 86,660

Inlet Air Temp 60°F

WC - 18

Inlet H_2O Press 4 3/4 psi

Inlet H_2O Temp 58°F

Sump + Sight - OK

Sump Checked = OK

11-23 DREWSPERSE = @ 2 3/4"

412 = APP. 27 GPM

09:40 413 = 45

414 = 21

Inlet Air = 62

Stripper Dia Press = 18

Inlet H20 Temp = 58

" " Press = 6½

Sight Tube = OK (@ mid mark)

412 = 20804790

413 = 37374570

414 = 26563670

~~MONTHLY MEASURES~~ MRS

Added Remainder in Bucket Drewsperse = 3½"

11-24-98 350

412 - 20832445 - 35945

413 - 37422065 - 61565 } 115920

414 - 26577850 - 18410

All gages OK

DREWSPERSE = @ 2 3/4"

124710

497345

121,805

(@ mid mark)

121,745

11/24/98 11:00 SYSTEM SUT down FOR MAINT
15:10 SYSTEM RESTARTED Filters, Cleaned.
DREWSPERSE Changed @ this Time also.

11-25-98 400
412 - 20861950 - 29505
413 - 37472760 - 50695 } 96835
414 - 26594485 - 16635
All PARAS OK
DREWSPERSE = @ 30"

11-30-98 435
412 - 21046050 - 184100
413 - 37792730 - 319970 } 602600
414 - 26693015 - 98530
Inlet Air Temp 62°F
WC - 18
Inlet H_2O PRESS 5 psi
Inlet H_2O Temp 58°F
Sump & Sight - OK
DREWSPERSE @ 24¼
Sump Checked - OK

12-1-98 405
Monthly Measures
412 - 21082070 - 36020
413 - 37855320 - 62590 } 117,720
414 - 26712125 - 19110
All PARA'S OK
DREWSPERSE @ 23¼"

12-2-98 400
412 - 21118640 - 36570
413 - 37918815 - 63495 } 121150
414 - 26733210 - 21085
All PARAS OK
DREWSPERSE @ 22"
INLET AIR = 50°
STRIPPER DIA PRESS = 18
INLET H2O TEMP = 58°
" " PRESS = 6½
SIGHT TUBE = OK (@ mid MARK)

12/2/98 412 = APP
413 =
414 =

12-3-98 330
412 - 2115
413 - 3798
414 - 26753
All PARAS
DREWSPERSE
ADDED RE
SUMP Chec

12-6-98 730
412 2127
413 3818
414 2682

12-7-98 43
412 - 213
413 - 382
414 - 2684
Inlet A
WC -
Inlet H_2
Inlet H_2
Sump
DREWSPERSE
SUMP Check
14:00 System
14:30 System

12-8-98 400
412 - 2133
413 - 3829
414 - 2686
All para
DREWSPERSE

WN FOR MAINT
RTed FILTERS, Cleaned.
h TIME ALSO.

> 96835

> 602600

psi
=

1/4

> 117,720

12/15

mid MAR

12/2/98 412 = APP 27 GPM
413 = 45
414 = 24

12-3-98 330
412 - 21155190 - 36550
413 - 37982180 - 63365 > 119865
414 - 26753160 - 19950
All parts ok
DREWSPERSE @ 21"
ADDED REMAINDER IN BUCKET DREWSPERSE = @ 23 1/4
Sump Checked = OK

12-6-98 730
412 21270380 - 115180
413 38182740 - 200560 > 383440
414 26820850 - 67690

12-7-98 430
412 - 21301900 - 31520
413 - 38237580 - 54840 > 105970
414 - 26840360 - 19510
Inlet Air Temp -63 °F
WC - 16
Inlet H_2O press 5 psi
Inlet H_2O Temp 58°F
Sump + Sight OK
DREWSPERSE = @ 19 1/4"
Sump Checked = OK
* 14:00 System SHUT down for MAINT.
14:30 System RESTARTed

12-8-98 400
412 - 21337355 - 35455
413 - 38299390 - 61810 > 119145
414 - 26862240 - 21880
All parts ok
DREWSPERSE = @ 18"

12-9-98 405
412 - 21373855 - 36500
413 - 38362970 - 63580 } 122300
414 - 26884460 - 22220
All parms OK
DREWSPERSE = @ 16 3/4"

12-10-98 355
412 - 21410275 - 36420
413 - 39426345 - 63375 } 121395
414 - 26906060 - 21600
All parms OK
DREWSPERSE @ 15 3/4"
412 = APP. 28 GPM
413 = 47
414 = 28
Inlet AIR PRESS = 54
STRIPPER DIA PRESS = 18
Inlet H2O Temp = 58°
" " PMP = 6 3/4
Sight Tube = OK (@ MID MARK)
412 = 21416170
413 = 38436620
414 = 26909060
Sump CHECKED = OK

12-14-98 435
412 - 2155 6855 - 146580
413 - 3868140 - 255295 } 492270
414 - 26996455 - 90395
Inlet Air Temp 46° F
WC 18
Inlet H2O Press 6½ psi
Inlet H2O Temp 58 °F
Sump + Sight Tube - OK
DREWSPERSE = @ 11 3/4"
SUMP CHECKED = OK

12-15-98 40
412 - 21
413 - 38
414 - 27
All parm
DREWSPERSE

12-16-98 415
412 - 2162
413 - 38807
414 - 27041
All par
DREWSPER
412 = A
413 =
414 =
STRIPPER
INLET
"
Sight Tu
Inlet H

12-17-98 39
412 - 216
413 - 3887
414 - 270
All par
DREWSPERSE

12-21-98 410
412 - 2181
413 - 3912
414 - 27145
Inlet A
WC
Inlet H
Inlet
Sump +
DREWSPERSE
SUMP CH

12-15-98 405

412 - 21592730 - 35875

> 122300

413 - 38744125 - 62485 > 120965

414 - 27019060 - 22605

All paras OK

DREWSPERSE = @ 10 3/4"

12-16-98 415

412 - 21629340 - 36610

> 121385

413 - 38807920 - 62795 > 123275

414 - 27041930 - 22870

All paras OK

DREWSPERSE = @ (9 3/4")

412 = APP. 28 GPM

413 = 46

414 = 28

STRIPPER DIA PRESS = 18

INLET AIR = 46

" H2O TEMP = 58°

SIGHT TUB = OK (@ MID MARK)

D MARK)

INLET H2O PRESS = 6 3/4"

12-17-98 340

412 - 21645140 - 35860

413 - 38870300 - 62380 > 120175

414 - 27063925 - 21995

All paras OK

DREWSPERSE = @ 8 3/4"

49270

12-21-98 410

412 - 21812240 - 147100

413 - 39125950 - 255650 > 484,170

414 - 27145345 - 81,420

Inlet Air Temp 58°F

WC 18

Inlet H_2O Temp 58°F

Inlet H_2O press 5 psi

Sump + Sight tube OK

DREWSPERSE = @ 4 3/4"

SUMP CHECKED = OK

12-22-98 410
412 - 21848720 - 36,480
413 - 39189345 - 63,395 > 119,900
414 - 27165370 - 20,025
All fans OK
DREWSPERSE = @ 3 1/8"

12-23-98 405
412 - 21885050 - 36,330
413 - 39292480 - 63,135 > 124,175
414 - 27190080 - 24,710
All fans OK

12-23/98 412 = APP. 28 GPM
413 = 46
414 = 27
INLET AIR = 50°
STRIPPER DIA PRESS = 18
Inlet H2O Temp = 58
" " PRESS = 6 3/4
Sight TUBE = OK (@ mid MARK)
412 = 21892660
413 = 39265780
414 = 27195610
14:00 * DREWSPERSE = @ 2 1/4" Before Changing
DREWSPERSE = @ 28 3/4" After Changing.
SUMP CHECKED = OK

12-28-98
412 - 22071400 - 186,350
413 - 39576490 - 324,010 > 636,510
414 - 27316230 - 126,150
Inlet Air Temp 54°F
W C 18
Inlet H2O Press 5 psi
Inlet H2O Temp 58°F
Sump & Sight Tube - OK

12/30/98 07:05 Monthly Measures

12-29-9
412 -
413 -
414 -
All

12/30/98 DREW
412 :
413 :
414 :
Sum
Inle
STRIP
Inle
"
412
413
414
DREWS
12/31/98 Terr
1430
12/31/98 Sept
1-4-99 440
412 - 2
413 - 4
414 - 2
Inlet
W C
Inlet
Inlet
Sump
DREWSP
1-5-99 40
412 - 2
413 - 4
414 27
All

12-29-98 520
412 - 22106275 - 34875
413 - 39637260 - 60770 > 117980
414 - 27338565 - 22335
All gauges O/C

12/30/98 DREWSPERSE 21 3/4
07:05 412 = 22145520
413 = 39705660
414 = 27362130
Sump & Sight TUBE = OK (@ mid MARK)
Inlet AIR Temp = 50°F
STRIPPER DIA PRESS = 18
Inlet H20 Temp = 58°F
" " PRESS = 6 3/4 psi
412 = APP. 27 GPM
413 = 46
414 = 28
DREWSPERSE = @ 25 1/4" ADDED REMAINDER IN BUCKET

12/31/98 Terran service on SVE system
1430 shut down.
12/31/98 System turned back on 1530

1-4-99 440
412 - 22322590 - 174480
413 - 40014900 - 304760 > 582070
414 - 27466450 - 102830
Inlet Air Temp - 47°F
WC - 18
Inlet H0 press 6 1/2 psi
Inlet H20 Temp 58°F
Sump + Sight OK
DREWSPERSE = @ 22 3/4"

1-5-99 400
412 - 22358260 - 35670
413 - 40077035 - 62135 > 116765
414 - 27485410 - 18960
All gauges - OK

> 119,900

30
35 > 124175
10

(@ mid MARK)

2 1/4" Before Changing
3 3/4" After Changing

> 636510

51

OK

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-007/98
January 8, 1998

98-TC/01-08

Director, Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.6)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Brown:

Attached are copies of Environmental Restoration's Operable Unit 1 (OU1) Authorization to Discharge monitoring results for December 1997. This report was prepared by staff under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and complete. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P.O. Box 1049
Columbus, OH 43266-1049

There were no exceptions for the month of December. All parameters were within their specified limits as imposed by the Ohio EPA. Please note that the toxicity report is included with the monthly report forms to be submitted to the OEPA. This report also requires your signature, in addition to the monthly report forms.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/ddh

Enclosures

cc: DCC
Ron H. Church

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

MONTHLY REPORT FORM

4500

U.S. DEPARTMENT OF ENERGY 1IN90010003 DEC 1997 1 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C
MIAMISBURG 45343 MONTGOMERY

FORM

						MOUND		DENISE HESS		
	1	3	3	2	2	3	2	2	2	2
	999	1	1	48	48	1	48	48	48	3
	CONDUIT FLOW MGD	PH S.U.	DO mg/L	DSS mg/L	TSS mg/L	CBOD 5 Day mg/L	Hg Tot Rec ug/L	Se Tot Rec ug/L	Ag Tot Rec ug/L	BIS PHTHAL ug/L
	50050	00400	00300	70301	00530	80082	99992	00981	01079	39100
01	0.138					AA				
02	0.137			594.0	2.1		AA	AA	AA	AA
03	0.113									
04	0.139	7.9	10.8							
05	0.139									
06	0.138									
07	0.102									
08	0.089									
09	0.137						AA			
10	0.142									
11	0.124	7.7	10.3							
12	0.123									
13	0.123									
14	0.123									
15	0.129			614.0	AA					
16	0.148						AA			
17	0.138									
18	0.134	7.6	10.7							
19	0.134									
20	0.135									
21	0.135									
22	0.135						AA			
23	0.134	7.6	10.8							
24	0.135									
25	0.135									
26	0.135									
27	0.135									
28	0.135									
29	0.074									
30	0.074									
31	0.074									
	3.886	30.8	42.6	1208.0	2.1	AA	AA	AA	AA	AA
	0.125	7.7	10.6	604.0	1.1	AA	AA	AA	AA	AA
	0.148	7.9	10.8	614.0	2.1	AA	AA	AA	AA	AA
	0.074	7.6	10.3	594.0	AA	AA	AA	AA	AA	AA

AA: Suspended Solids < 1 mg/L; CBOD5 < 4 mg/L.
Mercury < 0.2 ug/L; Silver < 40 ug/L; Selenium < 100 ug/L.
Bis (2-Ethylhexyl) phthalate < 5 ug/L.

REPORTER

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 DEC 1997 2 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY

FORM

	2 48 Cr Tot Rec ug/L	2 48 Cu Tot Rec ug/L	2 48 Ni Tot Rec ug/L	2 48 Pb Tot Rec ug/L	2 48 Zn Tot Rec ug/L	MOUND 2 48 ACUTE TOX CERIODA TUa	2 48 CHRONIC TOX CERIODA TUc	DENISE HESS 2 48 ACUTE TOX PIMEPHA TUa	2 48 CHRONIC TOX PIMEPHA TUc
	99985	99989	99984	99988	99983	61425	61426	61427	61428
01									
02	AA	AA	AA	AA	AA				
03									
04									
05									
06									
07									
08	AA	AA	AA	AA	AA				
09									
10									
11									
12								AA	AA
13									
14									
15									
16	AA	AA	AA	AA	AA				
17									
18									
19						AA	1.4		
20									
21									
22	AA	AA	AA	AA	AA				
23									
24									
25									
26									
27									
28									
29									
30									
31									
	AA	AA	AA	AA	AA	AA	1.4	AA	AA
	AA	AA	AA	AA	AA	AA	1.4	AA	AA
	AA	AA	AA	AA	AA	AA	1.4	AA	AA
	AA	AA	AA	AA	AA	AA	1.4	AA	AA

AA: Chromium, Copper, Nickel, Lead, Zinc < 15 ug/L.
Toxicity < 1.0 TU, Toxicity Report Enclosed.

REPORTER

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 DEC 1997 3 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI
MIAMISBURG 45343 MONTGOMERY

FORM

MOUND DENISE HESS

	3 1 CC14 ug/L	3 1 CHC13 ug/L	3 1 CH2C12 ug/L	3 1 C2C14 ug/L	3 1 CC13F ug/L	3 1 C2H3C13 ug/L	3 1 C2H2C12 ug/L	3 1 C2H3C1 ug/L	3 1 C2HC13 ug/L	3 1 C2H2C1 ug/L
	32102	32106	34423	34475	34488	34506	34546	39175	39180	46363
01										
02										
03	AA	AA	AA	AA	AA	AA	AA	AA	AA	A
04										
05										
06										
07										
08										
09										
10										
11										
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13										
14										
15										
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20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA

AA: Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) < 1

REPORTER

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
Miamisburg, Ohio 45343-3030

P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020
Fax: (937) 865-5445

ESC-043/98
February 10, 1998

98-TC/02-10

Director, Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.6)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Brown:

Attached are copies of Environmental Restoration's Operable Unit 1 (OU1) Authorization to Discharge monitoring results for January 1998. This report was prepared by staff under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and complete. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P.O. Box 1049
Columbus, OH 43266-1049

There were no exceptions for the month of January. All parameters were within their specified limits as imposed by the Ohio EPA.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/ddh

Enclosures

cc: DCC
Ron H. Church

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 JAN 1998 3 3 OH0009857

MOUND FACILITY
P.O. BOX 66
MIAMISBURG 45343 MONTGOMERY

003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI

FORM

MOUND DENISE HESS

	3	3	3	3	3	3	3	3	3	3
	1	1	1	1	1	1	1	1	1	1
	CCl4	CHCl3	CH2Cl2	C2Cl4	CCl3F	C2H3Cl3	C2H2Cl2	C2H3Cl	C2HCl3	C2H2Cl2
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	Carbon Tet	chloroform	Methylene chloride	Tetrachloroethene	Trichlorofluoromethane	1,1,1 Trichloroethane	trans + 1,2 dichloroethene	vinyl chloride	Trichloroethene	cis 1,2 Dichlorethene
	32102	32106	34423	34475	34488	34506	34546	39175	39180	46363
01										
02										
03										
04										
05										
06										
07	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
08										
09										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA

AA: Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) [illegible]

REPORTER

4500

:CNTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 JAN 1998 1 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY

FORM

	1 999 CONDUIT FLOW MGD	3 1 PH S.U.	3 1 DO mg/L	2 48 DSS mg/L	2 48 TSS mg/L	MOUND 3 1 CBOD 5 Day mg/L	2 48 Hg Tot Rec ug/L	DENISE HESS 2 48 Se Tot Rec ug/L	2 48 Ag Tot Rec ug/L
	50050	00400	00300	70301	00530	80082	99992	00981	01079
01	0.074								
02	0.074								
03	0.074								
04	0.074								
05	0.138			538.0	AA				
06	0.138	7.7	10.4			AA	AA	AA	AA
07	0.137								
08	0.142								
09	0.143								
10	0.143								
	0.143								
	0.144						AA		
	0.143	8.7	10.6						
14	0.145								
15	0.145								
16	0.144								
17	0.144								
18	0.144								
19	0.137			568.0	1.8		AA		
20	0.150	7.9	10.9						
21	0.031								
22	0.126								
23	0.126								
24	0.125								
25	0.125								
26	0.132						AA		
27	0.144	7.9	10.8						
28	0.140								
29	0.143								
30	0.143								
31	0.143								
	3.954	32.3	42.8	1106.0	1.8	AA	AA	AA	AA
	0.128	8.1	10.7	553.0	AA	AA	AA	AA	AA
	0.150	8.7	10.9	568.0	1.8	AA	AA	AA	AA
	0.031	7.7	10.4	538.0	AA	AA	AA	AA	AA

AA: Suspended Solids < 1.0 mg/L; CBOD5 < 4.0 mg/L.
Mercury < 0.2 ug/L; Silver < 40 ug/L; Selenium < 100 ug/L.

REPORTER

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 JAN 1998 2 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI
MIAMISBURG 45343 MONTGOMERY

FORM

MOUND DENISE HESS

	2	2	2	2	2
	48	48	48	48	48
	Cr	Cu	Ni	Pb	Zn
	Tot Rec	Tot Rec	Tot Rec	Tot Rec	Tot Rec
	ug/L	ug/L	ug/L	ug/L	ug/L
	99985	99989	99984	99988	99983
01					
02					
03					
04					
05					
06	AA	16	AA	AA	AA
07					
08					
09					
10					
11					
12	AA	18	AA	AA	AA
13					
14					
15					
16					
17					
18					
19	AA	20	AA	AA	AA
20					
21					
22					
23					
24					
25					
26	AA	AA	AA	AA	AA
27					
28					
29					
30					
31					
	AA	54	AA	AA	AA
	AA	AA	AA	AA	AA
	AA	20	AA	AA	AA
	AA	AA	AA	AA	AA

AA: Chromium, Copper, Nickel, Lead, Zinc < 15 ug/L.

REPORTER

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-067/98
March 10, 1998

98-TC/03-10

Director, Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.6)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Brown:

Attached are copies of Environmental Restoration's Operable Unit 1 (OU1) Authorization to Discharge monitoring results for February 1998. This report was prepared by staff under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and complete. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P.O. Box 1049
Columbus, OH 43266-1049

There were no exceptions for the month of February. All parameters were within their specified limits as imposed by the Ohio EPA. Please note that the toxicity report is included with the monthly report forms to be submitted to the OEPA. This report also requires your signature, in addition to the monthly report forms.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/ddh

Enclosures

cc: DCC
Ron H. Church

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 FEB 1998 1 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI
MIAMISBURG 45343 MONTGOMERY

FORM

						MOUND		DENISE HESS	
	1	3	3	2	2	3	2	2	2
	999	1	1	48	48	1	48	48	48
	CONDUIT FLOW	PH	DO	DSS	TSS	CBOD 5 Day	Hg Tot Rec	Se Tot Rec	Ag Tot Rec
	MGD	S.U.	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L
	50050	00400	00300	70301	00530	80082	99992	00981	01079
01	0.143								
02	0.143				1.2				
03	0.142	8.3	10.9				AA	AA	AA
04	0.145								
05	0.135								
06	0.135								
07	0.135								
08	AC								
09	AC								
10	0.095						AA		
11	0.127	7.8							
12	0.153								
13	0.152								
14	0.152								
15	0.122								
16	0.140								
17	0.133						AA		
18	0.140	8.							
19	0.142								
20	0.142								
21	0.143								
22	0.143								
23	0.141								
24	0.144	8.2					AA		
25	0.059								
26	0.125								
27	0.125								
28	0.124								
29									
30									
31									
	3.480	32.5	43.6	1656.0	2.4	AA	AA	AA	AA
	0.124	8.1	10.9	828.0	1.2	AA	AA	AA	AA
	0.153	8.3	11.1	1008.0	1.2	AA	AA	AA	AA
	0.000	7.8	10.7	648.0	1.2	AA	AA	AA	AA

OU 1

AA: CBOD5 < 4 mg/L.
Mercury < 0.2 ug/L; Silver < 0.5 ug/L; Selenium < 5.0 ug/L.

REPORTER

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 FEB 1998 2 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI (
MIAMISBURG 45343 MONTGOMERY

FORM

	2 48 Cr Tot Rec ug/L	2 48 Cu Tot Rec ug/L	2 48 Ni Tot Rec ug/L	2 48 Pb Tot Rec ug/L	2 48 Zn Tot Rec ug/L	MOUND 2 48 ACUTE TOX CERIODA TUa	2 48 CHRONIC TOX CERIODA TUc	DENISE HESS 2 48 ACUTE TOX PIMEPHA TUa	2 48 CHRONIC TOX PIMEPHA TUc
	99985	99989	99984	99988	99983	61425	61426	61427	61428
01									
02									
03	AA	AA	54	AA	AA				
04									
05									
06									
07									
08									
09									
10	AA	AA	38	AA	AA				
11									
12									
13									
14									
15						AA	1.4	AA	AA
16	AA	AA	33	AA	AA				
17									
18									
19									
20									
21									
22									
23									
24	AA	AA	46	AA	AA				
25									
26									
27									
28									
29									
30									
31									
	AA	AA	171	AA	AA	AA	1.4	AA	AA
	AA	AA	43	AA	AA	AA	1.4	AA	AA
	AA	AA	54	AA	AA	AA	1.4	AA	AA
	AA	AA	33	AA	AA	AA	1.4	AA	AA

AA: Chromium, Copper, Lead, Zinc < 15 ug/L.
Toxicity < 1.0 TU, toxicity report enclosed.

REPORTER

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 FEB 1998 3 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIA
MIAMISBURG 45343 MONTGOMERY FORM

MOUND DENISE HESS

	3 1 CCl4 ug/L	3 1 CHCl3 ug/L	3 1 CH2Cl2 ug/L	3 1 C2Cl4 ug/L	3 1 CCl3F ug/L	3 1 C2H3Cl3 ug/L	3 1 C2H2Cl2 ug/L	3 1 C2H3Cl ug/L	3 1 C2HCl3 ug/L	3 1 C2H2(ug/
	32102	32106	34423	34475	34488	34506	34546	39175	39180	4636
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12	AA	AA	AA	AA	AA	AA	AA	AA	AA	
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA

AA: Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) < 1

REPORTER

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-097/98
April 08, 1998

98-TC/04-08

Director, Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.2)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Brown:

Attached are copies of Operable Unit 1 (OU1) Authorization to Discharge monitoring results for March 1998. This report was prepared by staff under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and complete. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P.O. Box 1049
Columbus, OH 43266-1049

There were no exceptions for the month of March. All parameters were within their specified limits as imposed by the Ohio EPA.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/ddh

Enclosures

cc: DCC
Ron H. Church

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

ONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 MAR 1998 1 3 OH0009857

OUND FACILITY
.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C
MIAMISBURG 45343 MONTGOMERY

FORM

						MOUND		DENISE HESS		
	1	3	3	2	2	3	2	2	2	2
	999	1	1	48	48	1	48	48	48	3
	CONDUIT FLOW MGD	PH S.U.	DO mg/L	DSS mg/L	TSS mg/L	CBOD 5 Day mg/L	Hg Tot Rec ug/L	Se Tot Rec ug/L	Ag Tot Rec ug/L	BIS PHTHA ug/L
	50050	00400	00300	70301	00530	80082	99992	00981	01079	39100
01	0.124									
02	0.144				2.1					
03	0.147	8.1	11.2			AA	AA	AA	AA	A
04	0.143									
05	0.143			509.0						
06	0.142									
07	0.142									
08	0.142									
09	0.141									
10	0.141	8.1	11.3				AA			
11	0.144									
12	0.065									
13	AC									
14	AC									
15	AC									
16	AC									
17	AC									
18	0.049			631.0	7.2		AA			
19	0.142	8.3	10.9							
20	0.143									
21	0.143									
22	0.143									
23	0.142						AA			
24	0.143	8.2	11.2							
25	0.143									
26	0.142									
27	0.143									
28	0.143									
29	0.143									
30	0.144									
31	0.144	8.2	10.8				AA			
	3.525	40.9	55.3	1140.0	9.3	AA	AA	AA	AA	AA
	0.136	8.2	11.1	570.0	4.7	AA	AA	AA	AA	AA
	0.147	8.3	11.3	631.0	7.2	AA	AA	AA	AA	AA
	0.000	8.1	10.8	509.0	2.1	AA	AA	AA	AA	AA

: CBOD5 < 4 mg/L; Bis (2-Ethylhexyl) phthalate < 5 ug/L.
Mercury < 0.2 ug/L; Silver < 40 ug/L; Selenium < 100 ug/L.
AC: System shutdown for maintenance.

REPORTER

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 MAR 1998 2 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI
MIAMISBURG 45343 MONTGOMERY FORM

MOUND DENISE HESS

	2	2	2	2	2
	48	48	48	48	48
	Cr	Cu	Ni	Pb	Zn
	Tot Rec	Tot Rec	Tot Rec	Tot Rec	Tot Rec
	ug/L	ug/L	ug/L	ug/L	ug/L
	99985	99989	99984	99988	99983
01					
02					
03	AA	AA	18	83	AA
04					
05					
06					
07					
08					
09					
10	AA	AA	AA	AA	AA
11					
14					
15					
16					
17					
18	AA	AA	AA	AA	AA
19					
20					
21					
22					
23					
24	AA	AA	15	AA	AA
25					
26					
27					
28					
29					
30					
31	AA	AA	AA	AA	AA
	AA	AA	33	83	AA
	AA	AA	AA	17	AA
	AA	AA	18	83	AA
	AA	AA	AA	AA	AA

: Chromium, Copper, Nickel, Lead, Zinc < 15 ug/L.

REPORTER

CNTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 MAR 1998 3 3 OH0009857

OUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI
MIAMISBURG 45343 MONTGOMERY

FORM

					MOUND		DENISE HESS		
3	3	3	3	3	3	3	3	3	3
1	1	1	1	1	1	1	1	1	1
CC14	CHC13	CH2C12	C2C14	CC13F	C2H3C13	C2H2C12	C2H3C1	C2HC13	C2H2C1
ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
32102	32106	34423	34475	34488	34506	34546	39175	39180	46363
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
1									
1									
14									
15									
16									
17									
18									
19	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA

: Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) < 1

REPORTER

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-127/98
May 7, 1998

98-TC/05-07

Director, Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.2)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Brown:

Attached are copies of the Operable Unit 1 (OU1) Authorization to Discharge monitoring results for April. This report was prepared by staff under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and complete. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P.O. Box 1049
Columbus, OH 43266-1049

There were no exceptions for the month of April. All parameters were within their specified limits as imposed by the Ohio EPA. Please note that the toxicity report is included with the monthly report forms to be submitted to the OEPA. This report also requires your signature, in addition to the monthly report forms.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

LRBauer

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/rpp

Enclosures

cc: DCC
Ron H. Church

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 APR 1998 1 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI
MIAMISBURG 45343 MONTGOMERY

FORM

						MOUND		DENISE HESS	
	1	3	3	2	2	3	2	2	2
	999	1	1	48	48	1	48	48	48
	CONDUIT FLOW	PH	DO	DSS	TSS	CBOD 5 Day	Hg Tot Rec	Se Tot Rec	Ag Tot Rec
	MGD	S.U.	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L
	50050	00400	00300	70301	00530	80082	99992	00981	01079
01	0.144								
02	0.142								
03	0.141								
04	0.141								
05	0.141								
06	0.139			729.0	AA				
07	0.114	8.1	10.5			AA	AA	AA	AA
08	0.142								
09	0.151								
10	0.151								
11	0.151								
12	0.124								
	0.143								
	0.148	8.0	11.1				AA		
15	0.142								
16	0.149								
17	0.149								
18	0.148								
19	0.148								
20	0.144			718.0	1.0				
21	0.147	7.9	11.4				AA		
22	0.148								
23	0.148								
24	0.147								
25	0.147								
26	0.147								
27	0.145								
28	0.148	8.0	11.4				AA		
29	0.040								
30	0.137								
31									
	4.206	31.9	44.3	1447.0	1.0	AA	AA	AA	AA
	0.140	8.0	11.1	723.5	AA	AA	AA	AA	AA
	0.151	8.1	11.4	729.0	1.0	AA	AA	AA	AA
	0.040	7.9	10.5	718.0	AA	AA	AA	AA	AA

AA: Suspended Solids < 1 mg/L; CBOD5 < 4 mg/L.
Mercury < 0.2 ug/L; Silver < 40 ug/L; Selenium < 100 ug/L.

REPORTER

MONTHLY REPORT FORM

4500

U.S. DEPARTMENT OF ENERGY 1IN90010003 APR 1998 2 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY

FORM

	2 48 Cr Tot Rec ug/L	2 48 Cu Tot Rec ug/L	2 48 Ni Tot Rec ug/L	2 48 Pb Tot Rec ug/L	2 48 Zn Tot Rec ug/L	MOUND 2 48 ACUTE TOX CERIODA TUa	2 48 CHRONIC TOX CERIODA TUc	DENISE HESS 2 48 ACUTE TOX PIMEPHA TUa	2 48 CHRONIC TOX PIMEPHA TUc
	99985	99989	99984	99988	99983	61425	61426	61427	61428
01	AA	AA	AA	16	AA				
02									
03									
04									
05									
06									
07	AA	AA	AA	AA	AA				
08									
09									
10									
11									
12						AA	1.4	AA	AA
13									
14	AA	AA	23	AA	AA				
15									
16									
17									
18									
19									
20									
21	AA	AA	19	AA	AA				
22									
23									
24									
25									
26									
27									
28	AA	AA	16	AA	AA				
29									
30									
31									
	AA	AA	58	16	AA	AA	1.4	AA	AA
	AA	AA	AA	AA	AA	AA	1.4	AA	AA
	AA	AA	23	16	AA	AA	1.4	AA	AA
	AA	AA	AA	AA	AA	AA	1.4	AA	AA

AA: Chromium, Copper, Nickel, Lead, Zinc < 15 ug/L.
Tu < 1.0; Toxicity Report Enclosed.

REPORTER

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 APR 1998 3 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIA
MIAMISBURG 45343 MONTGOMERY

FORM

MOUND DENISE HESS

	3 1 CC14 ug/L	3 1 CHC13 ug/L	3 1 CH2C12 ug/L	3 1 C2C14 ug/L	3 1 CC13F ug/L	3 1 C2H3C13 ug/L	3 1 C2H2C12 ug/L	3 1 C2H3C1 ug/L	3 1 C2HC13 ug/L	3 1 C2H2C ug/
	32102	32106	34423	34475	34488	34506	34546	39175	39180	4636
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										
15	AA	AA	AA	AA	AA	AA	AA	AA	AA	
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
	AA	AA	AA	AA	AA	AA	AA	AA	AA	A
	AA	AA	AA	AA	AA	AA	AA	AA	AA	A
	AA	AA	AA	AA	AA	AA	AA	AA	AA	A
	AA	AA	AA	AA	AA	AA	AA	AA	AA	A

AA: Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) <

REPORTER

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-155/98
June 8, 1998

98-TC/06-08

Director, Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.2)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Brown:

Attached are copies of the Operable Unit 1 (OU1) Authorization to Discharge monitoring results for May. This report was prepared by staff under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and complete. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P.O. Box 1049
Columbus, OH 43266-1049

There were no exceptions for the month of May. All parameters were within their specified limits as imposed by the Ohio EPA.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/rpp

Enclosures

cc: DCC
Ron H. Church

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 MAY 1998 1 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY

FORM

						MOUND		DENISE HESS	
	1	3	3	2	2	3	2	2	2
	999	1	1	48	48	1	48	48	48
	CONDUIT FLOW	PH	DO	DSS	TSS	CBOD 5 Day	Hg Tot Rec	Se Tot Rec	Ag Tot Rec
	MGD	S.U.	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L
	50050	00400	00300	70301	00530	80082	99992	00981	01079
01	0.137								
02	0.137								
03	0.137								
04	0.143								
05	0.145	8.2	11.0			AA	AA	AA	AA
06	0.144								
07	0.147								
08	0.147								
09	0.147								
10	0.147								
11	0.143								
12	0.146	8.1	10.8	707.0	AA		AA		
13	0.140								
14	0.147								
15	0.147								
16	0.148								
17	0.148								
18	0.142								
19	0.143	8.0	11.0				AA		
20	0.146								
21	0.145								
22	0.145								
23	0.145								
24	0.144								
25	0.144								
26	0.144	8.0	11.1				AA		
27	0.145			643.0	AA				
28	0.145								
29	0.145								
30	0.144								
31	0.144								
	4.471	32.4	43.8	1350.0	AA	AA	AA	AA	AA
	0.144	8.1	11.0	675.0	AA	AA	AA	AA	AA
	0.148	8.2	11.1	707.0	AA	AA	AA	AA	AA
	0.137	8.0	10.8	643.0	AA	AA	AA	AA	AA

AA: Suspended Solids < 1 mg/L; CBOD < 4 mg/L.
Mercury < 0.2 ug/L; Silver < 40 ug/L; Selenium < 100 ug/L.

REPORTER

MONTHLY REPORT FORM

4500

U.S. DEPARTMENT OF ENERGY 1IN90010003 MAY 1998 2 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY FORM

MOUND DENISE HESS

	2 48 Cr Tot Rec ug/L	2 48 Cu Tot Rec ug/L	2 48 Ni Tot Rec ug/L	2 48 Pb Tot Rec ug/L	2 48 Zn Tot Rec ug/L
	99985	99989	99984	99988	99983
01					
02					
03					
04					
05	AA	AA	28	AA	AA
06					
07					
08					
09					
10					
11					
12	AA	AA	AA	18	AA
13					
14					
15					
16					
17					
18					
19	AA	AA	27	AA	AA
20					
21					
22					
23					
24					
25					
26	AA	AA	46	AA	AA
27					
28					
29					
30					
31					
	AA	AA	101	18	AA
	AA	AA	25	AA	AA
	AA	AA	46	18	AA
	AA	AA	AA	AA	AA

AA: Chromium, Copper, Nickel, Lead, Zinc < 15 ug/L.

REPORTER

4500

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 MAY 1998 3 3 OH0009857

MOUND FACILITY
P.O. BOX 66
MIAMISBURG 45343 MONTGOMERY

003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.

FORM

MOUND DENISE HESS

	3 1 CC14 ug/L	3 1 CHC13 ug/L	3 1 CH2C12 ug/L	3 1 C2C14 ug/L	3 1 CC13F ug/L	3 1 C2H3C13 ug/L	3 1 C2H2C12 ug/L	3 1 C2H3C1 ug/L	3 1 C2HC13 ug/L	3 1 C2H2C12 ug/L
	32102	32106	34423	34475	34488	34506	34546	39175	39180	46363
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										
13	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
14										
15										
16										
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19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA

AA: Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) < 1 u

REPORTER

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-175/98
July 9, 1998

98-TC/07-09

Director, Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.2b)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Brown:

Attached are copies of the Operable Unit 1 (OU1) Authorization to Discharge monitoring results for June. This report was prepared by staff under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and complete. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P.O. Box 1049
Columbus, OH 43266-1049

There were no exceptions for the month of June. However, "AH" (sample not taken) was reported for mercury on June 16, 1998. The sample was lost by the contract laboratory. All other parameters were within their specified limits as imposed by the Ohio EPA.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/rpp

Enclosures

cc: DCC
Ron H. Church

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

MONTHLY REPORT FORM

4500

U.S. DEPARTMENT OF ENERGY 1IN90010003 JUN 1998 1 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY FORM

	1	3	3	2	2	MOUND 3	2	DENISE HESS 2	2
	999	1	1	48	48	1	48	48	48
	CONDUIT FLOW	PH	DO	DSS	TSS	CBOD 5 Day	Hg Tot Rec	Se Tot Rec	Ag Tot Rec
	MGD	S.U.	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L
	50050	00400	00300	70301	00530	80082	99992	00981	01079
01	0.140								
02	0.145	8.2	11.0			7.0	AA	AA	AA
03	0.142								
04	0.146								
05	0.146								
06	0.146								
07	0.146								
08	0.104			700.0	1.0				
09	0.143	8.2	9.8				AA		
10	0.141								
11	0.092								
12	0.092								
13	0.092								
14	0.092								
15	0.147								
16	0.146	8.2	10.3				AH		
17	0.146								
18	0.144								
19	0.143								
20	0.143								
21	0.143								
22	0.248								
23	0.157	8.2	10.3	676.0	AA		AA		
24	0.132								
25	0.145								
26	0.145								
27	0.145								
28	0.145								
29	0.134								
30	0.144	7.9	10.1				AA		
31									
	4.174	40.7	51.6	1376.0	1.0	7.0	AA	AA	AA
	0.139	8.1	10.3	688.0	AA	7.0	AA	AA	AA
	0.248	8.2	11.0	700.0	1.0	7.0	AA	AA	AA
	0.092	7.9	9.8	676.0	AA	7.0	AA	AA	AA

AA: Suspended Solids < 1.0 mg/L.
Mercury < 0.2 ug/L; Silver < 40 ug/L; Selenium < 100 ug/L.
AH: Mercury sample for 6/16 was lost by the contractor laboratory.

REPORTER

MONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 JUN 1998 2 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY

FORM

	2 48 Cr Tot Rec ug/L	2 48 Cu Tot Rec ug/L	2 48 Ni Tot Rec ug/L	2 48 Pb Tot Rec ug/L	2 48 Zn Tot Rec ug/L	MOUND 2 48 ACUTE TOX CERIODA TUa	2 48 CHRONIC TOX CERIODA TUc	DENISE HESS 2 48 ACUTE TOX PIMEPHA TUa	2 48 CHRONIC TOX PIMEPHA TUc	2 3 BIS PHTHAL ug/L
	99985	99989	99984	99988	99983	61425	61426	61427	61428	39100
01										
02	AA	AA	37	AA	AA					
03										
04										
05										
06										
07										
08										
09	AA	AA	43	AA	AA					
10										
11										
12										
13										
14										
15										AA
16	AA	AA	53	AA	AA					
17										
18										
19										
20										
21										
22						AA	AA	AA	AA	
23	AA	AA	41	AA	AA					
24										
25										
26										
27										
28										
29										
30	AA	AA	48	AA	AA					
31										
	AA	AA	222	AA	AA	AA	AA	AA	AA	AA
	AA	AA	44	AA	AA	AA	AA	AA	AA	AA
	AA	AA	53	AA	AA	AA	AA	AA	AA	AA
	AA	AA	37	AA	AA	AA	AA	AA	AA	AA

AA: Chromium, Copper, Lead, Zinc < 15 ug/L.
Toxicity Report Enclosed.
Bis (2-Ethylhexyl) phthalate < 5 ug/L.

REPORTER

MONTHLY REPORT FORM

4500

U.S. DEPARTMENT OF ENERGY 1IN90010003 JUN 1998 3 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI
MIAMISBURG 45343 MONTGOMERY

FORM

MOUND DENISE HESS

	3 1 CCl4 ug/L	3 1 CHCl3 ug/L	3 1 CH2Cl2 ug/L	3 1 C2Cl4 ug/L	3 1 CCl3F ug/L	3 1 C2H3Cl3 ug/L	3 1 C2H2Cl2 ug/L	3 1 C2H3Cl ug/L	3 1 C2HCl3 ug/L	3 1 C2H2Cl2 ug/L
	32102	32106	34423	34475	34488	34506	34546	39175	39180	46363
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA

AA: Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) < 1 ug

REPORTER

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-192/98
August 10, 1998

98-TC/08-10

Acting Director, Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Aurthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.2b)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Folker:

Attached are copies of the Operable Unit 1 (OU1) Authorization to Discharge monitoring results for July. This report was prepared by staff under my supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and accurate. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P. O. Box 1049
Columbus, Ohio 43266-1049

There were no exceptions for the month of July. All parameters were within their specified limits as imposed by the Ohio EPA.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/rpp

Enclosures

cc: DCC
Ron H. Church

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

NTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 JUL 1998 1 3 OH0009857

UND FACILITY
O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY FORM

						MOUND		DENISE HESS	
	1	3	3	2	2	3	2	2	2
	999	1	1	48	48	1	48	48	48
	CONDUIT FLOW MGD	PH S.U.	DO mg/L	DSS mg/L	TSS mg/L	CBOD 5 Day mg/L	Hg Tot Rec ug/L	Se Tot Rec ug/L	Ag Tot Rec ug/L
	50050	00400	00300	70301	00530	80082	99992	00981	01079
01	0.143								
02	0.159								
03	0.159								
04	0.158					AA			
05	0.158								
06	0.090								
07	0.144	8.2	10.2		AA		AA	AA	AA
08	0.144								
09	0.141								
10	0.140								
11	0.140								
12	0.140			670.5					
13	0.143								
14	0.149	8.1	9.3		AA		AA		
15	0.137								
16	0.139								
17	0.139								
18	0.138								
19	0.138								
20	0.129								
21	0.139	7.9	10.3		AA		AA		
22	0.138								
23	0.140			727.0					
24	0.140								
25	0.140								
26	0.140								
27	0.140								
28	0.140	7.9	11.3				AA		
29	0.137								
30	0.138								
31	0.138								
	4.358	32.1	41.1	1397.5	AA	AA	AA	AA	AA
	0.141	8.0	10.3	698.8	AA	AA	AA	AA	AA
	0.159	8.2	11.3	727.0	AA	AA	AA	AA	AA
	0.090	7.9	9.3	670.5	AA	AA	AA	AA	AA

: Suspended Solids < 1.0 mg/L; CBOD5 < 4.0 mg/L.
Mercury < 0.2 ug/L; Silver < 40 ug/L; Selenium < 100 ug/L.

REPORTER

THLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 JUL 1998 2 3 OH0009857

MOUND FACILITY
. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY

FORM

MOUND DENISE HESS

2	2	2	2	2
48	48	48	48	48
Cr	Cu	Ni	Pb	Zn
Tot Rec	Tot Rec	Tot Rec	Tot Rec	Tot Rec
ug/L	ug/L	ug/L	ug/L	ug/L
99985	99989	99984	99988	99983
AA	AA	AA	AA	AA
AA	AA	AA	AA	AA
AA	AA	AA	43	AA
AA	AA	AA	AA	AA
AA	AA	AA	43	AA
AA	AA	AA	AA	AA
AA	AA	AA	43	AA
AA	AA	AA	AA	AA
AA	AA	AA	43	AA
AA	AA	AA	AA	AA

AA: Chromium, Copper, Nickel, Lead, Zinc < 15 ug/L.

REPORTER

ONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 JUL 1998 3 3 OH0009857

OUND FACILITY
.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI
MIAMISBURG 45343 MONTGOMERY

FORM

MOUND DENISE HESS

3 1 CC14 ug/L	3 1 CHC13 ug/L	3 1 CH2C12 ug/L	3 1 C2C14 ug/L	3 1 CC13F ug/L	3 1 C2H3C13 ug/L	3 1 C2H2C12 ug/L	3 1 C2H3C1 ug/L	3 1 C2HC13 ug/L	3 1 C2H2C1 ug/L
32102	32106	34423	34475	34488	34506	34546	39175	39180	46363
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA

A: Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) < 1

REPORTER

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-209/98
September 8, 1998

98-TC/09-08

Acting Director, Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.2b)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Folker:

Attached are copies of the Operable Unit 1 (OU1) Authorization to Discharge monitoring results for August. This report was prepared by staff under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and complete. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P.O. Box 1049
Columbus, OH 43266-1049

There were no exceptions for the month of August. All parameters were within their specified limits as imposed by the Ohio EPA. Please note that the toxicity report is included with the monthly report forms to be submitted to the OEPA. This report also requires your signature, in addition to the monthly report forms.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/rpp

Enclosures

cc: DCC
Ron H. Church

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

IN[illegible]EPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 AUG 1998 1 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY FORM

	1 999 CONDUIT FLOW MGD	3 1 PH S.U.	3 1 DO mg/L	2 48 DSS mg/L	2 48 TSS mg/L	MOUND 3 1 CBOD 5 Day mg/L	2 48 Hg Tot Rec ug/L	DENISE HESS 2 48 Se Tot Rec ug/L	2 48 Ag Tot Rec ug/L	2 3 BIS PHTHAL ug/L
	50050	00400	00300	70301	00530	80082	99992	00981	01079	39100
01	0.138									
02	0.137									
03	0.135			656.0	AA					
04	0.133	8.0	11.1				AA	AA	AA	
05	0.135					AA				
06	0.145									
07	0.145									
08	0.146									
09	0.097									
10	0.131									
11	0.137	7.8	10.1				AA			AA
12	0.132									
13	0.138									
14	0.138									
15	0.139									
16	0.120									
17	0.130			776.0	AA					
18	0.132	7.8	10.3				AA			
19	0.126									
20	0.132									
21	0.131									
22	0.131									
23	0.131									
24	0.125						AA			
25	0.031	7.9	10.1							
26	AC									
27	0.086									
28	0.086									
29	0.086									
30	0.086									
31	0.123									
	3.682	31.5	41.6	1432.0	AA	AA	AA	AA	AA	AA
	0.123	7.9	10.4	716.0	AA	AA	AA	AA	AA	AA
	0.146	8.0	11.1	776.0	AA	AA	AA	AA	AA	AA
	AC	7.8	10.1	656.0	AA	AA	AA	AA	AA	AA

AA: Suspended Solids < 1.0 mg/L; CBOD5 < 4.0 mg/L; Bis(2-Ethylhexyl) phthalate < 5 ug/L; Mercury < 0.2 ug/L; Silver < 0.5 ug/L; Selenium < 5.0 ug/L.
[illegible]: Shutdown for maintenance.

REPORTER

NT EPORT FORM

4500

U.S. DEPARTMENT OF ENERGY 1IN90010003 AUG 1998 2 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY

FORM

	2 48 Cr Tot Rec ug/L	2 48 Cu Tot Rec ug/L	2 48 Ni Tot Rec ug/L	2 48 Pb Tot Rec ug/L	2 48 Zn Tot Rec ug/L	MOUND 2 48 ACUTE TOX CERIODA TUa	2 48 CHRONIC TOX CERIODA TUc	DENISE HESS 2 48 ACUTE TOX PIMEPHA TUa	2 48 CHRONIC TOX PIMEPHA TUc
	99985	99989	99984	99988	99983	61425	61426	61427	61428
01									
02									
03									
04	AA	AA	15	54	AA				
05									
06									
07									
08									
09									
10									
11	AA	AA	22	AA	AA				
12									
13									
14									
15									
16						AA	AA	AA	AA
17									
18	AA	AA	16	22	AA				
19									
20									
21									
22									
23									
24	AA	AA	31	AA	AA				
25									
26									
27									
28									
29									
30									
31									
	AA	AA	84	76	AA	AA	AA	AA	AA
	AA	AA	21	19	AA	AA	AA	AA	AA
	AA	AA	31	54	AA	AA	AA	AA	AA
	AA	AA	15	AA	AA	AA	AA	AA	AA

A: Chromium, Copper, Lead, Zinc < 15 ug/L.
Toxicity Report Enclosed.

REPORTER

4500

REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 AUG 1998 3 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C.
MIAMISBURG 45343 MONTGOMERY

FORM

MOUND DENISE HESS

3	3	3	3	3	3	3	3	3	3
1	1	1	1	1	1	1	1	1	1
CCl4	CHCl3	CH2Cl2	C2Cl4	CCl3F	C2H3Cl3	C2H2Cl2	C2H3Cl	C2HCl3	C2H2Cl2
ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
32102	32106	34423	34475	34488	34506	34546	39175	39180	46363
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA

AA: Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) < 1 ug/L.

REPORTER

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-229/98
October 13, 1998

98-TC/10-13

Mr. Robert Folker, Acting Director
Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.2b)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Folker:

Attached are copies of the Operable Unit 1 (OU1) Authorization to Discharge monitoring results for September. This report was prepared by staff under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and complete. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P.O. Box 1049
Columbus, OH 43266-1049

There were no known exceptions for the month of September. All results were within their specified limits as imposed by the Ohio EPA.

The mercury result for September 29 is not available as a result of an equipment failure at the vendor laboratory. The sample has been transferred to another laboratory for analysis. Additionally, due to an oversight, weekly samples for copper and chromium were not collected during the fifth week of September (lead, nickel, and zinc samples are required bi-weekly). Another sample is being reworked for the missed analytes. Upon receipt of the analytical results, an amended DMR will be submitted.

Submittal of this report was delayed with the expectation that the mercury result would be available today. ESC was notified by the laboratory today that the analysis is not complete. In order to meet the OEPA submittal date of October 15, ESC staff are available to deliver the report to OEPA or arrange for overnight mail on DOE's behalf.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/rpp

Enclosures

cc: DCC

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

)NTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 SEP 1998 1 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI
MIAMISBURG 45343 MONTGOMERY FORM

						MOUND		DENISE HESS		
	1	3	3	2	2	3	2	2	2
	999	1	1	48	48	1	48	48	48
	CONDUIT FLOW	PH	DO	DSS	TSS	CBOD 5 Day	Hg Tot Rec	Se Tot Rec	Ag Tot Rec
	MGD	S.U.	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L
	50050	00400	00300	70301	00530	80082	99992	00981	01079
01	0.108	8.3	10.2		AA	AA	AA	AA	AA
02	0.076								
03	0.103								
04	0.104								
05	0.104								
06	0.104								
07	0.104								
08	0.112			843.0					
09	0.120	7.0	10.4				AA		
10	0.118								
11	0.118								
12	0.118								
13	0.118								
14	0.116								
15	0.118	8.3	10.2						
16	0.036						AA		
17	0.090								
18	0.089								
19	0.089								
20	0.089								
21	0.128								
22	0.128	8.2	8.7	723.0	AA		AA		
23	0.129								
24	0.122								
25	0.122								
26	0.122								
27	0.122								
28	0.124								
29	0.127	8.2	9.8				AH		
30	0.127								
31									
	3.285	39.9	49.3	1566.0	AA	AA	AA	AA	AA
	0.110	8.0	9.9	783.0	AA	AA	AA	AA	AA
	0.129	8.3	10.4	843.0	AA	AA	AA	AA	AA
	0.036	7.0	8.7	723.0	AA	AA	AA	AA	AA

A: Suspended Solids < 1.0 mg/L; CBOD5 < 4.0 mg/L.
Mercury < 0.2 ug/L; Silver < 40 ug/L; Selenium < 100 ug/L.
AH: As of this date, laboratory results not available.

REPORTER

ONTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 SEP 1998 2 3 OH0009857

MOUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI (
MIAMISBURG 45343 MONTGOMERY

FORM

MOUND DENISE HESS

	2	2	2	2	2
	48	48	48	48	48
	Cr	Cu	Ni	Pb	Zn
	Tot Rec	Tot Rec	Tot Rec	Tot Rec	Tot Rec
	ug/L	ug/L	ug/L	ug/L	ug/L
	99985	99989	99984	99988	99983
01	AA	AA	AA	AA	AA
02					
03					
04					
05					
06					
07					
08					
09	AA	AA	AA	AA	AA
10					
13					
14					
15					
16	AA	AA	AA	AA	AA
17					
18					
19					
20					
21					
22	AA	AA	AA	AA	AA
23					
24					
25					
26					
27					
28					
29	AH	AH			
30					
31					
	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA

AA: Chromium, Copper, Nickel, Lead, Zinc < 15 ug/L.
AH: Sample not taken.

REPORTER

U.S. DEPARTMENT OF ENERGY 1IN90010003 SEP 1998 3 3 OH0009857

OUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI
MIAMISBURG 45343 MONTGOMERY

FORM

MOUND DENISE HESS

3	3	3	3	3	3	3	3	3	3
1	1	1	1	1	1	1	1	1	1
CC14	CHC13	CH2C12	C2C14	CC13F	C2H3C13	C2H2C12	C2H3C1	C2HC13	C2H2C1
ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
32102	32106	34423	34475	34488	34506	34546	39175	39180	46363
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
AA	AA	AA	AA	AA	AA	AA	AA	AA	AA

Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) < 1

REPORTER

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-241/98
November 2, 1998

98-TC/11-02

Mr. Richard B. Provencher, Director
Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
RESUBMITTAL OF OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Provencher:

Attached are copies of Operable Unit 1 (OU1) Authorization to Discharge monitoring results for September 1998. The amended forms include metal results that were not available at time the report was originally sent. Red-line changes to photocopies of data forms have been made in accordance with OEPA guidelines. Please forward the corrected reports to the following agency.

Mr. Brian Nickel
Ohio Environmental Protection Agency
Southwest District Office
401 E. Fifth Street
Dayton, Ohio 45402-2086

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/rpp

Enclosures

cc: DCC

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
M. Spivey
M. Gilliat

NTHLY REPORT FORM

4500

REPORTED

OhioEP

NAME, ADDRESS CITY, COUNTY, ZIP	STATION CODE	DATE (MONTH, YEAR)	PAGE	PRINTING DATE	APPLICATIO
U.S. DEPARTMENT OF ENERGY	1IN90010003	SEP 1998	2 OF 3		OH0009857

SAMPLING STATION DESCRIPTION

UND FACILITY
P.O. BOX 66
MIAMISBURG 45343 MONTGOMERY

003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI

NOTE: THIS FORM MUST BE TY

N(1) - ENTER 1 FOR CONTINUOUS, 2 FOR COMPOSITE, 3 FOR GRAB SAMPLE
N(2) - ENTER FREQUENCY OF SAMPLING

REPORTING LAB: MOUND

ANALYST: DENISE HESS

(1)	2	2	2	2	2					
(2)	48	48	48	48	48					
	Cr Tot Rec ug/L	Cu Tot Rec ug/L	Ni Tot Rec ug/L	Pb Tot Rec ug/L	Zn Tot Rec ug/L					
	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING
DAY	99985	99989	99984	99988	99983					
01	AA	AA	AA	AA	AA					
02										
03										
04										
05										
06										
07										
08										
09	AA	AA	AA	AA	AA					
10										
11										
12										
13										
14										
15										
16	AA	AA	AA	AA	AA					
17										
18										
19										
20										
21										
22	AA	AA	AA	AA	AA					
23										
24										
25										
26										
27										
28										
29	AA ~~AH~~	AA ~~AH~~	AA	AA	AA					
30										
31										
TAL	AA	AA	AA	AA	AA					
G.	AA	AA	AA	AA	AA					
X	AA	AA	AA	AA	AA					
I.	AA	AA	AA	AA	AA					

AL REMARKS (AH REPORTING CODES MUST BE EXPLAINED IN THIS SECTION)
A: Chromium, Copper, Nickel, Lead, Zinc < 15 ug/L.
AH: Sample not taken.

DISTRIBUTION
WHITE - AGENCY
GREEN - REPORTER

I CERTIFY UNDER THE PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED AND BASED ON MY INQUIRY THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT.

DATE REPORT COMPLETED	SIGNATURE OF REPORTER	TITLE OF REPORTER
Oct 14, 1998	Ora L. Vincent	Deputy Director

ORM NO EPA 4500 (8-91)

4500

ITHLY REPORT FORM

OhioEP

NAME, ADDRESS CITY, COUNTY, ZIP	STATION CODE	REPORTED DATE (MONTH, YEAR)	PAGE OF	PRINTING DATE	APPLICATIO
U.S. DEPARTMENT OF ENERGY	1IN90010003	SEP 1998	1 3		OH000988

SAMPLING STATION DESCRIPTION

MOUND FACILITY
P.O. BOX 66
MIAMISBURG 45343 MONTGOMERY

003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI

NOTE: THIS FORM MUST BE TYP

(1) - ENTER 1 FOR CONTINUOUS, 2 FOR COMPOSITE, 3 FOR GRAB SAMPLE
(2) - ENTER FREQUENCY OF SAMPLING

REPORTING LAB: MOUND
ANALYST: DENISE HESS

(1)	1	3	3	2	2	3	2	2	2	
(2)	999	1	1	48	48	1	48	48	48	
	CONDUIT FLOW MGD	PH S.U.	DO mg/L	DSS mg/L	TSS mg/L	CBOD 5 Day mg/L	Hg Tot Rec ug/L	Se Tot Rec ug/L	Ag Tot Rec ug/L	
	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING CODE	REPORTING
DAY	50050	00400	00300	70301	00530	80082	99992	00981	01079	
01	0.108	8.3	10.2		AA	AA	AA	AA	AA	
02	0.076									
03	0.103									
04	0.104									
05	0.104									
06	0.104									
07	0.104									
08	0.112			843.0						
09	0.120	7.0	10.4				AA			
10	0.118									
11	0.118									
12	0.118									
13	0.118									
14	0.116									
15	0.118	8.3	10.2							
16	0.036						AA			
17	0.090									
18	0.089									
19	0.089									
20	0.089									
21	0.128									
22	0.128	8.2	8.7	723.0	AA		AA			
23	0.129									
24	0.122									
25	0.122									
26	0.122									
27	0.122									
28	0.124									
29	0.127	8.2	9.8				AA ~~AH~~			
30	0.127									
31										
TAL	3.285	39.9	49.3	1566.0	AA	AA	AA	AA	AA	
G.	0.110	8.0	9.9	783.0	AA	AA	AA	AA	AA	
X	0.129	8.3	10.4	843.0	AA	AA	AA	AA	AA	
N	0.036	7.0	8.7	723.0	AA	AA	AA	AA	AA	

AL REMARKS (AH REPORTING CODES MUST BE EXPLAINED IN THIS SECTION)

A: Suspended Solids < 1.0 mg/L; CBOD5 < 4.0 mg/L.
Mercury < 0.2 ug/L; Silver < 40 ug/L; Selenium < 100 ug/L.

AH: As of this date, laboratory results not available.

DISTRIBUTION
WHITE - AGENCY
GREEN - REPORTER

I CERTIFY UNDER THE PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED AND BASED ON MY INQUIRY THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT

DATE REPORT COMPLETED	SIGNATURE OF REPORTER	TITLE OF REPORTER
Oct 14 1998	Oba L. Vincent	Deputy Director

ORM NO EPA 4500 (8-91)

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-264/98
December 7, 1998

98-TC/12-07

Mr. Richard B. Provencher, Director
Miamisburg Environmental Management Project
U.S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Arthur W. Kleinrath

SUBJECT: Contract No. DE-AC24-97OH20044
OPERABLE UNIT 1 (OU1) AUTHORIZATION TO DISCHARGE MONITORING RESULTS (Deliverable C.7.2b)

REFERENCE: OU1 Authorization to Discharge Permit 1IN90010*AD requires submittal of the enclosed report forms each month.

Dear Mr. Provencher:

Attached are copies of the Operable Unit 1 (OU1) Authorization to Discharge monitoring results for November. This report was prepared by staff under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I certify that I have reviewed the reporting forms and based on my inquiry of those persons immediately responsible for obtaining the information, to the best of my knowledge and belief, the information contained in the report is true and complete. Please forward the report to the following agency, ensuring receipt before the 15th of the month.

Ohio Environmental Protection Agency
Division of Surface Water
Permit Compliance Unit
P.O. Box 1049
Columbus, OH 43266-1049

There were no exceptions for the month of November. All parameters were within their specified limits as imposed by the Ohio EPA.

If you require further information, please contact Ronald Paulick at extension 4080 or Sue Mackey at extension 4013.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/rpp

Enclosures

cc: DCC

bc: L. R. Bauer
S. A. Mackey
R. P. Paulick
Mr. Spivey
M. Gilliat

MTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 NOV 1998 1 OF 3 OH0009857

UND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI C
MIAMISBURG 45343 MONTGOMERY

FORM

					MOUND		DENISE HESS	
1	3	3	2	2	3	2	2	2
999	1	1	48	48	1	48	48	48
CONDUIT FLOW MGD	PH S.U.	DO mg/L	DSS mg/L	TSS mg/L	CBOD 5 Day mg/L	Hg Tot Rec ug/L	Se Tot Rec ug/L	Ag Tot Rec ug/L
50050	00400	00300	70301	00530	80082	99992	00981	01079
01 0.127								
02 0.126			718.0	1.9				
03 0.126	8.3	10.1				AA	AA	AA
04 0.127								
05 0.125								
06 0.125								
07 0.125								
08 0.125								
09 0.123								
10 0.126	8.5	7.4				AA		
11 0.125								
12 0.125								
13 0.124								
14 0.124								
15 0.124								
16 0.122			686.0	2.0				
17 0.122	8.3	10.5				AA		
18 0.118								
19 0.122								
20 0.122								
21 0.123								
22 0.123								
23 0.116					AA			
24 0.097	8.4	9.6				AA		
25 0.121								
26 0.121								
27 0.121								
28 0.120								
29 0.120								
30 0.118								
31								
3.663	33.5	37.6	1404.0	3.9	AA	AA	AA	AA
0.122	8.4	9.4	702.0	2.0	AA	AA	AA	AA
0.127	8.5	10.5	718.0	2.0	AA	AA	AA	AA
0.097	8.3	7.4	686.0	1.9	AA	AA	AA	AA

: CBOD5 < 4.0 mg/L.
Mercury < 0.2 ug/L; Silver < 0.5 ug/L; Selenium < 5.0 ug/L.

REPORTER

NTHLY REPORT FORM

U.S. DEPARTMENT OF ENERGY 1IN90010003 NOV 1998 2 3 OH0009857

OUND FACILITY
P.O. BOX 66 003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI (
MIAMISBURG 45343 MONTGOMERY

FORM

MOUND DENISE HESS

	2	2	2	2	2
	48	48	48	48	48
	Cr	Cu	Ni	Pb	Zn
	Tot Rec	Tot Rec	Tot Rec	Tot Rec	Tot Rec
	ug/L	ug/L	ug/L	ug/L	ug/L
	99985	99989	99984	99988	99983
01					
02					
03	AA	AA	22	AA	AA
04					
05					
06					
07					
08					
09					
10	AA	AA	AA	AA	AA
11					
14					
15					
16					
17	AA	AA	16	AA	AA
18					
19					
20					
21					
22					
23					
24	AA	AA	AA	AA	AA
25					
26					
27					
28					
29					
30					
31					
	AA	AA	38	AA	AA
	AA	AA	AA	AA	AA
	AA	AA	22	AA	AA
	AA	AA	AA	AA	AA

A: Chromium, Copper, Nickel, Lead, Zinc < 15 ug/L.

REPORTER

4500

MONTHLY REPORT FORM

NAME, ADDRESS CITY, COUNTY | REPORTING DATE MONTH YEAR | PERMIT EXPIRATION DATE | APPLICATION NO.

U.S. DEPARTMENT OF ENERGY 1IN90010003 NOV 1998 3 3 OH0009857

MOUND FACILITY
P.O. BOX 66
MIAMISBURG 45343 MONTGOMERY

003 GROUNDWATER TREATMENT WORKS DISCHARGE TO MIAMI (

FORM TYPED

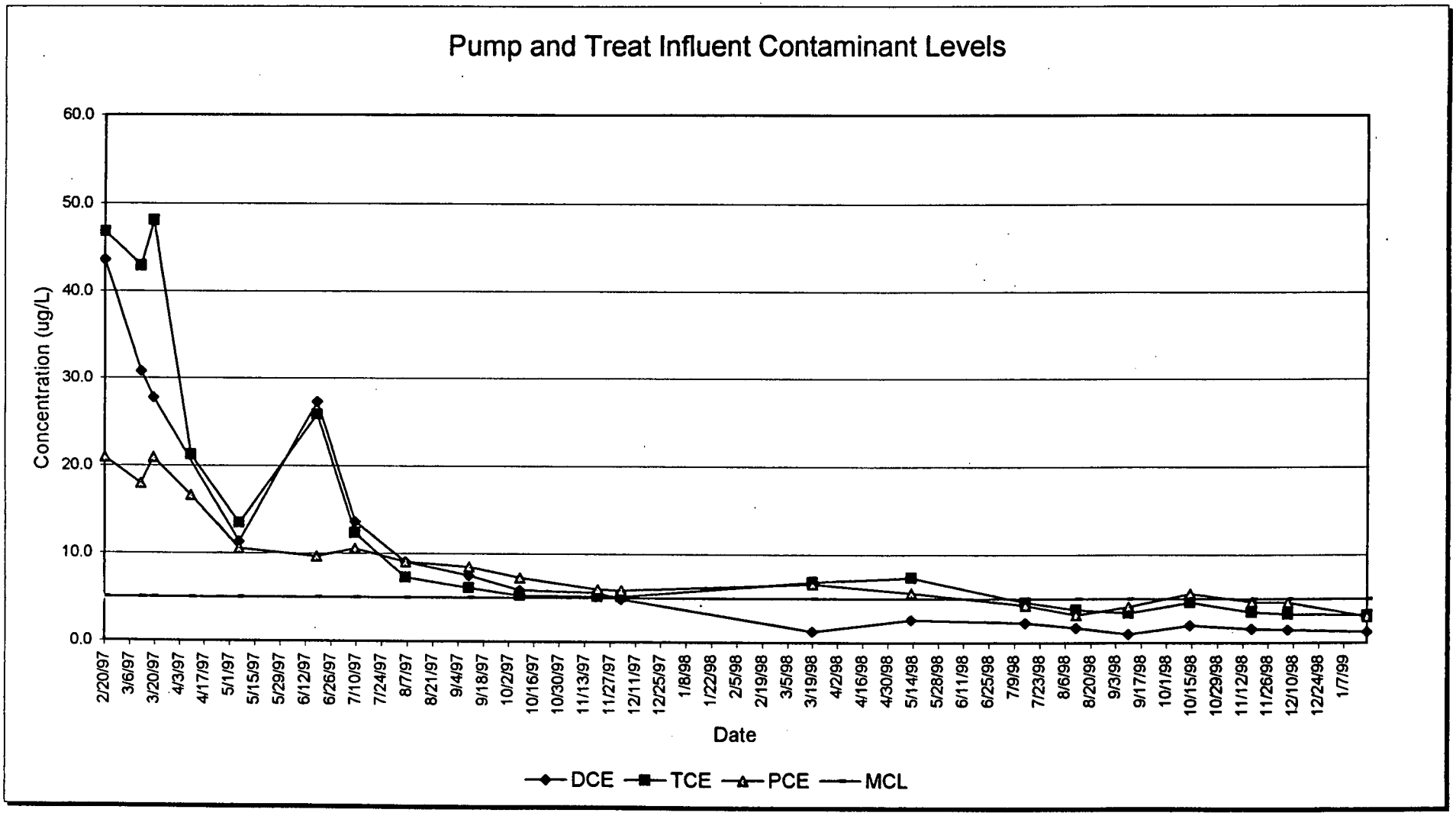
						MOUND		DENISE HESS		
(1)	3	3	3	3	3	3	3	3	3	3
(2)	1	1	1	1	1	1	1	1	1	1
	CC14 ug/L	CHC13 ug/L	CH2C12 ug/L	C2C14 ug/L	CC13F ug/L	C2H3C13 ug/L	C2H2C12 ug/L	C2H3C1 ug/L	C2HC13 ug/L	C2H2C12 ug/L
DAY	32102	32106	34423	34475	34488	34506	34546	39175	39180	46363
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
17	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA

AA: Methylene Chloride (34423) < 10 ug/L; Vinyl Chloride (39175) < 2 ug/L; Carbon Tetrachloride (32102), Chloroform (32106), Trichlorofluoromethane (34488), Tetrachloroethene (34475), 1,1,1-Trichloroethane (34506), Trichloroethene (39180), trans & cis-1,2-Dichloroethene (34546 & 46363) < 1

REPORTER

Pump and Treat Influent Contaminant Levels

Without SVE influent			ug/l					With SVE influent						
Date	Gallons	Liters	PCE	TCE	DCE	COC Effluent	MCL	Date	Gallons	Liters	PCA	TCE	DCE	COC Effluent
02/20/97	297759	1127140.492	20.9	46.8	43.6	<1.0	5							
03/12/97	3171135	12004052.48	17.9	42.9	30.8	<1.0	5							
03/19/97	3400844	12873595.69	20.9	48.1	27.7	<1.0	5							
04/09/97	6391168	24193204.04	16.6	21.2		<1.0	5							
05/06/97	10407796	39397795.87	10.6	13.4	11.3	<1.0	5							
06/18/97	17081704	64661287.3	9.7	25.8	27.3	<1.0	5							
07/09/97	19693578	74548306.48	10.6	12.3	13.6	<1.0	5							
08/06/97	23652387	89534029.58	9.1	7.3	9.1	<1.0	5							
09/10/97	28503649	107898055	8.5	6.1	7.5	<1.0	5							
10/08/97	32397250	122636938.9	7.3	5.3	5.9	<1.0	5							
11/20/97	37998290	143839182.9	6.0	5.2	5.6	<1.0	5							
12/03/97	39770235	150546724.8	5.9	5.2	4.9	<1.0	5							
							5	1/7/98	43952710	166379115.9	7.9	78.4	72.3	<1.0
							5	2/12/98	48546654	183769086.6	5	167		<1.0
3/19/98	52495035	198715335.4	6.7	6.9	1.3	<1.0	5							
5/13/98	60283515	228197941.1	5.7	7.4	2.6	<1.0	5							
7/15/98	69314280	262383107.3	4.3	4.6	2.3	<1.0	5							
8/12/98	73100645	276716058.8	3.2	3.8	1.7	<1.0	5							
9/10/98	76280040	288751378.8	4.1	3.4	1	<1.0	5							
10/14/98	79665760	301567723.9	5.6	4.6	2	<1.0	5							
11/17/98	83986860	317924867.7	4.7	3.5	1.6	<1.0	5							
12/7/98	89213310	337709134.2	4.6	3.3	1.5	<1.0	5							
1/20/99	91713205	347172266.8	3	3.2	1.3	<1.0	5							

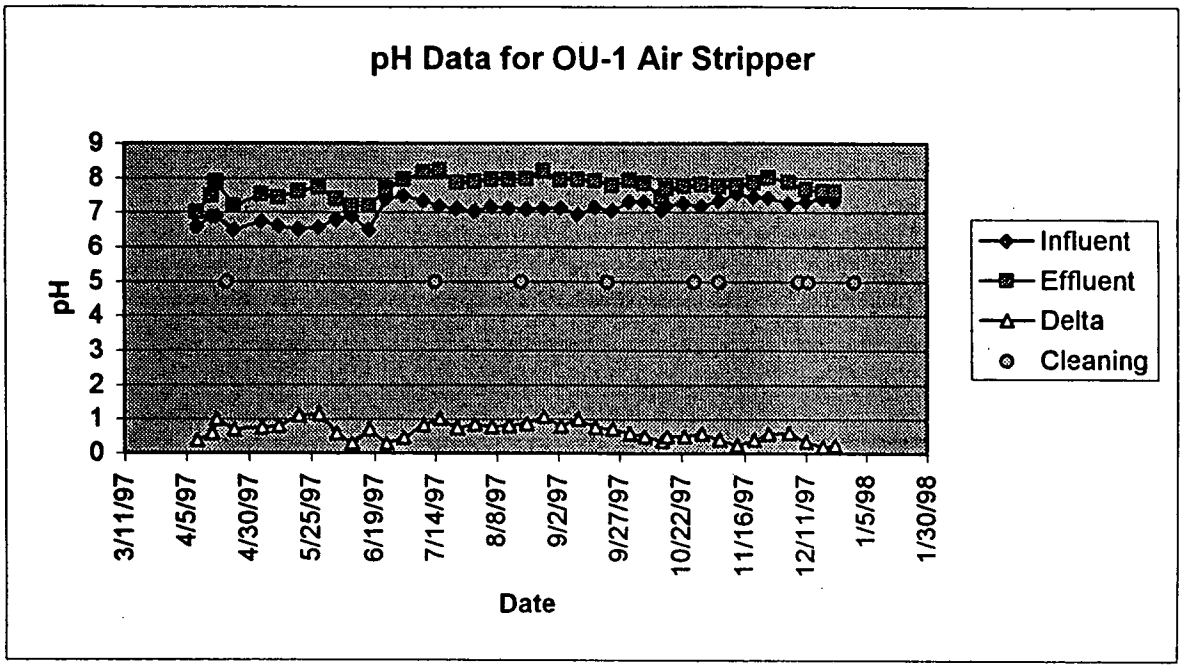

Pump and Treat Influent Contaminant Levels
Concentration (ug/L)
60.0
50.0
40.0
30.0
20.0
10.0
0.0
2/20/97
3/6/97
3/20/97
4/3/97
4/17/97
5/1/97
5/15/97
5/29/97
6/12/97
6/26/97
7/10/97
7/24/97
8/7/97
8/21/97
9/4/97
9/18/97
10/2/97
10/16/97
10/30/97
11/13/97
11/27/97
12/11/97
12/25/97
1/8/98
1/22/98
2/5/98
2/19/98
3/5/98
3/19/98
4/2/98
4/16/98
4/30/98
5/14/98
5/28/98
6/11/98
6/25/98
7/9/98
7/23/98
8/6/98
8/20/98
9/3/98
9/17/98
10/1/98
10/15/98
10/29/98
11/12/98
11/26/98
12/10/98
12/24/98
1/7/99
Date
DCE
TCE
PCE
MCL

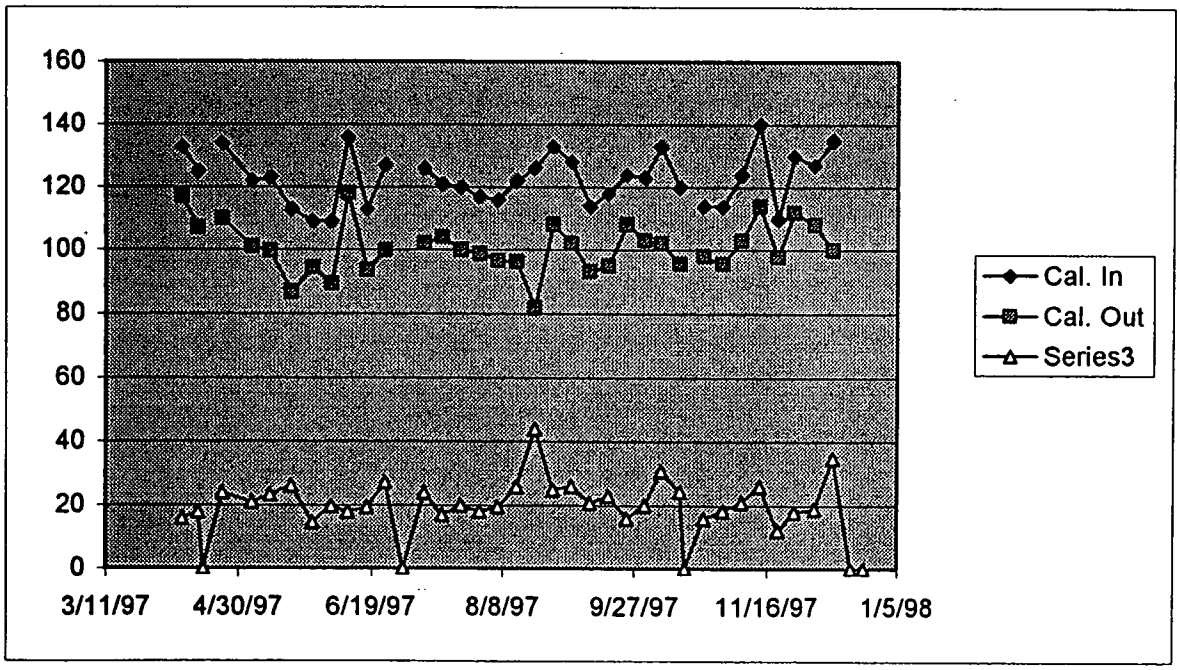
ug/l

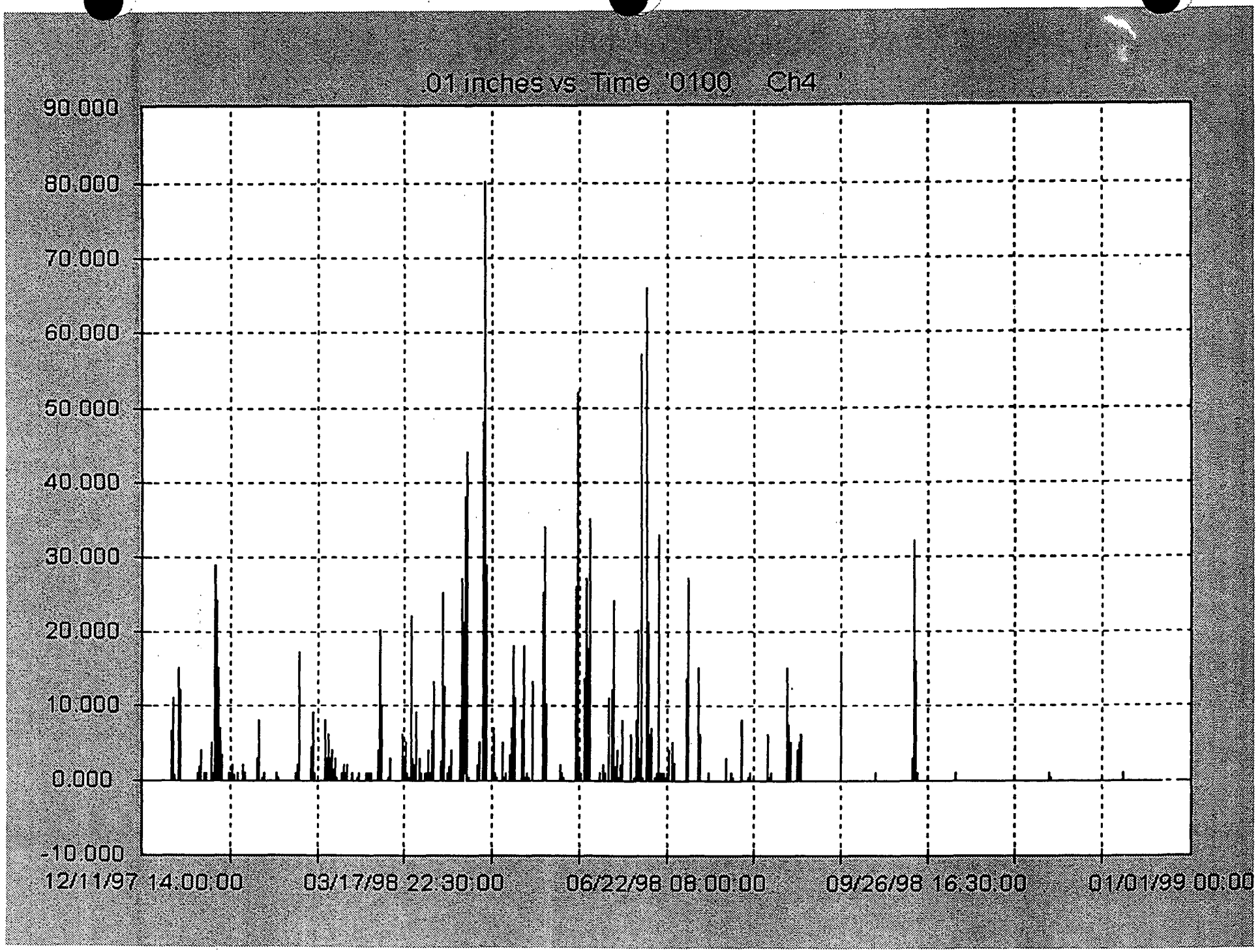
Date	Total Gallons	Total Liters	PCE 412	PCE 413	PCE 414	TCE 412	TCE 413	TCE 414	DCE 412	DCE 413	DCE 414
3/19/98	52495035	1.99E+08	11.7	2.6	9	7.1	2.4	10.6	0	0	7.3
7/15/98	69314280	2.62E+08	7.8	1.5	6.7	6.4	1.5	8.2	0	0	7.4
8/12/98	73100645	2.77E+08	8.2	1.4	5.8	5.2	1.4	5.9	0	0	6.8
9/10/98	76280040	2.89E+08	8.2	1.6	7	6.2	1.8	8	0	0	11.7
10/14/98	79665760	3.02E+08	10.3	1.7	7.8	7.4	1.4	7.1	0	0	7.3
11/17/98	83986860	3.18E+08	8.9	1.5	6.3	6.1	1.2	5.8	0	0	4.5
12/7/98	89213310	3.38E+08	8.9	1.5	6.1	5.4	1.1	5	0	0	4
1/20/99	91713205	3.47E+08	7.3	0	5.2	5.6	1.1	5.2	0	0	4.4

OU-1 Water Quality and Air Stripper Cleaning

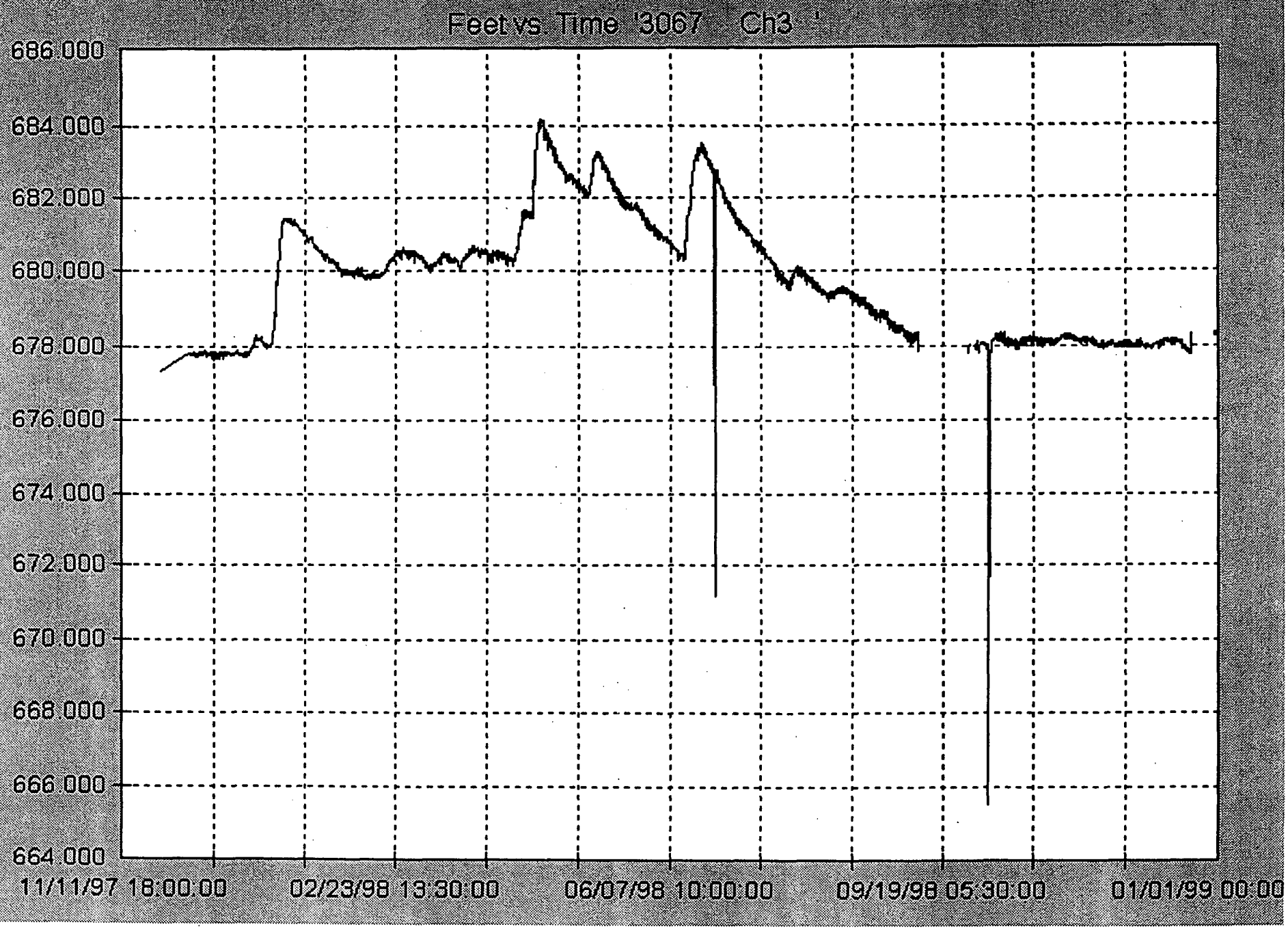
Date	Influent	Effluent	Delta	Cleaning	Cal. In	Cal. Out	Delta
4/9/97	6.6	7	0.4		133	117	16
4/15/97	6.9	7.5	0.6		125	107	18
4/17/97	6.9	7.9	1	4/21/97			0
4/24/97	6.5	7.2	0.7		134	110	24
5/5/97	6.75	7.52	0.77		122	101	21
5/12/97	6.62	7.43	0.81		123	99.5	23.5
5/20/97	6.52	7.63	1.11		113	86.7	26.3
5/28/97	6.58	7.73	1.15		109	94.3	14.7
6/4/97	6.8	7.4	0.6		109	89.3	19.7
6/10/97	6.9	7.2	0.3		136	118	18
6/17/97	6.5	7.2	0.7		113	93.6	19.4
6/24/97	7.4	7.7	0.3		127	99.7	27.3
7/1/97	7.49	7.96	0.47				0
7/9/97	7.34	8.17	0.83	7/14/97	126	102	24
7/16/97	7.2	8.22	1.02		121	104	17
7/23/97	7.11	7.86	0.75		120	100	20
7/30/97	7.05	7.9	0.85		117	98.8	18.2
8/6/97	7.17	7.96	0.79		116	96.5	19.5
8/13/97	7.13	7.95	0.82	8/18/97	122	96.2	25.8
8/20/97	7.1	7.98	0.88		126	81.9	44.1
8/27/97	7.11	8.2	1.09		133	108	25
9/3/97	7.13	7.94	0.81		128	102	26
9/10/97	6.95	7.95	1		114	93.2	20.8
9/17/97	7.15	7.92	0.77	9/22/97	118	94.9	23.1
9/24/97	7.06	7.79	0.73		124	108	16
10/1/97	7.33	7.93	0.6		123	103	20
10/7/97	7.33	7.84	0.51		133	102	31
10/14/97	7.08	7.46	0.38		120	95.6	24.4
10/16/97	7.2	7.7	0.5				0
10/23/97	7.27	7.77	0.5	10/27/97	114	98	16
10/30/97	7.2	7.8	0.6		114	95.6	18.4
11/6/97	7.34	7.75	0.41	11/6/97	124	103	21
11/13/97	7.54	7.78	0.24		140	114	26
11/20/97	7.45	7.86	0.41		110	97.8	12.2
11/26/97	7.43	8.01	0.58		130	112	18
12/4/97	7.27	7.88	0.61	12/8/97	127	108	19
12/11/97	7.32	7.68	0.36	12/12/97	135	100	35
12/18/97	7.42	7.63	0.21				0
12/23/97	7.35	7.6	0.25				0
				12/31/97			


pH Data for OU-1 Air Stripper
pH
9
8
7
6
5
4
3
2
1
0
3/11/97
4/5/97
4/30/97
5/25/97
6/19/97
7/14/97
8/8/97
9/2/97
9/27/97
10/22/97
11/16/97
12/11/97
1/5/98
1/30/98
Date
Influent
Effluent
Delta
Cleaning

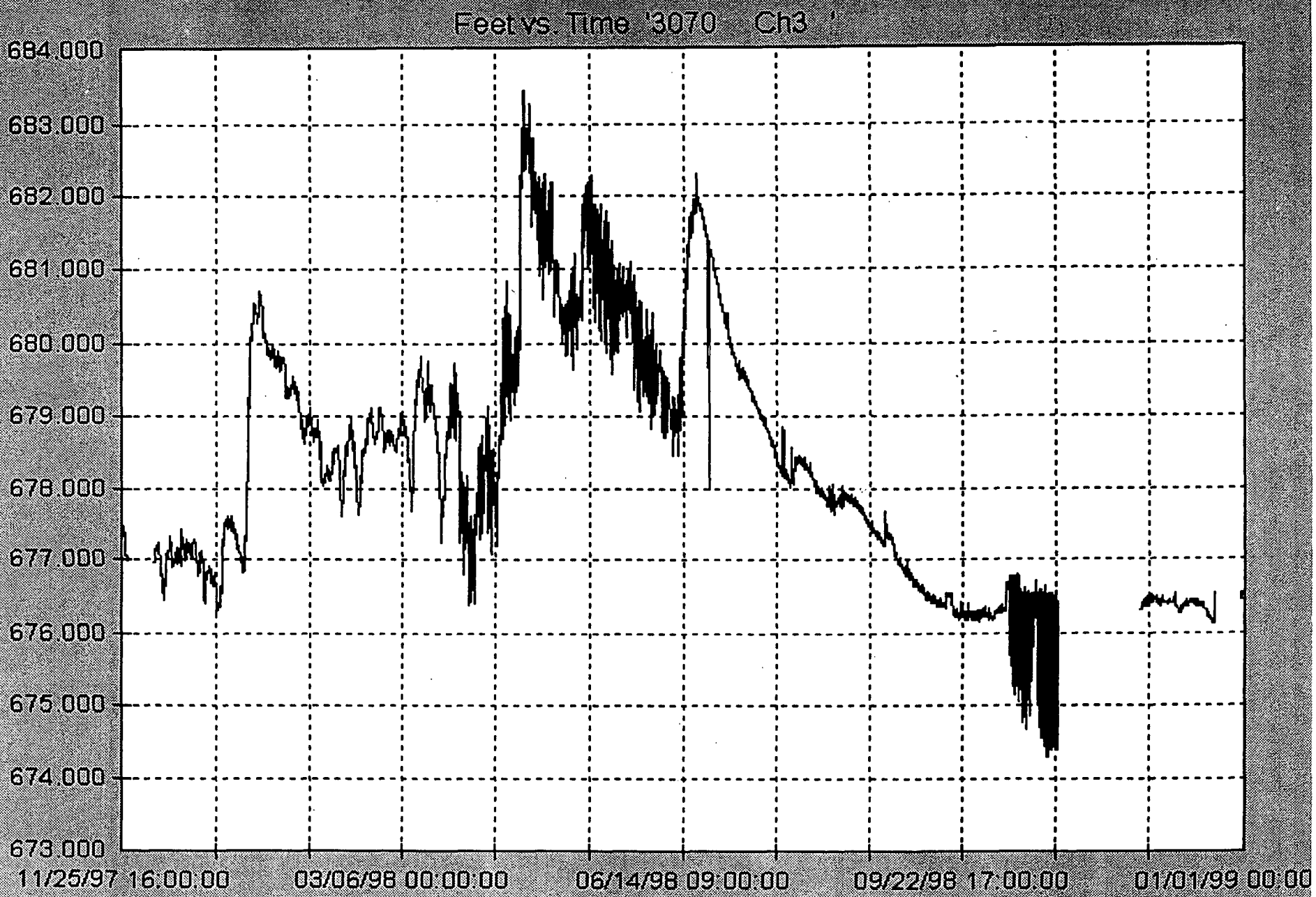

160
140
120
100
80
60
40
20
0
3/11/97
4/30/97
6/19/97
8/8/97
9/27/97
11/16/97
1/5/98
Cal. In
Cal. Out
Series3

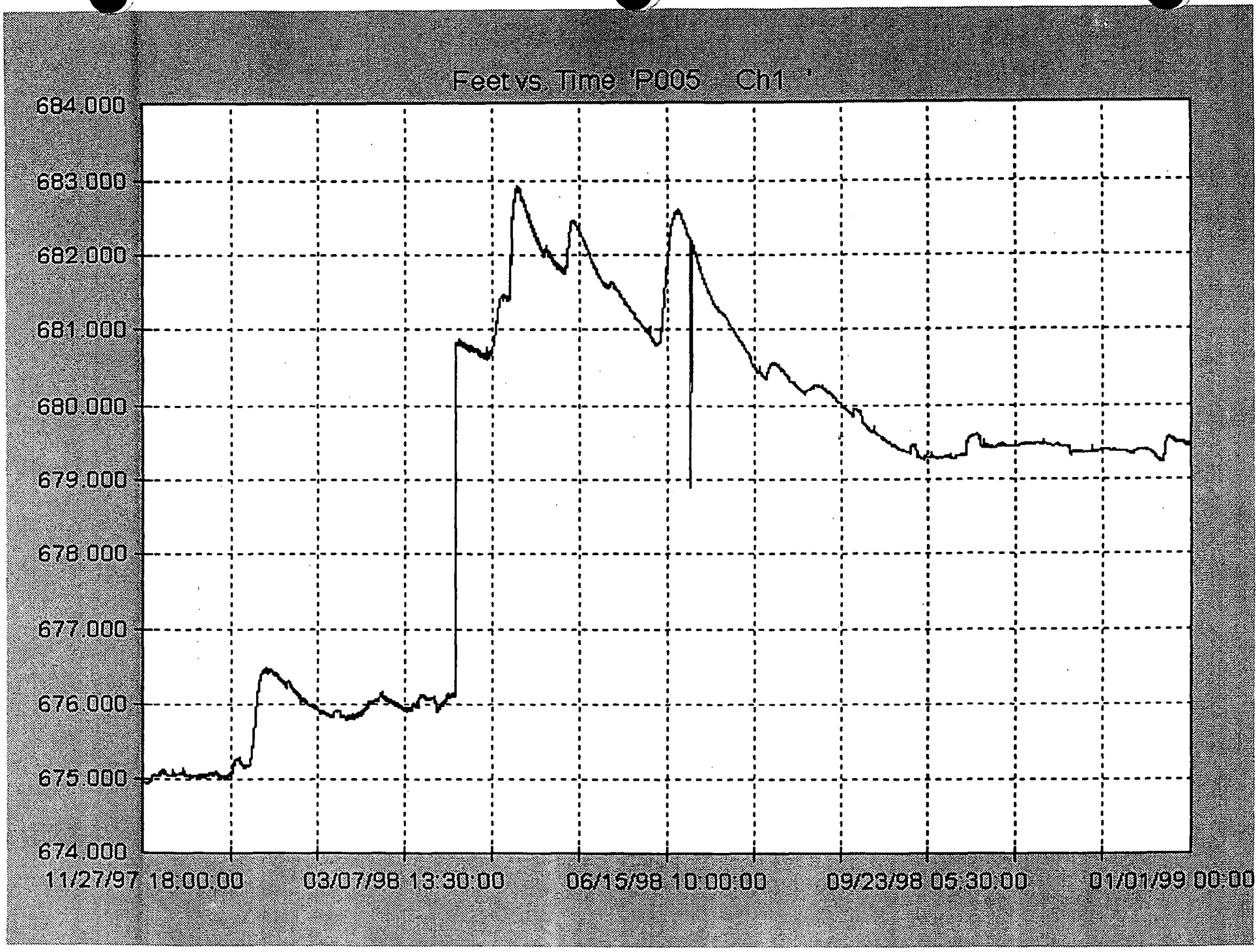

.01 inches vs. Time '0100 Ch4
90.000
80.000
70.000
60.000
50.000
40.000
30.000
20.000
10.000
0.000
-10.000
12/11/97 14:00:00
03/17/98 22:30:00
06/22/98 08:00:00
09/26/98 16:30:00
01/01/99 00:00

Well P001

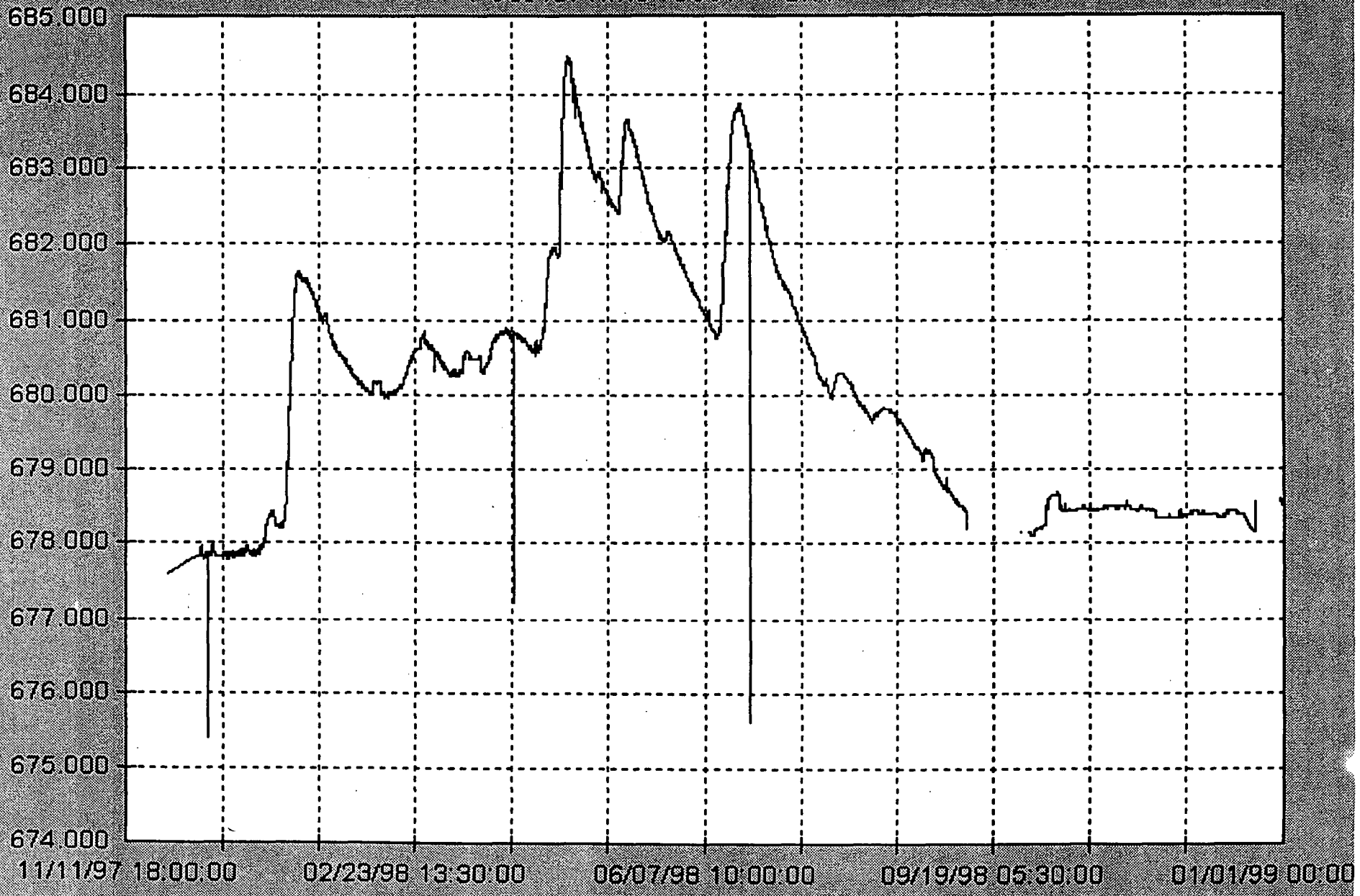

Feet vs. Time '3067 Ch3
686.000
684.000
682.000
680.000
678.000
676.000
674.000
672.000
670.000
668.000
666.000
664.000
11/11/97 18:00:00
02/23/98 13:30:00
06/07/98 10:00:00
09/19/98 05:30:00
01/01/99 00:00

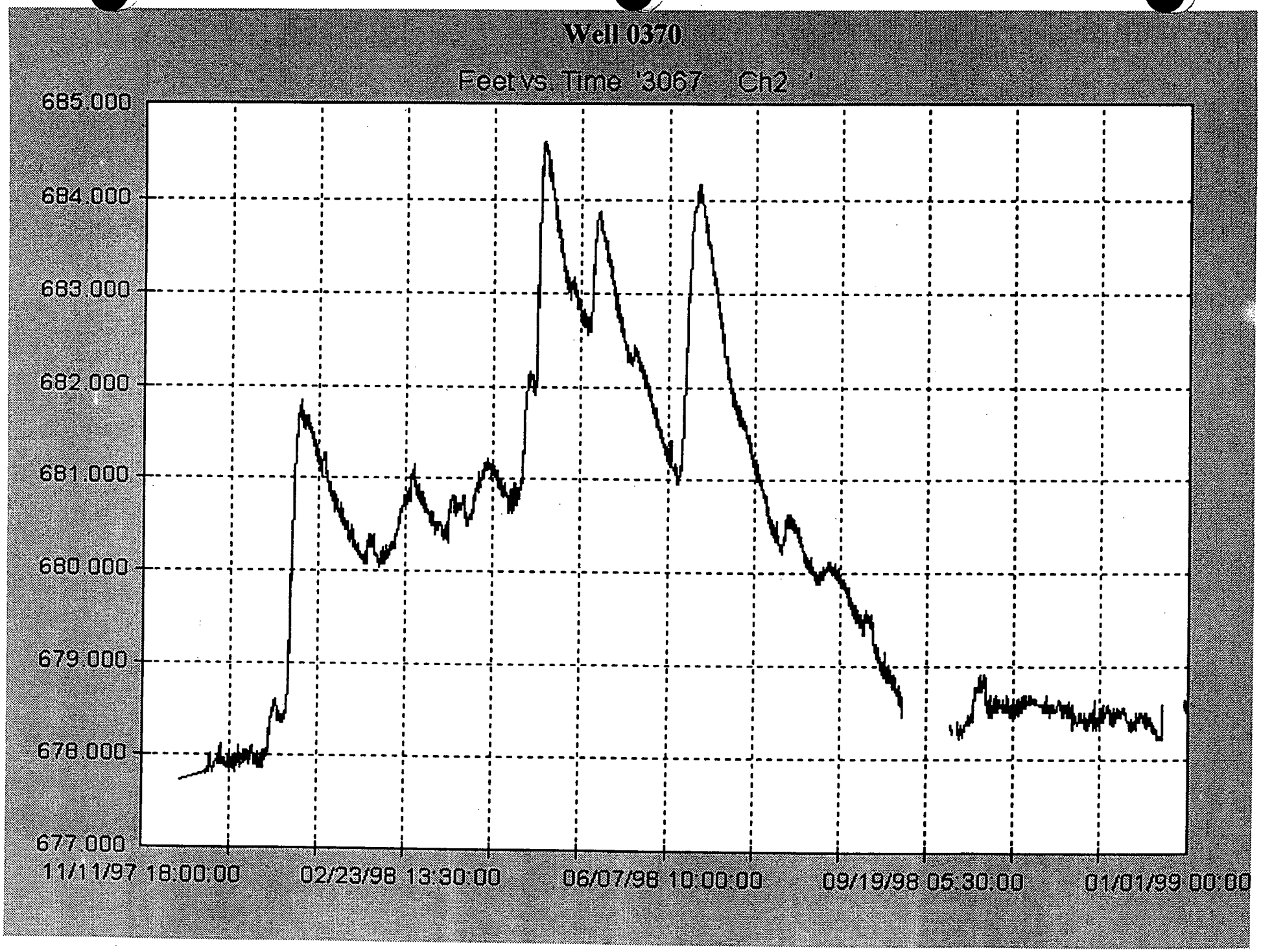
Well P003


Feet vs. Time '3070 Ch3 '
684.000
683.000
682.000
681.000
680.000
679.000
678.000
677.000
676.000
675.000
674.000
673.000
11/25/97 16:00:00
03/06/98 00:00:00
06/14/98 09:00:00
09/22/98 17:00:00
01/01/99 00:00

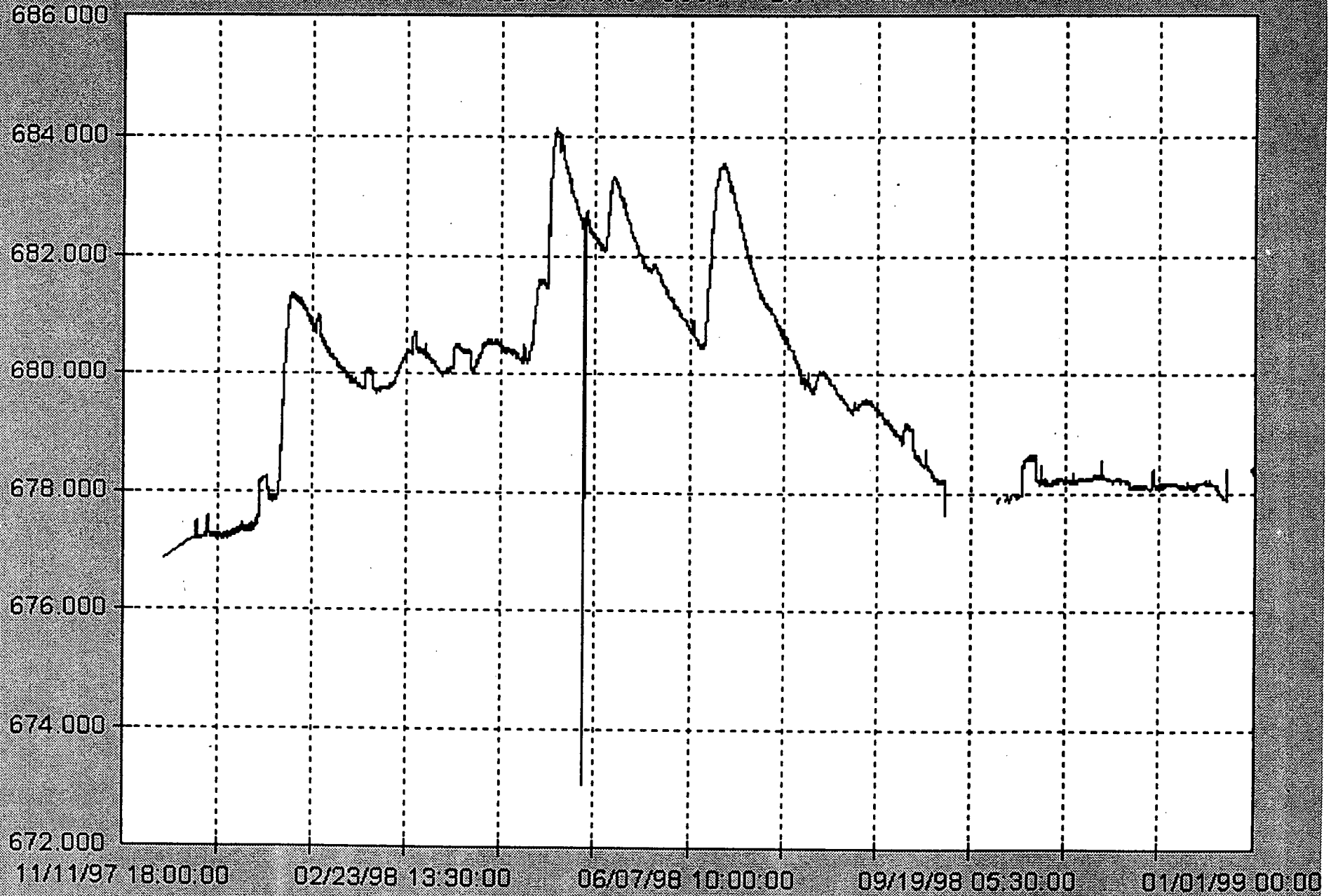

Feet vs. Time 'P005 Ch1 '
684.000
683.000
682.000
681.000
680.000
679.000
678.000
677.000
676.000
675.000
674.000
11/27/97 18:00:00
03/07/98 13:30:00
06/15/98 10:00:00
09/23/98 05:30:00
01/01/99 00:00

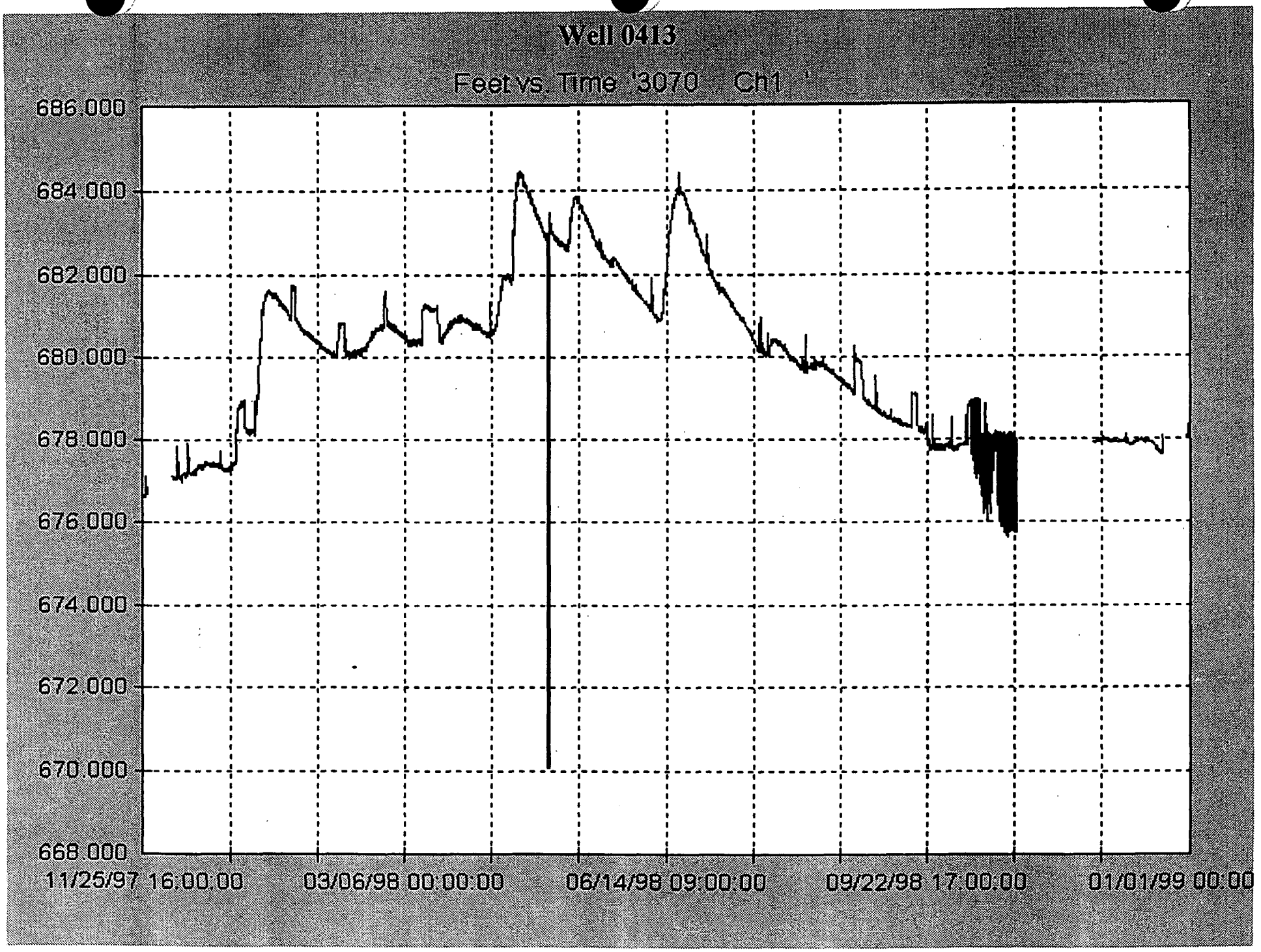
Well 0313


Feet vs. Time '3067 Ch4 '
685.000
684.000
683.000
682.000
681.000
680.000
679.000
678.000
677.000
676.000
675.000
674.000
11/11/97 18:00:00
02/23/98 13:30:00
06/07/98 10:00:00
09/19/98 05:30:00
01/01/99 00:00

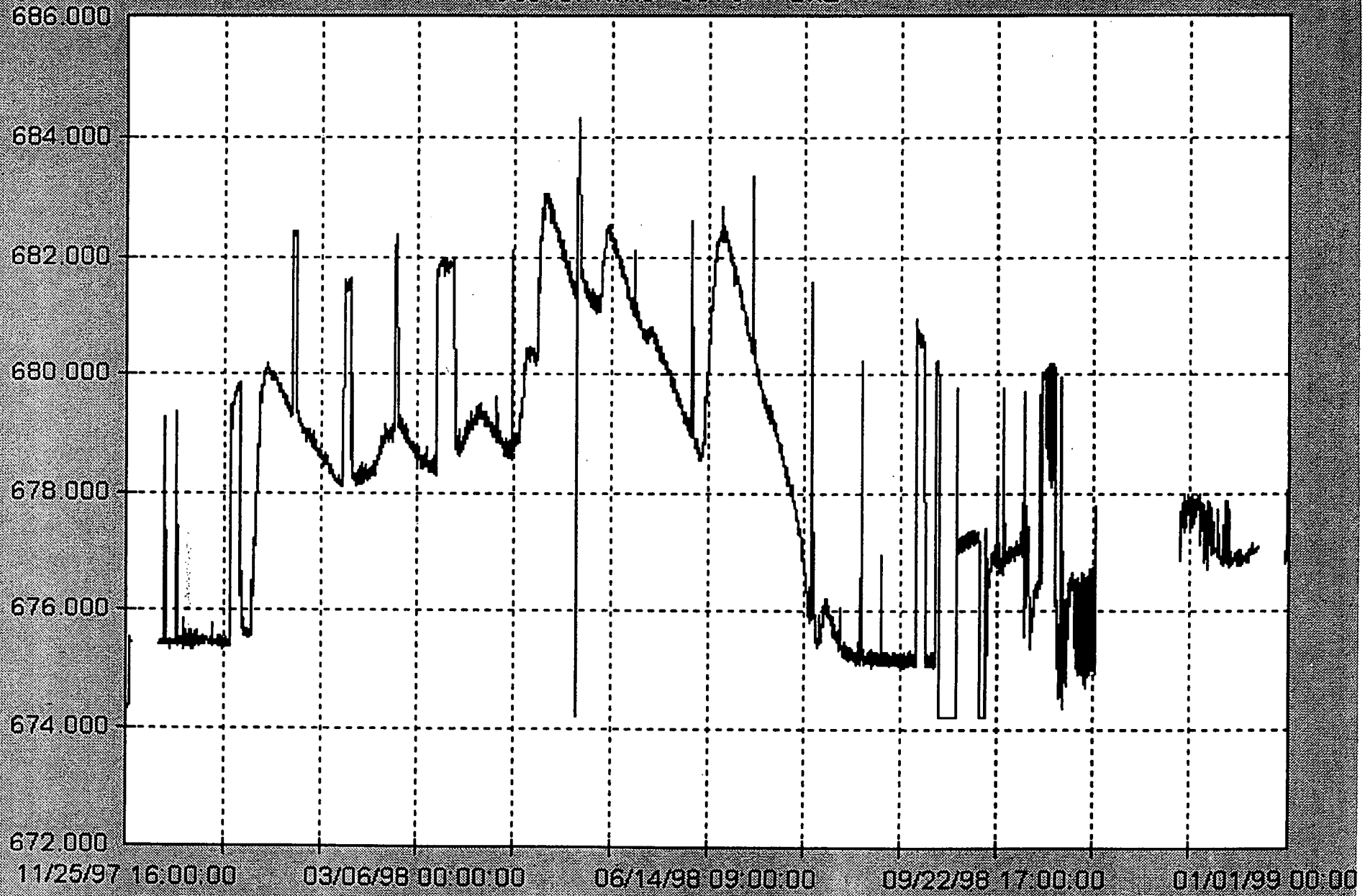

Well 0370
Feet vs. Time '3067 Ch2
685.000
684.000
683.000
682.000
681.000
680.000
679.000
678.000
677.000
11/11/97 18:00:00
02/23/98 13:30:00
06/07/98 10:00:00
09/19/98 05:30:00
01/01/99 00:00

Well 0412


Feet vs. Time '3067 Ch1 '
686.000
684.000
682.000
680.000
678.000
676.000
674.000
672.000
11/11/97 18:00:00
02/23/98 13:30:00
06/07/98 10:00:00
09/19/98 05:30:00
01/01/99 00:00


Well 0413
Feet vs. Time '3070 Ch1
686.000
684.000
682.000
680.000
678.000
676.000
674.000
672.000
670.000
668.000
11/25/97 16:00:00
03/06/98 00:00:00
06/14/98 09:00:00
09/22/98 17:00:00
01/01/99 00:00

Well 0414


Feet vs. Time 3070 Ch2
686.000
684.000
682.000
680.000
678.000
676.000
674.000
672.000
11/25/97 16:00:00
03/06/98 00:00:00
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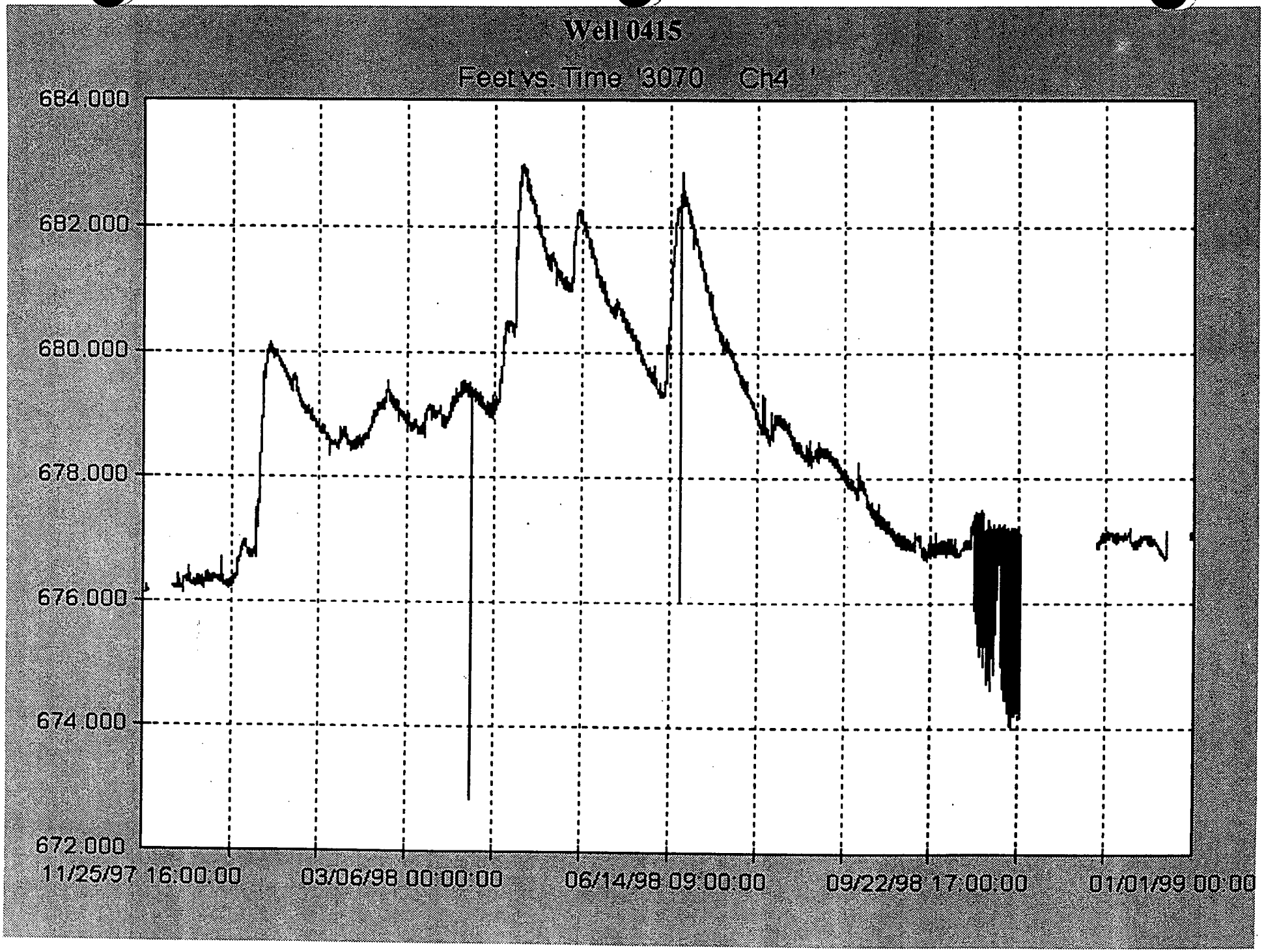
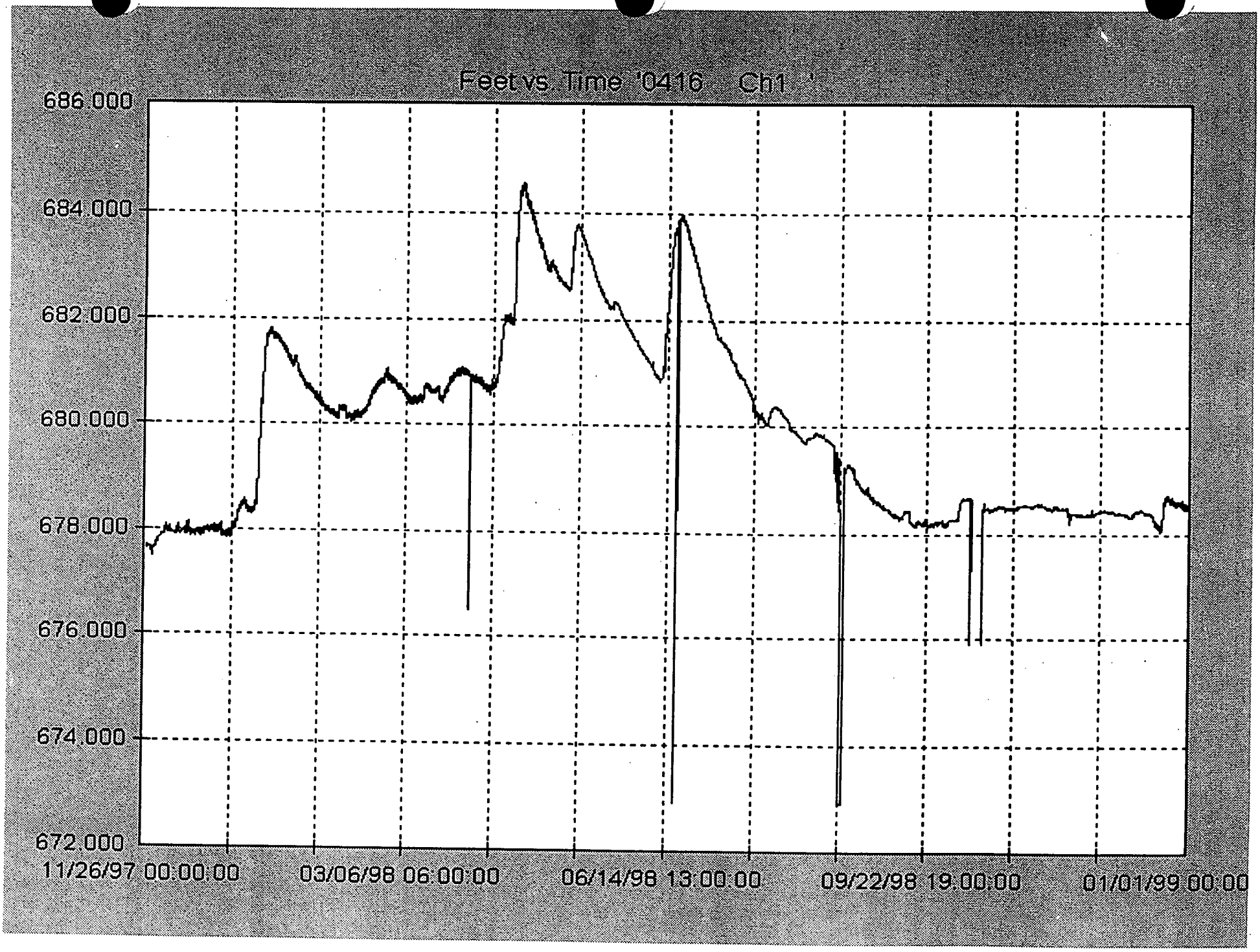
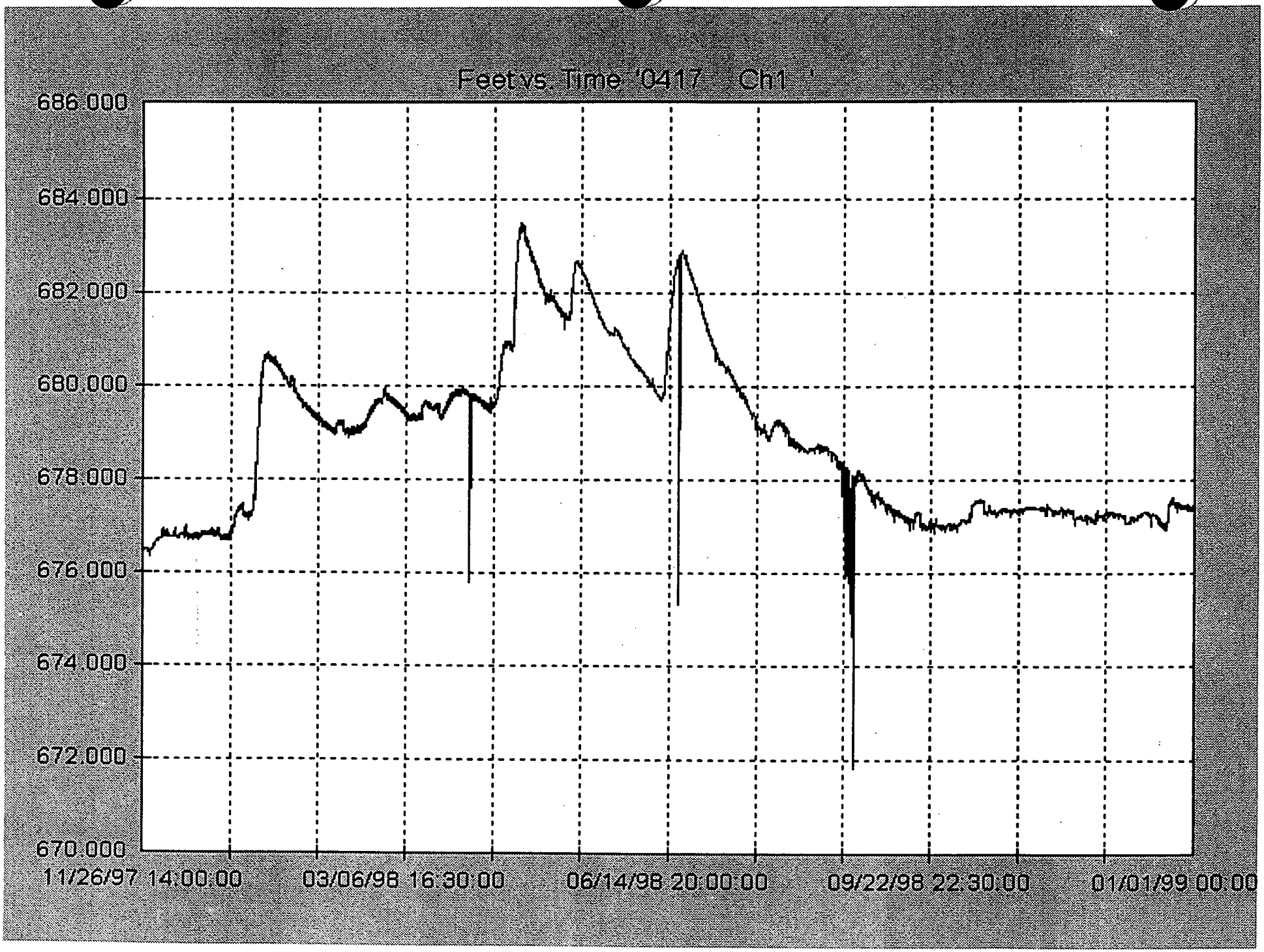
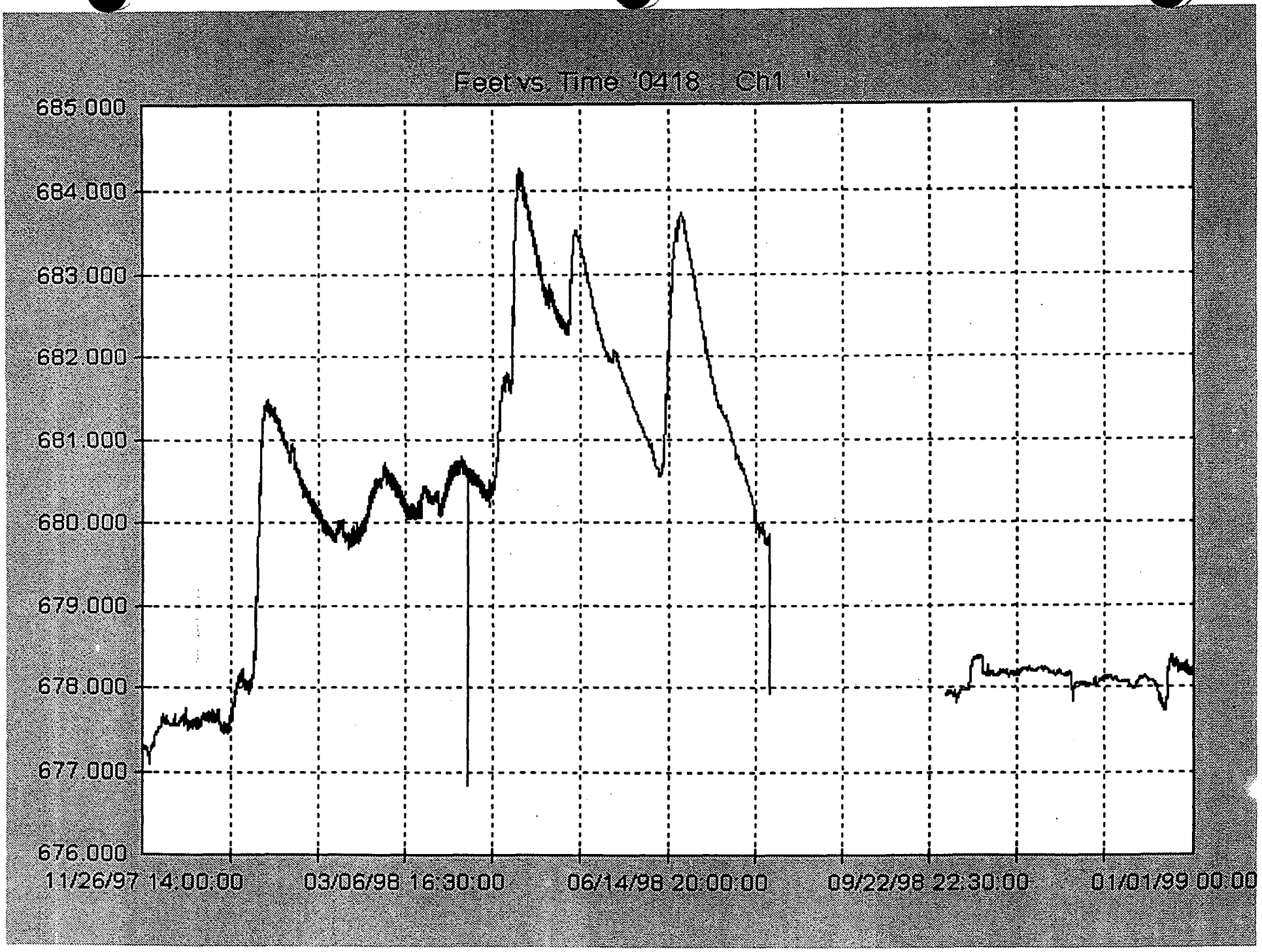
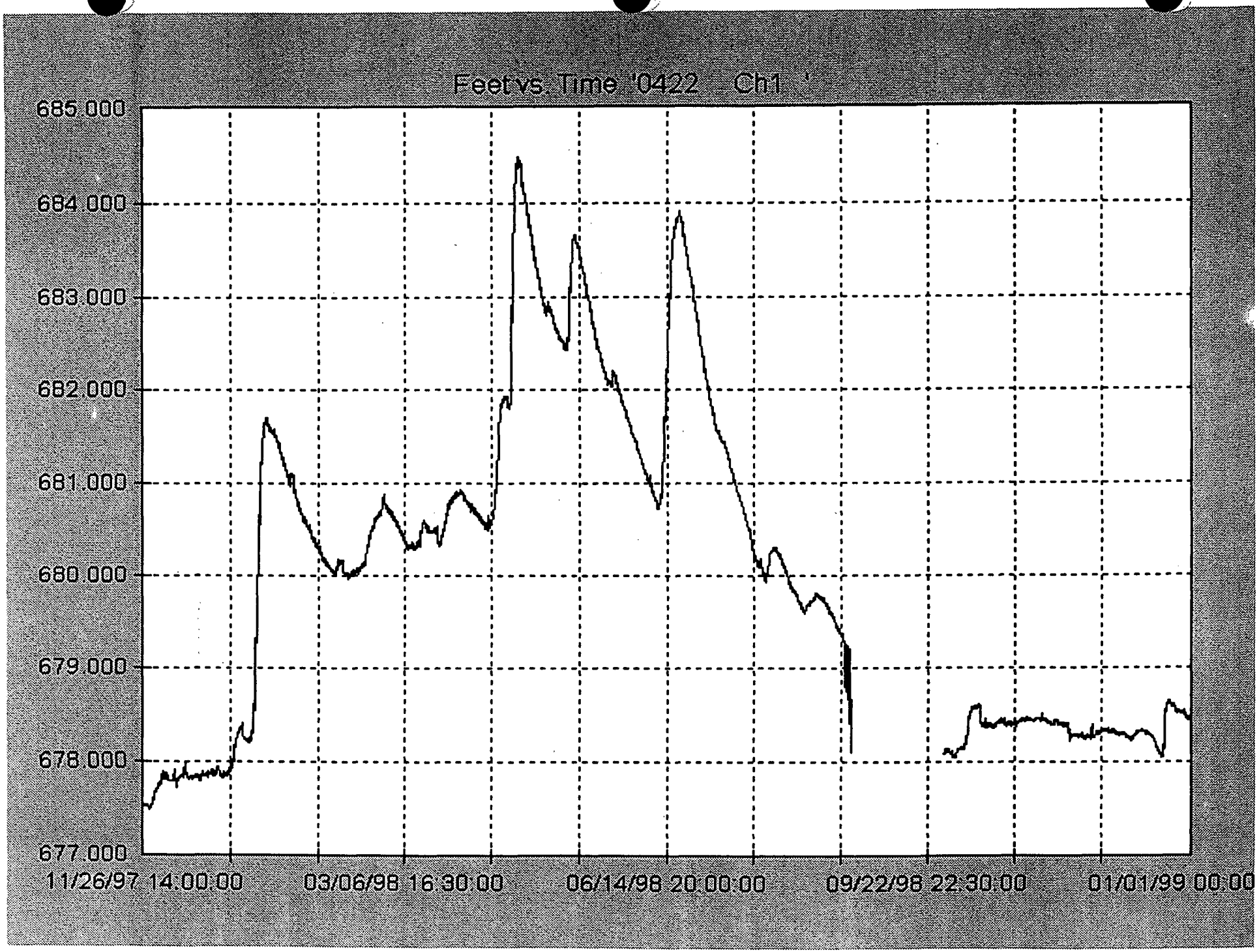
09/22/98 17:00:00
01/01/99 00:00


Well 0415
Feet vs. Time '3070 Ch4
684.000
682.000
680.000
678.000
676.000
674.000
672.000
11/25/97 16:00:00
03/06/98 00:00:00
06/14/98 09:00:00
09/22/98 17:00:00
01/01/99 00:00


Feet vs. Time '0416 Ch1
686.000
684.000
682.000
680.000
678.000
676.000
674.000
672.000
11/26/97 00:00:00
03/06/98 06:00:00
06/14/98 13:00:00
09/22/98 19:00:00
01/01/99 00:00:00


Feet vs. Time '0417 Ch1
686.000
684.000
682.000
680.000
678.000
676.000
674.000
672.000
670.000
11/26/97 14:00:00
03/06/98 16:30:00
06/14/98 20:00:00
09/22/98 22:30:00
01/01/99 00:00


Feet vs. Time '0418 Ch1
685.000
684.000
683.000
682.000
681.000
680.000
679.000
678.000
677.000
676.000
11/26/97 14:00:00
03/06/98 16:30:00
06/14/98 20:00:00
09/22/98 22:30:00
01/01/99 00:00


Feet vs. Time '0422 Ch1
685.000
684.000
683.000
682.000
681.000
680.000
679.000
678.000
677.000
11/26/97 14:00:00
03/06/98 16:30:00
06/14/98 20:00:00
09/22/98 22:30:00
01/01/99 00:00

Feet vs. Time '0423 Ch1 '
690.000
685.000
680.000
675.000
670.000
665.000
660.000
11/26/97 14:00:00
03/06/98 16:30:00
06/14/98 20:00:00
09/22/98 22:30:00
01/01/99 00:00

NATIONAL ENVIRONMENTAL TESTING, INC.

Dayton Division
3601 South Dixie Drive
Dayton, OH 45439
Tel: (937) 294-6856
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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510496

Sample Description: 003I

Date Taken: 12/07/1998

Date Received: 12/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	12/09/1998	jpf
Acrolein (Screen)	<50.0	ug/L	12/09/1998	jpf
Acrylonitrile (Screen)	<50.0	ug/L	12/09/1998	jpf
Benzene	<1.0	ug/L	12/09/1998	jpf
Bromodichloromethane	<1.0	ug/L	12/09/1998	jpf
Bromoform	<1.0	ug/L	12/09/1998	jpf
Bromomethane	<5.0	ug/L	12/09/1998	jpf
Carbon tetrachloride	<1.0	ug/L	12/09/1998	jpf
Chlorobenzene	<1.0	ug/L	12/09/1998	jpf
Chloroethane	<10.0	ug/L	12/09/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	12/09/1998	jpf
Chloroform	<1.0	ug/L	12/09/1998	jpf
Chloromethane	<10.0	ug/L	12/09/1998	jpf
Dibromochloromethane	<1.0	ug/L	12/09/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	12/09/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	12/09/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
cis-1,2-Dichloroethene	1.5	ug/L	12/09/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	12/09/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	12/09/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	12/09/1998	jpf
Ethylbenzene	<1.0	ug/L	12/09/1998	jpf
Methylene chloride	<10.0	ug/L	12/09/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	12/09/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	12/09/1998	jpf
Tetrachloroethene	4.6	ug/L	12/09/1998	jpf
Toluene	<1.0	ug/L	12/09/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	12/09/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	12/09/1998	jpf
Trichloroethene	3.3	ug/L	12/09/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	12/09/1998	jpf
Vinyl chloride	<2.0	ug/L	12/09/1998	jpf

NATIONAL ENVIRONMENTAL TESTING, INC.

Dayton Division
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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510496

Sample Description: 003I

Date Taken: 12/07/1998

Date Received: 12/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	95	%	12/09/1998	jpf
Surrogate: d8-Toluene	98	%	12/09/1998	jpf
Surrogate: BFB	100	%	12/09/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510497

Sample Description: 003E

Date Taken: 12/07/1998

Date Received: 12/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	12/09/1998	jpf
Acrolein (Screen)	<50.0	ug/L	12/09/1998	jpf
Acrylonitrile (Screen)	<50.0	ug/L	12/09/1998	jpf
Benzene	<1.0	ug/L	12/09/1998	jpf
Bromodichloromethane	<1.0	ug/L	12/09/1998	jpf
Bromoform	<1.0	ug/L	12/09/1998	jpf
Bromomethane	<5.0	ug/L	12/09/1998	jpf
Carbon tetrachloride	<1.0	ug/L	12/09/1998	jpf
Chlorobenzene	<1.0	ug/L	12/09/1998	jpf
Chloroethane	<10.0	ug/L	12/09/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	12/09/1998	jpf
Chloroform	<1.0	ug/L	12/09/1998	jpf
Chloromethane	<10.0	ug/L	12/09/1998	jpf
Dibromochloromethane	<1.0	ug/L	12/09/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	12/09/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	12/09/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	12/09/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	12/09/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	12/09/1998	jpf
Ethylbenzene	<1.0	ug/L	12/09/1998	jpf
Methylene chloride	<10.0	ug/L	12/09/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	12/09/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	12/09/1998	jpf
Tetrachloroethene	<1.0	ug/L	12/09/1998	jpf
Toluene	<1.0	ug/L	12/09/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	12/09/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	12/09/1998	jpf
Trichloroethene	<1.0	ug/L	12/09/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	12/09/1998	jpf
Vinyl chloride	<2.0	ug/L	12/09/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510497

Sample Description: 003E

Date Taken: 12/07/1998

Date Received: 12/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	95	%	12/09/1998	jpf
Surrogate: d8-Toluene	97	%	12/09/1998	jpf
Surrogate: BFB	100	%	12/09/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510498

Sample Description: 003-412

Date Taken: 12/07/1998

Date Received: 12/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	12/09/1998	jpf
Acrolein (Screen)	<50.0	ug/L	12/09/1998	jpf
Acrylonitrile (Screen)	<50.0	ug/L	12/09/1998	jpf
Benzene	<1.0	ug/L	12/09/1998	jpf
Bromodichloromethane	<1.0	ug/L	12/09/1998	jpf
Bromoform	<1.0	ug/L	12/09/1998	jpf
Bromomethane	<5.0	ug/L	12/09/1998	jpf
Carbon tetrachloride	<1.0	ug/L	12/09/1998	jpf
Chlorobenzene	<1.0	ug/L	12/09/1998	jpf
Chloroethane	<10.0	ug/L	12/09/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	12/09/1998	jpf
Chloroform	<1.0	ug/L	12/09/1998	jpf
Chloromethane	<10.0	ug/L	12/09/1998	jpf
Dibromochloromethane	<1.0	ug/L	12/09/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	12/09/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	12/09/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	12/09/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	12/09/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	12/09/1998	jpf
Ethylbenzene	<1.0	ug/L	12/09/1998	jpf
Methylene chloride	<10.0	ug/L	12/09/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	12/09/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	12/09/1998	jpf
Tetrachloroethene	1.5	ug/L	12/09/1998	jpf
Toluene	<1.0	ug/L	12/09/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	12/09/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	12/09/1998	jpf
Trichloroethene	1.1	ug/L	12/09/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	12/09/1998	jpf
Vinyl chloride	<2.0	ug/L	12/09/1998	jpf

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510498

Sample Description: 003-412

Date Taken: 12/07/1998

Date Received: 12/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	95	%	12/09/1998	jpf
Surrogate: d8-Toluene	97	%	12/09/1998	jpf
Surrogate: BFB	99	%	12/09/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510499

Sample Description: 003-413

Date Taken: 12/07/1998

Date Received: 12/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	12/09/1998	jpf
Acrolein (Screen)	<50.0	ug/L	12/09/1998	jpf
Acrylonitrile (Screen)	<50.0	ug/L	12/09/1998	jpf
Benzene	<1.0	ug/L	12/09/1998	jpf
Bromodichloromethane	<1.0	ug/L	12/09/1998	jpf
Bromoform	<1.0	ug/L	12/09/1998	jpf
Bromomethane	<5.0	ug/L	12/09/1998	jpf
Carbon tetrachloride	<1.0	ug/L	12/09/1998	jpf
Chlorobenzene	<1.0	ug/L	12/09/1998	jpf
Chloroethane	<10.0	ug/L	12/09/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	12/09/1998	jpf
Chloroform	<1.0	ug/L	12/09/1998	jpf
Chloromethane	<10.0	ug/L	12/09/1998	jpf
Dibromochloromethane	<1.0	ug/L	12/09/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	12/09/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	12/09/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	12/09/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	12/09/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	12/09/1998	jpf
Ethylbenzene	<1.0	ug/L	12/09/1998	jpf
Methylene chloride	<10.0	ug/L	12/09/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	12/09/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	12/09/1998	jpf
Tetrachloroethene	8.9	ug/L	12/09/1998	jpf
Toluene	<1.0	ug/L	12/09/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	12/09/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	12/09/1998	jpf
Trichloroethene	5.4	ug/L	12/09/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	12/09/1998	jpf
Vinyl chloride	<2.0	ug/L	12/09/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510499

Sample Description: 003-413

Date Taken: 12/07/1998

Date Received: 12/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	95	%	12/09/1998	jpf
Surrogate: d8-Toluene	98	%	12/09/1998	jpf
Surrogate: BFB	100	%	12/09/1998	jpf

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Ron Paulick
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12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510500

Sample Description: 003-414

Date Taken: 12/07/1998

Date Received: 12/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	12/09/1998	jpf
Acrolein (Screen)	<50.0	ug/L	12/09/1998	jpf
Acrylonitrile (Screen)	<50.0	ug/L	12/09/1998	jpf
Benzene	<1.0	ug/L	12/09/1998	jpf
Bromodichloromethane	<1.0	ug/L	12/09/1998	jpf
Bromoform	<1.0	ug/L	12/09/1998	jpf
Bromomethane	<5.0	ug/L	12/09/1998	jpf
Carbon tetrachloride	<1.0	ug/L	12/09/1998	jpf
Chlorobenzene	<1.0	ug/L	12/09/1998	jpf
Chloroethane	<10.0	ug/L	12/09/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	12/09/1998	jpf
Chloroform	<1.0	ug/L	12/09/1998	jpf
Chloromethane	<10.0	ug/L	12/09/1998	jpf
Dibromochloromethane	<1.0	ug/L	12/09/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	12/09/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	12/09/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	12/09/1998	jpf
cis-1,2-Dichloroethene	4.0	ug/L	12/09/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	12/09/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	12/09/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	12/09/1998	jpf
Ethylbenzene	<1.0	ug/L	12/09/1998	jpf
Methylene chloride	<10.0	ug/L	12/09/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	12/09/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	12/09/1998	jpf
Tetrachloroethene	6.1	ug/L	12/09/1998	jpf
Toluene	<1.0	ug/L	12/09/1998	jpf
1,1,1-Trichloroethane	2.4	ug/L	12/09/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	12/09/1998	jpf
Trichloroethene	5.0	ug/L	12/09/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	12/09/1998	jpf
Vinyl chloride	<2.0	ug/L	12/09/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
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Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510500

Sample Description: 003-414

Date Taken: 12/07/1998

Date Received: 12/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	96	%	12/09/1998	jpf
Surrogate: d8-Toluene	97	%	12/09/1998	jpf
Surrogate: BFB	97	%	12/09/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510501

Sample Description: 003

Date Taken: 12/07/1998

Date Received: 12/07/1998

BASE NEUTRAL COMPOUNDS - 625

Parameter	Result	Unit	Date Anal.	Analyst
Acenaphthene	<5	ug/L	12/09/1998	jwr
Acenaphthylene	<5	ug/L	12/09/1998	jwr
Anthracene	<5	ug/L	12/09/1998	jwr
Benzidine	<50	ug/L	12/09/1998	jwr
Benzo(a)anthracene	<5	ug/L	12/09/1998	jwr
Benzo(b)fluoranthene	<10	ug/L	12/09/1998	jwr
Benzo(k)fluoranthene	<10	ug/L	12/09/1998	jwr
Benzo(a)pyrene	<5	ug/L	12/09/1998	jwr
Benzo(ghi)perylene	<5	ug/L	12/09/1998	jwr
Benzyl butyl phthalate	<5	ug/L	12/09/1998	jwr
bis(2-Chloroethyl)ether	<5	ug/L	12/09/1998	jwr
bis(2-Chloroethoxy)methane	<5	ug/L	12/09/1998	jwr
bis(2-Ethylhexyl)phthalate	<5	ug/L	12/09/1998	jwr
bis(2-Chloroisopropyl)ether	<5	ug/L	12/09/1998	jwr
4-Bromophenyl phenyl ether	<5	ug/L	12/09/1998	jwr
2-Chloronaphthalene	<5	ug/L	12/09/1998	jwr
4-Chlorophenylphenyl ether	<5	ug/L	12/09/1998	jwr
Chrysene	<5	ug/L	12/09/1998	jwr
Dibenzo(a,h)anthracene	<5	ug/L	12/09/1998	jwr
Di-n-butylphthalate	<5	ug/L	12/09/1998	jwr
1,3-Dichlorobenzene	<5	ug/L	12/09/1998	jwr
1,2-Dichlorobenzene	<5	ug/L	12/09/1998	jwr
1,4-Dichlorobenzene	<5	ug/L	12/09/1998	jwr
3,3'-Dichlorobenzidine	<50	ug/L	12/09/1998	jwr
Diethyl phthalate	<5	ug/L	12/09/1998	jwr
1,2-Diphenylhydrazine	<5	ug/L	12/09/1998	jwr
Dimethyl phthalate	<5	ug/L	12/09/1998	jwr
2,4-Dinitrotoluene	<5	ug/L	12/09/1998	jwr
2,6-Dinitrotoluene	<5	ug/L	12/09/1998	jwr
Di-n-octylphthalate	<5	ug/L	12/09/1998	jwr
Fluoranthene	<5	ug/L	12/09/1998	jwr
Fluorene	<5	ug/L	12/09/1998	jwr
Hexachlorobenzene	<5	ug/L	12/09/1998	jwr

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

12/11/1998

JOB NUMBER: 98.21466

SAMPLE NO.: 510501

Sample Description: 003

Date Taken: 12/07/1998

Date Received: 12/07/1998

BASE NEUTRAL COMPOUNDS - 625

Parameter	Result	Unit	Date Anal.	Analyst
Hexachloro-1,3-butadiene	<5	ug/L	12/09/1998	jwr
Hexachlorocyclopentadiene	<20	ug/L	12/09/1998	jwr
Hexachloroethane	<5	ug/L	12/09/1998	jwr
Indeno(1,2,3-cd)pyrene	<5	ug/L	12/09/1998	jwr
Isophorone	<5	ug/L	12/09/1998	jwr
Naphthalene	<5	ug/L	12/09/1998	jwr
Nitrobenzene	<5	ug/L	12/09/1998	jwr
N-Nitrosodimethylamine	<5	ug/L	12/09/1998	jwr
N-Nitrosodiphenylamine	<5	ug/L	12/09/1998	jwr
N-Nitrosodi-n-propylamine	<5	ug/L	12/09/1998	jwr
Phenanthrene	<5	ug/L	12/09/1998	jwr
Pyrene	<5	ug/L	12/09/1998	jwr
1,2,4-Trichlorobenzene	<5	ug/L	12/09/1998	jwr
Surrogate: d5-Nitrobenzene	78	%	12/09/1998	jwr
Surrogate: 2-Fluorobiphenyl	83	%	12/09/1998	jwr
Surrogate: d14-Terphenyl	70 note	%	12/09/1998	jwr

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NOTES AND COMMENTS

NET Job Number: 98.21466

Sample Number: 510501

Analysis: 625 BNA

The recovery for the d12-Perylene internal standard is below the recommended acceptance limit. No target analytes are affected.

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

11/20/1998

JOB NUMBER: 98.20333

SAMPLE NO.: 507311

Sample Description: 003E

Date Taken: 11/17/1998

Date Received: 11/17/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	11/19/1998	dmg
Acrolein (Screen)	<50.0	ug/L	11/19/1998	dmg
Acrylonitrile (Screen)	<50.0	ug/L	11/19/1998	dmg
Benzene	<1.0	ug/L	11/19/1998	dmg
Bromodichloromethane	<1.0	ug/L	11/19/1998	dmg
Bromoform	<1.0	ug/L	11/19/1998	dmg
Bromomethane	<5.0	ug/L	11/19/1998	dmg
Carbon tetrachloride	<1.0	ug/L	11/19/1998	dmg
Chlorobenzene	<1.0	ug/L	11/19/1998	dmg
Chloroethane	<10.0	ug/L	11/19/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	11/19/1998	dmg
Chloroform	<1.0	ug/L	11/19/1998	dmg
Chloromethane	<10.0	ug/L	11/19/1998	dmg
Dibromochloromethane	<1.0	ug/L	11/19/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	11/19/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	11/19/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	11/19/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	11/19/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	11/19/1998	dmg
Ethylbenzene	<1.0	ug/L	11/19/1998	dmg
Methylene chloride	<10.0	ug/L	11/19/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	11/19/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	11/19/1998	dmg
Tetrachloroethene	<1.0	ug/L	11/19/1998	dmg
Toluene	<1.0	ug/L	11/19/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	11/19/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	11/19/1998	dmg
Trichloroethene	<1.0	ug/L	11/19/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	11/19/1998	dmg
Vinyl chloride	<2.0	ug/L	11/19/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
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Miamisburg, OH 45343-3000

11/20/1998

JOB NUMBER: 98.20333

SAMPLE NO.: 507311

Sample Description: 003E

Date Taken: 11/17/1998

Date Received: 11/17/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	99	%	11/19/1998	dmg
Surrogate: d8-Toluene	98	%	11/19/1998	dmg
Surrogate: BFB	96	%	11/19/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

11/20/1998

JOB NUMBER: 98.20333

SAMPLE NO.: 507312

Sample Description: 003I

Date Taken: 11/17/1998

Date Received: 11/17/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	11/19/1998	dmg
Acrolein (Screen)	<50.0	ug/L	11/19/1998	dmg
Acrylonitrile (Screen)	<50.0	ug/L	11/19/1998	dmg
Benzene	<1.0	ug/L	11/19/1998	dmg
Bromodichloromethane	<1.0	ug/L	11/19/1998	dmg
Bromoform	<1.0	ug/L	11/19/1998	dmg
Bromomethane	<5.0	ug/L	11/19/1998	dmg
Carbon tetrachloride	<1.0	ug/L	11/19/1998	dmg
Chlorobenzene	<1.0	ug/L	11/19/1998	dmg
Chloroethane	<10.0	ug/L	11/19/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	11/19/1998	dmg
Chloroform	<1.0	ug/L	11/19/1998	dmg
Chloromethane	<10.0	ug/L	11/19/1998	dmg
Dibromochloromethane	<1.0	ug/L	11/19/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	11/19/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	11/19/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
cis-1,2-Dichloroethene	1.6	ug/L	11/19/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	11/19/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	11/19/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	11/19/1998	dmg
Ethylbenzene	<1.0	ug/L	11/19/1998	dmg
Methylene chloride	<10.0	ug/L	11/19/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	11/19/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	11/19/1998	dmg
Tetrachloroethene	4.7	ug/L	11/19/1998	dmg
Toluene	<1.0	ug/L	11/19/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	11/19/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	11/19/1998	dmg
Trichloroethene	3.5	ug/L	11/19/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	11/19/1998	dmg
Vinyl chloride	<2.0	ug/L	11/19/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
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Miamisburg, OH 45343-3000

11/20/1998

JOB NUMBER: 98.20333

SAMPLE NO.: 507312

Sample Description: 003I

Date Taken: 11/17/1998

Date Received: 11/17/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	99	%	11/19/1998	dmg
Surrogate: d8-Toluene	98	%	11/19/1998	dmg
Surrogate: BFB	94	%	11/19/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
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11/20/1998

JOB NUMBER: 98.20333

SAMPLE NO.: 507313

Sample Description: 003-412

Date Taken: 11/17/1998

Date Received: 11/17/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	11/19/1998	dmg
Acrolein (Screen)	<50.0	ug/L	11/19/1998	dmg
Acrylonitrile (Screen)	<50.0	ug/L	11/19/1998	dmg
Benzene	<1.0	ug/L	11/19/1998	dmg
Bromodichloromethane	<1.0	ug/L	11/19/1998	dmg
Bromoform	<1.0	ug/L	11/19/1998	dmg
Bromomethane	<5.0	ug/L	11/19/1998	dmg
Carbon tetrachloride	<1.0	ug/L	11/19/1998	dmg
Chlorobenzene	<1.0	ug/L	11/19/1998	dmg
Chloroethane	<10.0	ug/L	11/19/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	11/19/1998	dmg
Chloroform	<1.0	ug/L	11/19/1998	dmg
Chloromethane	<10.0	ug/L	11/19/1998	dmg
Dibromochloromethane	<1.0	ug/L	11/19/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	11/19/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	11/19/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	11/19/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	11/19/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	11/19/1998	dmg
Ethylbenzene	<1.0	ug/L	11/19/1998	dmg
Methylene chloride	<10.0	ug/L	11/19/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	11/19/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	11/19/1998	dmg
Tetrachloroethene	8.9	ug/L	11/19/1998	dmg
Toluene	<1.0	ug/L	11/19/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	11/19/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	11/19/1998	dmg
Trichloroethene	6.1	ug/L	11/19/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	11/19/1998	dmg
Vinyl chloride	<2.0	ug/L	11/19/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
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11/20/1998

JOB NUMBER: 98.20333

SAMPLE NO.: 507313

Sample Description: 003-412

Date Taken: 11/17/1998

Date Received: 11/17/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	100	%	11/19/1998	dmg
Surrogate: d8-Toluene	97	%	11/19/1998	dmg
Surrogate: BFB	96	%	11/19/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
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11/20/1998

JOB NUMBER: 98.20333

SAMPLE NO.: 507314

Sample Description: 003-413

Date Taken: 11/17/1998

Date Received: 11/17/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	11/19/1998	dmg
Acrolein (Screen)	<50.0	ug/L	11/19/1998	dmg
Acrylonitrile (Screen)	<50.0	ug/L	11/19/1998	dmg
Benzene	<1.0	ug/L	11/19/1998	dmg
Bromodichloromethane	<1.0	ug/L	11/19/1998	dmg
Bromoform	<1.0	ug/L	11/19/1998	dmg
Bromomethane	<5.0	ug/L	11/19/1998	dmg
Carbon tetrachloride	<1.0	ug/L	11/19/1998	dmg
Chlorobenzene	<1.0	ug/L	11/19/1998	dmg
Chloroethane	<10.0	ug/L	11/19/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	11/19/1998	dmg
Chloroform	<1.0	ug/L	11/19/1998	dmg
Chloromethane	<10.0	ug/L	11/19/1998	dmg
Dibromochloromethane	<1.0	ug/L	11/19/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	11/19/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	11/19/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	11/19/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	11/19/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	11/19/1998	dmg
Ethylbenzene	<1.0	ug/L	11/19/1998	dmg
Methylene chloride	<10.0	ug/L	11/19/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	11/19/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	11/19/1998	dmg
Tetrachloroethene	1.5	ug/L	11/19/1998	dmg
Toluene	<1.0	ug/L	11/19/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	11/19/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	11/19/1998	dmg
Trichloroethene	1.2	ug/L	11/19/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	11/19/1998	dmg
Vinyl chloride	<2.0	ug/L	11/19/1998	dmg

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11/20/1998

JOB NUMBER: 98.20333

SAMPLE NO.: 507314

Sample Description: 003-413

Date Taken: 11/17/1998

Date Received: 11/17/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	100	%	11/19/1998	dmg
Surrogate: d8-Toluene	100	%	11/19/1998	dmg
Surrogate: BFB	94	%	11/19/1998	dmg

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11/20/1998

JOB NUMBER: 98.20333

SAMPLE NO.: 507315

Sample Description: 003-414

Date Taken: 11/17/1998

Date Received: 11/17/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	11/19/1998	dmg
Acrolein (Screen)	<50.0	ug/L	11/19/1998	dmg
Acrylonitrile (Screen)	<50.0	ug/L	11/19/1998	dmg
Benzene	<1.0	ug/L	11/19/1998	dmg
Bromodichloromethane	<1.0	ug/L	11/19/1998	dmg
Bromoform	<1.0	ug/L	11/19/1998	dmg
Bromomethane	<5.0	ug/L	11/19/1998	dmg
Carbon tetrachloride	<1.0	ug/L	11/19/1998	dmg
Chlorobenzene	<1.0	ug/L	11/19/1998	dmg
Chloroethane	<10.0	ug/L	11/19/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	11/19/1998	dmg
Chloroform	<1.0	ug/L	11/19/1998	dmg
Chloromethane	<10.0	ug/L	11/19/1998	dmg
Dibromochloromethane	<1.0	ug/L	11/19/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	11/19/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	11/19/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	11/19/1998	dmg
cis-1,2-Dichloroethene	4.5	ug/L	11/19/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	11/19/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	11/19/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	11/19/1998	dmg
Ethylbenzene	<1.0	ug/L	11/19/1998	dmg
Methylene chloride	<10.0	ug/L	11/19/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	11/19/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	11/19/1998	dmg
Tetrachloroethene	6.3	ug/L	11/19/1998	dmg
Toluene	<1.0	ug/L	11/19/1998	dmg
1,1,1-Trichloroethane	2.6	ug/L	11/19/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	11/19/1998	dmg
Trichloroethene	5.8	ug/L	11/19/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	11/19/1998	dmg
Vinyl chloride	<2.0	ug/L	11/19/1998	dmg

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11/20/1998

JOB NUMBER: 98.20333

SAMPLE NO.: 507315

Sample Description: 003-414

Date Taken: 11/17/1998

Date Received: 11/17/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	99	%	11/19/1998	dmg
Surrogate: d8-Toluene	99	%	11/19/1998	dmg
Surrogate: BFB	95	%	11/19/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

10/22/1998

JOB NUMBER: 98.18249

SAMPLE NO.: 501154

Sample Description: 003E

Date Taken: 10/14/1998

Date Received: 10/14/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	10/16/1998	jpf
Acrolein (Screen)	<50.0	ug/L	10/16/1998	jpf
Acrylonitrile (Screen)	<50.0	ug/L	10/16/1998	jpf
Benzene	<1.0	ug/L	10/16/1998	jpf
Bromodichloromethane	<1.0	ug/L	10/16/1998	jpf
Bromoform	<1.0	ug/L	10/16/1998	jpf
Bromomethane	<5.0	ug/L	10/16/1998	jpf
Carbon tetrachloride	<1.0	ug/L	10/16/1998	jpf
Chlorobenzene	<1.0	ug/L	10/16/1998	jpf
Chloroethane	<10.0	ug/L	10/16/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	10/16/1998	jpf
Chloroform	<1.0	ug/L	10/16/1998	jpf
Chloromethane	<10.0	ug/L	10/16/1998	jpf
Dibromochloromethane	<1.0	ug/L	10/16/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	10/16/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	10/16/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	10/16/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	10/16/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	10/16/1998	jpf
Ethylbenzene	<1.0	ug/L	10/16/1998	jpf
Methylene chloride	<10.0	ug/L	10/16/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	10/16/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	10/16/1998	jpf
Tetrachloroethene	<1.0	ug/L	10/16/1998	jpf
Toluene	<1.0	ug/L	10/16/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	10/16/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	10/16/1998	jpf
Trichloroethene	<1.0	ug/L	10/16/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	10/16/1998	jpf
Vinyl chloride	<2.0	ug/L	10/16/1998	jpf

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10/22/1998

JOB NUMBER: 98.18249

SAMPLE NO.: 501154

Sample Description: 003E

Date Taken: 10/14/1998

Date Received: 10/14/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	98	%	10/16/1998	jpf
Surrogate: d8-Toluene	101	%	10/16/1998	jpf
Surrogate: BFB	92	%	10/16/1998	jpf

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10/22/1998

JOB NUMBER: 98.18249

SAMPLE NO.: 501155

Sample Description: 003I

Date Taken: 10/14/1998

Date Received: 10/14/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	10/16/1998	jpf
Acrolein (Screen)	<50.0	ug/L	10/16/1998	jpf
Acrylonitrile (Screen)	<50.0	ug/L	10/16/1998	jpf
[illegible]ene	<1.0	ug/L	10/16/1998	jpf
[illegible]odichloromethane	<1.0	ug/L	10/16/1998	jpf
Bromoform	<1.0	ug/L	10/16/1998	jpf
Bromomethane	<5.0	ug/L	10/16/1998	jpf
Carbon tetrachloride	<1.0	ug/L	10/16/1998	jpf
Chlorobenzene	<1.0	ug/L	10/16/1998	jpf
Chloroethane	<10.0	ug/L	10/16/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	10/16/1998	jpf
Chloroform	<1.0	ug/L	10/16/1998	jpf
Chloromethane	<10.0	ug/L	10/16/1998	jpf
Dibromochloromethane	<1.0	ug/L	10/16/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	10/16/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	10/16/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
cis-1,2-Dichloroethene	2.0	ug/L	10/16/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	10/16/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	10/16/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	10/16/1998	jpf
Ethylbenzene	<1.0	ug/L	10/16/1998	jpf
Methylene chloride	<10.0	ug/L	10/16/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	10/16/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	10/16/1998	jpf
Tetrachloroethene	5.6	ug/L	10/16/1998	jpf
Toluene	<1.0	ug/L	10/16/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	10/16/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	10/16/1998	jpf
Trichloroethene	4.6	ug/L	10/16/1998	jpf
[illegible]chlorofluoromethane	<1.0	ug/L	10/16/1998	jpf
[illegible] chloride	<2.0	ug/L	10/16/1998	jpf

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ANALYTICAL REPORT

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10/22/1998

JOB NUMBER: 98.18249

SAMPLE NO.: 501155

Sample Description: 003I

Date Taken: 10/14/1998

Date Received: 10/14/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	100	%	10/16/1998	jpf
Surrogate: d8-Toluene	103	%	10/16/1998	jpf
Surrogate: BFB	94	%	10/16/1998	jpf

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ANALYTICAL REPORT

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10/22/1998

JOB NUMBER: 98.18249

SAMPLE NO.: 501156

Sample Description: 003-412`

Date Taken: 10/14/1998

Date Received: 10/14/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	10/16/1998	jpf
Acrolein (Screen)	<50.0	ug/L	10/16/1998	jpf
Acrylonitrile (Screen)	<50.0	ug/L	10/16/1998	jpf
Benzene	<1.0	ug/L	10/16/1998	jpf
Bromodichloromethane	<1.0	ug/L	10/16/1998	jpf
Bromoform	<1.0	ug/L	10/16/1998	jpf
Bromomethane	<5.0	ug/L	10/16/1998	jpf
Carbon tetrachloride	1.3	ug/L	10/16/1998	jpf
Chlorobenzene	<1.0	ug/L	10/16/1998	jpf
Chloroethane	<10.0	ug/L	10/16/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	10/16/1998	jpf
Chloroform	<1.0	ug/L	10/16/1998	jpf
Chloromethane	<10.0	ug/L	10/16/1998	jpf
Dibromochloromethane	<1.0	ug/L	10/16/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	10/16/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	10/16/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	10/16/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	10/16/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	10/16/1998	jpf
Ethylbenzene	<1.0	ug/L	10/16/1998	jpf
Methylene chloride	<10.0	ug/L	10/16/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	10/16/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	10/16/1998	jpf
Tetrachloroethene	10.3	ug/L	10/16/1998	jpf
Toluene	<1.0	ug/L	10/16/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	10/16/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	10/16/1998	jpf
Trichloroethene	7.4	ug/L	10/16/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	10/16/1998	jpf
Vinyl chloride	<2.0	ug/L	10/16/1998	jpf

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ANALYTICAL REPORT

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10/22/1998

JOB NUMBER: 98.18249

SAMPLE NO.: 501156

Sample Description: 003-412

Date Taken: 10/14/1998

Date Received: 10/14/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	99	%	10/16/1998	jpf
Surrogate: d8-Toluene	101	%	10/16/1998	jpf
Surrogate: BFB	90	%	10/16/1998	jpf

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ANALYTICAL REPORT

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10/22/1998

JOB NUMBER: 98.18249

SAMPLE NO.: 501157

Sample Description: 003-413

Date Taken: 10/14/1998

Date Received: 10/14/1998

VOLATILE COMPOUNDS - 624

arameter	Result	Unit	Date Anal.	Analyst
cetone	<20.0	ug/L	10/16/1998	jpf
crolein (Screen)	<50.0	ug/L	10/16/1998	jpf
crylonitrile (Screen)	<50.0	ug/L	10/16/1998	jpf
enzene	<1.0	ug/L	10/16/1998	jpf
romodichloromethane	<1.0	ug/L	10/16/1998	jpf
romoform	<1.0	ug/L	10/16/1998	jpf
romomethane	<5.0	ug/L	10/16/1998	jpf
arbon tetrachloride	<1.0	ug/L	10/16/1998	jpf
hlorobenzene	<1.0	ug/L	10/16/1998	jpf
hloroethane	<10.0	ug/L	10/16/1998	jpf
-Chloroethyl vinyl ether	<5.0	ug/L	10/16/1998	jpf
hloroform	<1.0	ug/L	10/16/1998	jpf
hloromethane	<10.0	ug/L	10/16/1998	jpf
ibromochloromethane	<1.0	ug/L	10/16/1998	jpf
,1-Dichloroethane	<1.0	ug/L	10/16/1998	jpf
,2-Dichloroethane	<1.0	ug/L	10/16/1998	jpf
,1-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
rans-1,2-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
is-1,2-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
,2-Dichloropropane	<1.0	ug/L	10/16/1998	jpf
is-1,3-Dichloropropene	<1.0	ug/L	10/16/1998	jpf
rans-1,3-Dichloropropene	<1.0	ug/L	10/16/1998	jpf
thylbenzene	<1.0	ug/L	10/16/1998	jpf
ethylene chloride	<10.0	ug/L	10/16/1998	jpf
-Butanone (MEK)	<10.0	ug/L	10/16/1998	jpf
,1,2,2-Tetrachloroethane	<1.0	ug/L	10/16/1998	jpf
etrachloroethene	1.7	ug/L	10/16/1998	jpf
oluene	<1.0	ug/L	10/16/1998	jpf
1,1-Trichloroethane	<1.0	ug/L	10/16/1998	jpf
1,2-Trichloroethane	<1.0	ug/L	10/16/1998	jpf
richloroethene	1.4	ug/L	10/16/1998	jpf
richlorofluoromethane	<1.0	ug/L	10/16/1998	jpf
inyl chloride	<2.0	ug/L	10/16/1998	jpf

NATIONAL ENVIRONMENTAL TESTING, INC.

Dayton Division
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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

10/22/1998

JOB NUMBER: 98.18249

SAMPLE NO.: 501157

Sample Description: 003-413

Date Taken: 10/14/1998

Date Received: 10/14/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	99	%	10/16/1998	jpf
Surrogate: d8-Toluene	101	%	10/16/1998	jpf
Surrogate: BFB	93	%	10/16/1998	jpf

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Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
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10/22/1998

JOB NUMBER: 98.18249

SAMPLE NO.: 501158

Sample Description: 003-414

Date Taken: 10/14/1998

Date Received: 10/14/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	10/16/1998	jpf
Acrolein (Screen)	<50.0	ug/L	10/16/1998	jpf
Acrylonitrile (Screen)	<50.0	ug/L	10/16/1998	jpf
Benzene	<1.0	ug/L	10/16/1998	jpf
Bromodichloromethane	<1.0	ug/L	10/16/1998	jpf
Bromoform	<1.0	ug/L	10/16/1998	jpf
Bromomethane	<5.0	ug/L	10/16/1998	jpf
Carbon tetrachloride	<1.0	ug/L	10/16/1998	jpf
Chlorobenzene	<1.0	ug/L	10/16/1998	jpf
Chloroethane	<10.0	ug/L	10/16/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	10/16/1998	jpf
Chloroform	<1.0	ug/L	10/16/1998	jpf
Chloromethane	<10.0	ug/L	10/16/1998	jpf
Dibromochloromethane	<1.0	ug/L	10/16/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	10/16/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	10/16/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	10/16/1998	jpf
cis-1,2-Dichloroethene	7.3	ug/L	10/16/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	10/16/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	10/16/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	10/16/1998	jpf
Ethylbenzene	<1.0	ug/L	10/16/1998	jpf
Methylene chloride	<10.0	ug/L	10/16/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	10/16/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	10/16/1998	jpf
Tetrachloroethene	7.8	ug/L	10/16/1998	jpf
Toluene	<1.0	ug/L	10/16/1998	jpf
1,1,1-Trichloroethane	2.2	ug/L	10/16/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	10/16/1998	jpf
Trichloroethene	7.1	ug/L	10/16/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	10/16/1998	jpf
Vinyl chloride	<2.0	ug/L	10/16/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
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10/22/1998

JOB NUMBER: 98.18249

SAMPLE NO.: 501158

Sample Description: 003-414

Date Taken: 10/14/1998

Date Received: 10/14/1998

VOLATILE COMPOUNDS - 624

arameter	Result	Unit	Date Anal.	Analyst
ırrogate: d4-1,2-DCE	99	%	10/16/1998	jpf
gate: d8-Toluene	103	%	10/16/1998	jpf
gate: BFB	91	%	10/16/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

09/15/1998

JOB NUMBER: 98:15937

SAMPLE NO.: 494130

Sample Description: 003-412

Date Taken: 09/10/1998

Date Received: 09/10/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	09/11/1998	jpf
Acrolein	<50.0	ug/L	09/11/1998	jpf
Acrylonitrile	<50.0	ug/L	09/11/1998	jpf
Benzene	<1.0	ug/L	09/11/1998	jpf
Bromodichloromethane	<1.0	ug/L	09/11/1998	jpf
Bromoform	<1.0	ug/L	09/11/1998	jpf
Bromomethane	<5.0	ug/L	09/11/1998	jpf
Carbon tetrachloride	1.2	ug/L	09/11/1998	jpf
Chlorobenzene	<1.0	ug/L	09/11/1998	jpf
Chloroethane	<10.0	ug/L	09/11/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	09/11/1998	jpf
Chloroform	<1.0	ug/L	09/11/1998	jpf
Chloromethane	<10.0	ug/L	09/11/1998	jpf
Dibromochloromethane	<1.0	ug/L	09/11/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	09/11/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	09/11/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	09/11/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	09/11/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	09/11/1998	jpf
Ethylbenzene	<1.0	ug/L	09/11/1998	jpf
Methylene chloride	<10.0	ug/L	09/11/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	09/11/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	09/11/1998	jpf
Tetrachloroethene	8.2	ug/L	09/11/1998	jpf
Toluene	<1.0	ug/L	09/11/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	09/11/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	09/11/1998	jpf
Trichloroethene	6.2	ug/L	09/11/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	09/11/1998	jpf
Vinyl chloride	<2.0	ug/L	09/11/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

09/15/1998

JOB NUMBER: 98.15937

SAMPLE NO.: 494130

Sample Description: 003-412

Date Taken: 09/10/1998

Date Received: 09/10/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	101	%	09/11/1998	jpf
Surrogate: d8-Toluene	101	%	09/11/1998	jpf
Surrogate: BFB	92	%	09/11/1998	jpf

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P. O. Box 3030
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09/15/1998

JOB NUMBER: 98.15937

SAMPLE NO.: 494131

Sample Description: 003-413

Date Taken: 09/10/1998

Date Received: 09/10/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	09/11/1998	jpf
Acrolein	<50.0	ug/L	09/11/1998	jpf
Acrylonitrile	<50.0	ug/L	09/11/1998	jpf
Benzene	<1.0	ug/L	09/11/1998	jpf
Bromodichloromethane	<1.0	ug/L	09/11/1998	jpf
Bromoform	<1.0	ug/L	09/11/1998	jpf
Bromomethane	<5.0	ug/L	09/11/1998	jpf
Carbon tetrachloride	<1.0	ug/L	09/11/1998	jpf
Chlorobenzene	<1.0	ug/L	09/11/1998	jpf
Chloroethane	<10.0	ug/L	09/11/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	09/11/1998	jpf
Chloroform	<1.0	ug/L	09/11/1998	jpf
Chloromethane	<10.0	ug/L	09/11/1998	jpf
Dibromochloromethane	<1.0	ug/L	09/11/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	09/11/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	09/11/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	09/11/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	09/11/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	09/11/1998	jpf
Ethylbenzene	<1.0	ug/L	09/11/1998	jpf
Methylene chloride	<10.0	ug/L	09/11/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	09/11/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	09/11/1998	jpf
Tetrachloroethene	1.6	ug/L	09/11/1998	jpf
Toluene	<1.0	ug/L	09/11/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	09/11/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	09/11/1998	jpf
Trichloroethene	1.8	ug/L	09/11/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	09/11/1998	jpf
Vinyl chloride	<2.0	ug/L	09/11/1998	jpf

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ANALYTICAL REPORT

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BABCOCK & WILCOX OF OHIO
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09/15/1998

JOB NUMBER: 98.15937

SAMPLE NO.: 494131

Sample Description: 003-413

Date Taken: 09/10/1998

Date Received: 09/10/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	97	%	09/11/1998	jpf
Surrogate: d8-Toluene	105	%	09/11/1998	jpf
Surrogate: BFB	91	%	09/11/1998	jpf

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ANALYTICAL REPORT

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09/15/1998

JOB NUMBER: 98.15937

SAMPLE NO.: 494132

Sample Description: 003-414

Date Taken: 09/10/1998

Date Received: 09/10/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	09/11/1998	jpf
Acrolein	<50.0	ug/L	09/11/1998	jpf
Acrylonitrile	<50.0	ug/L	09/11/1998	jpf
Benzene	<1.0	ug/L	09/11/1998	jpf
Bromodichloromethane	<1.0	ug/L	09/11/1998	jpf
Bromoform	<1.0	ug/L	09/11/1998	jpf
Bromomethane	<5.0	ug/L	09/11/1998	jpf
Carbon tetrachloride	<1.0	ug/L	09/11/1998	jpf
Chlorobenzene	<1.0	ug/L	09/11/1998	jpf
Chloroethane	<10.0	ug/L	09/11/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	09/11/1998	jpf
Chloroform	<1.0	ug/L	09/11/1998	jpf
Chloromethane	<10.0	ug/L	09/11/1998	jpf
Dibromochloromethane	<1.0	ug/L	09/11/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	09/11/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	09/11/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
cis-1,2-Dichloroethene	11.7	ug/L	09/11/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	09/11/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	09/11/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	09/11/1998	jpf
Ethylbenzene	<1.0	ug/L	09/11/1998	jpf
Methylene chloride	<10.0	ug/L	09/11/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	09/11/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	09/11/1998	jpf
Tetrachloroethene	7.0	ug/L	09/11/1998	jpf
Toluene	<1.0	ug/L	09/11/1998	jpf
1,1,1-Trichloroethane	2.0	ug/L	09/11/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	09/11/1998	jpf
Trichloroethene	8.0	ug/L	09/11/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	09/11/1998	jpf
Vinyl chloride	<2.0	ug/L	09/11/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
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09/15/1998

JOB NUMBER: 98.15937

SAMPLE NO.: 494132

Sample Description: 003-414

Date Taken: 09/10/1998

Date Received: 09/10/1998

VOLATILE COMPOUNDS - 624

arameter	Result	Unit	Date Anal.	Analyst
urrogate: d4-1,2-DCE	97	%	09/11/1998	jpf
urrogate: d8-Toluene	101	%	09/11/1998	jpf
urrogate: BFB	89	%	09/11/1998	jpf

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09/15/1998

JOB NUMBER: 98.15937

SAMPLE NO.: 494133

Sample Description: 003I

Date Taken: 09/10/1998

Date Received: 09/10/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	09/11/1998	jpf
[illegible]olein	<50.0	ug/L	09/11/1998	jpf
[illegible]ylonitrile	<50.0	ug/L	09/11/1998	jpf
[illegible]nzene	<1.0	ug/L	09/11/1998	jpf
Bromodichloromethane	<1.0	ug/L	09/11/1998	jpf
Bromoform	<1.0	ug/L	09/11/1998	jpf
Bromomethane	<5.0	ug/L	09/11/1998	jpf
Carbon tetrachloride	<1.0	ug/L	09/11/1998	jpf
Chlorobenzene	<1.0	ug/L	09/11/1998	jpf
Chloroethane	<10.0	ug/L	09/11/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	09/11/1998	jpf
Chloroform	<1.0	ug/L	09/11/1998	jpf
Chloromethane	<10.0	ug/L	09/11/1998	jpf
Dibromochloromethane	<1.0	ug/L	09/11/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	09/11/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	09/11/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	09/11/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	09/11/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	09/11/1998	jpf
thylbenzene	<1.0	ug/L	09/11/1998	jpf
ethylene chloride	<10.0	ug/L	09/11/1998	jpf
-Butanone (MEK)	<10.0	ug/L	09/11/1998	jpf
,1,2,2-Tetrachloroethane	<1.0	ug/L	09/11/1998	jpf
etrachloroethene	4.1	ug/L	09/11/1998	jpf
oluene	<1.0	ug/L	09/11/1998	jpf
,1,1-Trichloroethane	<1.0	ug/L	09/11/1998	jpf
,[illegible]2-Trichloroethane	<1.0	ug/L	09/11/1998	jpf
[illegible]loroethene	3.4	ug/L	09/11/1998	jpf
[illegible]hlorofluoromethane	<1.0	ug/L	09/11/1998	jpf
inyl chloride	<2.0	ug/L	09/11/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
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09/15/1998

JOB NUMBER: 98.15937

SAMPLE NO.: 494133

Sample Description: 003I

Date Taken: 09/10/1998

Date Received: 09/10/1998

VOLATILE COMPOUNDS - 624

rameter	Result	Unit	Date Anal.	Analyst
rogate: d4-1,2-DCE	101	%	09/11/1998	jpf
rogate: d8-Toluene	101	%	09/11/1998	jpf
rogate: BFB	90	%	09/11/1998	jpf

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Ron Paulick
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09/15/1998

JOB NUMBER: 98.15937

SAMPLE NO.: 494134

Sample Description: 003E

Date Taken: 09/10/1998

Date Received: 09/10/1998

VOLATILE COMPOUNDS - 624

·ameter	Result	Unit	Date Anal.	Analyst
tone	<20.0	ug/L	09/11/1998	jpf
olein	<50.0	ug/L	09/11/1998	jpf
ylonitrile	<50.0	ug/L	09/11/1998	jpf
zene	<1.0	ug/L	09/11/1998	jpf
modichloromethane	<1.0	ug/L	09/11/1998	jpf
·orm	<1.0	ug/L	09/11/1998	jpf
ethane	<5.0	ug/L	09/11/1998	jpf
on tetrachloride	<1.0	ug/L	09/11/1998	jpf
robenzene	<1.0	ug/L	09/11/1998	jpf
roethane	<10.0	ug/L	09/11/1998	jpf
loroethyl vinyl ether	<5.0	ug/L	09/11/1998	jpf
roform	<1.0	ug/L	09/11/1998	jpf
romethane	<10.0	ug/L	09/11/1998	jpf
omochloromethane	<1.0	ug/L	09/11/1998	jpf
Dichloroethane	<1.0	ug/L	09/11/1998	jpf
Dichloroethane	<1.0	ug/L	09/11/1998	jpf
Dichloroethene	<1.0	ug/L	09/11/1998	jpf
s-1,2-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
1,2-Dichloroethene	<1.0	ug/L	09/11/1998	jpf
Dichloropropane	<1.0	ug/L	09/11/1998	jpf
1,3-Dichloropropene	<1.0	ug/L	09/11/1998	jpf
s-1,3-Dichloropropene	<1.0	ug/L	09/11/1998	jpf
benzene	<1.0	ug/L	09/11/1998	jpf
lene chloride	<10.0	ug/L	09/11/1998	jpf
anone (MEK)	<10.0	ug/L	09/11/1998	jpf
,2-Tetrachloroethane	<1.0	ug/L	09/11/1998	jpf
chloroethene	<1.0	ug/L	09/11/1998	jpf
ne	<1.0	ug/L	09/11/1998	jpf
-Trichloroethane	<1.0	ug/L	09/11/1998	jpf
-Trichloroethane	<1.0	ug/L	09/11/1998	jpf
loroethene	<1.0	ug/L	09/11/1998	jpf
lorofluoromethane	<1.0	ug/L	09/11/1998	jpf
chloride	<2.0	ug/L	09/11/1998	jpf

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Dayton Division
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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

09/15/1998

JOB NUMBER: 98.15937

SAMPLE NO.: 494134

Sample Description: 003E

Date Taken: 09/10/1998

Date Received: 09/10/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	99	%	09/11/1998	jpf
Surrogate: d8-Toluene	100	%	09/11/1998	jpf
Surrogate: BFB	90	%	09/11/1998	jpf

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73,100,645 gallons to date from 412,413, & 414
8/12/98

ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

08/24/1998

JOB NUMBER: 98.14207

SAMPLE NO.: 488902

Sample Description: 003E GRAB

Date Taken: 08/12/1998

Date Received: 08/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	08/14/1998	dmg
Acrolein	<50.0	ug/L	08/14/1998	dmg
Acrylonitrile	<50.0	ug/L	08/14/1998	dmg
Benzene	<1.0	ug/L	08/14/1998	dmg
Bromodichloromethane	<1.0	ug/L	08/14/1998	dmg
Bromoform	<1.0	ug/L	08/14/1998	dmg
Bromomethane	<5.0	ug/L	08/14/1998	dmg
Carbon tetrachloride	<1.0	ug/L	08/14/1998	dmg
Chlorobenzene	<1.0	ug/L	08/14/1998	dmg
Chloroethane	<10.0	ug/L	08/14/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	08/14/1998	dmg
Chloroform	<1.0	ug/L	08/14/1998	dmg
Chloromethane	<10.0	ug/L	08/14/1998	dmg
Dibromochloromethane	<1.0	ug/L	08/14/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	08/14/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	08/14/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	08/14/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	08/14/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	08/14/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	08/14/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	08/14/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	08/14/1998	dmg
Ethylbenzene	<1.0	ug/L	08/14/1998	dmg
Methylene chloride	<10.0	ug/L	08/14/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	08/14/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	08/14/1998	dmg
Tetrachloroethene	<1.0	ug/L	08/14/1998	dmg
Toluene	<1.0	ug/L	08/14/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	08/14/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	08/14/1998	dmg
Trichloroethene	<1.0	ug/L	08/14/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	08/14/1998	dmg
Vinyl chloride	<2.0	ug/L	08/14/1998	dmg

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

08/24/1998

JOB NUMBER: 98.14207

SAMPLE NO.: 488902

Sample Description: 003E GRAB

Date Taken: 08/12/1998

Date Received: 08/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	120	%	08/14/1998	dmg
Surrogate: d8-Toluene	98	%	08/14/1998	dmg
Surrogate: BFB	92	%	08/14/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

08/24/1998

JOB NUMBER: 98.14207

SAMPLE NO.: 488903

Sample Description: 003I GRAB

Date Taken: 08/12/1998

Date Received: 08/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	08/14/1998	dmg
Acrolein	<50.0	ug/L	08/14/1998	dmg
Acrylonitrile	<50.0	ug/L	08/14/1998	dmg
Benzene	<1.0	ug/L	08/14/1998	dmg
Bromodichloromethane	<1.0	ug/L	08/14/1998	dmg
Bromoform	<1.0	ug/L	08/14/1998	dmg
Bromomethane	<5.0	ug/L	08/14/1998	dmg
Carbon tetrachloride	<1.0	ug/L	08/14/1998	dmg
Chlorobenzene	<1.0	ug/L	08/14/1998	dmg
Chloroethane	<10.0	ug/L	08/14/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	08/14/1998	dmg
Chloroform	<1.0	ug/L	08/14/1998	dmg
Chloromethane	<10.0	ug/L	08/14/1998	dmg
Dibromochloromethane	<1.0	ug/L	08/14/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	08/14/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	08/14/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	08/14/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	08/14/1998	dmg
cis-1,2-Dichloroethene	1.7	ug/L	08/14/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	08/14/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	08/14/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	08/14/1998	dmg
Ethylbenzene	<1.0	ug/L	08/14/1998	dmg
Methylene chloride	<10.0	ug/L	08/14/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	08/14/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	08/14/1998	dmg
Tetrachloroethene	3.8	ug/L	08/14/1998	dmg
Toluene	<1.0	ug/L	08/14/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	08/14/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	08/14/1998	dmg
Trichloroethene	3.2	ug/L	08/14/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	08/14/1998	dmg
Vinyl chloride	<2.0	ug/L	08/14/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

08/24/1998

JOB NUMBER: 98.14207

SAMPLE NO.: 488903

Sample Description: 003I GRAB

Date Taken: 08/12/1998

Date Received: 08/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	118	%	08/14/1998	dmg
Surrogate: d8-Toluene	98	%	08/14/1998	dmg
Surrogate: BFB	92	%	08/14/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

08/24/1998

JOB NUMBER: 98.14207

SAMPLE NO.: 488904

Sample Description: 003412 GRAB

Date Taken: 08/12/1998

Date Received: 08/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	08/14/1998	dmg
Acrolein	<50.0	ug/L	08/14/1998	dmg
Acrylonitrile	<50.0	ug/L	08/14/1998	dmg
Benzene	<1.0	ug/L	08/14/1998	dmg
Bromodichloromethane	<1.0	ug/L	08/14/1998	dmg
Bromoform	<1.0	ug/L	08/14/1998	dmg
Bromomethane	<5.0	ug/L	08/14/1998	dmg
Carbon tetrachloride	<1.0	ug/L	08/14/1998	dmg
Chlorobenzene	<1.0	ug/L	08/14/1998	dmg
Chloroethane	<10.0	ug/L	08/14/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	08/14/1998	dmg
Chloroform	<1.0	ug/L	08/14/1998	dmg
Chloromethane	<10.0	ug/L	08/14/1998	dmg
Dibromochloromethane	<1.0	ug/L	08/14/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	08/14/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	08/14/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	08/14/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	08/14/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	08/14/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	08/14/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	08/14/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	08/14/1998	dmg
Ethylbenzene	<1.0	ug/L	08/14/1998	dmg
Methylene chloride	<10.0	ug/L	08/14/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	08/14/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	08/14/1998	dmg
Tetrachloroethene	8.2	ug/L	08/14/1998	dmg
Toluene	<1.0	ug/L	08/14/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	08/14/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	08/14/1998	dmg
Trichloroethene	5.2	ug/L	08/14/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	08/14/1998	dmg
Vinyl chloride	<2.0	ug/L	08/14/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

08/24/1998

JOB NUMBER: 98.14207

SAMPLE NO.: 488904

Sample Description: 003412 GRAB

Date Taken: 08/12/1998

Date Received: 08/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	119	%	08/14/1998	dmg
Surrogate: d8-Toluene	99	%	08/14/1998	dmg
Surrogate: BFB	94	%	08/14/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

08/24/1998

JOB NUMBER: 98.14207

SAMPLE NO.: 488905

Sample Description: 003413 GRAB

Date Taken: 08/12/1998

Date Received: 08/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	08/22/1998	dmg
Acrolein	<50.0	ug/L	08/22/1998	dmg
Acrylonitrile	<50.0	ug/L	08/22/1998	dmg
Benzene	<1.0	ug/L	08/22/1998	dmg
Bromodichloromethane	<1.0	ug/L	08/22/1998	dmg
Bromoform	<1.0	ug/L	08/22/1998	dmg
Bromomethane	<5.0	ug/L	08/22/1998	dmg
Carbon tetrachloride	<1.0	ug/L	08/22/1998	dmg
Chlorobenzene	<1.0	ug/L	08/22/1998	dmg
Chloroethane	<10.0	ug/L	08/22/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	08/22/1998	dmg
Chloroform	<1.0	ug/L	08/22/1998	dmg
Chloromethane	<10.0	ug/L	08/22/1998	dmg
Dibromochloromethane	<1.0	ug/L	08/22/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	08/22/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	08/22/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	08/22/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	08/22/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	08/22/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	08/22/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	08/22/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	08/22/1998	dmg
Ethylbenzene	<1.0	ug/L	08/22/1998	dmg
Methylene chloride	<10.0	ug/L	08/22/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	08/22/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	08/22/1998	dmg
Tetrachloroethene	1.4	ug/L	08/22/1998	dmg
Toluene	<1.0	ug/L	08/22/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	08/22/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	08/22/1998	dmg
Trichloroethene	1.4	ug/L	08/22/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	08/22/1998	dmg
Vinyl chloride	<2.0	ug/L	08/22/1998	dmg

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
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08/24/1998

JOB NUMBER: 98.14207

SAMPLE NO.: 488905

Sample Description: 003413 GRAB

Date Taken: 08/12/1998

Date Received: 08/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	101	%	08/22/1998	dmg
Surrogate: d8-Toluene	99	%	08/22/1998	dmg
Surrogate: BFB	97	%	08/22/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
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08/24/1998

JOB NUMBER: 98.14207

SAMPLE NO.: 488906

Sample Description: 003414 GRAB

Date Taken: 08/12/1998

Date Received: 08/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	08/14/1998	dmg
Acrolein	<50.0	ug/L	08/14/1998	dmg
Acrylonitrile	<50.0	ug/L	08/14/1998	dmg
Benzene	<1.0	ug/L	08/14/1998	dmg
Bromodichloromethane	<1.0	ug/L	08/14/1998	dmg
Bromoform	<1.0	ug/L	08/14/1998	dmg
Bromomethane	<5.0	ug/L	08/14/1998	dmg
Carbon tetrachloride	<1.0	ug/L	08/14/1998	dmg
Chlorobenzene	<1.0	ug/L	08/14/1998	dmg
Chloroethane	<10.0	ug/L	08/14/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	08/14/1998	dmg
Chloroform	<1.0	ug/L	08/14/1998	dmg
Chloromethane	<10.0	ug/L	08/14/1998	dmg
Dibromochloromethane	<1.0	ug/L	08/14/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	08/14/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	08/14/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	08/14/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	08/14/1998	dmg
cis-1,2-Dichloroethene	6.8	ug/L	08/14/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	08/14/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	08/14/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	08/14/1998	dmg
Ethylbenzene	<1.0	ug/L	08/14/1998	dmg
Methylene chloride	<10.0	ug/L	08/14/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	08/14/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	08/14/1998	dmg
Tetrachloroethene	5.8	ug/L	08/14/1998	dmg
Toluene	<1.0	ug/L	08/14/1998	dmg
1,1,1-Trichloroethane	2.3	ug/L	08/14/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	08/14/1998	dmg
Trichloroethene	5.9	ug/L	08/14/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	08/14/1998	dmg
Vinyl chloride	<2.0	ug/L	08/14/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
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08/24/1998

JOB NUMBER: 98.14207

SAMPLE NO.: 488906

Sample Description: 003414 GRAB

Date Taken: 08/12/1998

Date Received: 08/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	120	%	08/14/1998	dmg
Surrogate: d8-Toluene	98	%	08/14/1998	dmg
Surrogate: BFB	89	%	08/14/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
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P. O. Box 3030
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07/21/1998

JOB NUMBER: 98.12224

SAMPLE NO.: 483543

Sample Description: 003E

Date Taken: 07/15/1998

Date Received: 07/15/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	07/17/1998	jpf
Acrolein	<50.0	ug/L	07/17/1998	jpf
Acrylonitrile	<50.0	ug/L	07/17/1998	jpf
Benzene	<1.0	ug/L	07/17/1998	jpf
Bromodichloromethane	<1.0	ug/L	07/17/1998	jpf
Bromoform	<1.0	ug/L	07/17/1998	jpf
Bromomethane	<5.0	ug/L	07/17/1998	jpf
Carbon tetrachloride	<1.0	ug/L	07/17/1998	jpf
Chlorobenzene	<1.0	ug/L	07/17/1998	jpf
Chloroethane	<10.0	ug/L	07/17/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	07/17/1998	jpf
Chloroform	<1.0	ug/L	07/17/1998	jpf
Chloromethane	<10.0	ug/L	07/17/1998	jpf
Dibromochloromethane	<1.0	ug/L	07/17/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	07/17/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	07/17/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	07/17/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	07/17/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	07/17/1998	jpf
Ethylbenzene	<1.0	ug/L	07/17/1998	jpf
Methylene chloride	<10.0	ug/L	07/17/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	07/17/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	07/17/1998	jpf
Tetrachloroethene	<1.0	ug/L	07/17/1998	jpf
Toluene	<1.0	ug/L	07/17/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	07/17/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	07/17/1998	jpf
Trichloroethene	<1.0	ug/L	07/17/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	07/17/1998	jpf
Vinyl chloride	<2.0	ug/L	07/17/1998	jpf

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

07/21/1998

JOB NUMBER: 98.12224

SAMPLE NO.: 483543

Sample Description: 003E

Date Taken: 07/15/1998

Date Received: 07/15/1998

VOLATILE COMPOUNDS - 624

arameter	Result	Unit	Date Anal.	Analyst
urrogate: d4-1,2-DCE	95	%	07/17/1998	jpf
urrogate: d8-Toluene	100	%	07/17/1998	jpf
gate: BFB	96	%	07/17/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
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P. O. Box 3030
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07/21/1998

JOB NUMBER: 98.12224

SAMPLE NO.: 483544

Sample Description: 003I

Date Taken: 07/15/1998

Date Received: 07/15/1998

VOLATILE COMPOUNDS - 624

arameter	Result	Unit	Date Anal.	Analyst
.cetone	<20.0	ug/L	07/17/1998	jpf
.crolein	<50.0	ug/L	07/17/1998	jpf
.crylonitrile	<50.0	ug/L	07/17/1998	jpf
[illegible]ene	<1.0	ug/L	07/17/1998	jpf
[illegible]odichloromethane	<1.0	ug/L	07/17/1998	jpf
romoform	<1.0	ug/L	07/17/1998	jpf
romomethane	<5.0	ug/L	07/17/1998	jpf
arbon tetrachloride	<1.0	ug/L	07/17/1998	jpf
hlorobenzene	<1.0	ug/L	07/17/1998	jpf
hloroethane	<10.0	ug/L	07/17/1998	jpf
-Chloroethyl vinyl ether	<5.0	ug/L	07/17/1998	jpf
hloroform	<1.0	ug/L	07/17/1998	jpf
hloromethane	<10.0	ug/L	07/17/1998	jpf
ibromochloromethane	<1.0	ug/L	07/17/1998	jpf
,1-Dichloroethane	<1.0	ug/L	07/17/1998	jpf
,2-Dichloroethane	<1.0	ug/L	07/17/1998	jpf
,1-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
rans-1,2-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
is-1,2-Dichloroethene	2.3	ug/L	07/17/1998	jpf
,2-Dichloropropane	<1.0	ug/L	07/17/1998	jpf
is-1,3-Dichloropropene	<1.0	ug/L	07/17/1998	jpf
rans-1,3-Dichloropropene	<1.0	ug/L	07/17/1998	jpf
thylbenzene	<1.0	ug/L	07/17/1998	jpf
ethylene chloride	<10.0	ug/L	07/17/1998	jpf
-Butanone (MEK)	<10.0	ug/L	07/17/1998	jpf
,1,2,2-Tetrachloroethane	<1.0	ug/L	07/17/1998	jpf
etrachloroethene	4.3	ug/L	07/17/1998	jpf
oluene	<1.0	ug/L	07/17/1998	jpf
,1,1-Trichloroethane	<1.0	ug/L	07/17/1998	jpf
,1,2-Trichloroethane	<1.0	ug/L	07/17/1998	jpf
richloroethene	4.6	ug/L	07/17/1998	jpf
hlorofluoromethane	<1.0	ug/L	07/17/1998	jpf
[illegible]l chloride	<2.0	ug/L	07/17/1998	jpf

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

07/21/1998

JOB NUMBER: 98.12224

SAMPLE NO.: 483544

Sample Description: 003I

Date Taken: 07/15/1998

Date Received: 07/15/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	94	%	07/17/1998	jpf
Surrogate: d8-Toluene	99	%	07/17/1998	jpf
Surrogate: BFB	97	%	07/17/1998	jpf

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07/21/1998

JOB NUMBER: 98.12224

SAMPLE NO.: 483545

Sample Description: 003W1412

Date Taken: 07/15/1998

Date Received: 07/15/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	07/17/1998	jpf
Acrolein	<50.0	ug/L	07/17/1998	jpf
Acrylonitrile	<50.0	ug/L	07/17/1998	jpf
Benzene	<1.0	ug/L	07/17/1998	jpf
Bromodichloromethane	<1.0	ug/L	07/17/1998	jpf
Bromoform	<1.0	ug/L	07/17/1998	jpf
Bromomethane	<5.0	ug/L	07/17/1998	jpf
Carbon tetrachloride	<1.0	ug/L	07/17/1998	jpf
Chlorobenzene	<1.0	ug/L	07/17/1998	jpf
Chloroethane	<10.0	ug/L	07/17/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	07/17/1998	jpf
Chloroform	<1.0	ug/L	07/17/1998	jpf
Chloromethane	<10.0	ug/L	07/17/1998	jpf
Dibromochloromethane	<1.0	ug/L	07/17/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	07/17/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	07/17/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	07/17/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	07/17/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	07/17/1998	jpf
Ethylbenzene	<1.0	ug/L	07/17/1998	jpf
Methylene chloride	<10.0	ug/L	07/17/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	07/17/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	07/17/1998	jpf
Tetrachloroethene	7.8	ug/L	07/17/1998	jpf
Toluene	<1.0	ug/L	07/17/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	07/17/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	07/17/1998	jpf
Trichloroethene	6.4	ug/L	07/17/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	07/17/1998	jpf
Vinyl chloride	<2.0	ug/L	07/17/1998	jpf

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07/21/1998

JOB NUMBER: 98.12224

SAMPLE NO.: 483545

Sample Description: 003W1412

Date Taken: 07/15/1998

Date Received: 07/15/1998

VOLATILE COMPOUNDS - 624

rameter	Result	Unit	Date Anal.	Analyst
rrogate: d4-1,2-DCE	94	%	07/17/1998	jpf
rrogate: d8-Toluene	103	%	07/17/1998	jpf
rrogate: BFB	97	%	07/17/1998	jpf

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07/21/1998

JOB NUMBER: 98.12224

SAMPLE NO.: 483546

Sample Description: 003W2413

Date Taken: 07/15/1998

Date Received: 07/15/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	07/17/1998	jpf
Acrolein	<50.0	ug/L	07/17/1998	jpf
Acrylonitrile	<50.0	ug/L	07/17/1998	jpf
Benzene	<1.0	ug/L	07/17/1998	jpf
Bromodichloromethane	<1.0	ug/L	07/17/1998	jpf
Bromoform	<1.0	ug/L	07/17/1998	jpf
Bromomethane	<5.0	ug/L	07/17/1998	jpf
Carbon tetrachloride	<1.0	ug/L	07/17/1998	jpf
Chlorobenzene	<1.0	ug/L	07/17/1998	jpf
Chloroethane	<10.0	ug/L	07/17/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	07/17/1998	jpf
Chloroform	<1.0	ug/L	07/17/1998	jpf
Chloromethane	<10.0	ug/L	07/17/1998	jpf
Dibromochloromethane	<1.0	ug/L	07/17/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	07/17/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	07/17/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	07/17/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	07/17/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	07/17/1998	jpf
Ethylbenzene	<1.0	ug/L	07/17/1998	jpf
Methylene chloride	<10.0	ug/L	07/17/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	07/17/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	07/17/1998	jpf
Tetrachloroethene	1.5	ug/L	07/17/1998	jpf
Toluene	<1.0	ug/L	07/17/1998	jpf
1,1,1-Trichloroethane	1.1	ug/L	07/17/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	07/17/1998	jpf
Trichloroethene	1.5	ug/L	07/17/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	07/17/1998	jpf
Vinyl chloride	<2.0	ug/L	07/17/1998	jpf

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07/21/1998

JOB NUMBER: 98.12224

SAMPLE NO.: 483546

Sample Description: 003W2413

Date Taken: 07/15/1998

Date Received: 07/15/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	95	%	07/17/1998	jpf
Surrogate: d8-Toluene	102	%	07/17/1998	jpf
Surrogate: BFB	99	%	07/17/1998	jpf

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07/21/1998

JOB NUMBER: 98.12224

SAMPLE NO.: 483547

Sample Description: 003W3414

Date Taken: 07/15/1998

Date Received: 07/15/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	07/17/1998	jpf
Acrolein	<50.0	ug/L	07/17/1998	jpf
Acrylonitrile	<50.0	ug/L	07/17/1998	jpf
[illegible]zene	<1.0	ug/L	07/17/1998	jpf
[illegible]modichloromethane	<1.0	ug/L	07/17/1998	jpf
Bromoform	<1.0	ug/L	07/17/1998	jpf
Bromomethane	<5.0	ug/L	07/17/1998	jpf
Carbon tetrachloride	<1.0	ug/L	07/17/1998	jpf
Chlorobenzene	<1.0	ug/L	07/17/1998	jpf
Chloroethane	<10.0	ug/L	07/17/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	07/17/1998	jpf
Chloroform	<1.0	ug/L	07/17/1998	jpf
Chloromethane	<10.0	ug/L	07/17/1998	jpf
Dibromochloromethane	<1.0	ug/L	07/17/1998	jpf
,1-Dichloroethane	<1.0	ug/L	07/17/1998	jpf
,2-Dichloroethane	<1.0	ug/L	07/17/1998	jpf
,1-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
rans-1,2-Dichloroethene	<1.0	ug/L	07/17/1998	jpf
is-1,2-Dichloroethene	7.4	ug/L	07/17/1998	jpf
,2-Dichloropropane	<1.0	ug/L	07/17/1998	jpf
is-1,3-Dichloropropene	<1.0	ug/L	07/17/1998	jpf
rans-1,3-Dichloropropene	<1.0	ug/L	07/17/1998	jpf
thylbenzene	<1.0	ug/L	07/17/1998	jpf
ethylene chloride	<10.0	ug/L	07/17/1998	jpf
-Butanone (MEK)	<10.0	ug/L	07/17/1998	jpf
,1,2,2-Tetrachloroethane	<1.0	ug/L	07/17/1998	jpf
etrachloroethene	6.7	ug/L	07/17/1998	jpf
oluene	<1.0	ug/L	07/17/1998	jpf
,1,1-Trichloroethane	1.9	ug/L	07/17/1998	jpf
,1,2-Trichloroethane	<1.0	ug/L	07/17/1998	jpf
richloroethene	8.2	ug/L	07/17/1998	jpf
[illegible]hlorofluoromethane	<1.0	ug/L	07/17/1998	jpf
[illegible] chloride	<2.0	ug/L	07/17/1998	jpf

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07/21/1998

JOB NUMBER: 98.12224

SAMPLE NO.: 483547

Sample Description: 003W3414

Date Taken: 07/15/1998

Date Received: 07/15/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	95	%	07/17/1998	jpf
Surrogate: d8-Toluene	101	%	07/17/1998	jpf
Surrogate: BFB	98	%	07/17/1998	jpf

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ANALYTICAL REPORT

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05/18/1998

JOB NUMBER: 98.07894

SAMPLE NO.: 471102

Sample Description: 003E

Date Taken: 05/13/1998

Date Received: 05/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	05/14/1998	jpf
Acrolein	<50.0	ug/L	05/14/1998	jpf
Acrylonitrile	<50.0	ug/L	05/14/1998	jpf
Benzene	<1.0	ug/L	05/14/1998	jpf
Bromodichloromethane	<1.0	ug/L	05/14/1998	jpf
Bromoform	<1.0	ug/L	05/14/1998	jpf
Bromomethane	<5.0	ug/L	05/14/1998	jpf
Carbon tetrachloride	<1.0	ug/L	05/14/1998	jpf
Chlorobenzene	<1.0	ug/L	05/14/1998	jpf
Chloroethane	<10.0	ug/L	05/14/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	05/14/1998	jpf
Chloroform	<1.0	ug/L	05/14/1998	jpf
Chloromethane	<10.0	ug/L	05/14/1998	jpf
Dibromochloromethane	<1.0	ug/L	05/14/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	05/14/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	05/14/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	05/14/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	05/14/1998	jpf
cis-1,2-Dichloroethene	<1.0	ug/L	05/14/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	05/14/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	05/14/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	05/14/1998	jpf
Ethylbenzene	<1.0	ug/L	05/14/1998	jpf
Methylene chloride	<10.0	ug/L	05/14/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	05/14/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	05/14/1998	jpf
Tetrachloroethene	<1.0	ug/L	05/14/1998	jpf
Toluene	<1.0	ug/L	05/14/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	05/14/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	05/14/1998	jpf
Trichloroethene	<1.0	ug/L	05/14/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	05/14/1998	jpf
Vinyl chloride	<2.0	ug/L	05/14/1998	jpf

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ANALYTICAL REPORT

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05/18/1998

JOB NUMBER: 98.07894

SAMPLE NO.: 471102

Sample Description: 003E

Date Taken: 05/13/1998

Date Received: 05/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	84	%	05/14/1998	jpf
Surrogate: d8-Toluene	105	%	05/14/1998	jpf
Surrogate: BFB	93	%	05/14/1998	jpf

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05/18/1998

JOB NUMBER: 98.07894

SAMPLE NO.: 471103

Sample Description: 003I

Date Taken: 05/13/1998

Date Received: 05/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	05/14/1998	jpf
Acrolein	<50.0	ug/L	05/14/1998	jpf
Acrylonitrile	<50.0	ug/L	05/14/1998	jpf
[illegible]ene	<1.0	ug/L	05/14/1998	jpf
[illegible]odichloromethane	<1.0	ug/L	05/14/1998	jpf
Bromoform	<1.0	ug/L	05/14/1998	jpf
Bromomethane	<5.0	ug/L	05/14/1998	jpf
Carbon tetrachloride	<1.0	ug/L	05/14/1998	jpf
Chlorobenzene	<1.0	ug/L	05/14/1998	jpf
Chloroethane	<10.0	ug/L	05/14/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	05/14/1998	jpf
Chloroform	<1.0	ug/L	05/14/1998	jpf
Chloromethane	<10.0	ug/L	05/14/1998	jpf
Dibromochloromethane	<1.0	ug/L	05/14/1998	jpf
,1-Dichloroethane	<1.0	ug/L	05/14/1998	jpf
,2-Dichloroethane	<1.0	ug/L	05/14/1998	jpf
,1-Dichloroethene	<1.0	ug/L	05/14/1998	jpf
rans-1,2-Dichloroethene	<1.0	ug/L	05/14/1998	jpf
is-1,2-Dichloroethene	2.6	ug/L	05/14/1998	jpf
,2-Dichloropropane	<1.0	ug/L	05/14/1998	jpf
is-1,3-Dichloropropene	<1.0	ug/L	05/14/1998	jpf
rans-1,3-Dichloropropene	<1.0	ug/L	05/14/1998	jpf
thylbenzene	<1.0	ug/L	05/14/1998	jpf
ethylene chloride	<10.0	ug/L	05/14/1998	jpf
-Butanone (MEK)	<10.0	ug/L	05/14/1998	jpf
,1,2,2-Tetrachloroethane	<1.0	ug/L	05/14/1998	jpf
etrachloroethene	5.7	ug/L	05/14/1998	jpf
oluene	<1.0	ug/L	05/14/1998	jpf
,1,1-Trichloroethane	<1.0	ug/L	05/14/1998	jpf
,1,2-Trichloroethane	<1.0	ug/L	05/14/1998	jpf
richloroethene	7.4	ug/L	05/14/1998	jpf
[illegible]lorofluoromethane	<1.0	ug/L	05/14/1998	jpf
i[illegible] chloride	<2.0	ug/L	05/14/1998	jpf

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05/18/1998

JOB NUMBER: 98.07894

SAMPLE NO.: 471103

Sample Description: 003I

Date Taken: 05/13/1998

Date Received: 05/13/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	86	%	05/14/1998	jpf
Surrogate: d8-Toluene	105	%	05/14/1998	jpf
Surrogate: BFB	96	%	05/14/1998	jpf

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

S. Howard
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461593

Sample Description: 003I-B

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	13.9	ug/L	03/21/1998	dmg
Acrolein	<50.0	ug/L	03/21/1998	dmg
Acrylonitrile	<50.0	ug/L	03/21/1998	dmg
Benzene	<1.0	ug/L	03/21/1998	dmg
Bromodichloromethane	<1.0	ug/L	03/21/1998	dmg
Bromoform	<1.0	ug/L	03/21/1998	dmg
Bromomethane	<5.0	ug/L	03/21/1998	dmg
Carbon tetrachloride	<1.0	ug/L	03/21/1998	dmg
Chlorobenzene	<1.0	ug/L	03/21/1998	dmg
Chloroethane	<10.0	ug/L	03/21/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	03/21/1998	dmg
Chloroform	1.6	ug/L	03/21/1998	dmg
Chloromethane	<10.0	ug/L	03/21/1998	dmg
Dibromochloromethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	03/21/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
Ethylbenzene	<1.0	ug/L	03/21/1998	dmg
Methylene chloride	<10.0	ug/L	03/21/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	03/21/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	03/21/1998	dmg
Tetrachloroethene	7.2	ug/L	03/21/1998	dmg
Toluene	<1.0	ug/L	03/21/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
Trichloroethene	23.0	ug/L	03/21/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	03/21/1998	dmg
Vinyl chloride	<2.0	ug/L	03/21/1998	dmg

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461593

Sample Description: 003I-B

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	94.1	%	03/21/1998	dmg
Surrogate: d8-Toluene	100	%	03/21/1998	dmg
Surrogate: BFB	89	%	03/21/1998	dmg

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461590

Sample Description: 003E-B

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	03/21/1998	dmg
Acrolein	<50.0	ug/L	03/21/1998	dmg
Acrylonitrile	<50.0	ug/L	03/21/1998	dmg
Benzene	<1.0	ug/L	03/21/1998	dmg
Bromodichloromethane	<1.0	ug/L	03/21/1998	dmg
Bromoform	<1.0	ug/L	03/21/1998	dmg
Bromomethane	<5.0	ug/L	03/21/1998	dmg
Carbon tetrachloride	<1.0	ug/L	03/21/1998	dmg
Chlorobenzene	<1.0	ug/L	03/21/1998	dmg
Chloroethane	<10.0	ug/L	03/21/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	03/21/1998	dmg
Chloroform	<1.0	ug/L	03/21/1998	dmg
Chloromethane	<10.0	ug/L	03/21/1998	dmg
Dibromochloromethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	03/21/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
Ethylbenzene	<1.0	ug/L	03/21/1998	dmg
Methylene chloride	<10.0	ug/L	03/21/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	03/21/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	03/21/1998	dmg
Tetrachloroethene	<1.0	ug/L	03/21/1998	dmg
Toluene	<1.0	ug/L	03/21/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
Trichloroethene	<1.0	ug/L	03/21/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	03/21/1998	dmg
Vinyl chloride	<2.0	ug/L	03/21/1998	dmg

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461590

Sample Description: 003E-B

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	94	%	03/21/1998	dmg
Surrogate: d8-Toluene	100	%	03/21/1998	dmg
Surrogate: BFB	93	%	03/21/1998	dmg

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461599

Sample Description: 003E

Date Taken: 03/18/1998

Date Received: 03/19/1998

Parameter	Result	Unit	Date Anal.	Analyst
MERCURY, CVAA	<0.0002	mg/L	03/23/1998	jmm

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461597

Sample Description: 003E-B

Date Taken: 03/19/1998

Date Received: 03/19/1998

Parameter	Result	Unit	Date Anal.	Analyst
CALCIUM, ICP	124	mg/L	03/20/1998	jrw

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461598

Sample Description: 003I-B

Date Taken: 03/19/1998

Date Received: 03/19/1998

Parameter	Result	Unit	Date Anal.	Analyst
CALCIUM, ICP	128	mg/L	03/20/1998	jrw

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461591

Sample Description: 003I-SVE

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	61.2	ug/L	03/21/1998	dmg
Acrolein	<50.0	ug/L	03/21/1998	dmg
Acrylonitrile	<50.0	ug/L	03/21/1998	dmg
Benzene	8.0	ug/L	03/21/1998	dmg
Bromodichloromethane	<1.0	ug/L	03/21/1998	dmg
Bromoform	<1.0	ug/L	03/21/1998	dmg
Bromomethane	<5.0	ug/L	03/21/1998	dmg
Carbon tetrachloride	<1.0	ug/L	03/21/1998	dmg
Chlorobenzene	<1.0	ug/L	03/21/1998	dmg
Chloroethane	<10.0	ug/L	03/21/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	03/21/1998	dmg
Chloroform	41.0	ug/L	03/21/1998	dmg
Chloromethane	<10.0	ug/L	03/21/1998	dmg
Dibromochloromethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloroethane	1.3	ug/L	03/21/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
trans-1,2-Dichloroethene	3.6	ug/L	03/21/1998	dmg
cis-1,2-Dichloroethene	700	ug/L	03/21/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	03/21/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
Ethylbenzene	<1.0	ug/L	03/21/1998	dmg
Methylene chloride	22.1	ug/L	03/21/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	03/21/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	03/21/1998	dmg
Tetrachloroethene	36.5	ug/L	03/21/1998	dmg
Toluene	593	ug/L	03/21/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
Trichloroethene	1,010	ug/L	03/21/1998	dmg
Trichlorofluoromethane	1.2	ug/L	03/21/1998	dmg
Vinyl chloride	4.3	ug/L	03/21/1998	dmg

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461591

Sample Description: 003I-SVE

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	95	%	03/21/1998	dmg
Surrogate: d8-Toluene	99	%	03/21/1998	dmg
Surrogate: BFB	91	%	03/21/1998	dmg

MARK SPUNEY

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461589

w/o SVE INC.

Sample Description: 003E-A

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	03/21/1998	dmg
Acrolein	<50.0	ug/L	03/21/1998	dmg
Acrylonitrile	<50.0	ug/L	03/21/1998	dmg
Benzene	<1.0	ug/L	03/21/1998	dmg
Bromodichloromethane	<1.0	ug/L	03/21/1998	dmg
Bromoform	<1.0	ug/L	03/21/1998	dmg
Bromomethane	<5.0	ug/L	03/21/1998	dmg
Carbon tetrachloride	<1.0	ug/L	03/21/1998	dmg
Chlorobenzene	<1.0	ug/L	03/21/1998	dmg
Chloroethane	<10.0	ug/L	03/21/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	03/21/1998	dmg
Chloroform	<1.0	ug/L	03/21/1998	dmg
Chloromethane	<10.0	ug/L	03/21/1998	dmg
Dibromochloromethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	03/21/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
Ethylbenzene	<1.0	ug/L	03/21/1998	dmg
Methylene chloride	<10.0	ug/L	03/21/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	03/21/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	03/21/1998	dmg
Tetrachloroethene	<1.0	ug/L	03/21/1998	dmg
Toluene	<1.0	ug/L	03/21/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
Trichloroethene	<1.0	ug/L	03/21/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	03/21/1998	dmg
Vinyl chloride	<2.0	ug/L	03/21/1998	dmg

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ANALYTICAL REPORT

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461589

Sample Description: 003E-A

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	92	%	03/21/1998	dmg
Surrogate: d8-Toluene	100	%	03/21/1998	dmg
Surrogate: BFB	90	%	03/21/1998	dmg

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461592

Sample Description: 003I-A

WIR SVE Inf.

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	03/21/1998	jpf
Acrolein	<50.0	ug/L	03/21/1998	jpf
Acrylonitrile	<50.0	ug/L	03/21/1998	jpf
Benzene	<1.0	ug/L	03/21/1998	jpf
Bromodichloromethane	<1.0	ug/L	03/21/1998	jpf
Bromoform	<1.0	ug/L	03/21/1998	jpf
Bromomethane	<5.0	ug/L	03/21/1998	jpf
Carbon tetrachloride	<1.0	ug/L	03/21/1998	jpf
Chlorobenzene	<1.0	ug/L	03/21/1998	jpf
Chloroethane	<10.0	ug/L	03/21/1998	jpf
2-Chloroethyl vinyl ether	<5.0	ug/L	03/21/1998	jpf
Chloroform	<1.0	ug/L	03/21/1998	jpf
Chloromethane	<10.0	ug/L	03/21/1998	jpf
Dibromochloromethane	<1.0	ug/L	03/21/1998	jpf
1,1-Dichloroethane	<1.0	ug/L	03/21/1998	jpf
1,2-Dichloroethane	<1.0	ug/L	03/21/1998	jpf
1,1-Dichloroethene	<1.0	ug/L	03/21/1998	jpf
trans-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	jpf
cis-1,2-Dichloroethene	1.3	ug/L	03/21/1998	jpf
1,2-Dichloropropane	<1.0	ug/L	03/21/1998	jpf
cis-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	jpf
trans-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	jpf
Ethylbenzene	<1.0	ug/L	03/21/1998	jpf
Methylene chloride	<10.0	ug/L	03/21/1998	jpf
2-Butanone (MEK)	<10.0	ug/L	03/21/1998	jpf
1,1,2,2-Tetrachloroethane	<1.0	ug/L	03/21/1998	jpf
Tetrachloroethene	5.7	ug/L	03/21/1998	jpf
Toluene	<1.0	ug/L	03/21/1998	jpf
1,1,1-Trichloroethane	<1.0	ug/L	03/21/1998	jpf
1,1,2-Trichloroethane	<1.0	ug/L	03/21/1998	jpf
Trichloroethene	6.9	ug/L	03/21/1998	jpf
Trichlorofluoromethane	<1.0	ug/L	03/21/1998	jpf
Vinyl chloride	<2.0	ug/L	03/21/1998	jpf

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461592

Sample Description: 003I-A

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	90	%	03/21/1998	jpf
Surrogate: d8-Toluene	99	%	03/21/1998	jpf
Surrogate: BFB	90	%	03/21/1998	jpf

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03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461594

Sample Description: 003I-412

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	03/21/1998	dmg
Acrolein	<50.0	ug/L	03/21/1998	dmg
Acrylonitrile	<50.0	ug/L	03/21/1998	dmg
Benzene	<1.0	ug/L	03/21/1998	dmg
Bromodichloromethane	<1.0	ug/L	03/21/1998	dmg
Bromoform	<1.0	ug/L	03/21/1998	dmg
Bromomethane	<5.0	ug/L	03/21/1998	dmg
Carbon tetrachloride	1.3	ug/L	03/21/1998	dmg
Chlorobenzene	<1.0	ug/L	03/21/1998	dmg
Chloroethane	<10.0	ug/L	03/21/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	03/21/1998	dmg
Chloroform	1.9	ug/L	03/21/1998	dmg
Chloromethane	<10.0	ug/L	03/21/1998	dmg
Dibromochloromethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	03/21/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
Ethylbenzene	<1.0	ug/L	03/21/1998	dmg
Methylene chloride	<10.0	ug/L	03/21/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	03/21/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	03/21/1998	dmg
Tetrachloroethene	11.7	ug/L	03/21/1998	dmg
Toluene	<1.0	ug/L	03/21/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
Trichloroethene	7.1	ug/L	03/21/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	03/21/1998	dmg
Vinyl chloride	<2.0	ug/L	03/21/1998	dmg

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ANALYTICAL REPORT

S. Howard
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461595

Sample Description: 003I-413

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	03/21/1998	dmg
Acrolein	<50.0	ug/L	03/21/1998	dmg
Acrylonitrile	<50.0	ug/L	03/21/1998	dmg
Benzene	<1.0	ug/L	03/21/1998	dmg
Bromodichloromethane	<1.0	ug/L	03/21/1998	dmg
Bromoform	<1.0	ug/L	03/21/1998	dmg
Bromomethane	<5.0	ug/L	03/21/1998	dmg
Carbon tetrachloride	<1.0	ug/L	03/21/1998	dmg
Chlorobenzene	<1.0	ug/L	03/21/1998	dmg
Chloroethane	<10.0	ug/L	03/21/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	03/21/1998	dmg
Chloroform	<1.0	ug/L	03/21/1998	dmg
Chloromethane	<10.0	ug/L	03/21/1998	dmg
Dibromochloromethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	03/21/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
Ethylbenzene	<1.0	ug/L	03/21/1998	dmg
Methylene chloride	<10.0	ug/L	03/21/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	03/21/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	03/21/1998	dmg
Tetrachloroethene	2.6	ug/L	03/21/1998	dmg
Toluene	<1.0	ug/L	03/21/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
Trichloroethene	2.4	ug/L	03/21/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	03/21/1998	dmg
Vinyl chloride	<2.0	ug/L	03/21/1998	dmg

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ANALYTICAL REPORT

S. Howard
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461595

Sample Description: 003I-413

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	94	%	03/21/1998	dmg
Surrogate: d8-Toluene	101	%	03/21/1998	dmg
Surrogate: BFB	90	%	03/21/1998	dmg

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ANALYTICAL REPORT

S. Howard
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461596

Sample Description: 003I-414

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	03/21/1998	dmg
Acrolein	<50.0	ug/L	03/21/1998	dmg
Acrylonitrile	<50.0	ug/L	03/21/1998	dmg
Benzene	<1.0	ug/L	03/21/1998	dmg
Bromodichloromethane	<1.0	ug/L	03/21/1998	dmg
Bromoform	<1.0	ug/L	03/21/1998	dmg
Bromomethane	<5.0	ug/L	03/21/1998	dmg
Carbon tetrachloride	<1.0	ug/L	03/21/1998	dmg
Chlorobenzene	<1.0	ug/L	03/21/1998	dmg
Chloroethane	<10.0	ug/L	03/21/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	03/21/1998	dmg
Chloroform	<1.0	ug/L	03/21/1998	dmg
Chloromethane	<10.0	ug/L	03/21/1998	dmg
Dibromochloromethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	03/21/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	03/21/1998	dmg
cis-1,2-Dichloroethene	7.3	ug/L	03/21/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	03/21/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	03/21/1998	dmg
Ethylbenzene	<1.0	ug/L	03/21/1998	dmg
Methylene chloride	<10.0	ug/L	03/21/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	03/21/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	03/21/1998	dmg
Tetrachloroethene	9.0	ug/L	03/21/1998	dmg
Toluene	<1.0	ug/L	03/21/1998	dmg
1,1,1-Trichloroethane	1.3	ug/L	03/21/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	03/21/1998	dmg
Trichloroethene	10.6	ug/L	03/21/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	03/21/1998	dmg
Vinyl chloride	<2.0	ug/L	03/21/1998	dmg

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

S. Howard
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

03/25/1998

JOB NUMBER: 98.04446

SAMPLE NO.: 461596

Sample Description: 003I-414

Date Taken: 03/19/1998

Date Received: 03/19/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	94	%	03/21/1998	dmg
Surrogate: d8-Toluene	99	%	03/21/1998	dmg
Surrogate: BFB	90	%	03/21/1998	dmg

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ANALYTICAL REPORT

S.Howard
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

02/19/1998

JOB NUMBER: 98.02250

SAMPLE NO.: 454615

Sample Description: 003 SVE-Grab

Date Taken: 02/12/1998

Date Received: 02/12/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acrolein	<500	ug/L	02/16/1998	dmg
Acrylonitrile	<500	ug/L	02/16/1998	dmg
Benzene	17.9	ug/L	02/16/1998	dmg
Bromodichloromethane	<10	ug/L	02/16/1998	dmg
Bromoform	<10	ug/L	02/16/1998	dmg
Bromomethane	<50	ug/L	02/16/1998	dmg
Carbon tetrachloride	<10	ug/L	02/16/1998	dmg
Chlorobenzene	<10	ug/L	02/16/1998	dmg
Chloroethane	<100	ug/L	02/16/1998	dmg
2-Chloroethyl vinyl ether	<50	ug/L	02/16/1998	dmg
Chloroform	42.6	ug/L	02/16/1998	dmg
Chloromethane	<100	ug/L	02/16/1998	dmg
Dibromochloromethane	<10	ug/L	02/16/1998	dmg
1,1-Dichloroethane	<10	ug/L	02/16/1998	dmg
1,2-Dichloroethane	<10	ug/L	02/16/1998	dmg
1,1-Dichloroethene	<10	ug/L	02/16/1998	dmg
trans-1,2-Dichloroethene	<10	ug/L	02/16/1998	dmg
1,2-Dichloropropane	<10	ug/L	02/16/1998	dmg
cis-1,3-Dichloropropene	<10	ug/L	02/16/1998	dmg
trans-1,3-Dichloropropene	<10	ug/L	02/16/1998	dmg
Ethylbenzene	<10	ug/L	02/16/1998	dmg
Methylene chloride	<100	ug/L	02/16/1998	dmg
1,1,2,2-Tetrachloroethane	<10	ug/L	02/16/1998	dmg
Tetrachloroethene	11.8	ug/L	02/16/1998	dmg
Toluene	576	ug/L	02/16/1998	dmg
1,1,1-Trichloroethane	<10	ug/L	02/16/1998	dmg
1,1,2-Trichloroethane	<10	ug/L	02/16/1998	dmg
Trichloroethene	1,390	ug/L	02/16/1998	dmg
Trichlorofluoromethane	<10	ug/L	02/16/1998	dmg
Vinyl chloride	20.9	ug/L	02/16/1998	dmg
Surrogate: d4-1,2-DCE	93	%	02/16/1998	dmg
Surrogate: d8-Toluene	102	%	02/16/1998	dmg
Surrogate: BFB	99	%	02/16/1998	dmg

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ANALYTICAL REPORT

S.Howard
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

02/19/1998

JOB NUMBER: 98.02250

SAMPLE NO.: 454616

Sample Description: 003 I-Grab

Date Taken: 02/12/1998

Date Received: 02/12/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acrolein	<200	ug/L	02/16/1998	dmg
Acrylonitrile	<200	ug/L	02/16/1998	dmg
Benzene	<5	ug/L	02/16/1998	dmg
Bromodichloromethane	<5	ug/L	02/16/1998	dmg
Bromoform	<5	ug/L	02/16/1998	dmg
Bromomethane	<20	ug/L	02/16/1998	dmg
Carbon tetrachloride	<5	ug/L	02/16/1998	dmg
Chlorobenzene	<5	ug/L	02/16/1998	dmg
Chloroethane	<50	ug/L	02/16/1998	dmg
2-Chloroethyl vinyl ether	<20	ug/L	02/16/1998	dmg
Chloroform	<5	ug/L	02/16/1998	dmg
Chloromethane	<50	ug/L	02/16/1998	dmg
Dibromochloromethane	<5	ug/L	02/16/1998	dmg
1,1-Dichloroethane	<5	ug/L	02/16/1998	dmg
1,2-Dichloroethane	<5	ug/L	02/16/1998	dmg
1,1-Dichloroethene	<5	ug/L	02/16/1998	dmg
trans-1,2-Dichloroethene	<5	ug/L	02/16/1998	dmg
1,2-Dichloropropane	<5	ug/L	02/16/1998	dmg
cis-1,3-Dichloropropene	<5	ug/L	02/16/1998	dmg
trans-1,3-Dichloropropene	<5	ug/L	02/16/1998	dmg
Ethylbenzene	<5	ug/L	02/16/1998	dmg
Methylene chloride	<50	ug/L	02/16/1998	dmg
1,1,2,2-Tetrachloroethane	<5	ug/L	02/16/1998	dmg
Tetrachloroethene	<5	ug/L	02/16/1998	dmg
Toluene	52.3	ug/L	02/16/1998	dmg
1,1,1-Trichloroethane	<5	ug/L	02/16/1998	dmg
1,1,2-Trichloroethane	<5	ug/L	02/16/1998	dmg
Trichloroethene	167	ug/L	02/16/1998	dmg
Trichlorofluoromethane	<5	ug/L	02/16/1998	dmg
Vinyl chloride	<10	ug/L	02/16/1998	dmg
Surrogate: d4-1,2-DCE	95	%	02/16/1998	dmg
Surrogate: d8-Toluene	101	%	02/16/1998	dmg
Surrogate: BFB	99	%	02/16/1998	dmg

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

S.Howard
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

02/19/1998

JOB NUMBER: 98.02250

SAMPLE NO.: 454617

Sample Description: 003 E-Grab

Date Taken: 02/12/1998

Date Received: 02/12/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acrolein	<50.0	ug/L	02/13/1998	dmg
Acrylonitrile	<50.0	ug/L	02/13/1998	dmg
Benzene	<1.0	ug/L	02/13/1998	dmg
Bromodichloromethane	<1.0	ug/L	02/13/1998	dmg
Bromoform	<1.0	ug/L	02/13/1998	dmg
Bromomethane	<5.0	ug/L	02/13/1998	dmg
Carbon tetrachloride	<1.0	ug/L	02/13/1998	dmg
Chlorobenzene	<1.0	ug/L	02/13/1998	dmg
Chloroethane	<10.0	ug/L	02/13/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	02/13/1998	dmg
Chloroform	<1.0	ug/L	02/13/1998	dmg
Chloromethane	<10.0	ug/L	02/13/1998	dmg
Dibromochloromethane	<1.0	ug/L	02/13/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	02/13/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	02/13/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	02/13/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	02/13/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	02/13/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	02/13/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	02/13/1998	dmg
Ethylbenzene	<1.0	ug/L	02/13/1998	dmg
Methylene chloride	<10.0	ug/L	02/13/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	02/13/1998	dmg
Tetrachloroethene	<1.0	ug/L	02/13/1998	dmg
Toluene	<1.0	ug/L	02/13/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	02/13/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	02/13/1998	dmg
Trichloroethene	<1.0	ug/L	02/13/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	02/13/1998	dmg
Vinyl chloride	<2.0	ug/L	02/13/1998	dmg
Surrogate: d4-1,2-DCE	84	%	02/13/1998	dmg
Surrogate: d8-Toluene	104	%	02/13/1998	dmg
Surrogate: BFB	96	%	02/13/1998	dmg

NATIONAL ENVIRONMENTAL TESTING, INC.

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NOTES AND COMMENTS

NET Job Number: 98.02250

Sample Number: 454615-617

Analysis: GCMS Volatiles 624

Concentration of cis-1,2-Dichloroethene detected was:

SAMPLE	CONC. OF cis-1,2-Dichloroethene
454615 SVE	42.6 ug/L
454616 003I	108
464617 003E	<1

AMMENDED PAGE

SPIVEY

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

01/13/1998

NET Job Number: 97.22954

Enclosed is the analytical report for the following sample(s) submitted to the Dayton Division of NET, Inc. for analysis:

Sample Number	Sample Description	Date Taken	Date Received
446595	003E	01/06/1998	01/07/1998
446596	003E	01/07/1998	01/07/1998
446597	003I	01/07/1998	01/07/1998
446598	003SVE	01/07/1998	01/07/1998
446599	003E	01/06/1998	01/07/1998

National Environmental Testing, Inc. certifies that the analytical results contained herein apply only to the specific samples analyzed.

Reproduction of this analytical report is permitted only in its entirety.

Enclosure

Project Coordinator

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

01/13/1998

JOB NUMBER: 97.22954

SAMPLE NO.: 446596

Sample Description: 003E

Date Taken: 01/07/1998

Date Received: 01/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	<20.0	ug/L	01/09/1998	dmg
Acrolein	<50.0	ug/L	01/09/1998	dmg
Acrylonitrile	<50.0	ug/L	01/09/1998	dmg
Benzene	<1.0	ug/L	01/09/1998	dmg
Bromodichloromethane	<1.0	ug/L	01/09/1998	dmg
Bromoform	<1.0	ug/L	01/09/1998	dmg
Bromomethane	<5.0	ug/L	01/09/1998	dmg
Carbon tetrachloride	<1.0	ug/L	01/09/1998	dmg
Chlorobenzene	<1.0	ug/L	01/09/1998	dmg
Chloroethane	<10.0	ug/L	01/09/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	01/09/1998	dmg
Chloroform	<1.0	ug/L	01/09/1998	dmg
Chloromethane	<10.0	ug/L	01/09/1998	dmg
Dibromochloromethane	<1.0	ug/L	01/09/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	01/09/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	01/09/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	01/09/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	01/09/1998	dmg
cis-1,2-Dichloroethene	<1.0	ug/L	01/09/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	01/09/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	01/09/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	01/09/1998	dmg
Ethylbenzene	<1.0	ug/L	01/09/1998	dmg
Methylene chloride	<10.0	ug/L	01/09/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	01/09/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	01/09/1998	dmg
Tetrachloroethene	<1.0	ug/L	01/09/1998	dmg
Toluene	<1.0	ug/L	01/09/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	01/09/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	01/09/1998	dmg
Trichloroethene	<1.0	ug/L	01/09/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	01/09/1998	dmg
Vinyl chloride	<2.0	ug/L	01/09/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

01/13/1998

JOB NUMBER: 97.22954

SAMPLE NO.: 446596

Sample Description: 003E

Date Taken: 01/07/1998

Date Received: 01/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	104	%	01/09/1998	dmg
Surrogate: d8-Toluene	96	%	01/09/1998	dmg
Surrogate: BFB	94	%	01/09/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
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01/13/1998

JOB NUMBER: 97.22954

SAMPLE NO.: 446597

Sample Description: 003I

Date Taken: 01/07/1998

Date Received: 01/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	97.4	ug/L	01/09/1998	dmg
Acrolein	<50.0	ug/L	01/09/1998	dmg
Acrylonitrile	<50.0	ug/L	01/09/1998	dmg
Benzene	1.1	ug/L	01/09/1998	dmg
Bromodichloromethane	<1.0	ug/L	01/09/1998	dmg
Bromoform	<1.0	ug/L	01/09/1998	dmg
Bromomethane	<5.0	ug/L	01/09/1998	dmg
Carbon tetrachloride	<1.0	ug/L	01/09/1998	dmg
Chlorobenzene	<1.0	ug/L	01/09/1998	dmg
Chloroethane	<10.0	ug/L	01/09/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	01/09/1998	dmg
Chloroform	2.7	ug/L	01/09/1998	dmg
Chloromethane	<10.0	ug/L	01/09/1998	dmg
Dibromochloromethane	<1.0	ug/L	01/09/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	01/09/1998	dmg
1,2-Dichloroethane	<1.0	ug/L	01/09/1998	dmg
1,1-Dichloroethene	<1.0	ug/L	01/09/1998	dmg
trans-1,2-Dichloroethene	<1.0	ug/L	01/09/1998	dmg
cis-1,2-Dichloroethene	72.3	ug/L	01/09/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	01/09/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	01/09/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	01/09/1998	dmg
Ethylbenzene	<1.0	ug/L	01/09/1998	dmg
Methylene chloride	<10.0	ug/L	01/09/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	01/09/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	01/09/1998	dmg
Tetrachloroethene	7.9	ug/L	01/09/1998	dmg
Toluene	72.2	ug/L	01/09/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	01/09/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	01/09/1998	dmg
Trichloroethene	78.4	ug/L	01/09/1998	dmg
Trichlorofluoromethane	<1.0	ug/L	01/09/1998	dmg
Vinyl chloride	<2.0	ug/L	01/09/1998	dmg

NATIONAL ENVIRONMENTAL TESTING, INC.

Dayton Division
3601 South Dixie Drive
Dayton, OH 45439
Tel: (937) 294-6856
Fax: (937) 294-7816

ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

01/13/1998

JOB NUMBER: 97.22954

SAMPLE NO.: 446597

Sample Description: 003I

Date Taken: 01/07/1998

Date Received: 01/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	106	%	01/09/1998	dmg
Surrogate: d8-Toluene	98	%	01/09/1998	dmg
Surrogate: BFB	96	%	01/09/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

01/13/1998

JOB NUMBER: 97.22954

SAMPLE NO.: 446598

Sample Description: 003SVE

Date Taken: 01/07/1998

Date Received: 01/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Acetone	1,570	ug/L	01/09/1998	dmg
Acrolein	<50.0	ug/L	01/09/1998	dmg
Acrylonitrile	<50.0	ug/L	01/09/1998	dmg
Benzene	<1.0	ug/L	01/09/1998	dmg
Bromodichloromethane	<1.0	ug/L	01/09/1998	dmg
Bromoform	<1.0	ug/L	01/09/1998	dmg
Bromomethane	<5.0	ug/L	01/09/1998	dmg
Carbon tetrachloride	17.9	ug/L	01/09/1998	dmg
Chlorobenzene	<1.0	ug/L	01/09/1998	dmg
Chloroethane	<10.0	ug/L	01/09/1998	dmg
2-Chloroethyl vinyl ether	<5.0	ug/L	01/09/1998	dmg
Chloroform	40.6	ug/L	01/09/1998	dmg
Chloromethane	<10.0	ug/L	01/09/1998	dmg
Dibromochloromethane	<1.0	ug/L	01/09/1998	dmg
1,1-Dichloroethane	<1.0	ug/L	01/09/1998	dmg
1,2-Dichloroethane	1.7	ug/L	01/09/1998	dmg
1,1-Dichloroethene	1.0	ug/L	01/09/1998	dmg
trans-1,2-Dichloroethene	6.0	ug/L	01/09/1998	dmg
cis-1,2-Dichloroethene	1,270	ug/L	01/09/1998	dmg
1,2-Dichloropropane	<1.0	ug/L	01/09/1998	dmg
cis-1,3-Dichloropropene	<1.0	ug/L	01/09/1998	dmg
trans-1,3-Dichloropropene	<1.0	ug/L	01/09/1998	dmg
Ethylbenzene	9.5	ug/L	01/09/1998	dmg
Methylene chloride	35.1	ug/L	01/09/1998	dmg
2-Butanone (MEK)	<10.0	ug/L	01/09/1998	dmg
1,1,2,2-Tetrachloroethane	<1.0	ug/L	01/09/1998	dmg
Tetrachloroethene	61.0	ug/L	01/09/1998	dmg
Toluene	1,290	ug/L	01/09/1998	dmg
1,1,1-Trichloroethane	<1.0	ug/L	01/09/1998	dmg
1,1,2-Trichloroethane	<1.0	ug/L	01/09/1998	dmg
Trichloroethene	1,380	ug/L	01/09/1998	dmg
Trichlorofluoromethane	4.4	ug/L	01/09/1998	dmg
Vinyl chloride	9.9	ug/L	01/09/1998	dmg

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ANALYTICAL REPORT

Ron Paulick
BABCOCK & WILCOX OF OHIO
P. O. Box 3030
Miamisburg, OH 45343-3000

01/13/1998

JOB NUMBER: 97.22954

SAMPLE NO.: 446598

Sample Description: 003SVE

Date Taken: 01/07/1998

Date Received: 01/07/1998

VOLATILE COMPOUNDS - 624

Parameter	Result	Unit	Date Anal.	Analyst
Surrogate: d4-1,2-DCE	100	%	01/09/1998	dmg
Surrogate: d8-Toluene	91	%	01/09/1998	dmg
Surrogate: BFB	94	%	01/09/1998	dmg

Pump and Treat as of 12/31/98

DCE (pounds)

$$a := \int_0^{337709134} e^{3.927092383 + -9.8581126 \cdot 10^{-6} \cdot x^{0.5} \cdot \ln(x)} dx \cdot 2.205 \cdot 10^{-9}$$

TCE (pounds)

$$b := \int_0^{337709134} 4.493690397 + 47.32379351 \cdot \exp\left(\frac{-x}{3.9382936 \cdot 10^{7}}\right) dx \cdot 2.205 \cdot 10^{-9}$$

PCE (pounds)

$$c := \int_0^{337709134} 4.420647746 + 17.37660803 \cdot \exp\left(\frac{-x}{6.7500467 \cdot 10^{7}}\right) dx \cdot 2.205 \cdot 10^{-9}$$

$a + b + c = 19.088$

Pump and Treat as of 12/31/98

DCE (pounds)

$$a := \int_{295159551}^{337709134} e^{3.927092383 + -9.8581126 \cdot 10^{-6} \cdot x^{0.5} \cdot \ln(x)} dx \cdot 2.205 \cdot 10^{-9}$$

TCE (pounds)

$$b := \int_{295159551}^{337709134} 4.493690397 + 47.32379351 \cdot \exp\left(\frac{-x}{3.9382936 \cdot 10^{7}}\right) dx \cdot 2.205 \cdot 10^{-9}$$

PCE (pounds)

$$c := \int_{295159551}^{337709134} 4.420647746 + 17.37660803 \cdot \exp\left(\frac{-x}{6.7500467 \cdot 10^{7}}\right) dx \cdot 2.205 \cdot 10^{-9}$$

$a + b + c = 1.008$

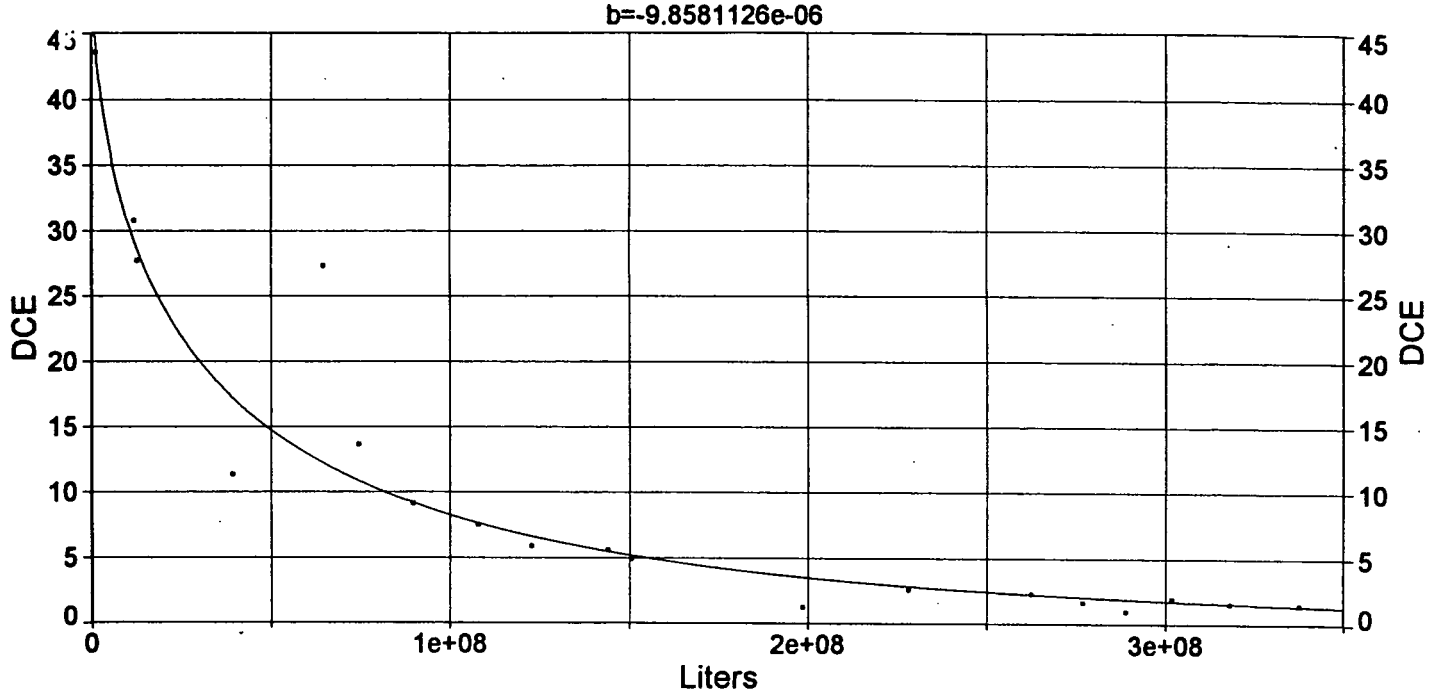
Pump & Treat

Rank 1 Eqn 30 $\ln y = a + bx^{0.5} \ln x$

r^2=0.97885511 DF Adj r^2=0.97603579 FitStdErr=1.8188307 Fstat=740.68386

a=3.9270924

b=-9.8581126e-06



Rank 1 Eqn 30 $\ln y = a + bx^{0.5} \ln x$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9788551060	0.9760357868	1.8188306951	740.68385943

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	3.927092383	0.039773786	98.73569533	3.842775724	4.011409042
b	-9.8581e-06	5.27799e-07	-18.6777686	-1.0977e-05	-8.7392e-06

Date	Time	File Source
Jan 27, 1999	3:15:14 PM	C:\TCWIN4\CLIPBRD.WK1

295159551
337709134

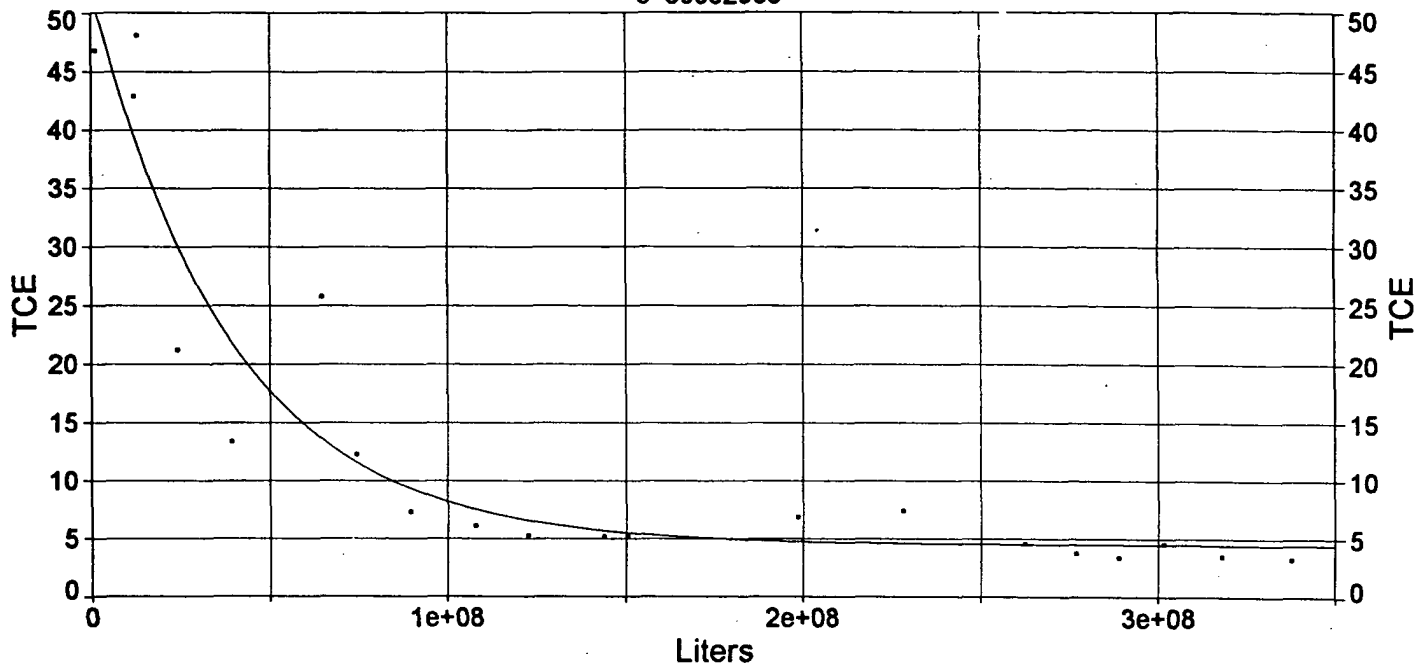
Pump & Treat

Rank 1 Eqn 8002 [Exponential] y=a+bexp(-x/c)

r^2=0.89814088 DF Adj r^2=0.87904229 FitStdErr=5.0861614 Fstat=74.94859

a=4.4936904 b=47.323794

c=39382936



Rank 1 Eqn 8002 [Exponential] y=a+bexp(-x/c)

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.8981408795	0.8790422944	5.0861614213	74.948590152

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	4.493690397	1.656342585	2.713019901	0.999113007	7.988267786
b	47.32379351	4.264971016	11.09592383	38.32549122	56.32209580
c	3.93829e+07	8.24851e+06	4.774550662	2.19801e+07	5.67858e+07

Date	Time	File Source
Jan 27, 1999	3:13:54 PM	C:\TCWIN4\CLIPBRD.WK1

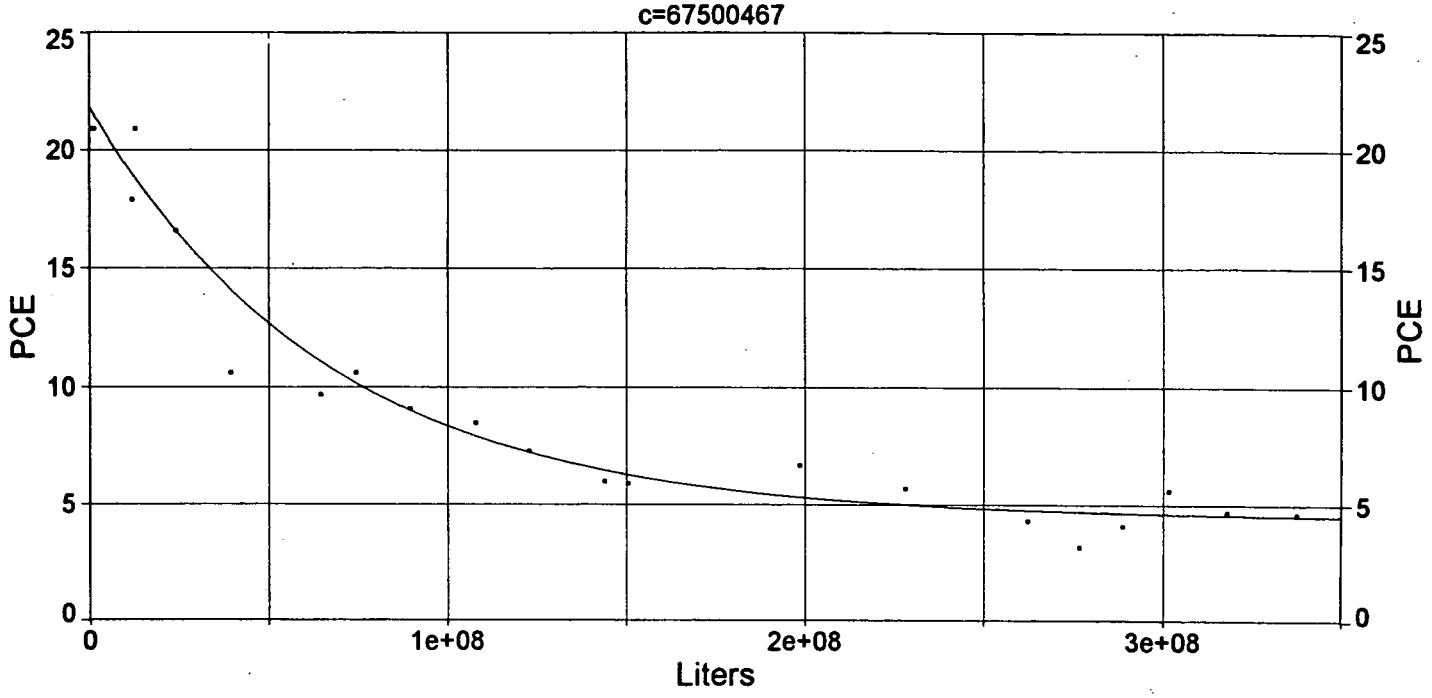
Pump & Treat

Rank 1 Eqn 8002 [Exponential] y=a+bexp(-x/c)

r^2=0.97466659 DF Adj r^2=0.96959991 FitStdErr=0.96672187 Fstat=307.78852

a=4.4206477 b=17.376608

c=67500467



Rank 1 Eqn 8002 [Exponential] y=a+bexp(-x/c)

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9746665898	0.9695999078	0.9667218667	307.78851598

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	4.420647746	0.423261717	10.44424186	3.523372988	5.317922504
b	17.37660803	0.705281005	24.63785059	15.88147909	18.87173697
c	6.75005e+07	7.22297e+06	9.345256964	5.21885e+07	8.28125e+07

Date	Time	File Source
Jan 27, 1999	3:11:58 PM	C:\TCWIN4\CLIPBRD.WK1

Pump and Treat as of 10/14/98

DCE (pounds)

$$a := \int_0^{301567723.9} e^{3.927142334 + -9.859237 \cdot 10^{-6} \cdot x^{0.5} \cdot \ln(x)} dx \cdot 2.205 \cdot 10^{-9}$$

TCE (pounds)

$$b := \int_0^{301567723.9} 4.836737590 + 49.45042903 \cdot \exp\left(\frac{-x}{3.1371395 \cdot 10^{7}}\right) dx \cdot 2.205 \cdot 10^{-9}$$

PCE (pounds)

$$c := \int_0^{301567723.9} 4.677431123 + 17.00818753 \cdot \exp\left(\frac{-x}{6.0810082 \cdot 10^{7}}\right) dx \cdot 2.205 \cdot 10^{-9}$$

$a + b + c = 17.655$

Pump and Treat Influent Contaminant Levels

Without SVE influent			ug/l					With SVE influent						
Date	Gallons	Liters	PCE	TCE	DCE	COC Effluent	MCL	Date	Gallons	Liters	PCA	TCE	DCE	COC Effluent
02/20/97	297759	1127140.492	20.9	46.8	43.6	<1.0	5							
03/12/97	3171135	12004052.48	17.9	42.9	30.8	<1.0	5							
03/19/97	3400844	12873595.69	20.9	48.1	27.7	<1.0	5							
04/09/97	6391168	24193204.04	16.6	21.2		<1.0	5							
05/06/97	10407796	39397795.87	10.6	13.4	11.3	<1.0	5							
06/18/97	17081704	64661287.3	9.7	25.8	27.3	<1.0	5							
07/09/97	19693578	74548306.48	10.6	12.3	13.6	<1.0	5							
08/06/97	23652387	89534029.58	9.1	7.3	9.1	<1.0	5							
09/10/97	28503649	107898055	8.5	6.1	7.5	<1.0	5							
10/08/97	32397250	122636938.9	7.3	5.3	5.9	<1.0	5							
11/20/97	37998290	143839182.9	6.0	5.2	5.6	<1.0	5							
12/03/97	39770235	150546724.8	5.9	5.2	4.9	<1.0	5							
							5	1/7/98	43952710	166379115.9	7.9	78.4	72.3	<1.0
							5	2/12/98	48546654	183769086.6	5	167		<1.0
3/19/98	52495035	198715335.4	6.7	6.9	1.3	<1.0	5							
5/13/98	60283515	228197941.1	5.7	7.4	2.6	<1.0	5							
7/15/98	69314280	262383107.3	4.3	4.6	2.3	<1.0	5							
8/12/98	73100645	276716058.8	3.2	3.8	1.7	<1.0	5							
9/10/98	76280040	288751378.8	4.1	3.4	1	<1.0	5							
10/14/98	79665760	301567723.9	5.6	4.6	2	<1.0	5							

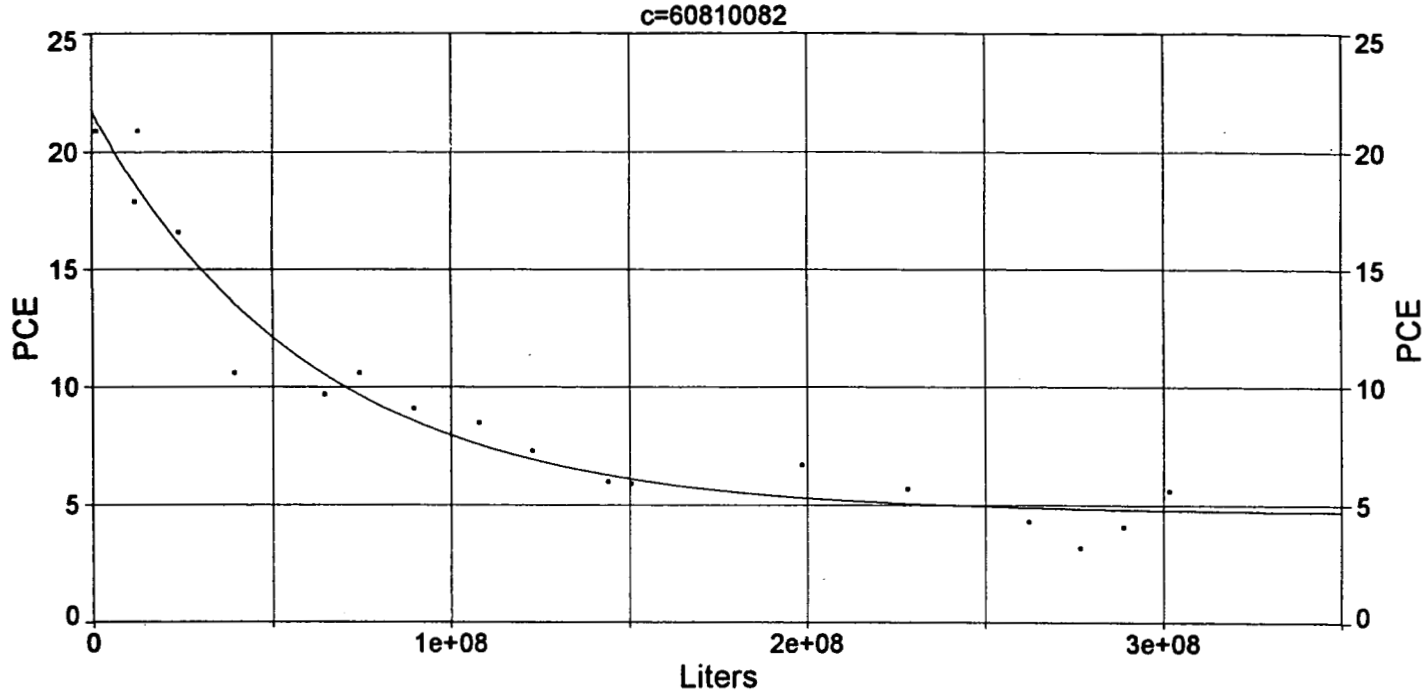
Pump & Treat

Rank 1 Eqn 8002 [Exponential] y=a+bexp(-x/c)

r^2=0.95348868 DF Adj r^2=0.94352196 FitStdErr=1.3030208 Fstat=153.75106

a=4.6774311 b=17.008188

c=60810082



Rank 1 Eqn 8002 [Exponential] y=a+bexp(-x/c)

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9534886766	0.9435219645	1.3030207707	153.75105586

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	4.677431123	0.615232352	7.602706702	3.366094406	5.988767841
b	17.00818753	0.978873431	17.37526731	14.92176820	19.09460686
c	6.08101e+07	9.23426e+06	6.585270110	4.11277e+07	8.04924e+07

Date	Time	File Source
Nov 4, 1998	1:50:13 PM	C:\TCWIN4\CLIPBRD.WK1

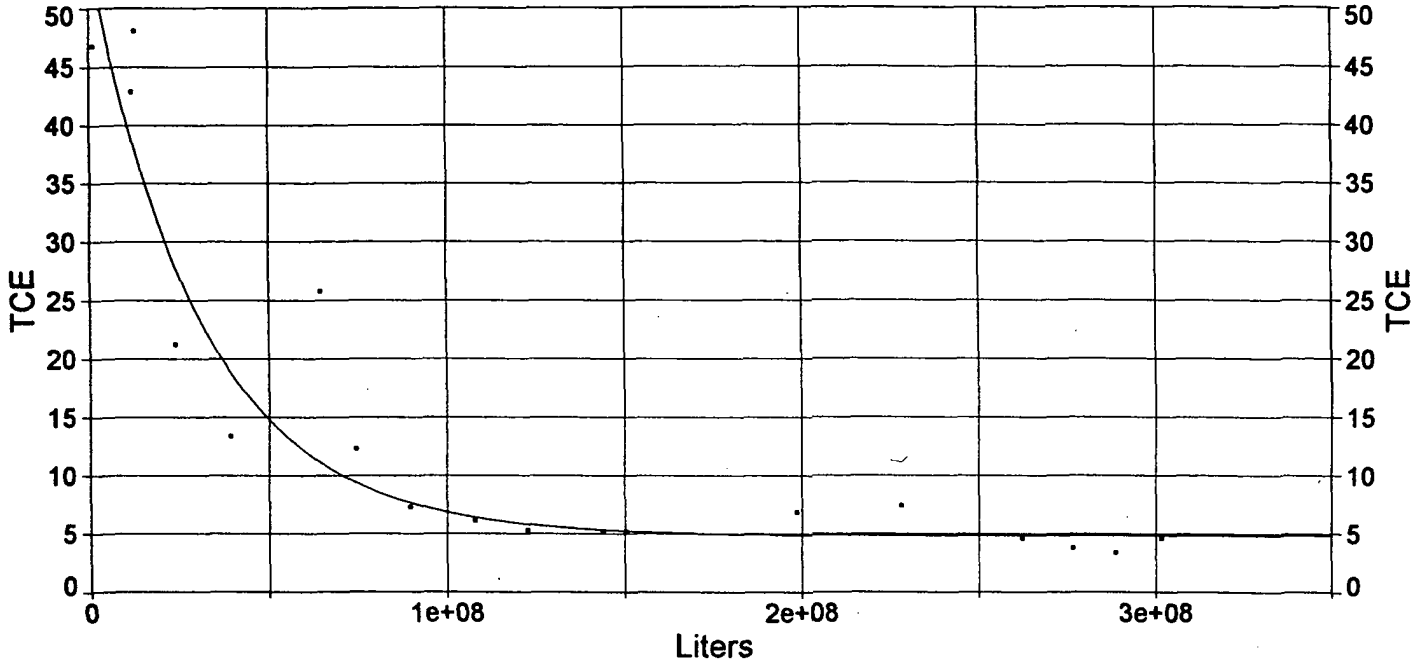
Pump & Treat

Rank 1 Eqn 8002 [Exponential] y=a+bexp(-x/c)

r^2=0.93513402 DF Adj r^2=0.92016495 FitStdErr=4.2787934 Fstat=100.91482

a=4.8367376 b=49.450429

c=31371395



Rank 1 Eqn 8002 [Exponential] y=a+bexp(-x/c)

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9351340241	0.9201649527	4.2787933861	100.91481824

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	4.836737590	1.426891934	3.389701402	1.776358762	7.897116418
b	49.45042903	4.004800143	12.34778947	40.86098699	58.03987107
c	3.13714e+07	6.01297e+06	5.217287976	1.84749e+07	4.42679e+07

Date	Time	File Source
Nov 4, 1998	1:48:52 PM	C:\TCWIN4\CLIPBRD.WK1

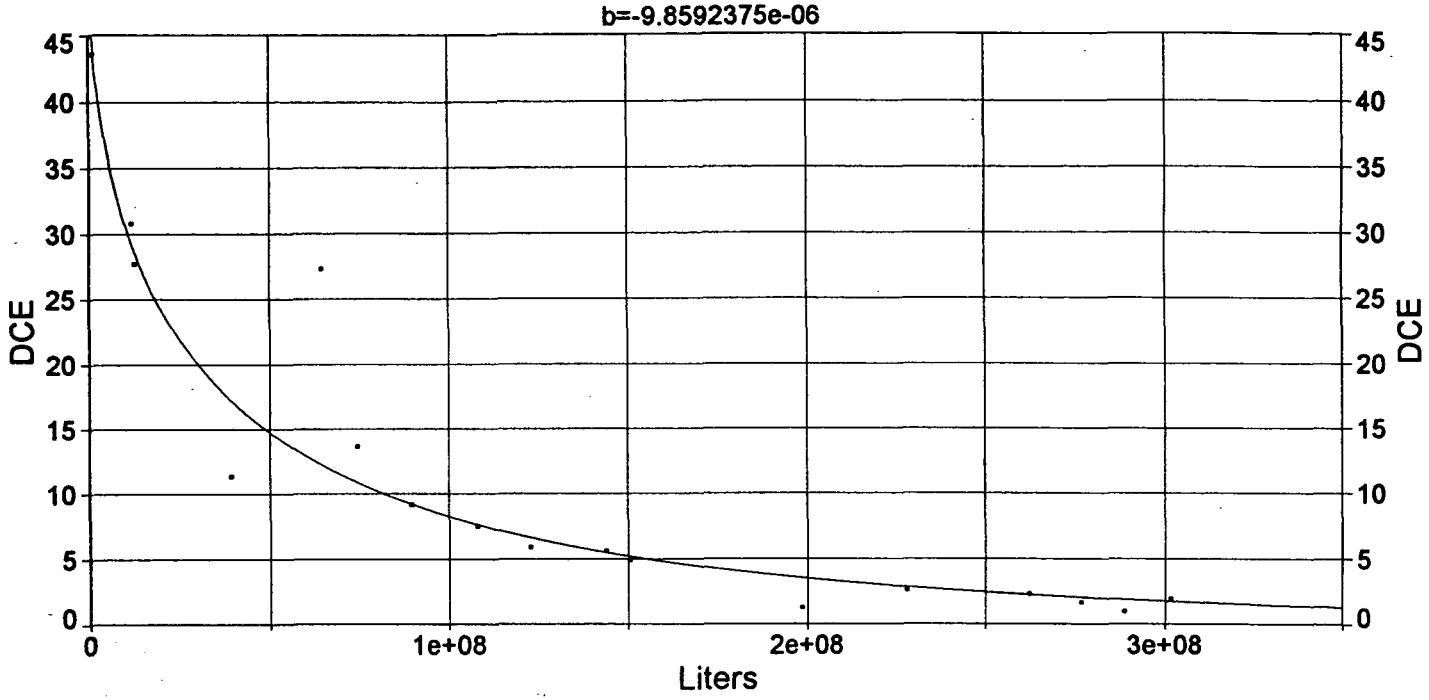
Pump & Treat

Rank 1 Eqn 30 $\ln y = a + bx^{0.5} \ln x$

r^2=0.97753189 DF Adj r^2=0.97407526 FitStdErr=1.9440762 Fstat=609.10532

a=3.9271423

b=-9.8592375e-06



Rank 1 Eqn 30 $\ln y = a + bx^{0.5} \ln x$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9775318883	0.9740752557	1.9440762029	609.10532344

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	3.927142334	0.042787418	91.78264310	3.835372449	4.018912219
b	-9.8592e-06	5.74827e-07	-17.1516642	-1.1092e-05	-8.6264e-06

Date	Time	File Source
Nov 4, 1998	1:52:11 PM	C:\TCWIN4\CLIPBRD.WK1

Pump and Treat as of 8/12/98

DCE (pounds)

$$\int_0^{276716058.8} e^{\left(3.925003585 + -9.5552737 \cdot 10^{-6} \cdot x^{0.5} \cdot \ln(x)\right)} dx \cdot 2.205 \cdot 10^{-9} = 5.769$$

TCE (pounds)

$$\int_0^{276716058.8} \frac{1}{0.01961884 + 7.0701049 \cdot 10^{-14} \cdot x^{1.5}} dx \cdot 2.205 \cdot 10^{-9} = 7.868$$

PCA (pounds)

$$\int_0^{276716058.8} \frac{1}{0.044809276 + 3.803835 \cdot 10^{-11} \cdot x \cdot \ln(x)} dx \cdot 2.205 \cdot 10^{-9} = 5.258$$

18.895 lbs

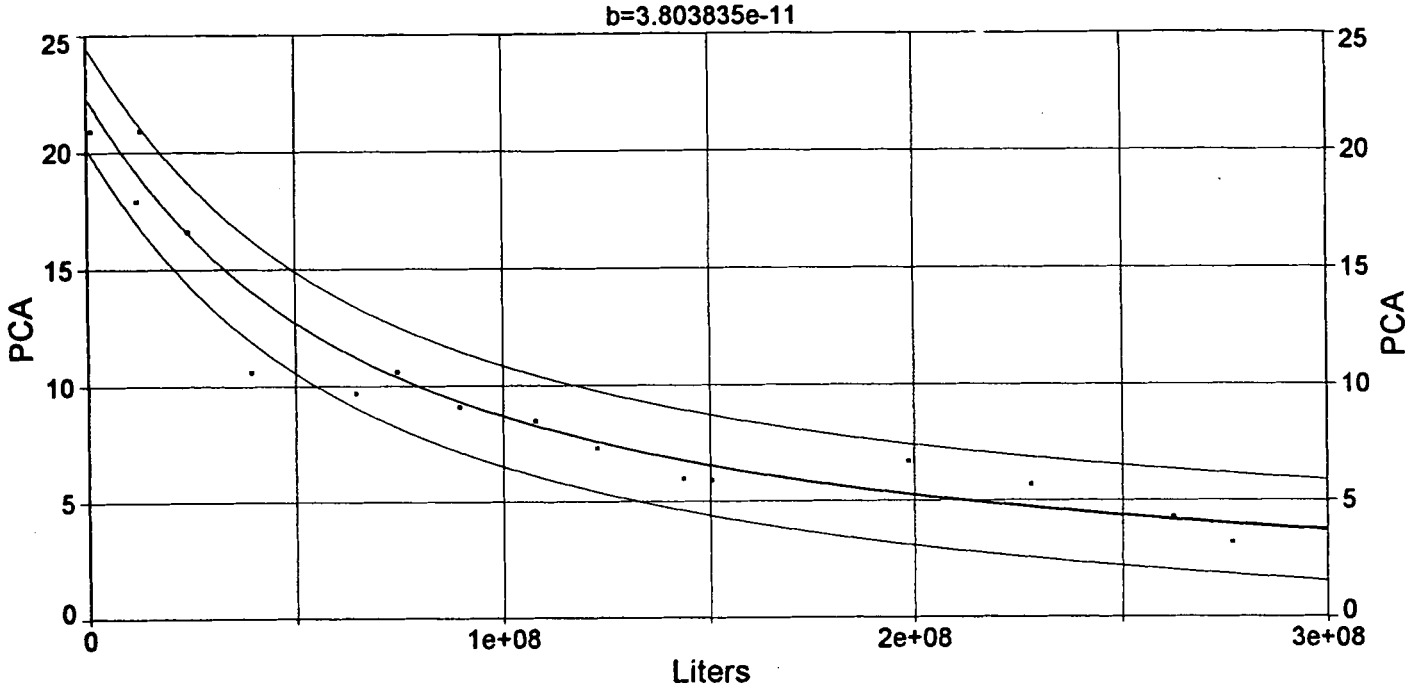
C:\TCWIN4\CLIPBRD.WK1

Rank 2 Eqn 44 $y^{-1}=a+bx\ln x$

$r^2=0.97527359$ DF Adj $r^2=0.97077788$ FitStdErr=0.99586776 Fstat=473.31113

a=0.044809276

b=3.803835e-11



Rank 2 Eqn 44 $y^{-1}=a+bx\ln x$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9752735939	0.9707778836	0.9958677630	473.31112571

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	0.044809276	0.001503771	29.79793583	0.041532840	0.048085711
b	3.80383e-11	2.86209e-12	13.29040613	3.18024e-11	4.42743e-11

Date	Time	File Source
Sep 10, 1998	10:25:46 AM	C:\TCWIN4\CLIPBRD.WK1

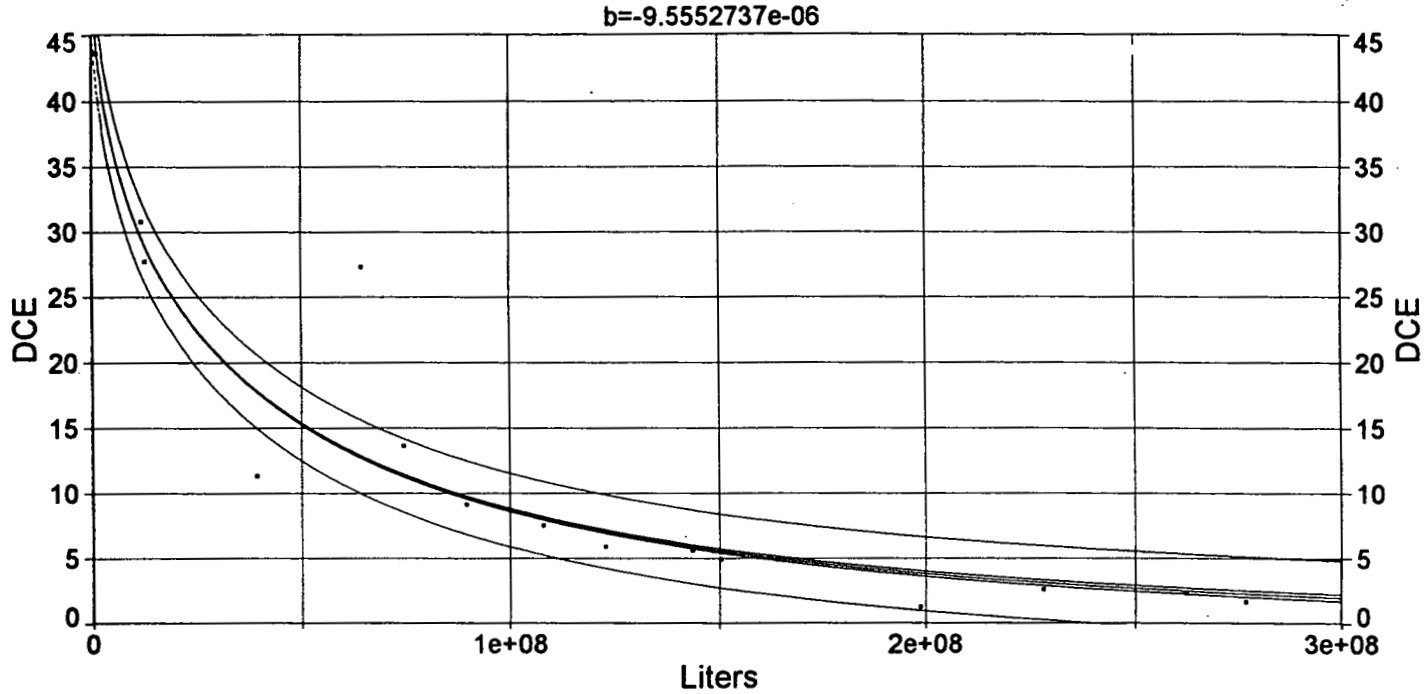
C:\TCWIN4\CLIPBRD.WK1

Rank 1 Eqn 30 $\ln y = a + bx^{0.5} \ln x$

r^2=0.99164498 DF Adj r^2=0.98997398 FitStdErr=1.2812506 Fstat=1305.5742

a=3.9250036

b=-9.5552737e-06



Rank 1 Eqn 30 $\ln y = a + bx^{0.5} \ln x$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9916449826	0.9899739791	1.2812506272	1305.5741561

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	3.925003585	0.028378583	138.3086552	3.862542746	3.987464424
b	-9.5553e-06	3.93487e-07	-24.2836038	-1.0421e-05	-8.6892e-06

Date	Time	File Source
Sep 10, 1998	10:30:26 AM	C:\TCWIN4\CLIPBRD.WK1

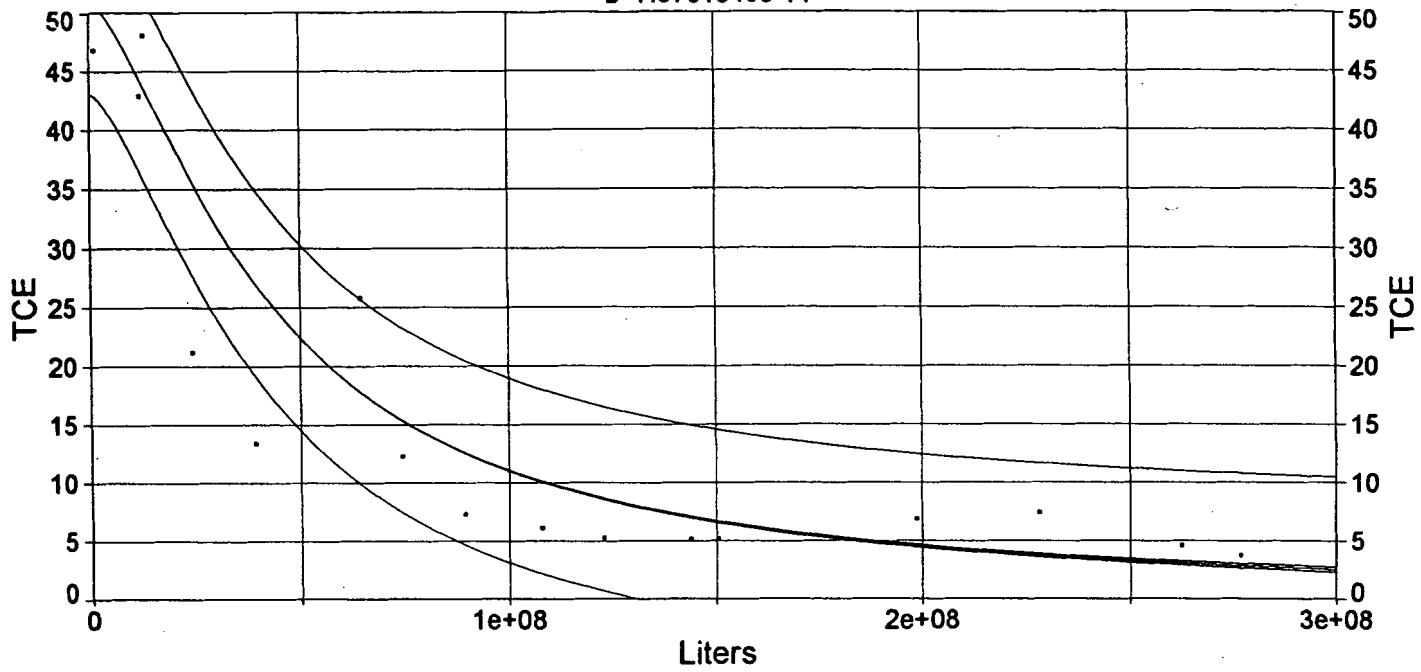
C:\TCWIN4\CLIPBRD.WK1

Rank 1 Eqn 45 $y^{-1}=a+bx^{1.5}$

r^2=0.96857485 DF Adj r^2=0.96071856 FitStdErr=3.4980296 Fstat=277.3948

a=0.01961884

b=7.0701049e-14



Rank 1 Eqn 45 $y^{-1}=a+bx^{1.5}$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9685748483	0.9607185603	3.4980296327	277.39479848

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	0.019618840	0.001106418	17.73184715	0.017115948	0.022121732
b	7.0701e-14	1.8377e-14	3.847252938	2.91293e-14	1.12273e-13

Date	Time	File Source
Sep 10, 1998	10:28:55 AM	C:\TCWIN4\CLIPBRD.WK1

Pump and Treat Influent Contaminant Levels

Without SVE influent			ug/l					With SVE influent						
Date	Gallons	Liters	PCA	TCE	DCE	COC Effluent	MCL	Date	Gallons	Liters	PCA	TCE	DCE	COC Effluent
02/20/97	297759	1127140.492	20.9	46.8	43.6	<1.0	5							
03/12/97	3171135	12004052.48	17.9	42.9	30.8	<1.0	5							
03/19/97	3400844	12873595.69	20.9	48.1	27.7	<1.0	5							
04/09/97	6391168	24193204.04	16.6	21.2		<1.0	5							
05/06/97	10407796	39397795.87	10.6	13.4	11.3	<1.0	5							
06/18/97	17081704	64661287.3	9.7	25.8	27.3	<1.0	5							
07/09/97	19693578	74548306.48	10.6	12.3	13.6	<1.0	5							
08/06/97	23652387	89534029.58	9.1	7.3	9.1	<1.0	5							
09/10/97	28503649	107898055	8.5	6.1	7.5	<1.0	5							
10/08/97	32397250	122636938.9	7.3	5.3	5.9	<1.0	5							
11/20/97	37998290	143839182.9	6.0	5.2	5.6	<1.0	5							
12/03/97	39770235	150546724.8	5.9	5.2	4.9	<1.0	5							
							5	1/7/98	43952710	166379115.9	7.9	78.4	72.3	<1.0
							5	2/12/98	48546654	183769086.6	5	167		<1.0
3/19/98	52495035	198715335.4	6.7	6.9	1.3	<1.0	5							
5/13/98	60283515	228197941.1	5.7	7.4	2.6	<1.0	5							
7/15/98	69314280	262383107.3	4.3	4.6	2.3	<1.0	5							
8/12/98	73100645	276716058.8	3.2	3.8	1.7	<1.0	5							

Pump and Treat

DCE (pounds)

$$\int_0^{262383107.3} e^{\left(3.926259623 + -9.838605\cdot 10^{-6}\cdot x^{0.5}\cdot \ln(x)\right)}\,dx\cdot 2.205\cdot 10^{-9} = 5.479$$

TCE (pounds)

$$\int_0^{262383107.3} \frac{1}{0.019841119 + 7.4774675\cdot 10^{-14}\cdot x^{1.5}}\,dx\cdot 2.205\cdot 10^{-9} = 7.512$$

PCA (pounds)

$$\int_0^{262383107.3} \frac{1}{0.043661291 + 1.287761\cdot 10^{-8}\cdot \frac{x}{\ln(x)}}\,dx\cdot 2.205\cdot 10^{-9} = 5.2$$

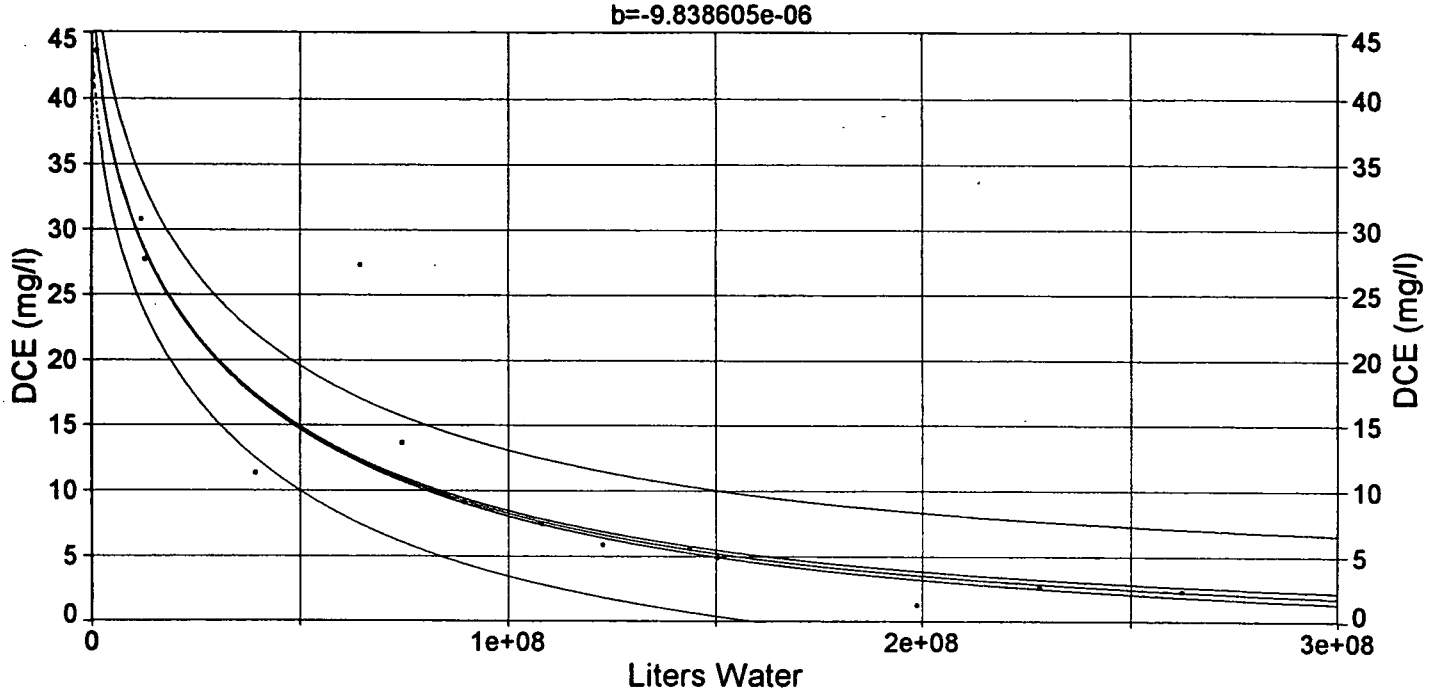
Pump and Treat

Rank 1 Eqn 30 $\ln y = a + bx^{0.5} \ln x$

r^2=0.97456532 DF Adj r^2=0.96947839 FitStdErr=2.1759641 Fstat=421.48043

a=3.9262596

b=-9.838605e-06



Rank 1 Eqn 30 $\ln y = a + bx^{0.5} \ln x$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9745653232	0.9694783879	2.1759641138	421.48043197

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	3.926259623	0.048348287	81.20783377	3.819845761	4.032673484
b	-9.8386e-06	6.61486e-07	-14.8734811	-1.1295e-05	-8.3827e-06

Date	Time	File Source
Aug 27, 1998	8:23:16 AM	C:\TCWIN4\CLIPBRD.WK1

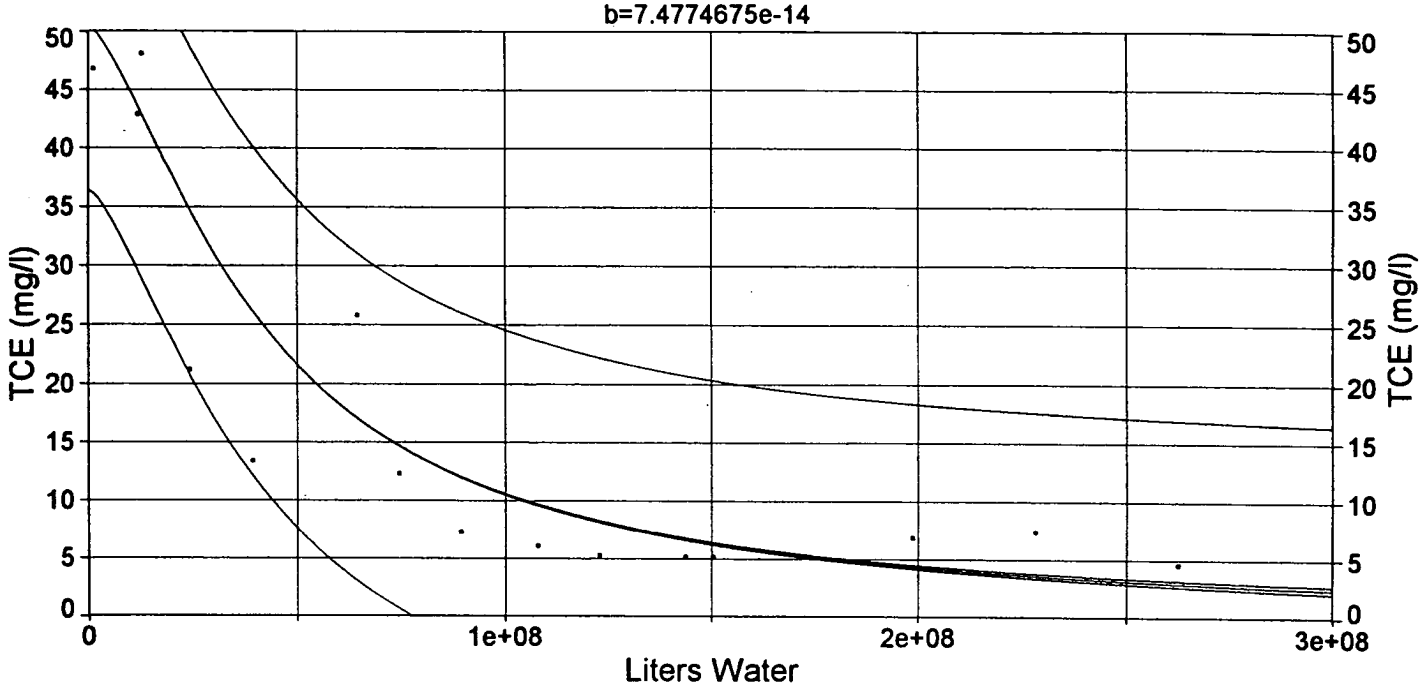
Pump and Treat

Rank 1 Eqn 45 $y^{-1}=a+bx^{1.5}$

r^2=0.87101965 DF Adj r^2=0.84522358 FitStdErr=6.3707314 Fstat=74.284311

a=0.019841119

b=7.4774675e-14



Rank 1 Eqn 45 $y^{-1}=a+bx^{1.5}$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.8710196540	0.8452235848	6.3707313874	74.284311471

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	0.019841119	0.001946625	10.19257255	0.015556626	0.024125613
b	7.47747e-14	2.78621e-14	2.683746263	1.34507e-14	1.36099e-13

Date	Time	File Source
Aug 27, 1998	8:25:35 AM	C:\TCWIN4\CLIPBRD.WK1

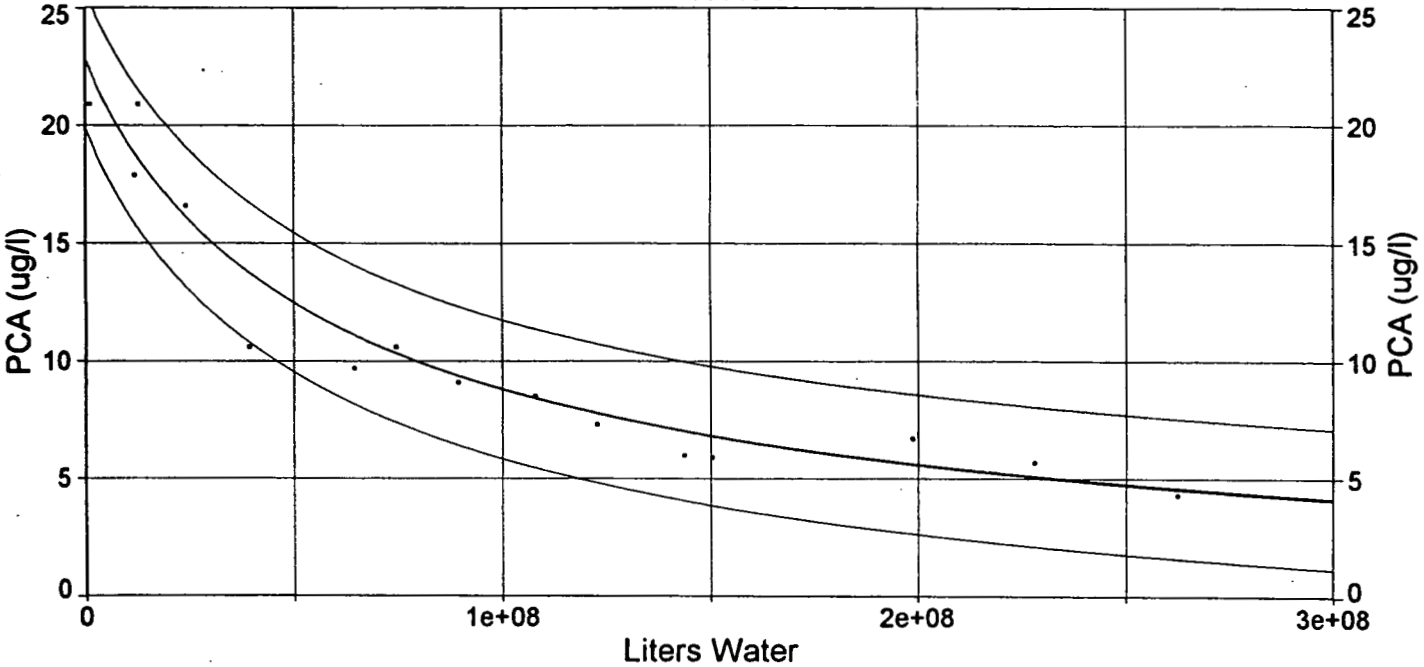
Pump and Treat

Rank 2 Eqn 53 $y^{-1}=a+bx/lnx$

r^2=0.94471459 DF Adj r^2=0.93550035 FitStdErr=1.3707086 Fstat=222.14341

a=0.043661291

b=1.287761e-08



Rank 2 Eqn 53 $y^{-1}=a+bx/lnx$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9447145891	0.9355003540	1.3707086069	222.14340925

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	0.043661291	0.002139799	20.40439345	0.039038537	0.048284045
b	1.28776e-08	1.26222e-09	10.20233312	1.01507e-08	1.56045e-08

Date	Time	File Source
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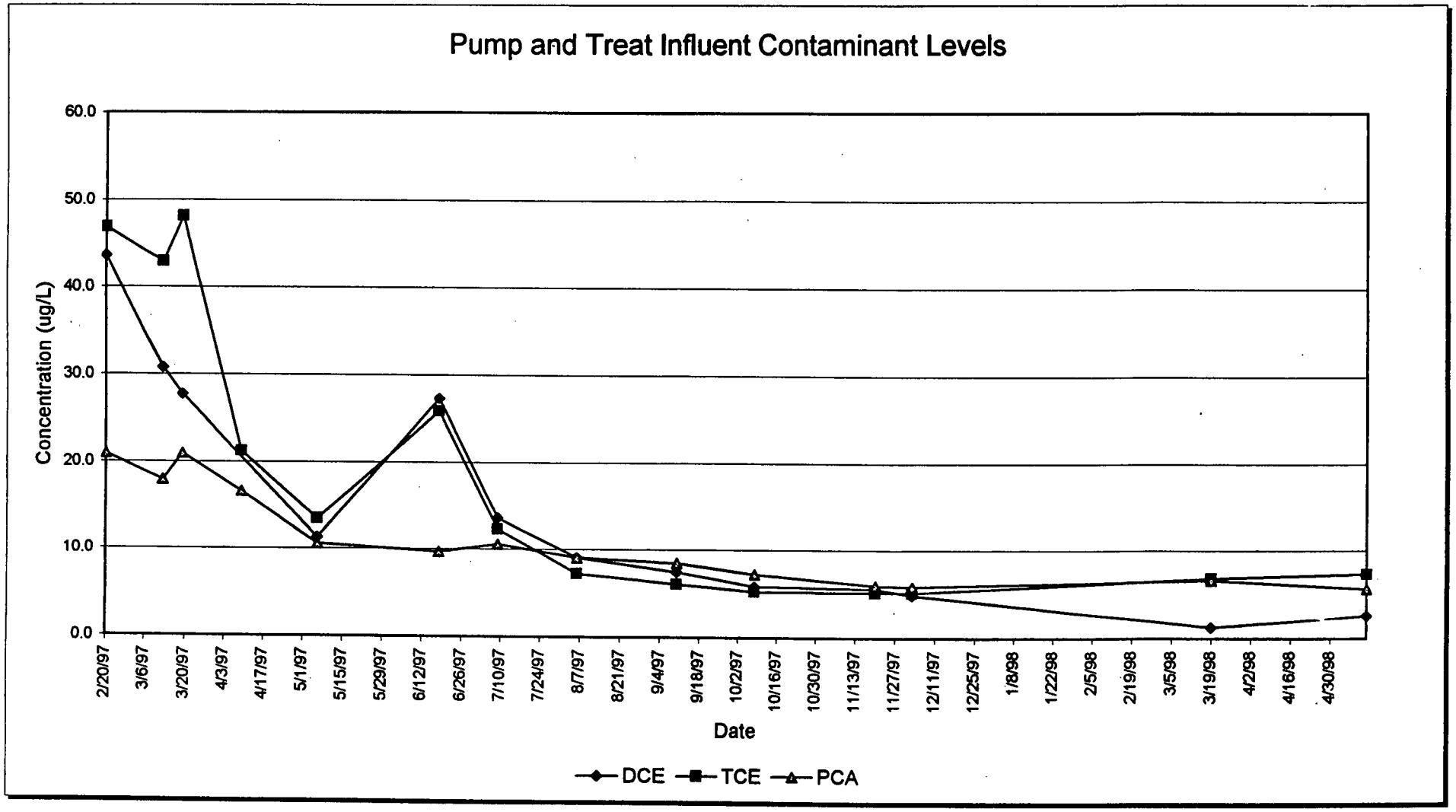

Pump and Treat Influent Contaminant Levels
Concentration (ug/L)
60.0
50.0
40.0
30.0
20.0
10.0
0.0
2/20/97
3/6/97
3/20/97
4/3/97
4/17/97
5/1/97
5/15/97
5/29/97
6/12/97
6/26/97
7/10/97
7/24/97
8/7/97
8/21/97
9/4/97
9/18/97
10/2/97
10/16/97
10/30/97
11/13/97
11/27/97
12/11/97
12/25/97
1/8/98
1/22/98
2/5/98
2/19/98
3/5/98
3/19/98
4/2/98
4/16/98
4/30/98
Date
DCE
TCE
PCA

Pump and Treat Influent Contaminant Levels

Without SVE influent							With SVE influent						
Date	Gallons	Liters	PCA	TCE	DCE	COC Effluent	Date	Gallons	Liters	PCA	TCE	DCE	COC Effluent
02/20/97	297759	1127140.492	20.9	46.8	43.6	<1.0							
03/12/97	3171135	12004052.48	17.9	42.9	30.8	<1.0							
03/19/97	3400844	12873595.69	20.9	48.1	27.7	<1.0							
04/09/97	6391168	24193204.04	16.6	21.2		<1.0							
05/06/97	10407796	39397795.87	10.6	13.4	11.3	<1.0							
06/18/97	17081704	64661287.3	9.7	25.8	27.3	<1.0							
07/09/97	19693578	74548306.48	10.6	12.3	13.6	<1.0							
08/06/97	23652387	89534029.58	9.1	7.3	9.1	<1.0							
09/10/97	28503649	107898055	8.5	6.1	7.5	<1.0							
10/08/97	32397250	122636938.9	7.3	5.3	5.9	<1.0							
11/20/97	37998290	143839182.9	6.0	5.2	5.6	<1.0							
12/03/97	39770235	150546724.8	5.9	5.2	4.9	<1.0							
							1/7/98	43952710	166379115.9	7.9	78.4	72.3	<1.0
							2/12/98	48546654	183769086.6	5	167		<1.0
3/19/98	52495035	198715335.4	6.7	6.9	1.3	<1.0							
5/13/98	60283515	228197941.1	5.7	7.4	2.6	<1.0							

2-18-97 to 5-13-98

liters H_2O treated = 228197941.1

6/23/98

Pump and Treat PCA

$a := -22.2496860$

$b := 42.85480925$

$c := -464058.524$

$d := 1.2666 \cdot 10^7$

$e := 0.035644581$

$f := 0.105531966$

$$\int_0^{228197941.1} a + b \cdot \left[1 + \left[\frac{x - d \cdot \frac{f}{(2 \cdot e) - c}}{d}\right]^2\right]^{-e} \cdot \frac{\exp\left[-f \cdot \left[\operatorname{atan}\left[\frac{x - d \cdot \frac{f}{(2 \cdot e) - c}}{d}\right] + \operatorname{atan}\left[\frac{f}{(2 \cdot e)}\right]\right]\right]}{\left[1 + \frac{f^2}{(4 \cdot e^2)}\right]^{-e}} \, dx = 1.868 \cdot 10^9 \text{ ugrams}$$

liters

ug

$1.868e9 \cdot 1e-6 = 1868$ g

$1868g \cdot 2.2046226e-3 = \underline{4.12}$ lbs Removed

Total mass removed via P&T from 2/18/97 to 5/13/98:

$4.12 + 5.82 + 4.91 = 15$ lbs.

6/23/9

Pump and Treat DCE

$a := 0.022577958$

$b := 2.634927 \cdot 10^{-13}$

$$\int_{0}^{64661287.3} \frac{1}{\left(a + b \cdot x^{1.5}\right)} dx = 1.174 \cdot 10^{9}$$

2.59 lbs

$a := -1.83150203$

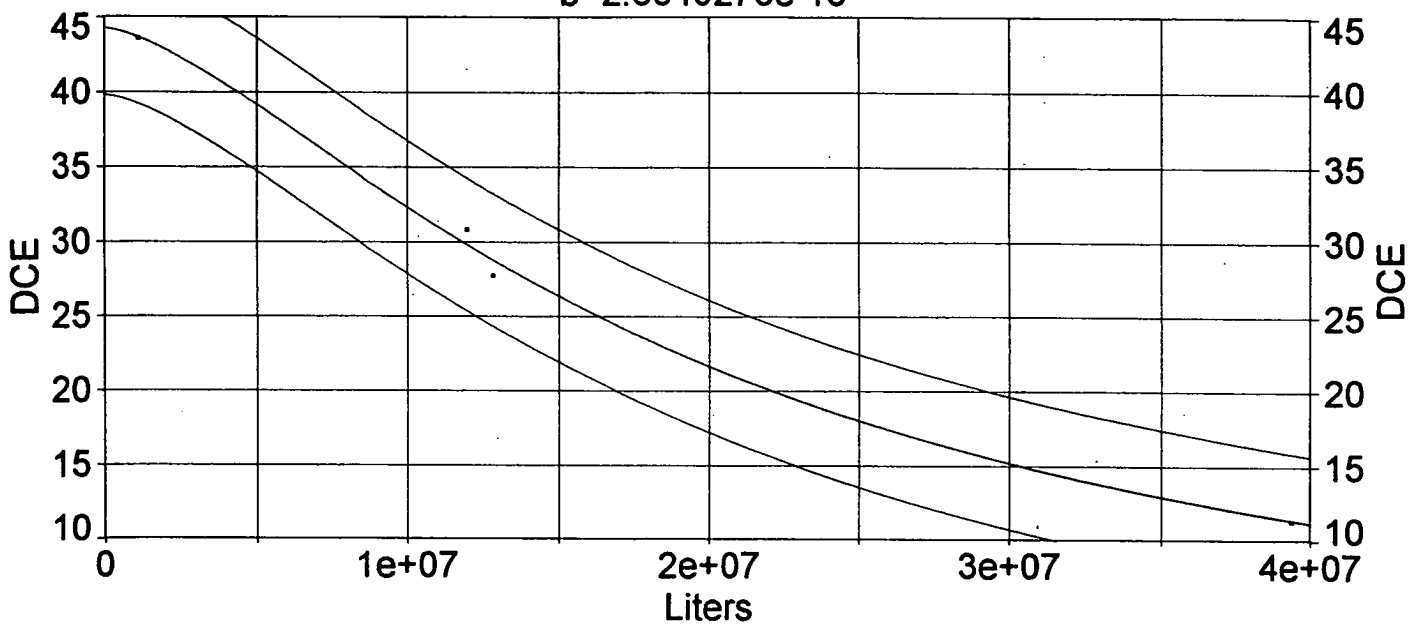
$b := 0.005776766$

$$\int_{64661287.3}^{228197941.1} \frac{1}{\left[a + b \cdot (\ln(x))^{2}\right]} dx = 1.051 \cdot 10^{9}$$

2.32 lbs

4.91 lbs

C:\TCWIN4\CLIPBRD.WK1
Rank 1 Eqn 45 $y^{-1}=a+bx^{1.5}$
r^2=0.9959554 DF Adj r^2=0.98786621 FitStdErr=1.0349838 Fstat=492.48672
a=0.022577958
b=2.6349278e-13



Rank 1 Eqn 45 $y^{-1}=a+bx^{1.5}$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9959554020	0.9878662060	1.0349838457	492.48671865

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	0.022577958	0.000536428	42.08948221	0.020269897	0.024886020
b	2.63493e-13	1.9649e-14	13.40995918	1.7895e-13	3.48036e-13

Date	Time	File Source
Jun 23, 1998	6:43:37 AM	C:\TCWIN4\CLIPBRD.WK1

0 → 64661287.3 liters

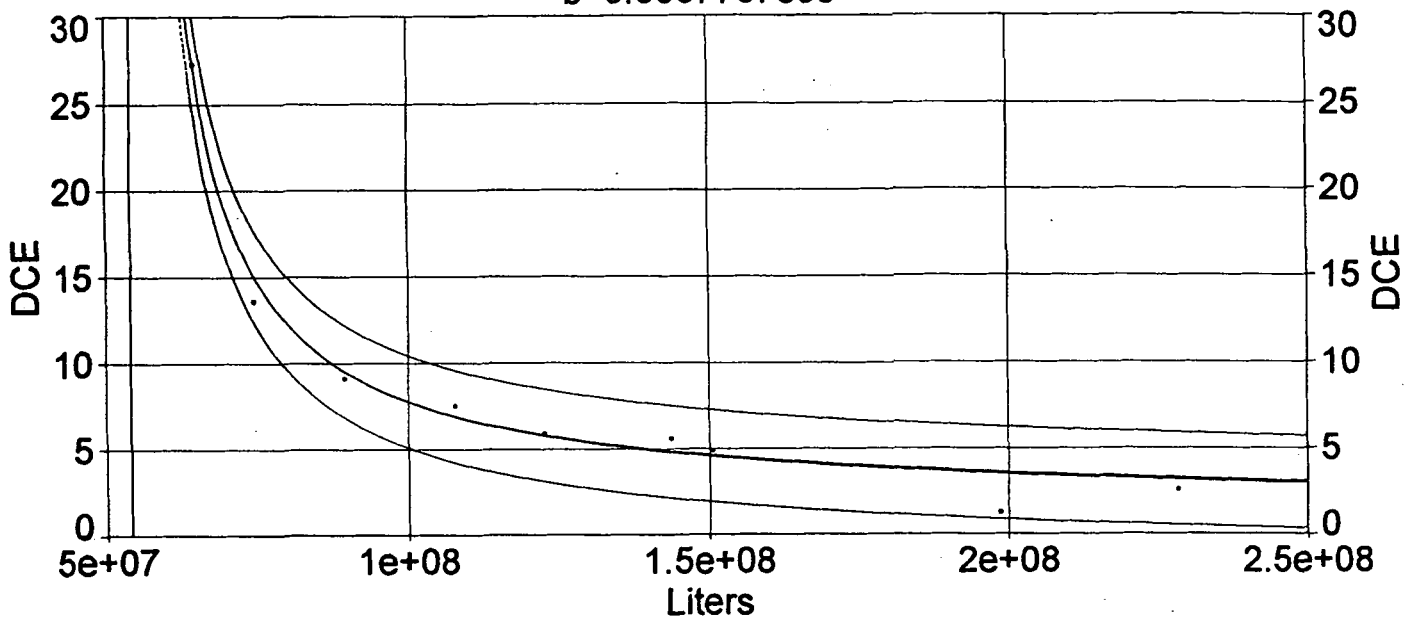
C:\TCWIN4\CLIPBRD.WK1

Rank 1 Eqn 52 $y^{-1}=a+b(\ln x)^2$

$r^2=0.9819446$ DF Adj $r^2=0.97592613$ FitStdErr=1.1304035 Fstat=380.69565

a=-1.831502

b=0.0057767658



Rank 1 Eqn 52 $y^{-1}=a+b(\ln x)^2$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9819446001	0.9759261335	1.1304035455	380.69565018

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	-1.83150203	0.165748219	-11.0499048	-2.22343429	-1.43956977
b	0.005776766	0.000511389	11.29623055	0.004567523	0.006986008

Date	Time	File Source
Jun 23, 1998	6:44:58 AM	C:\TCWIN4\CLIPBRD.WK1

64661287.3 → 228197941.1 liters

2-18-97 to 5/13/98

6/23/98

Pump and Treat TCE

$a := 0.020449487$

$b := 1.042578 \cdot 10^{-24}$

$$\int_{0}^{64661287.3} \frac{1}{(a + b \cdot x^3)} dx = 1.483 \cdot 10^9$$

3.27 lbs

$a := 6.009446717$

$b := 33819.82220$

$c := 8.6863932 \cdot 10^6$

$$\int_{64661287.3}^{228197941.1} a + b \cdot \exp\left(\frac{-x}{c}\right) dx = 1.155 \cdot 10^9$$

2.55 lbs

TOTAL 5.82 lbs.

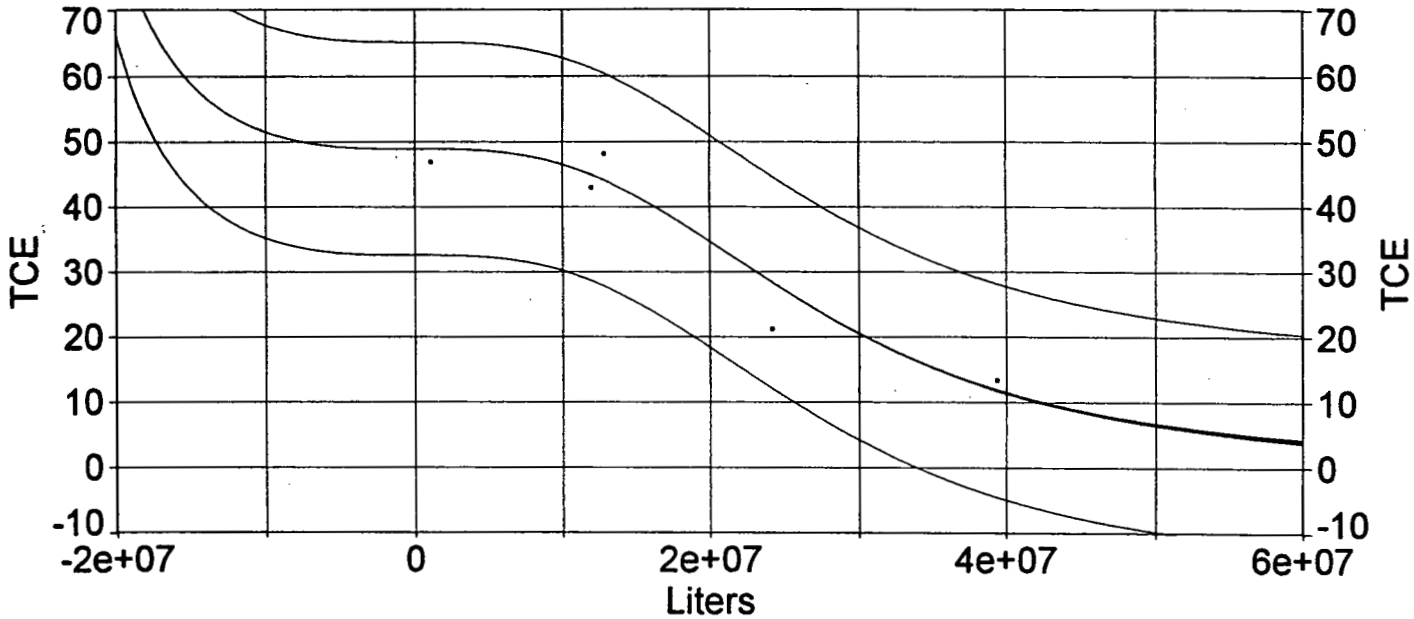
C:\TCWIN4\CLIPBRD.WK1

Rank 1 Eqn 49 $y^{-1}=a+bx^3$

r^2=0.9235429 DF Adj r^2=0.84708579 FitStdErr=5.1207853 Fstat=36.237688

a=0.020449487

b=1.042578e-24



Rank 1 Eqn 49 $y^{-1}=a+bx^3$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9235428956	0.8470857912	5.1207853038	36.237687893

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	0.020449487	0.001525373	13.40621866	0.015595069	0.025303905
b	1.04258e-24	4.04766e-25	2.575757309	-2.4557e-25	2.33072e-24

Date	Time	File Source
Jun 23, 1998	6:37:19 AM	C:\TCWIN4\CLIPBRD.WK1

0 – ~~3434775.87~~ 46661287.3 liters

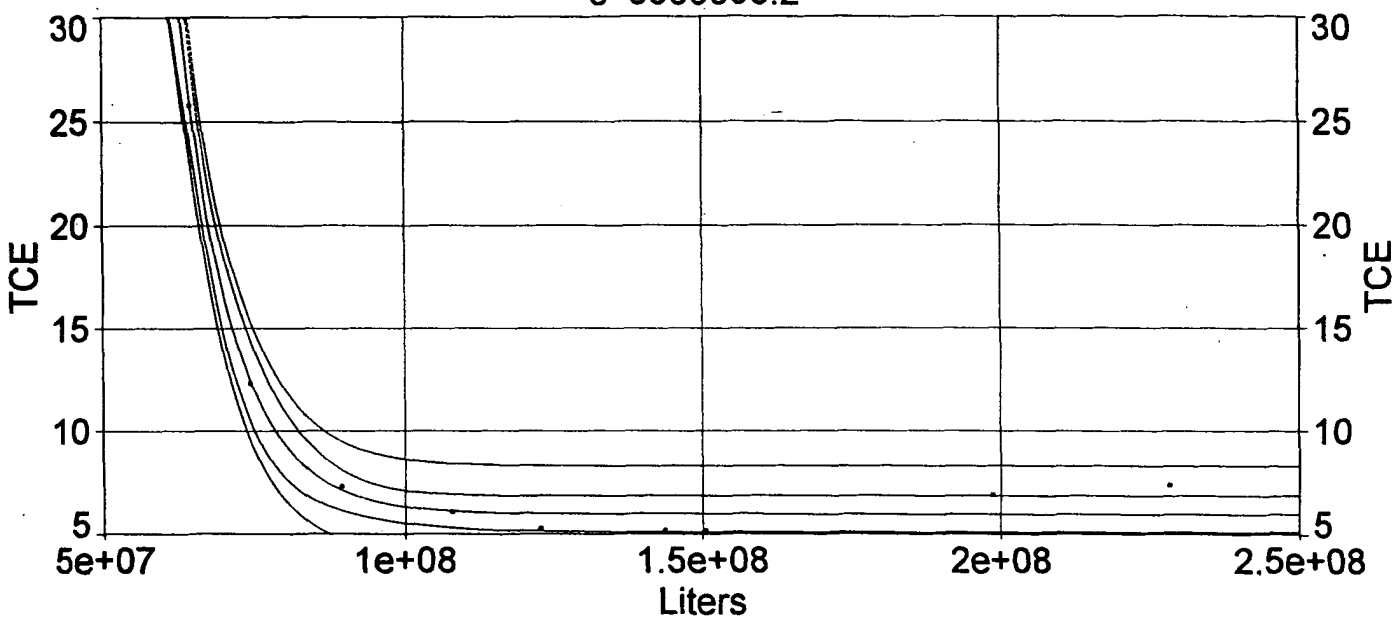
C:\TCWIN4\CLIPBRD.WK1

Rank 1 Eqn 8002 [Exponential] y=a+bexp(-x/c)

r^2=0.98696915 DF Adj r^2=0.97915064 FitStdErr=0.87675244 Fstat=227.22284

a=6.0094467 b=33819.822

c=8686393.2



Rank 1 Eqn 8002 [Exponential] y=a+bexp(-x/c)

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9869691472	0.9791506355	0.8767524363	227.22284418

Parm	Value	Std Error	t-value	95% Confidence Limits	
a	6.009446717	0.355162823	16.92025832	5.140394596	6.878498838
b	33819.82220	32048.17941	1.055280606	-44599.2478	112238.8922
c	8.68639e+06	1.09809e+06	7.910444718	5.99946e+06	1.13733e+07

Date	Time	File Source
Jun 23, 1998	6:39:26 AM	C:\TCWIN4\CLIPBRD.WK1

64661287.3 → 281 97941.1 liters

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

SP-019-98
September 17, 1998

98-TC-09-17

Acting Director, Miamisburg Environmental Management Project
U.S. Department of Energy
P.O. Box 66
Miamisburg, OH 45343-0066

Attention: Arthur Kleinrath

Subject: Contract No. DE-AC24-97OH20044
Implementation of Operable Unit One, Final Report

Dear Mr. Folker:

Mr. Tim Fischer of the U.S. Environmental Protection Agency has requested a final report documenting the implementation of the Operable Unit One Record of Decision. Attached please find the additional copies required for DOE/MEMP distribution.

If you have any questions or need further information, please contact John Price at extension 3954.

Sincerely,

John Price
Project Manager, Soils Project

JP/lkl

cc: DCC
DOE/MEMP (4)
DOE HQ
Admin. Record
MMCIC
ODH
OEPA (2)
US EPA (2)
Public Reading Rm.
J. Price
M. Spiver

FINAL REPORT ON THE IMPLEMENTATION OF OPERABLE UNIT 1 RECORD OF DECISION

Mound Plant
Miamisburg, OH

September 1998

Department of Energy
Ohio Field Office

BABCOCK & WILCOX OF OHIO

ATTACHMENTS

A. OU-1 Pump & Treat System Capture Zone Monitoring

A.1 Monitoring for April/May, 1997

A.2 Monitoring for June/July, 1997

A.3 Monitoring for August/September, 1997

B. OU-1 Contaminants of Concern

Operable Unit One Record of Decision Implementation

Operable Unit One (OU-1), or Area B as it was originally called, occupies approximately 4 acres in the southwestern portion of the Mound Plant. It encompasses the historic landfill, the site sanitary landfill, the overflow pond, and the three plant production wells. The Mound Plant began a periodic water-sampling program for VOCs in 1984. Under the Environmental Restoration (ER) Program, a Remedial Investigation (RI) was started in 1987 and focused on groundwater contamination. Since 1986, VOCs have been detected and monitored in the groundwater in Area B. An extended discussion of Area B history, including waste disposal and construction activities, is provided in the OU-1 Remedial Investigation Report, Section 1, March 1994.

As a result of the VOC groundwater contamination found in Operable Unit One, the Mound Plant was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priority List, in 1989. As part of the Mound CERCLA process, a Federal Facility Agreement was signed between the DOE, the U.S. EPA and Ohio EPA. The FFA agreement required DOE to produce an RI/FS report, which is based on remedial investigative fieldwork. As a result of the remedial investigative process, which took approximately 3 years (1992-1995), DOE and the U.S. EPA and Ohio EPA signed a CERCLA Record of Decision (ROD) for a remediation remedy to control groundwater VOC contamination in Operable Unit One, and in the adjacent buried valley aquifer.

The chosen remedial method for containment and removal of VOC contaminants was a pump-and-treat system. A remedial design was developed for the installation of extraction and monitoring wells and construction of an air stripper system. The extraction and monitoring wells for the OU-1 remediation project were installed in 1996, and the installation of the air stripper and associated equipment was completed and started operation on February 18, 1997. The first 180 days of operation was under a Treatability Test. Operation of the facility following the Treatability Test period has been conducted in accordance with the Authorization to Discharge. The effluent from the treatment facility is also known as Outfall 003. The monitoring for VOC contamination in OU-1 is ongoing and part of the Mound Plant Environmental Monitoring Program.

A six-month monitoring program was conducted to assess the hydraulic containment of the groundwater contamination plume within the western and southern compliance boundaries. This was accomplished by collecting water level data from 20 monitoring wells to evaluate the potentiometric surface and local hydraulic gradients in the OU-1 area. Local hydraulic gradients are determined by conducting three point evaluations using monitoring wells that straddle the compliance boundary. Two sets of three monitoring wells are currently being utilized to determine if hydraulic containment is achieved; wells 0417, 0305 and 0410 are used to verify containment at the southern boundary, and wells 0422, 0423 and P003 are used to verify containment at the western boundary. The results of the monitoring show that the system is effectively capturing the contamination. The initial pump-and-treatment capture zone monitoring reports, performed by Terran Corporation, are in Attachment A.

The VOC contaminants of concern (COC) have been monitored monthly on both the influent and effluent. The influent data shows that the pump-and-treatment system is being effective in the removal of the COCs from the groundwater by the rate of which the concentration of contaminants present in the influent is dropping. The effluent data exhibits the effectiveness of the air stripper in removing the COCs from the water being treated and exhibits compliance to the Authorization to Discharge from Outfall 003. A synopsis of the VOC COC data and Water Quality data are in Attachment B.

Based upon the pump-and-treat monitoring results, the system is fulfilling the criterion set forth by the ROD. Due to the aforementioned, the ROD is considered to be fully implemented. Mound will continue to monitor the systems performance until remediation efforts have been determined to be successful and permission is given to cease the treatment system operation.

Attachment A

OU-1 PUMP-AND-TREAT SYSTEM CAPTURE ZONE MONITORING FOR APRIL AND MAY 1997

MOUND PLANT
MIAMISBURG, OHIO

TECHNICAL MEMORANDUM

June 1997

Department Of Energy

EG&G Mound Applied Technologies

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ACKNOWLEDGMENTS

This report was prepared by Terran Corporation of Beavercreek, Ohio as report number TB-9728. It was completed under Task Order #16535 with EG&G Mound Applied Technologies. The author was Roger W. McCready and word processing and graphics prepared by Sandra L. Allen. Field work preliminary contouring was conducted by Michael Brady, Chris Ruef and Scott Hora.

1.0 INTRODUCTION

This report has been prepared as part of the Environmental Restoration (ER) Program at the U.S. Department of Energy (DOE) Mound Plant, Miamisburg, Ohio. Operable Unit One (OU-1) addresses possible chemical contamination of the buried valley aquifer which underlies the original southwest corner of the Mound Plant. OU-1 is currently in the remediation phase of the CERCLA process. The remedial method chosen is a pump-and-treat methodology.

Pump-and-treat systems are designed to hydraulically contain and remove the contaminants dissolved in the ground water. Due to the relatively long duration of pump-and-treat remediations the objective of the management problem is to minimize total pumping rate which reduce treatment costs. The OU-1 groundwater contamination plume must be contained within a western and southern compliance boundary. Containment refers to an inward hydraulic gradient at the boundary to prevent the movement of groundwater across the boundary. Therefore, the primary constraint is head differences at the compliance boundary. The design strategy was to have field measurable head-difference limits and the optimal limit of 0.05 feet was chosen during the design phase.

For the first six months of the pump-and-treat system will be monitored to measure the capture zone created by the system. The hydraulic effectiveness of the pump-and-treat system will be measured by collecting water levels from 20 monitoring wells in the area. A combination of hand water level measurements and continuous monitoring instrumentation is used to collect data necessary to quantify the hydraulic containment by the pump-and-treat system. The study area with extraction wells and monitoring well locations is shown in (Figure 1.1). The study began on April 21, 1997 when the dataloggers were installed and will continue until August 31, 1997. This report is a monthly summary of the data collected and the results of the pump-and-treat system hydraulic containment.

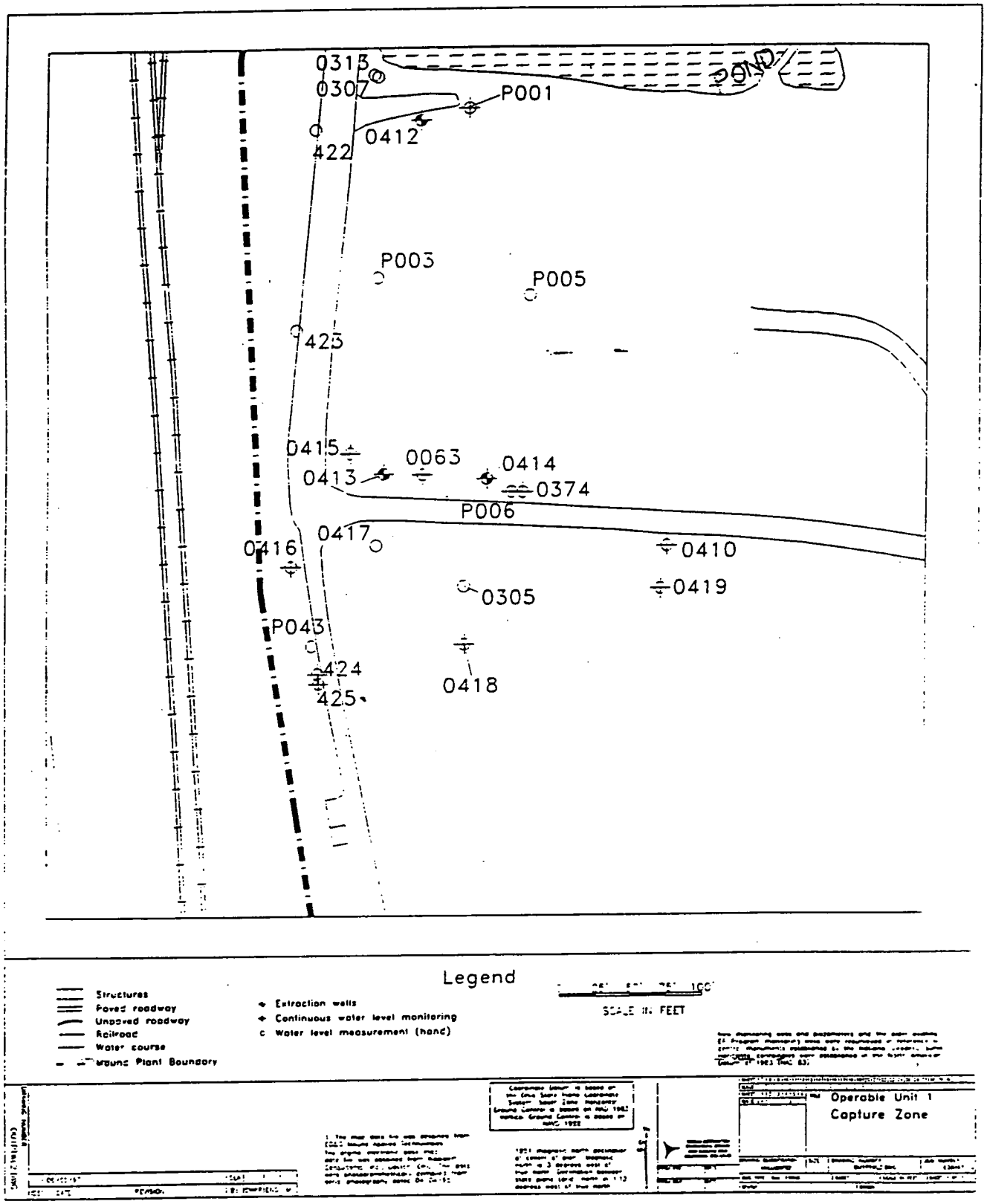

Figure 1.1. OU-1 Pump-and-Treat system capture zone monitoring study area.

2.0 WEEKLY POTENTIOMETRIC WATER LEVELS AND POTENTIOMETRIC SURFACE MAPPING

The ground water levels in twenty monitoring wells and the three pump-and-treat extraction wells are measured manually once a week. The water levels are contoured and an potentiometric map of the water level surface is prepared for each set of weekly water levels. Table II.1 list the depth to water and water level elevation for the twenty monitoring wells and three extraction wells during April and May, 1997.

Water level measurements were completed using standard protocol of the OU-9 QAPP (Revision 4, April 1995) SOP 3.1 Water Level Measurement (Revision 1, March 1992). Water level collection using a electric water level indicator that allows measurement to 0.01 foot. The water levels are recorded on a form and entered into a spreadsheet.

Preparation of the potentiometric water levels maps is conducted in a two step process. Data from each weekly measurement is entered into Golden Software Surfer were it is contoured using Kriging. The contours are then edited by a hydrogeologist before being drawn on the base map.

Only one set of measurements were collected in April and the capture zone is evident on the figure 2.1. During the month of May five sets of water levels were collected and the potentiometric water level surfaces are shown in figures 2.2 through 2.6. All the potentiometric maps have very similar shapes and show a definite cone of depression (capture zone) at the pump-and-treat system. Both the two southern extraction wells (0413 and 0414) are pumping at 43 gallons per minute with extraction well 0412 at 24 gallons per minute. The greatest drawdown is occurring at well 0414. This may indicate that the transvissivity in and around 0414 is lower than at 0413. Since both wells are producing the same amount of water but 0414 has a much greater drawdown. Also, well 0414 may have a lower well efficiency which causes a greater drawdown per yield.

Table II.1 OU-1 Weekly Water Levels for Late April and the Month of May, 1997

Monitoring Well		24-Apr-97 Water Level		01-May-97 Water Level		08-May-97 Water Level		15-May-97 Water Level		22-May-97 Water Level		29-May-97 Water Level	
Number	Elevation TOC	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation
		(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)
0063	705.60	25.42	680.18	25.70	679.90	25.00	680.60	25.31	680.29	25.48	680.12	25.90	679.70
0305	709.87	29.50	680.37	29.79	680.08	29.21	680.66	29.55	680.32	29.71	680.16	30.13	679.74
0307	716.10	35.67	680.43	35.98	680.12	35.25	680.85	35.57	680.53	35.47	680.63	36.14	679.96
0313	716.08	35.63	680.45	35.95	680.13	35.27	680.81	35.56	680.52	35.70	680.38	36.17	679.91
0374	706.29	26.08	680.21	26.94	679.35	25.79	680.50	26.06	680.23	26.25	680.04	26.58	679.71
0410	713.84	33.59	680.25	33.90	679.94	33.14	680.70	33.55	680.29	33.94	679.90	34.00	679.84
0412	717.00	36.73	680.27	37.00	680.00	36.21	680.79	36.69	680.31	36.91	680.09	37.13	679.87
0413	704.45	24.71	679.74	35.09	669.36*	24.27	680.18	24.58	679.87	24.76	679.69	25.09	679.36
0414	705.85	27.17	678.68	27.55	678.30	26.79	679.06	27.10	678.75	27.43	678.42	27.79	678.06
0415	706.09	25.74	680.35	26.15	679.94	25.37	680.72	25.72	680.37	25.89	680.20	26.35	679.74
0416	704.30	23.99	680.31	24.30	680.00	23.58	680.72	23.89	680.41	24.10	680.20	24.48	679.82
0417	705.07	24.78	680.29	25.11	679.96	24.39	680.68	24.68	680.39	24.97	680.10	25.28	679.79
0418	709.67	29.41	680.26	29.70	679.97	29.02	680.65	29.34	680.33	29.46	680.21	29.80	679.87
0419	716.41	36.18	680.23	36.50	679.91	35.82	680.59	36.11	680.30	36.36	680.05	36.60	679.81
0422	715.21	34.86	680.35	35.05	680.16	34.28	680.93	34.72	680.49	34.84	680.37	35.15	680.06
0423	709.12	28.63	680.49	29.03	680.09	28.39	680.73	28.69	680.43	28.56	680.56	29.13	679.99
0424	704.49	24.18	680.31	24.49	680.00	23.79	680.70	24.07	680.42	24.25	680.24	24.19	680.30
0425	704.58	24.23	680.35	24.56	680.02	23.90	680.68	24.11	680.47	24.36	680.22	24.54	680.04
P001	717.67	37.23	680.44	37.53	680.14	36.91	680.76	37.18	680.49	37.48	680.19	37.78	679.89
P003	707.46	27.13	680.33	27.43	680.03	26.79	680.67	27.07	680.39	27.33	680.13	27.64	679.82
P005	738.59	58.31	680.28	58.60	679.99	57.92	680.67	58.27	680.32	58.53	680.06	58.85	679.74
P006	705.96	26.10	679.86	26.20	679.76	25.53	680.43	25.79	680.17	25.97	679.99	26.36	679.60
P043	704.80	24.44	680.36	24.80	680.00	24.12	680.68	24.40	680.40	24.69	680.11	25.01	679.79

*Depth to water on May 1, 1997 for well 0413 was in error, the continuous monitoring with the Telog indicated that the water level elevation should be 679.35.

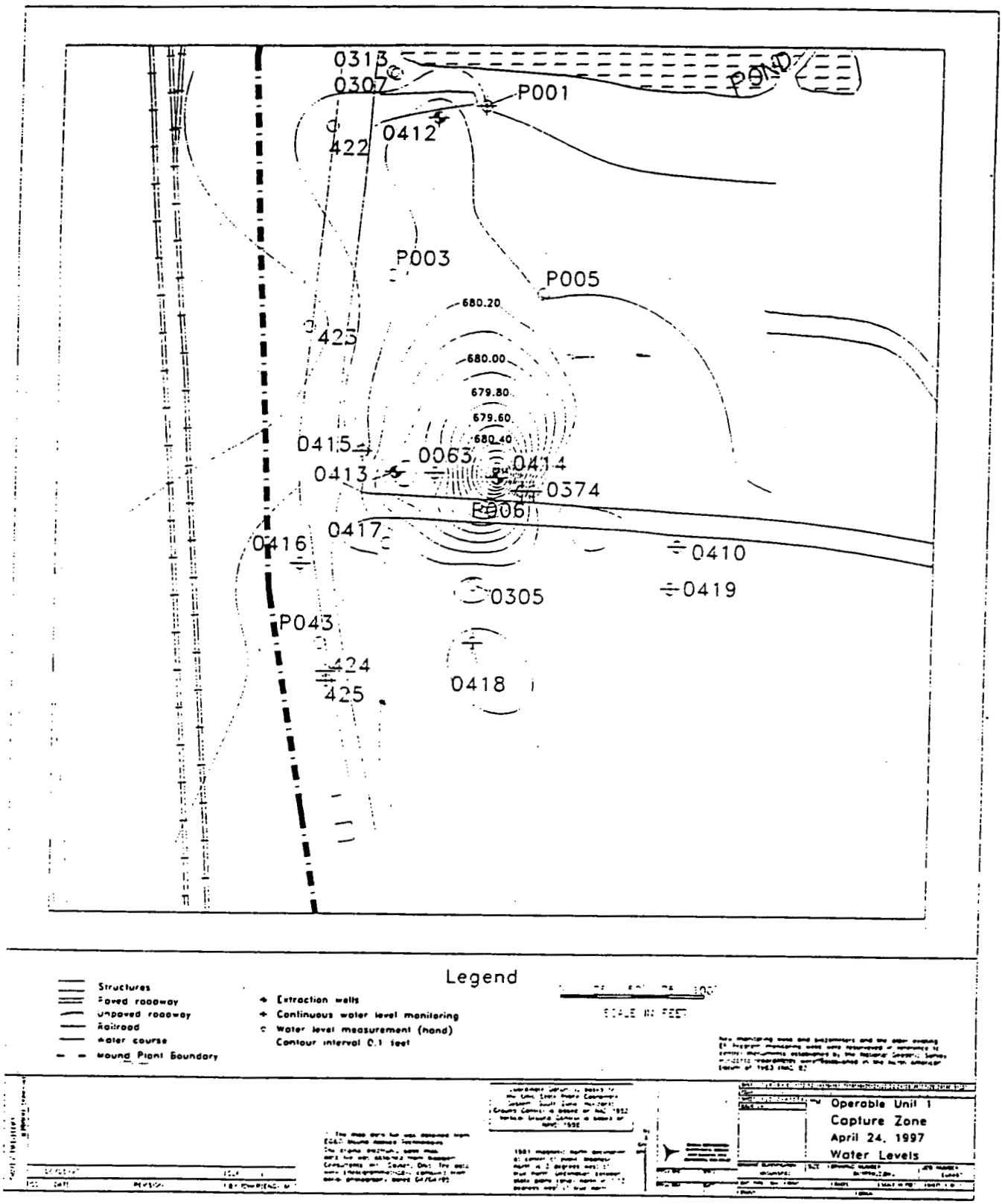

Figure 2.1. Groundwater potentiometric surface for April 24, 1997.

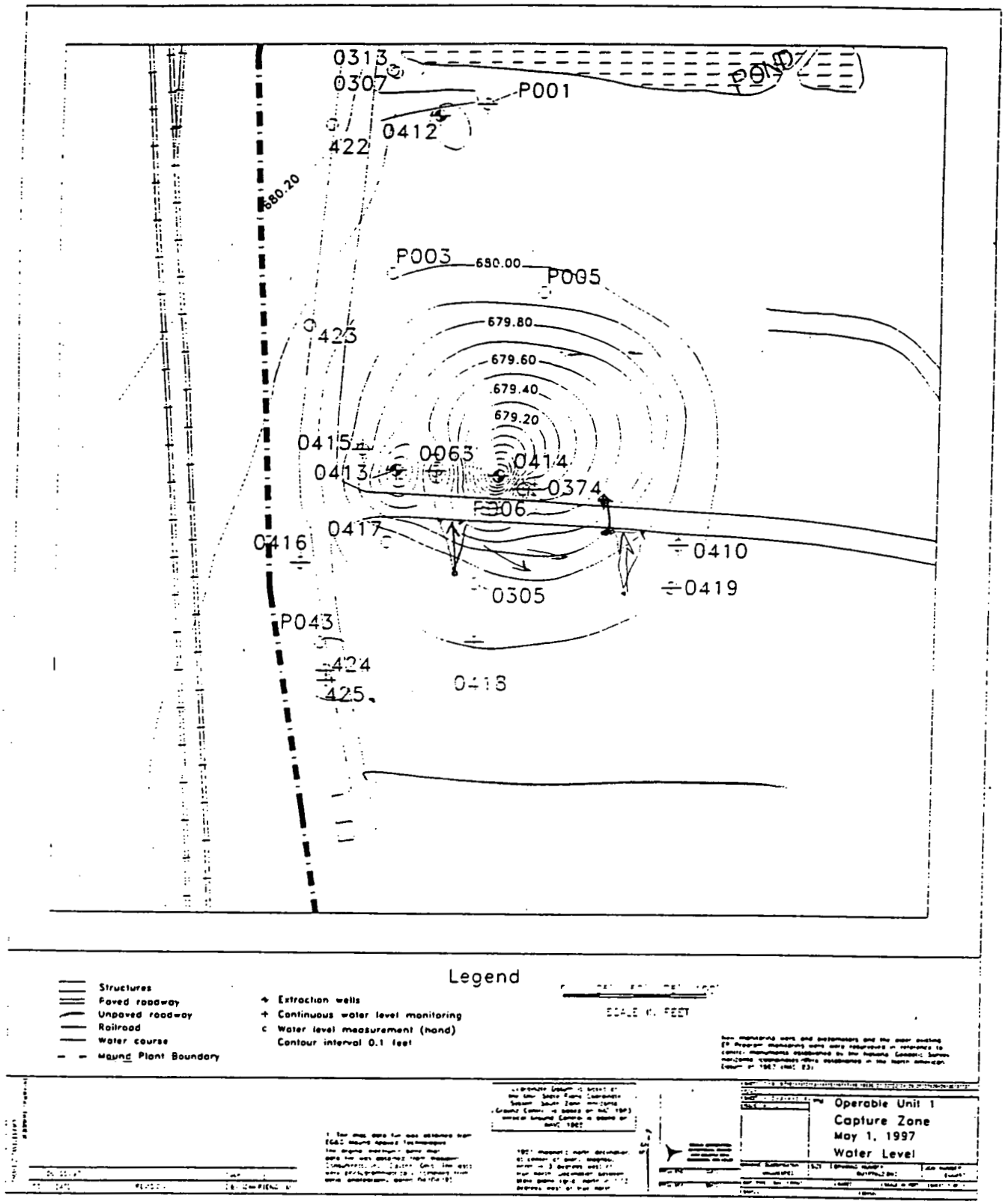

Figure 2.2. Groundwater potentiometric surface for May 1, 1997.

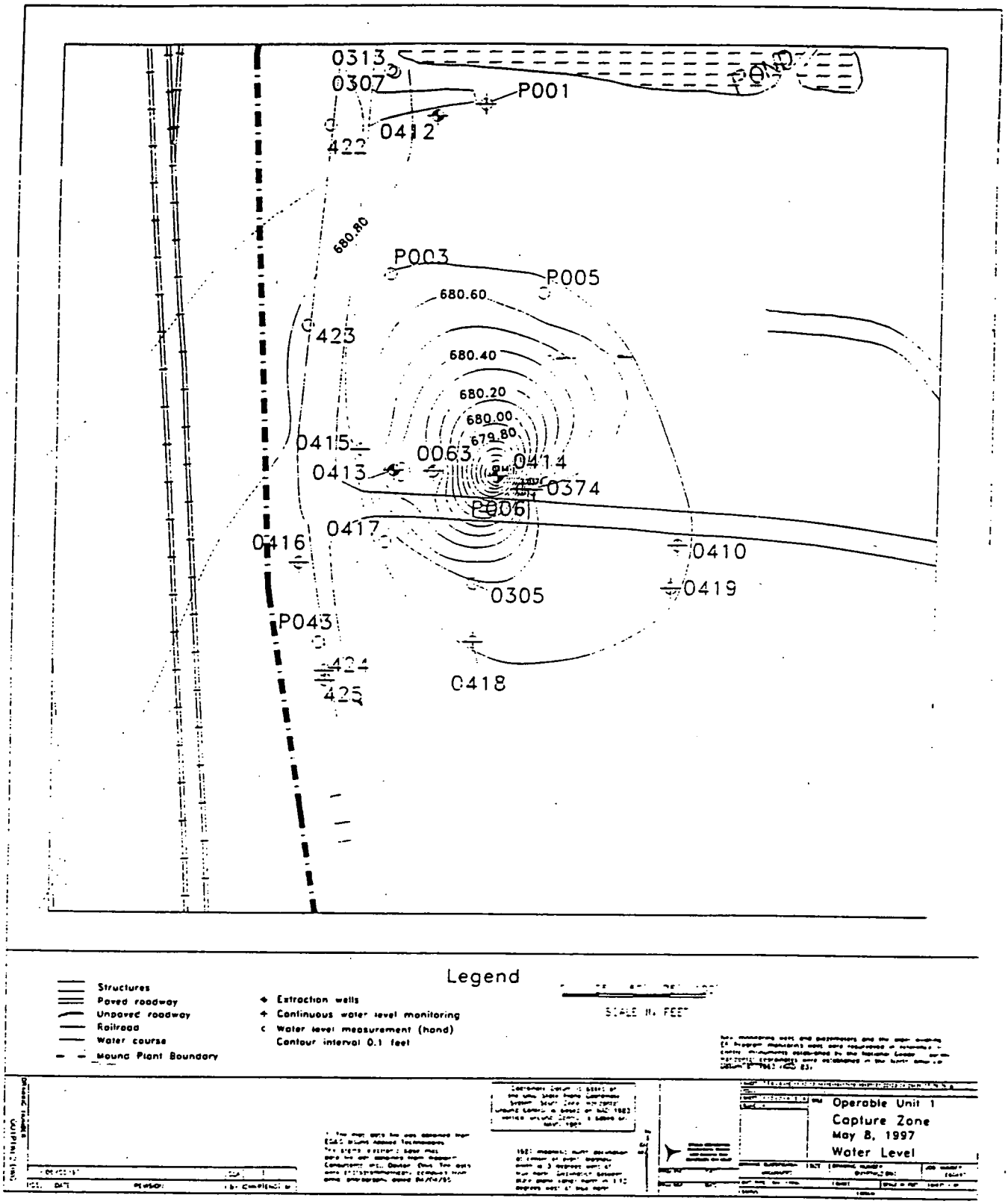

Figure 2.3. Groundwater potentiometric surface for May 8, 1997.

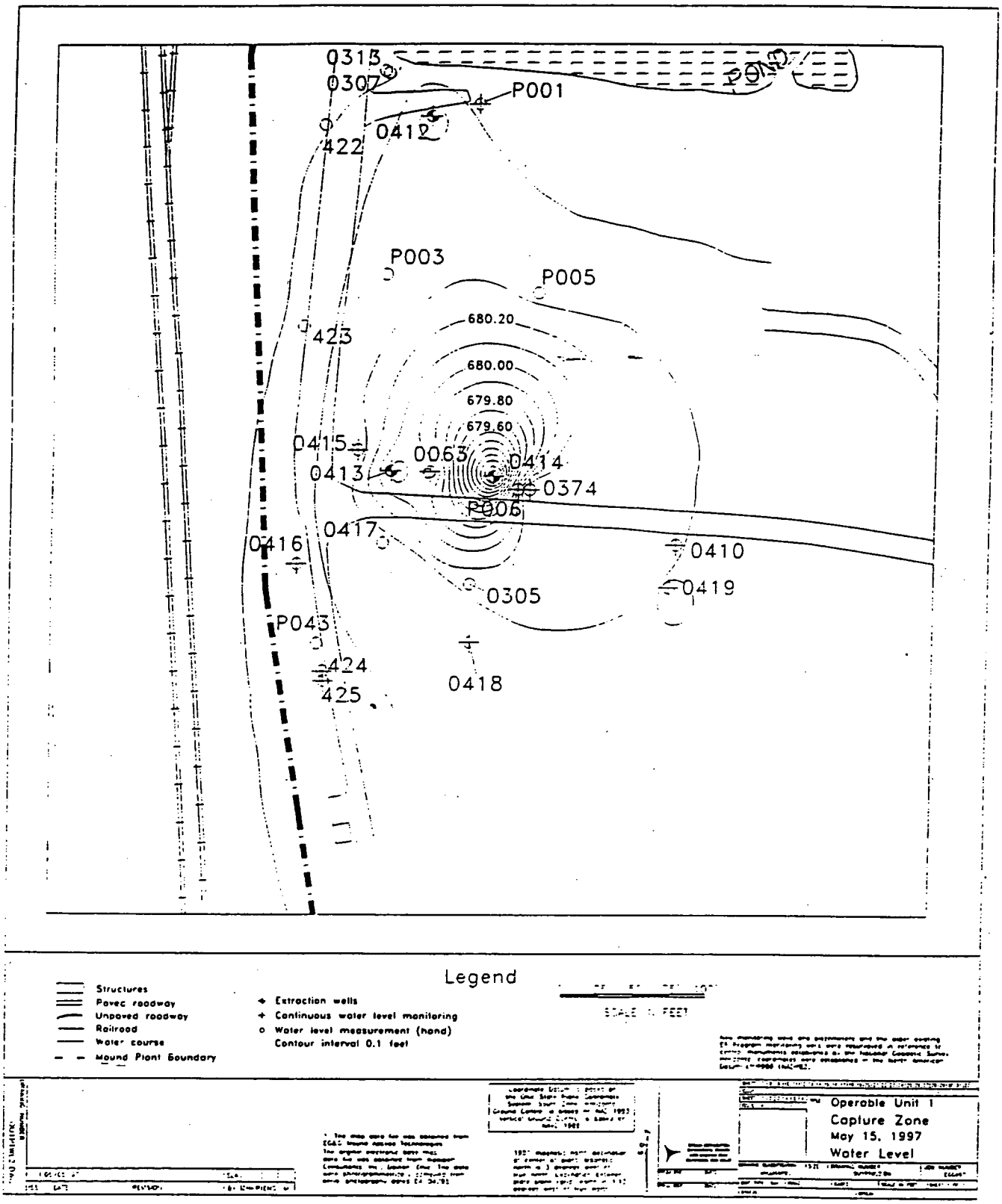

Figure 2.4. Groundwater potentiometric surface for May 15, 1997.

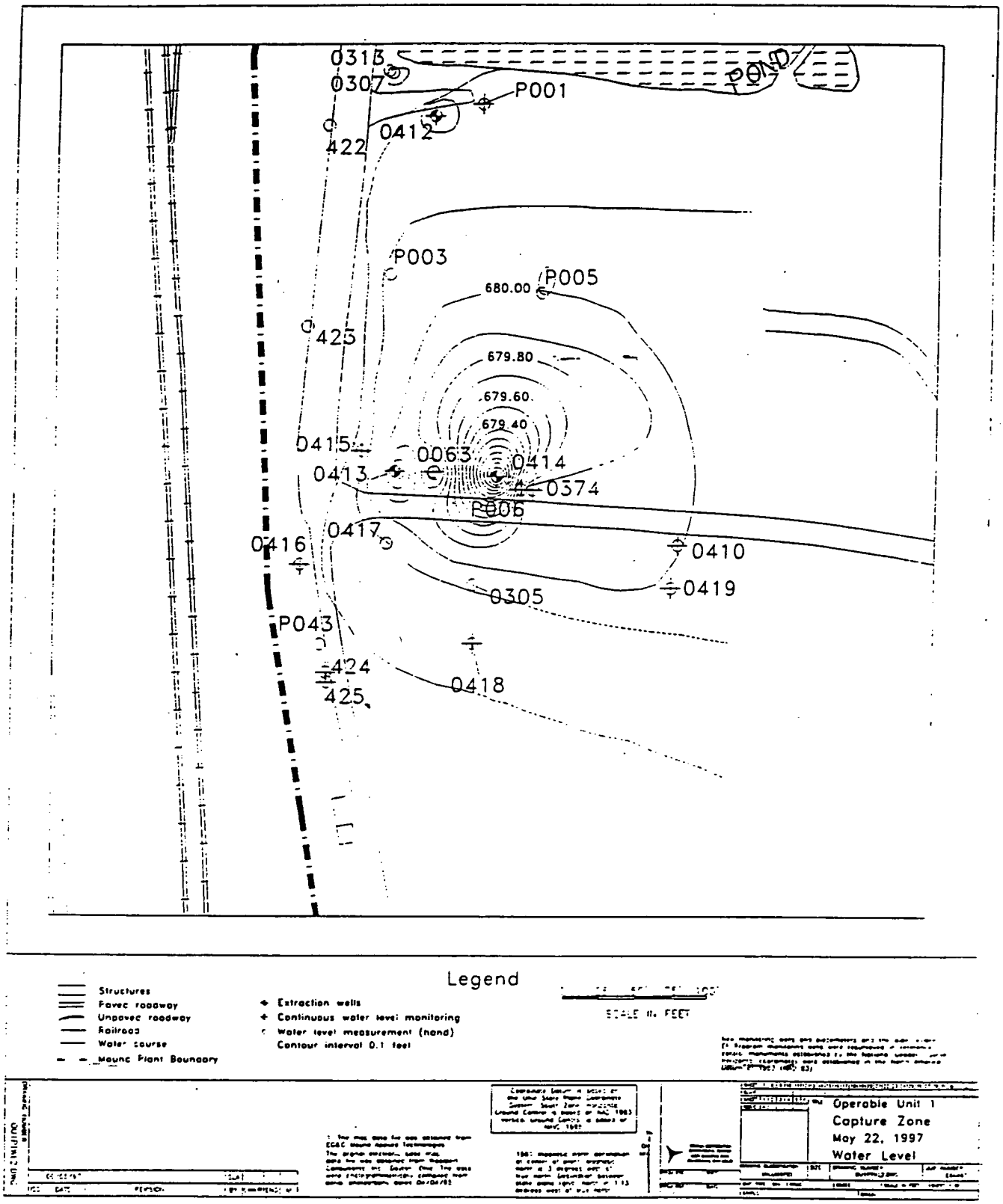

Figure 2.5. Groundwater potentiometric surface for May 22, 1997.

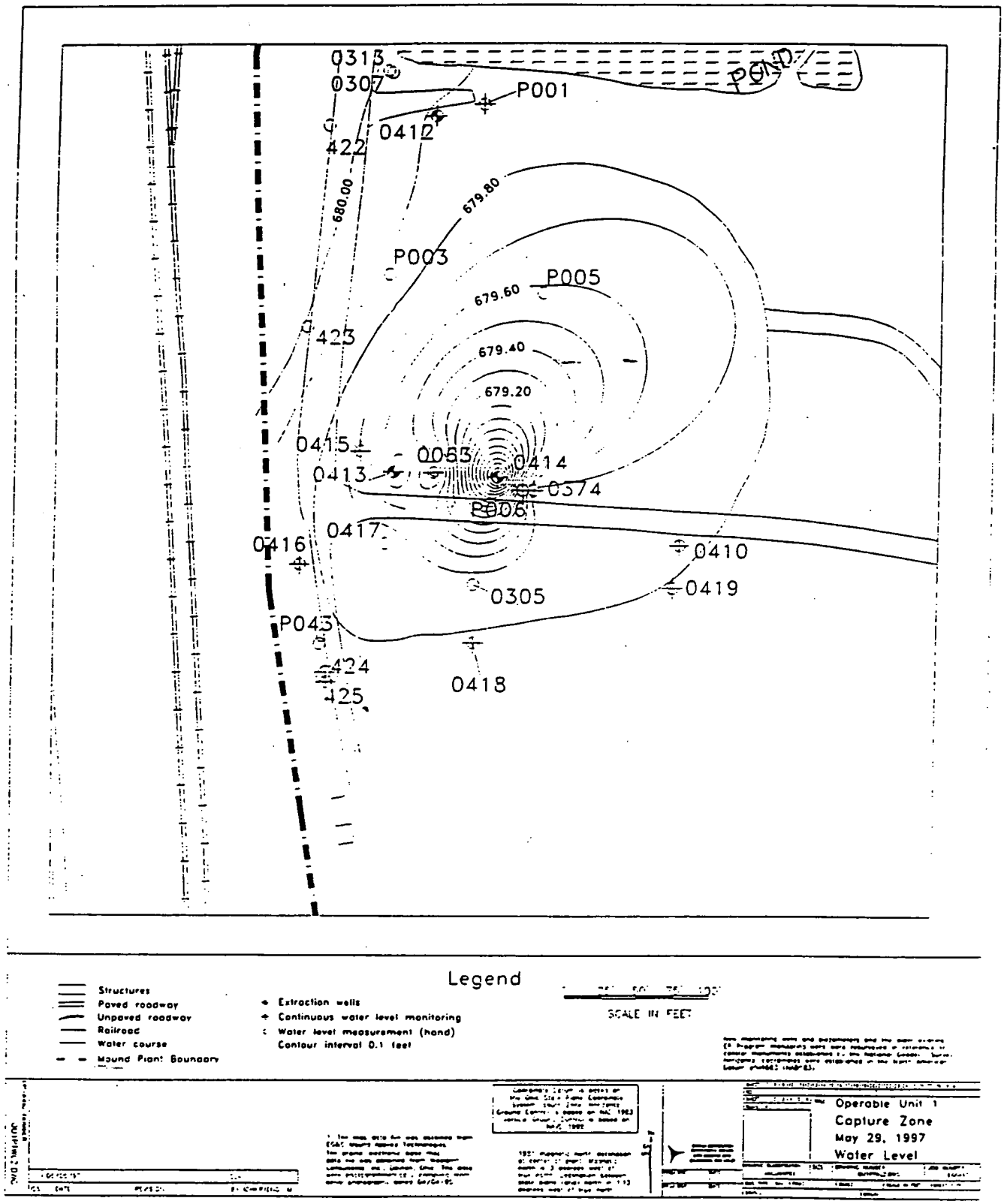

Figure 2.6. Groundwater potentiometric surface for May 29, 1997.

3.0 CONTINUOUS WATER LEVEL MONITORING RESULTS

To assess the potential fluctuations in water levels due to external sources such as the Mound production wells continuous water level monitoring at 13 locations surrounding the pump-and-treat system was initiated. Continuous water level monitoring is provided by individual Telog Level Trackers 2100. The Trackers are dataloggers and pressure transducers instrumentation to provide unattended remote water level recording. The instrumentation was installed in the 13 monitoring wells on April 21, 1997. Figure 1. shows the location of the monitoring wells and extraction wells that have Trackers installed. The dataloggers have been programmed to collect a water level measurement every 15 minutes. Once a week when the hand water level measurements are collected each datalogger is downloaded into a Telog Data Transfer Unit (DTU). The DTU is returned to the office where the data is uploaded into a database that contains records for each well.

Hydrographs of the April and May continuous water level data have been prepared as shown in Appendix A figures A.1 through A.15. The hydrographs reflect the natural water level fluctuations that occur in the Buried Valley Aquifer. Abrupt increase in ground water levels due to rain events and stage increase of the Great Miami River occur frequently through out the year. Increases up to six feet were recorded at P001 from July 1, 1993 to May, 1994 (DOE, 1995). During late April and May a five day ground water level increase occurred that increase water levels by 0.5 to 0.7 feet. The ground water levels are currently declining from the high on May 7, 1997.

The dataloggers were installed during the cleaning of the air stripper on April 21, 1997. The air stripper was turned back on April 22, 1997 at approximately 1300. This is evident by the decrease in water level on the graphs of all wells except 0419. All the wells show a gradual decline in the natural water level. Since the installation of the dataloggers the extraction wells have not been off.

Since the start of this monitoring the plant has been supplied by production well 3 (0076). Many of the hydrographs reveal the daily pumping of the production well. Monitoring well 0419 is most affected by production well 3 producing a daily drawdown of 0.4 feet between 0600 and 1000. Monitoring well 0374 has a 0.1 foot drawdown that occurs in the late afternoon each day. Based on a qualitative review of the other hydrographs the daily peak drawdown at all other monitoring wells used for this study is less 0.05 feet.

4.0 CAPTURE ZONE MEASUREMENT AT COMPLIANCE BOUNDARY

During the design of the pump-and-treat system ground water modeling and optimization was used to determine the number of wells and a field measurable head difference across the compliance boundary. The pump-and-treat system is required to maintain a hydraulic head difference of 0.05 feet at the compliance boundary to ensure capture as approved by regulators (DOE, 1996).

A comparison was made of water level elevations for monitoring wells outside versus inside the compliance boundary. Table IV.1 list eight sets of wells inside and outside of the compliance boundary and the corresponding head difference. The distance between nodes used for head difference calculations during design was 25 feet. Therefore, the design gradient was 0.002 ft/ft. Since the monitoring wells used for the field measurement are usually greater than 25 feet a gradient was also calculated for each location to compare with the design gradient of 0.002 ft/ft. A positive gradient and head difference indicates flow toward the extraction system. Review of table IV.1 indicates that two locations may not have flow toward the system (negative gradient). The set of monitoring wells 0422 and 0307 on the April 24, 1997 and May 22, 1997 have a 0.002 and -0.007 gradient respectively. These wells are not directly across the compliance line and 0307 is actually upgradient from 0422. The set of well 0417 and 0063 on May 22, 1997 had a slight -0.02 feet outward head difference and gradient.

Due to the small number of locations that are directly opposite the compliance line a second method was chosen to calculate the head differences. This method uses the gridding process that the contouring package Surfer performs prior to contouring. Terran Corporation uses Golden Software's program Surfer to produce the first estimate of the contours and then the contours are edited based on hydrogelogic knowledge and professional judgement. The kriging process calculates the water level elevation at the grid locations based on the twenty known water level elevations. Groundwater elevations at the compliance head difference locations are extracted from the grid file for each weekly event (Table IV.2). This allows a larger area to be compared and identify where capture may not be achieved. Figure 4.1 shows the location of the design optimization cells and nodes used in optimization of the head difference. The original head difference cells after surveying are too far north by 12.5 feet. An adjusted line head difference cells that straddle the compliance line is shown in figure 4.2. The design criteria was an head difference of 0.05 feet of cells 25 feet apart with the compliance line in the middle.

A head difference of 0.05 feet or greater is being maintained at the compliance line an estimated 90 percent of that time. During short duration (a few days) of increased water levels due to rain events the western compliance boundary may not maintain a 0.05 feet head difference. However, the site wide flow of the Buried Valley Aquifer during these short events has a easterly component due to flood wave affects which would reduce flow away from the area (DOE, 1994).

Table IV.1 Head Difference (Manually Measured) and Hydraulic Gradient Between Monitoring Wells that are Outside and Inside the Compliance Boundary.

Monitoring Well		24-Apr-97 Gradient / Head Difference		01-May-97 Gradient / Head Difference		08-May-97 Gradient / Head Difference		15-May-97 Gradient / Head Difference		22-May-97 Gradient / Head Difference		29-May-97 Gradient / Head difference	
#	Distance	(ft/ft)	(Feet)	(ft/ft)	(Feet)	(ft/ft)	(Feet)	(ft/ft)	(Feet)	(ft/ft)	(Feet)	(ft/ft)	(Feet)
0422-0412	36.27	0.002	0.086	0.005	0.166	0.004	0.146	0.005	0.186	0.008	0.286	0.005	0.196
0422-0307	36.62	-0.002	-0.079	0.001	0.041	0.002	0.081	-0.001	-0.039	-0.007	-0.259	0.003	0.101
0423-P003	36.07	0.005	0.163	0.002	0.063	0.002	0.063	0.001	0.043	0.012	0.433	0.005	0.173
0416-0415	78.33	-0.001	-0.040	0.001	0.060	-0.000	-0.000	0.001	0.040	-0.000	-0.000	0.001	0.080
0417-0413	49.45	0.011	0.551	0.214	10.601	0.010	0.501	0.011	0.521	0.008	0.411	0.009	0.431
0417-0063	49.06	0.002	0.110	0.001	0.060	0.002	0.080	0.002	0.100	-0.000	-0.020	0.002	0.090
0305-0414	74.17	0.023	1.695	0.024	1.785	0.022	1.605	0.021	1.575	0.024	1.745	0.023	1.685
0305-0374	65	0.002	0.160	0.011	0.730	0.002	0.160	0.001	0.090	0.002	0.120	0.000	0.030

Table IV.2 Estimated Head Differences Using Kriging (Figure 4.1).

Node #		April 24, 1997			May 1, 1997			May 8, 1997		
				Diff.			Diff.			Diff.
1	2									
3	4	680.401	680.400	0.001	680.401	680.400	0.001	680.934	680.870	0.064
5	6	680.343	680.323	0.02	680.343	680.323	0.02	680.973	680.885	0.088
7	8	680.346	680.308	0.038	680.346	680.308	0.038	680.920	680.864	0.056
9	10	680.368	680.325	0.043	680.368	680.325	0.043	680.872	680.825	0.047
11	12	680.397	680.344	0.053	680.397	680.344	0.053	680.827	680.779	0.048
13	14	680.429	680.326	0.073	680.429	680.356	0.073	680.786	680.730	0.056
15	16	680.459	680.355	0.104	680.459	680.355	0.104	680.755	680.689	0.066
17	18	680.459	680.331	0.128	680.459	680.331	0.128	680.736	680.657	0.079
19	20	680.431	680.293	0.138	680.431	680.293	0.138	680.736	680.639	0.097
21	22	680.419	680.269	0.150	680.419	680.269	0.150	680.754	680.652	0.102
23	24	680.403	680.252	0.151	680.403	680.252	0.151	680.762	680.710	0.052
27	26	679.917	679.939	-0.022	679.917	679.939	-0.022	679.342	679.375	-0.033
29	28	679.820	679.765	0.055	679.820	679.765	0.055	679.315	679.256	0.059
31	30	679.196	679.245	-0.049	679.196	679.245	-0.049	679.718	679.735	-0.017
33	32	679.648	679.405	0.243	679.648	679.403	0.243	679.803	679.685	0.118
35	34	680.248	679.943	0.305	680.248	679.943	0.305	680.624	680.265	0.359
Node #		May 15, 1997			May 22, 1997			May 29, 1997		
				Diff.			Diff.			Diff.
1	2									
3	4	680.924	680.855	0.0690	682.440	682.073	0.367	680.039	678.995	0.044
5	6	680.956	680.869	0.087	682.065	682.128	-0.063	680.055	680.000	0.055
7	8	680.911	680.852	0.059	682.092	682.139	-0.047	680.039	679.991	0.048
9	10	680.863	680.815	0.048	682.093	682.129	-0.036	680.025	679.976	0.049
11	12	680.817	680.769	0.048	682.077	682.097	-0.02	680.012	679.961	0.051
13	14	680.776	680.718	0.058	682.049	682.064	-0.015	679.998	679.939	0.059
15	16	680.742	680.676	0.066	682.012	682.016	-0.004	679.98	679.894	0.086
17	18	680.722	680.639	0.083	681.981	681.974	0.007	679.938	679.832	0.106
19	20	680.720	680.615	0.105	681.967	681.947	0.02	679.875	679.768	0.107
21	22	680.741	680.618	0.123	681.959	681.936	0.023	679.830	679.722	0.108
23	24	680.755	680.629	0.126	681.954	681.936	0.018	679.801	679.703	0.098
27	26	680.339	680.352	-0.013	681.886	681.885	0.001	679.509	679.506	0.003
29	28	680.232	680.178	0.054	681.865	681.826	0.039	679.563	679.470	0.093
31	30	679.591	679.641	-0.05	681.358	681.384	-0.026	678.843	678.841	0.002
33	32	680.107	679.806	0.301	681.713	681.450	0.263	678.880	678.716	0.164
35	34	680.630	680.340	0.29	681.900	681.738	0.162	679.734	679.309	0.425

Table IV.3 Estimated Head Differences Using Kriging at Adjusted Southern Line of Cells (Figure 4.2)

Node #		April 24, 1997			May 1, 1997			May 8, 1997		
				Diff.			Diff.			Diff.
25	24	680.129	680.252	-0.123	680.129	680.252	-0.123	680.578	680.710	-0.132
27	26	680.034	679.852	0.182	—	—	—	680.436	680.282	0.154
29	28	679.863	679.855	0.008	—	—	—	680.254	680.275	0.021
31	30	679.581	679.068	0.513	—	—	—	679.968	679.460	0.508
33	32	679.908	679.404	0.504	—	—	—	680.324	679.825	0.499
35	34	680.293	680.117	0.176	—	—	—	680.676	680.506	0.17
Node #		May 15, 1997			May 22, 1997			May 29, 1997		
				Diff.			Diff.			Diff.
25	24	680.529	680.629	0.1	681.924	681.936	0.012	679.643	679.703	0.06
27	26	680.436	680.282	0.154	679.957	679.814	0.143	679.603	679.476	0.127
29	28	680.254	680.275	0.021	679.838	679.919	0.081	679.444	679.538	0.094
31	30	679.968	679.460	0.508	679.527	678.930	0.597	679.096	678.539	0.557
33	32	680.324	679.825	0.499	679.879	679.276	0.603	679.456	678.881	0.575
35	34	680.676	680.506	0.17	680.078	679.833	0.245	679.808	679.586	0.222

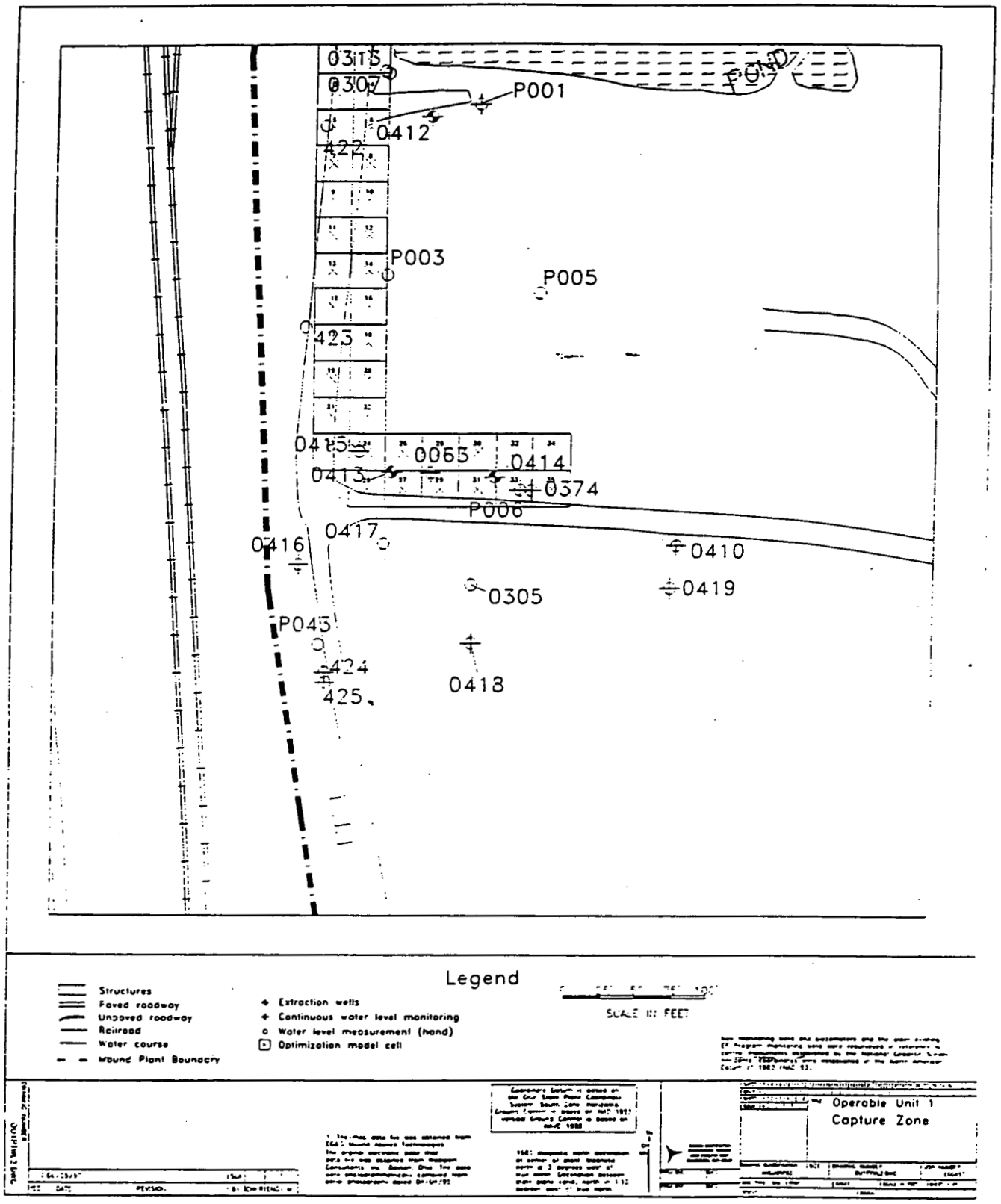

Figure 4.1. Original optimization cell locations and node numbers.

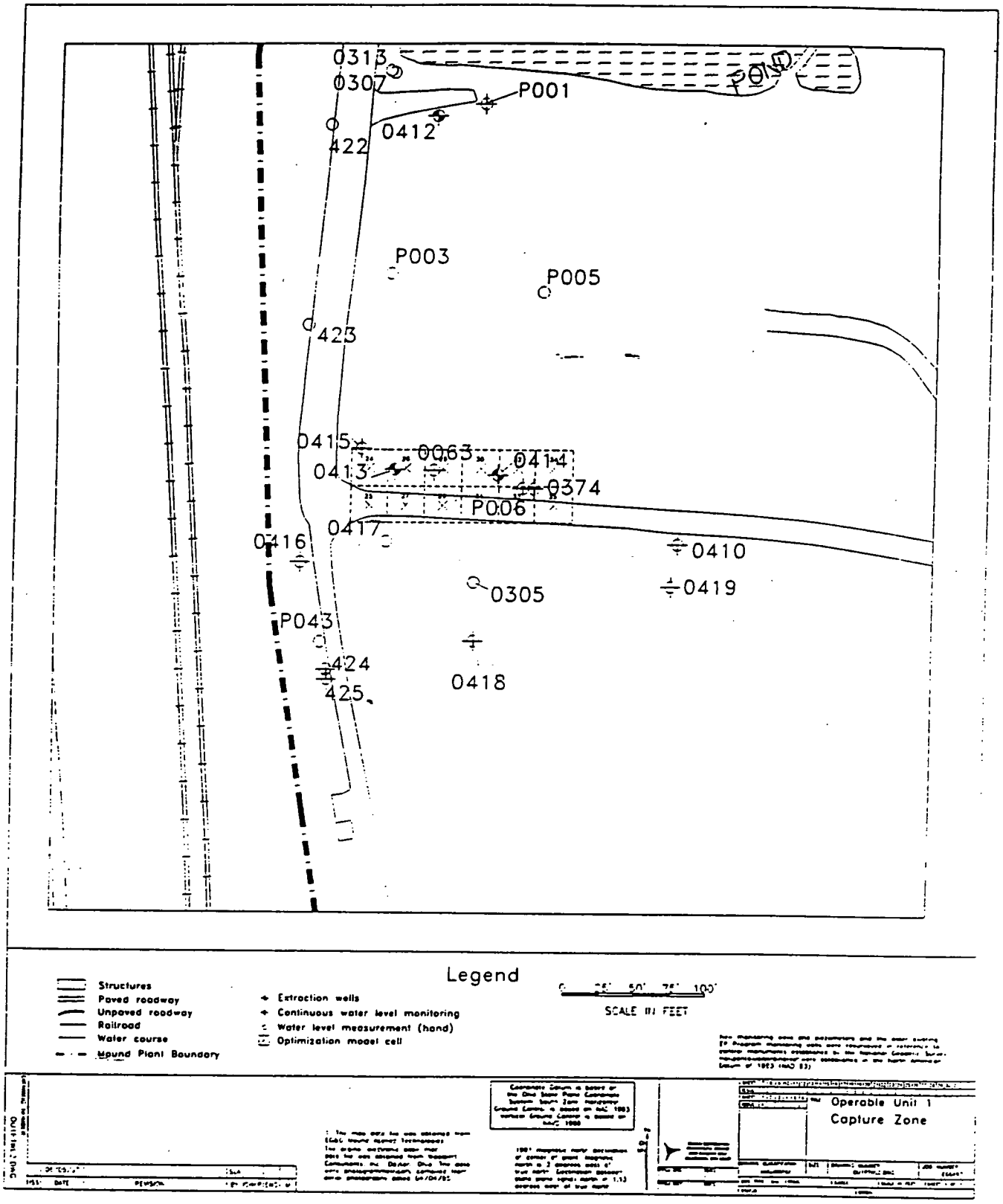

Figure 4.2. Adjusted optimization cell locations to calculate head differences that straddle the southern compliance line.

5.0 REFERENCES

DOE. 1994. "Determination of Aquifer Diffusivity from River Level Flucuations near the U.S. DOE Mound Facility in Miamisburg, Ohio". Environmental Restoration Program, U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

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DOE. 1996. "OU-1 Pump-and-Treat System Design"

APPENDIX A

HYDROGRAPHS FOR MONITORING WELLS P001, P006, 0374, 0063, 0410, 0412, 0413, 0415, 0415, 0416,0418, 0419, 0422, 0423

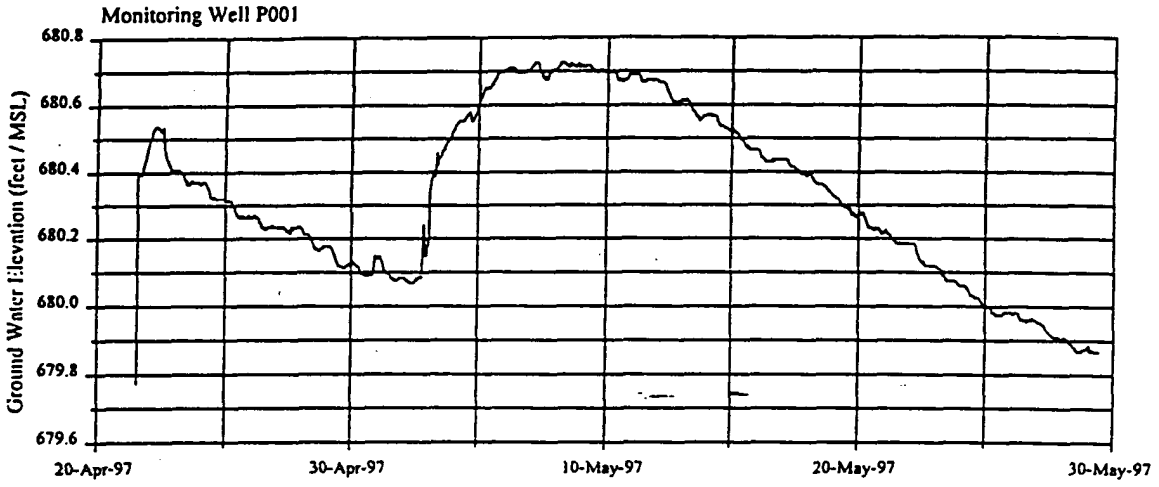


Figure A.1. Hydrograph of monitoring well P001.

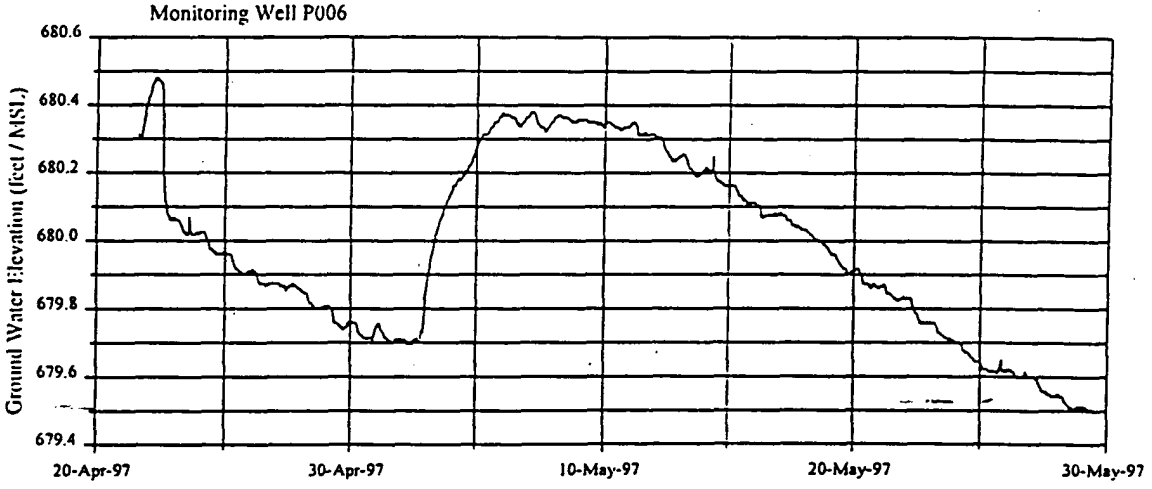
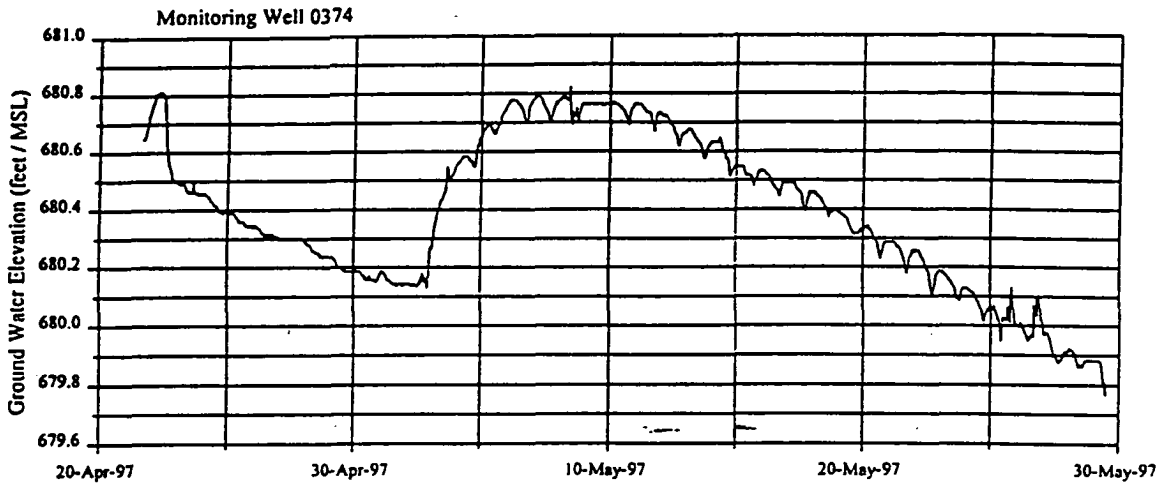


Figure A.2. Hydrograph of monitoring well P006.



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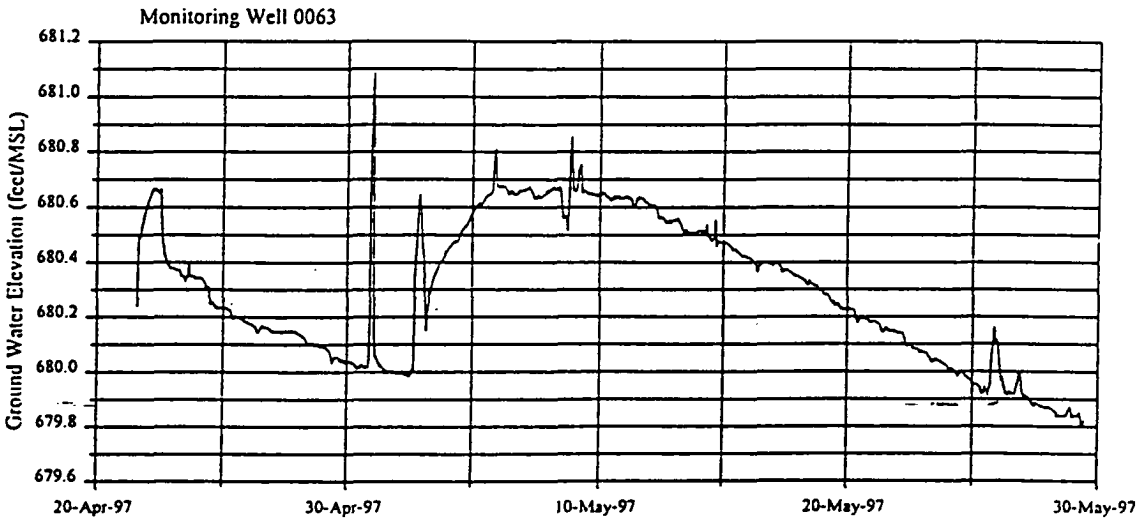

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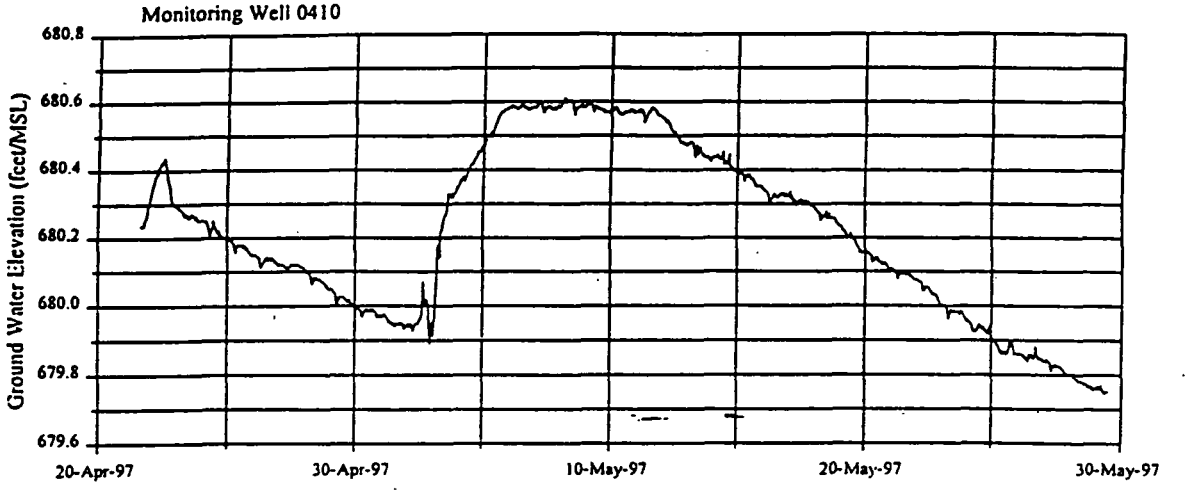

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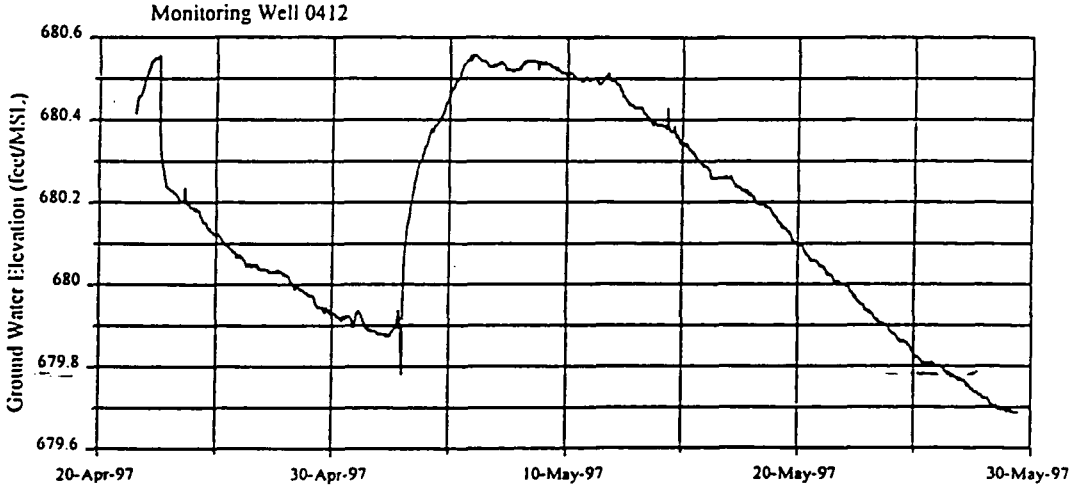

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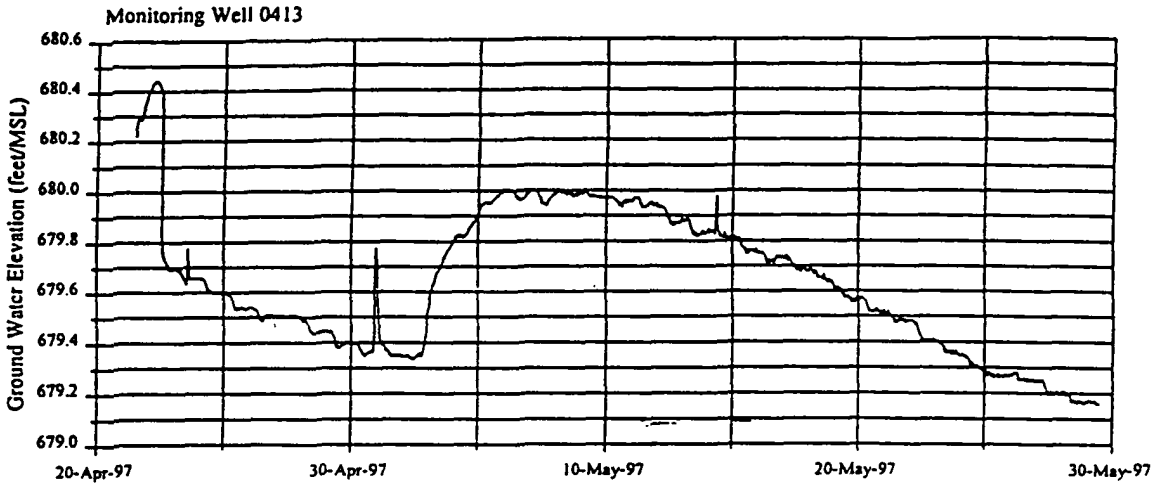

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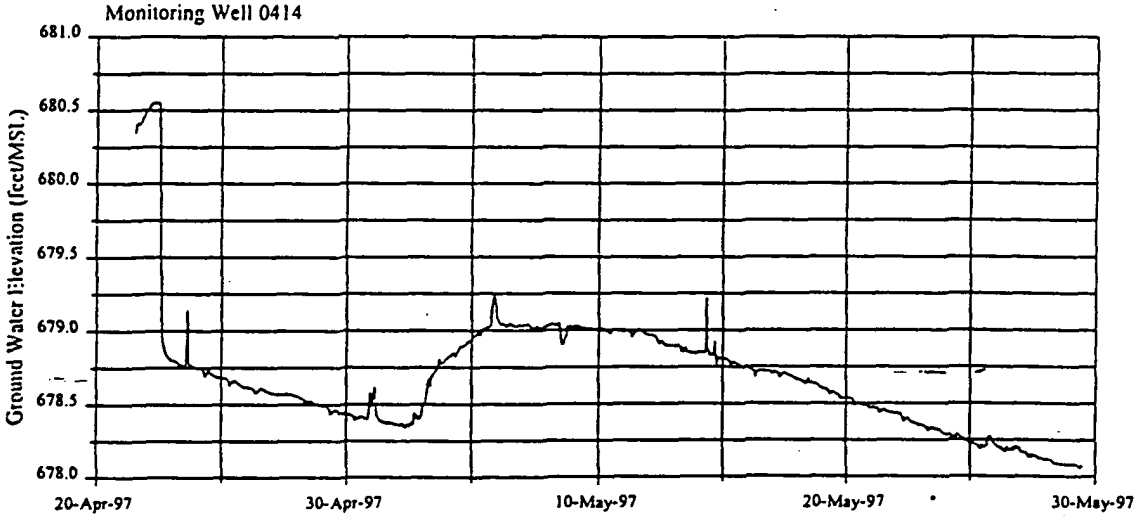

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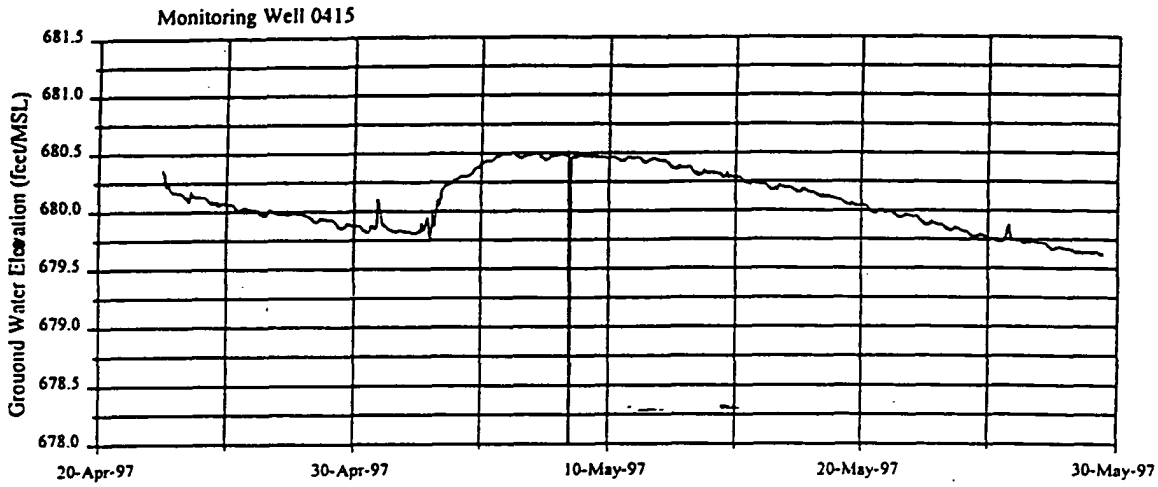

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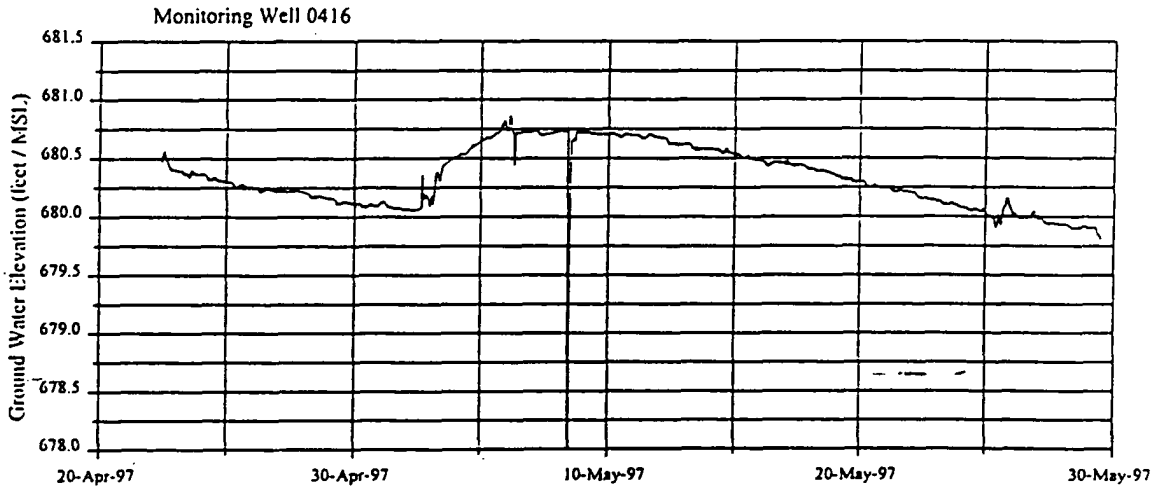

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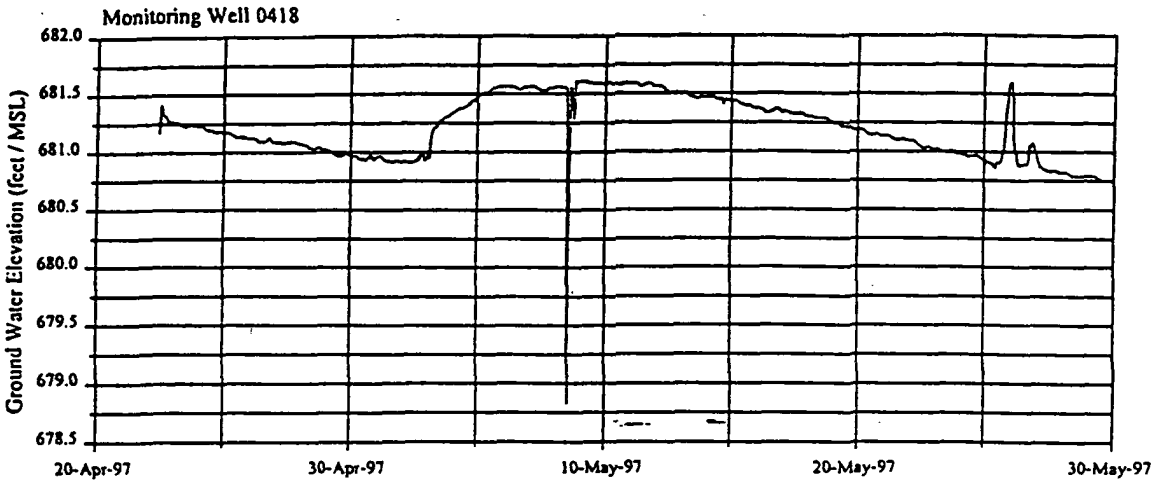

Figure A.11. Hydrograph of monitoring well 0418.

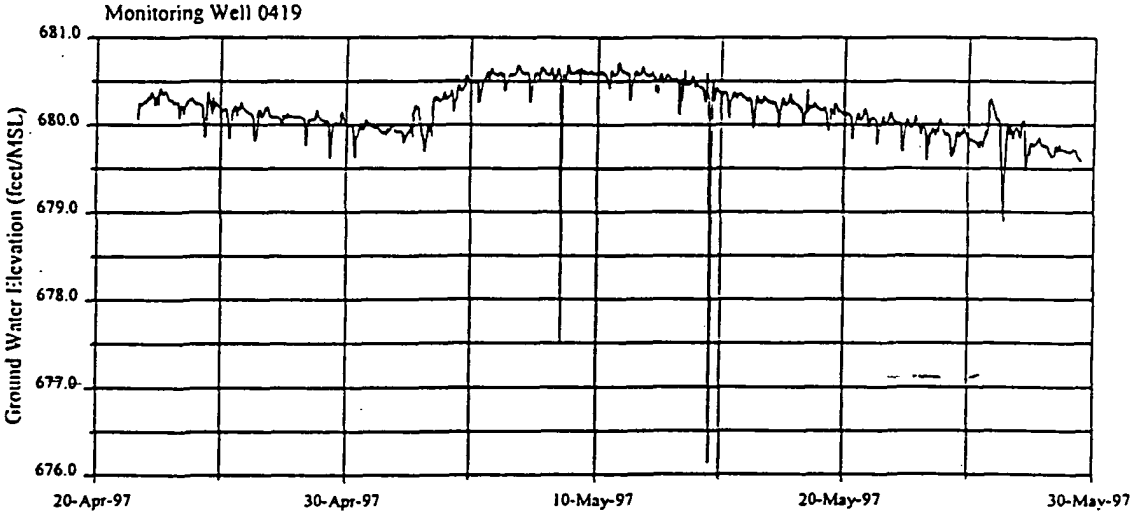

Figure A.12. Hydrograph of monitoring well 0419.

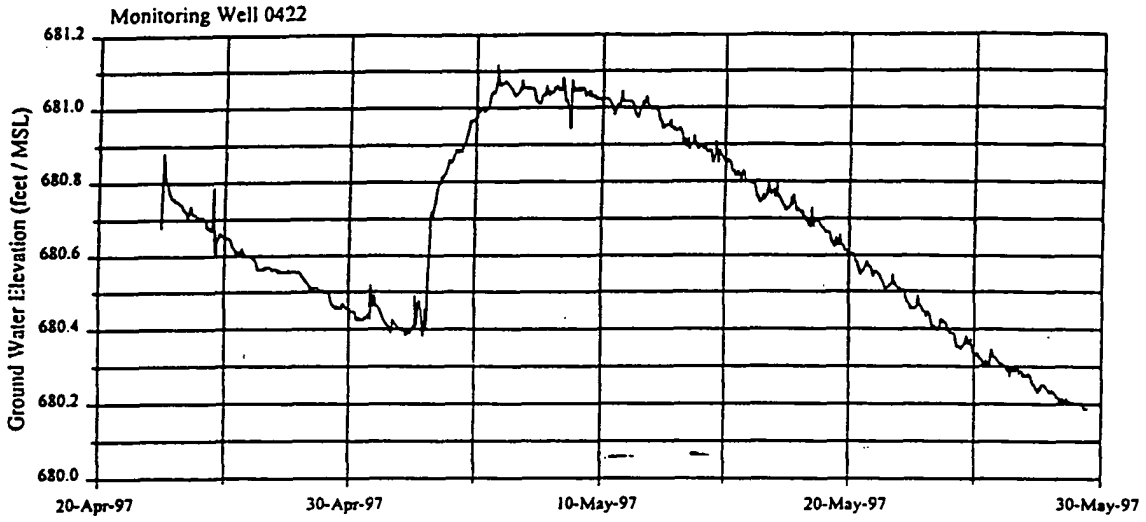

Figure A.13. Hydrograph of monitoring well 0422.

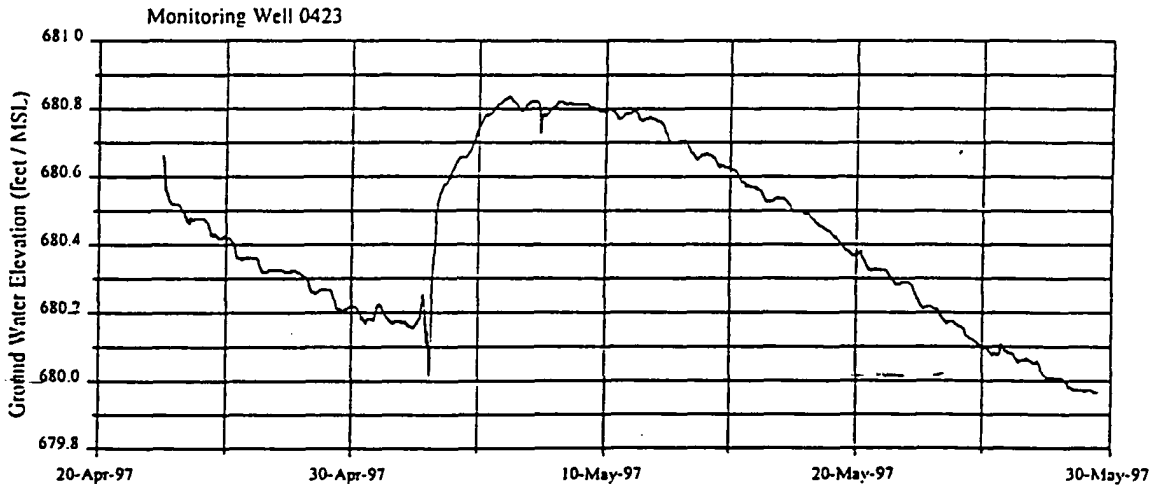

Figure A.14. Hydrograph of monitoring well 0423.

OU-1 PUMP-AND-TREAT SYSTEM CAPTURE ZONE MONITORING FOR JUNE AND JULY 1997

MOUND PLANT
MIAMISBURG, OHIO

TECHNICAL MEMORANDUM

August 1997

Department Of Energy

EG&G Mound Applied Technologies

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ACKNOWLEDGMENTS

This report was prepared by Terran Corporation of Beavercreek, Ohio as report number TB-9734. It was completed under Task Order #16535 with EG&G Mound Applied Technologies. The authors were Roger W. McCready and Scott Hora. Word processing and graphics were prepared by Sandra L. Allen. Field work and preliminary contouring were conducted by Michael Brady, Chris Ruef and Scott Hora.

1.0 INTRODUCTION

This report has been prepared as part of the Environmental Restoration (ER) Program at the U.S. Department of Energy (DOE) Mound Plant, Miamisburg, Ohio. Operable Unit One (OU-1) addresses possible chemical contamination of the buried valley aquifer which underlies the original southwest corner of the Mound Plant. OU-1 is in the remediation phase of the CERCLA. The remedial method chosen to remediate the OU-1 area is the pump-and-treat system.

Pump-and-treat systems are designed to contain and remove the contaminants dissolved in the ground water. Due to the relatively long duration of pump-and-treat process the objective is to minimize the total pumping rate to reduce treatment costs. The OU-1 groundwater contamination plume must be contained within the western and southern compliance boundaries. Containment is defined as an inward hydraulic gradient at a defined compliance boundary to prevent the movement of groundwater across this boundary. Therefore, the primary constraint is difference in head at the compliance boundary. The design strategy states that the optimal head difference to be 0.05 feet which is calculated from water level measurements taken manually.

The pump-and-treat system will be monitored for the first six months to define the capture zone created by the system. The hydraulic effectiveness of the pump-and-treat system will be determined by water level data from 20 monitoring wells in the area. Water level data will be collected via manual measurements and continuous monitoring instrumentation. The study area with extraction wells and monitoring well locations are shown in (Figure 1.1). This study began on April 21, 1997 when the dataloggers were installed and will continue until August 31, 1997. This report is a monthly summary of the data collected and the results of hydraulic containment due to the pump-and-treat system.

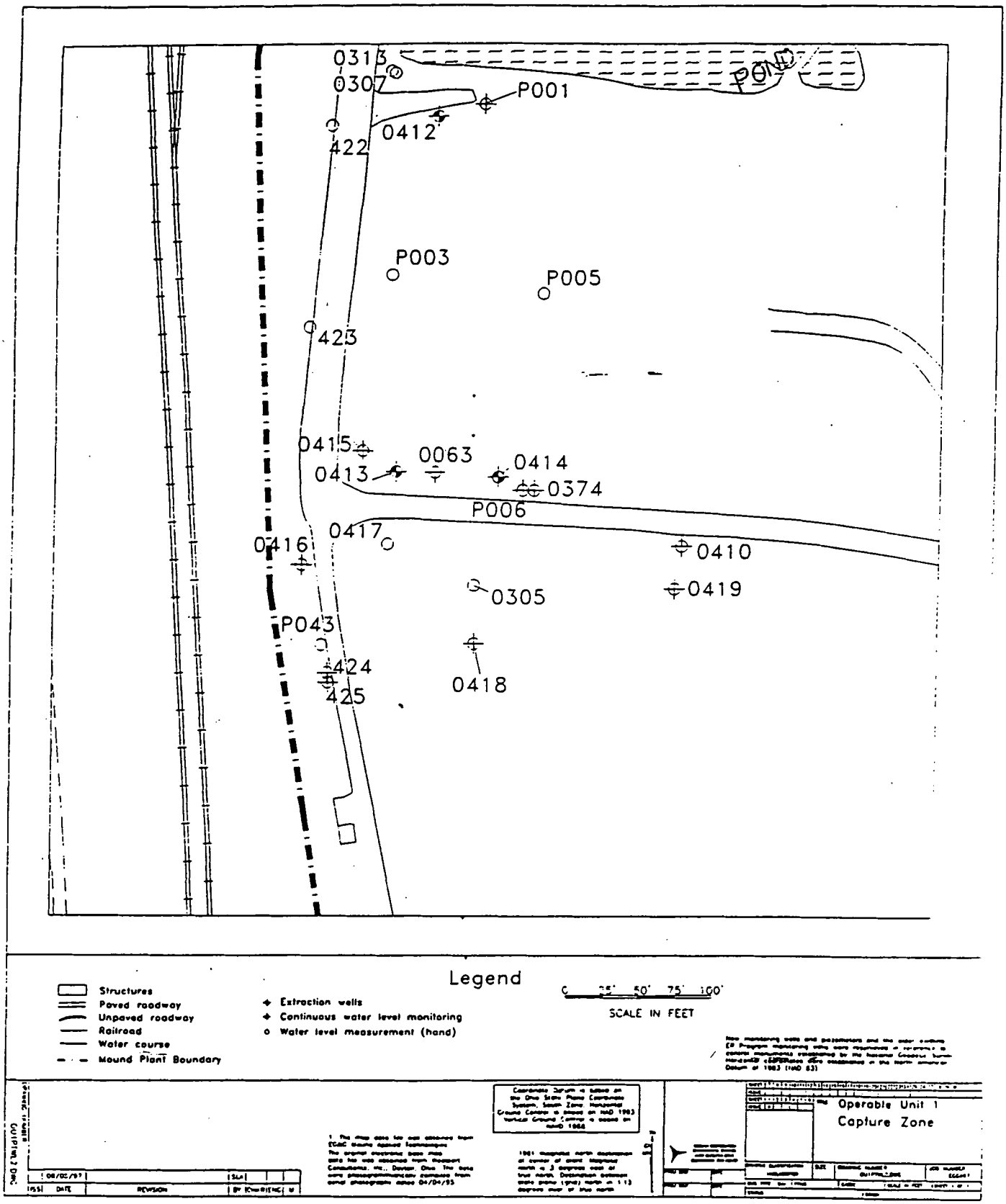

Figure 1.1. OU-1 Pump-and-Treat system capture zone monitoring study area.

2.0 WEEKLY WATER LEVELS AND CORRESPONDING POTENTIOMETRIC MAPS IN OU-1 AREA

The ground water levels in twenty monitoring wells and the three pump-and-treat extraction wells were measured manually once a week. Each set of weekly water level measurements were contoured to produce a potentiometric map of the water level surface for the Upper BVA. When wells were not accessible for manual measurements, data was acquired via dataloggers. Table II.1 list the depth to water and water level elevation for the twenty monitoring wells and three extraction wells for June and July.

Water level measurements were completed using standard protocol of the OU-9 QAPP (Revision 4, April 1995) SOP 3.1 Water Level Measurement (Revision 1, March 1992). Water level collection utilized an electric water level indicator that allows measurement to within 0.01 foot. The water levels are recorded and entered into a spreadsheet.

Preparation of the potentiometric water level maps is conducted in a three step process: (1) Data from each weekly measurement is entered into Golden Software Surfer were it is contoured; (2) The contours are edited by a hydrogeologist; (3) The map is digitized onto a base map.

Four sets of water level measurements were taken in June and another five sets in July 1997. The potentiometric maps for each data set are displayed in figures 2.1 through 2.9. For both months, the potentiometric maps clearly show a cone of depression or capture zone which are all similar in shape. The only exception is figure 2.5 which is a potentiometric map with no cone of depression. The water levels taken for that particular map represent a period when the pump and treat system was shut down for maintenance.

Table II.1 OU-1 Weekly Water Levels for June through July, 1997

Monitoring Well		05-Jun-97 Water Level		12-Jun-97 Water Level		19-Jun-97 Water Level		27-Jun-97 Water Level	
Number	Elevation TOC	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation
		(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)
0063	705.60	20.35	685.25	22.18	683.42	---	685.39*	24.55	681.05
0305	709.87	24.63	685.24	26.52	683.35	---	---	28.50	681.37
0307	716.10	30.53	685.57	32.74	683.36	---	---	31.83	684.27
0313	716.08	30.54	685.54	32.42	683.66	---	---	34.80	681.28
0374	706.29	21.12	685.17	22.9	683.39	---	---	24.26	682.03
0410	713.84	28.75	685.09	30.28	683.56	---	685.17*	32.14	681.70
0412	717.00	31.56	685.44	33.5	683.50	---	685.33*	---	681.03*
0413	704.45	19.63	684.82	21.57	682.88	---	684.65*	---	680.44*
0414	705.85	22.12	683.73	23.97	681.88	---	683.70*	---	679.51*
0415	706.09	20.55	685.54	22.62	683.47	---	685.19*	24.90	681.19
416	704.30	18.81	685.49	20.78	683.52	---	685.45*	23.25	681.05
0417	705.07	19.73	685.34	21.62	683.45	---	---	24.01	681.06
0418	709.67	24.53	685.14	26.3	683.37	---	686.26*	28.60	681.07
0419	716.41	31.20	685.21	32.88	683.53	---	685.16*	35.35	681.06
0422	715.21	29.60	685.61	31.42	683.79	---	685.82*	33.80	681.41
0423	709.12	23.52	685.60	25.52	683.60	---	685.57*	27.50	681.62
0424	704.49	19.18	685.31	20.95	683.54	---	---	23.40	681.09
0425	704.58	19.26	685.32	21.05	683.53	---	---	22.65	681.93
P001	717.67	32.25	685.42	34.04	683.63	---	685.40*	36.45	681.22
P003	707.46	22.04	685.42	23.9	683.56	---	---	26.35	681.11
P005	738.59	53.30	685.29	54.99	683.60	---	---	57.32	681.27
P006	705.96	20.86	685.10	22.6	683.36	---	685.07*	24.95	681.01
P043	704.80	19.47	685.33	21.3	683.50	---	---	23.80	681.00

*Indicates data that were recorded by dataloggers.
**Depth to water on May 1, 1997 for well 0413 was in error, the continuous monitoring with the Telog indicated that the water level elevation should be 679.35.
--- No data available

Table II.1 OU-1 Weekly Water Levels for June through July, 1997 (cont.)

Monitoring Well		03-Jul-97 Water Level		10-Jul-97 Water Level		17-Jul-97 Water Level		24-Jul-97 Water Level		31-Jul-97 Water Level	
Number	Elevation TOC	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation
		(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)
0063	705.60	24.75	680.85	25.87	679.73	26.15	679.45	26.67	678.93	27.07	678.53
0305	709.87	29.09	680.78	30.12	679.75	30.43	679.44	30.91	678.96	31.37	678.50
0307	716.10	35.17	680.93	36.10	680.00	36.38	679.72	36.86	679.24	37.38	678.72
0313	716.08	35.16	680.92	36.06	680.02	36.32	679.76	36.91	679.17	37.41	678.67
0374	706.29	25.52	680.77	26.07	680.22	26.88	679.41	27.25	679.04	27.82	678.47
0410	713.84	33.18	680.66	34.10	679.74	34.37	679.47	34.86	678.98	35.45	678.39
0412	717.00	36.06	680.94	37.14	679.86	37.43	679.57	---	678.93*	38.45	678.55
0413	704.45	23.57	680.88	25.18	679.27	25.39	679.06	---	678.38*	---	676.43*
0414	705.85	24.99	680.86	27.79	678.06	28.11	677.74	---	677.09*	---	677.86*
0415	706.09	25.24	680.85	26.18	679.91	26.61	679.48	26.33	679.76	27.47	678.62
416	704.30	23.44	680.86	24.46	679.84	24.74	679.56	25.3	679.00	25.72	678.58
0417	705.07	24.22	680.85	25.27	679.80	25.54	679.53	26.04	679.03	26.50	678.57
0418	709.67	28.93	680.74	29.98	679.69	30.20	679.47	30.59	679.08	36.20	673.47
0419	716.41	35.77	680.64	36.68	679.73	36.88	679.53	37.33	679.08	37.91	678.50
0422	715.21	34.27	680.94	35.21	680.00	35.13	680.08	35.85	679.36	36.42	678.79
0423	709.12	28.25	680.87	26.91	682.21	29.54	679.58	29.88	679.24	30.37	678.75
0424	704.49	23.65	680.84	24.62	679.87	24.86	679.63	25.33	679.16	25.85	678.64
0425	704.58	23.73	680.85	24.67	679.91	24.95	679.63	25.13	679.45	26.08	678.50
P001	717.67	36.80	680.87	37.75	679.92	38.06	679.61	38.52	679.15	39.04	678.63
P003	707.46	26.57	680.89	27.58	679.88	27.88	679.58	28.35	679.11	28.87	678.59
P005	738.59	57.78	680.81	58.76	679.83	59.06	679.53	59.47	679.12	59.97	678.62
P006	705.96	25.15	680.81	26.29	679.67	26.64	679.32	27.1	678.86	27.69	678.27
P043	704.80	24.00	680.80	25.03	679.77	25.24	679.56	25.76	679.04	26.31	678.49

*Indicates data that were recorded by dataloggers.
--- No data available

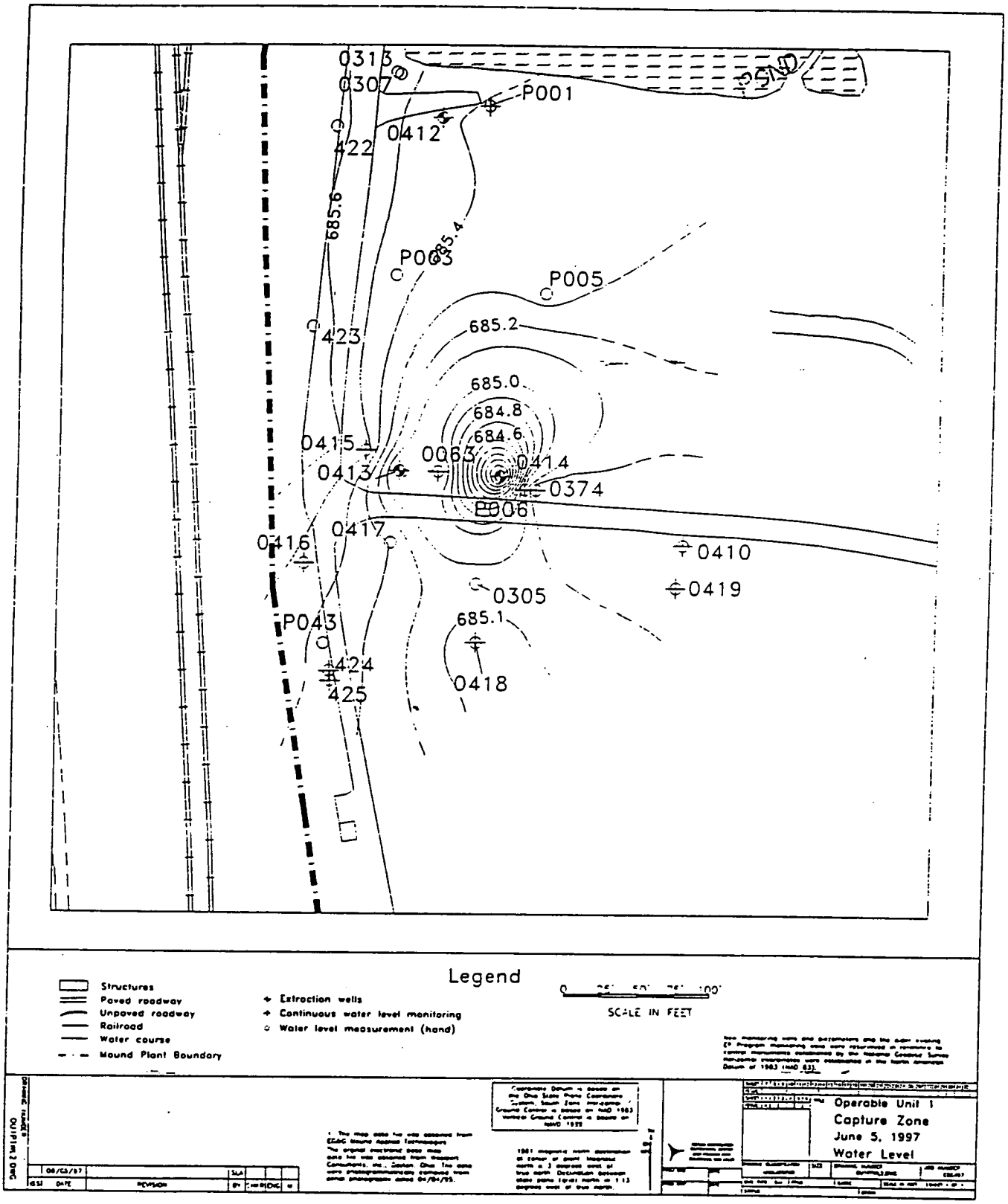

Figure 2.1. Groundwater potentiometric surface for June 5, 1997.

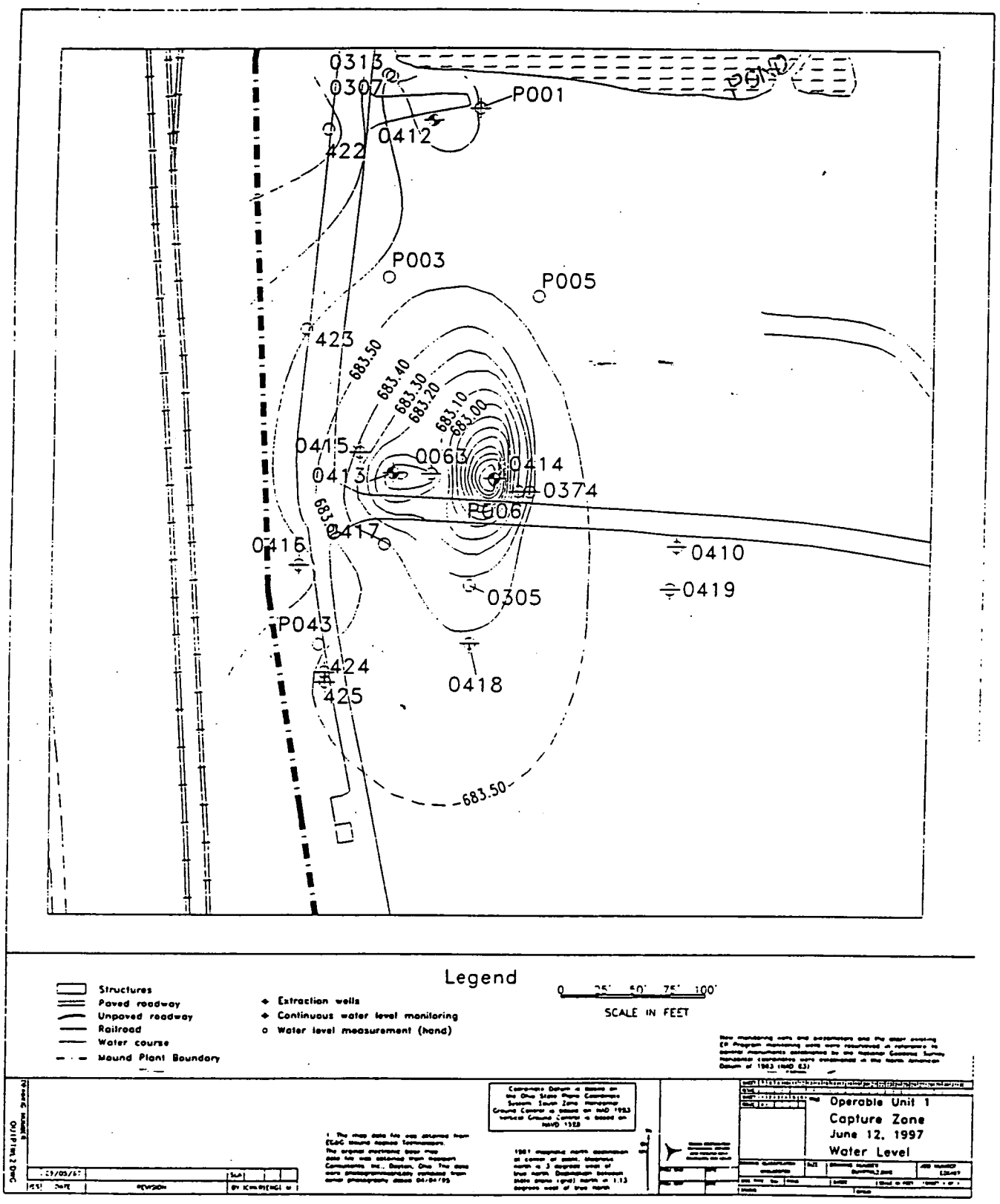

Figure 2.2. Groundwater potentiometric surface for June 12, 1997.

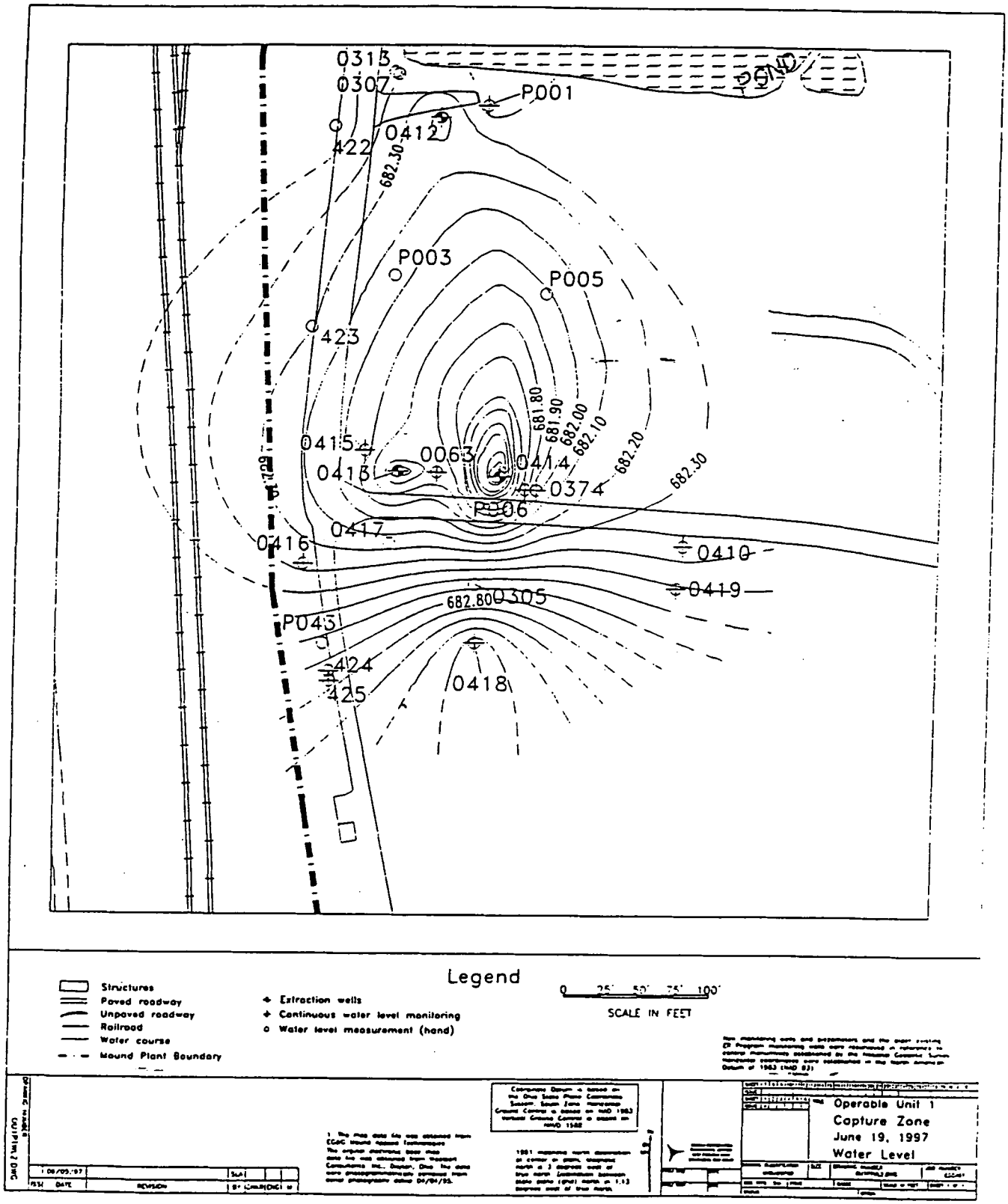

Figure 2.3. Groundwater potentiometric surface for June 19, 1997.

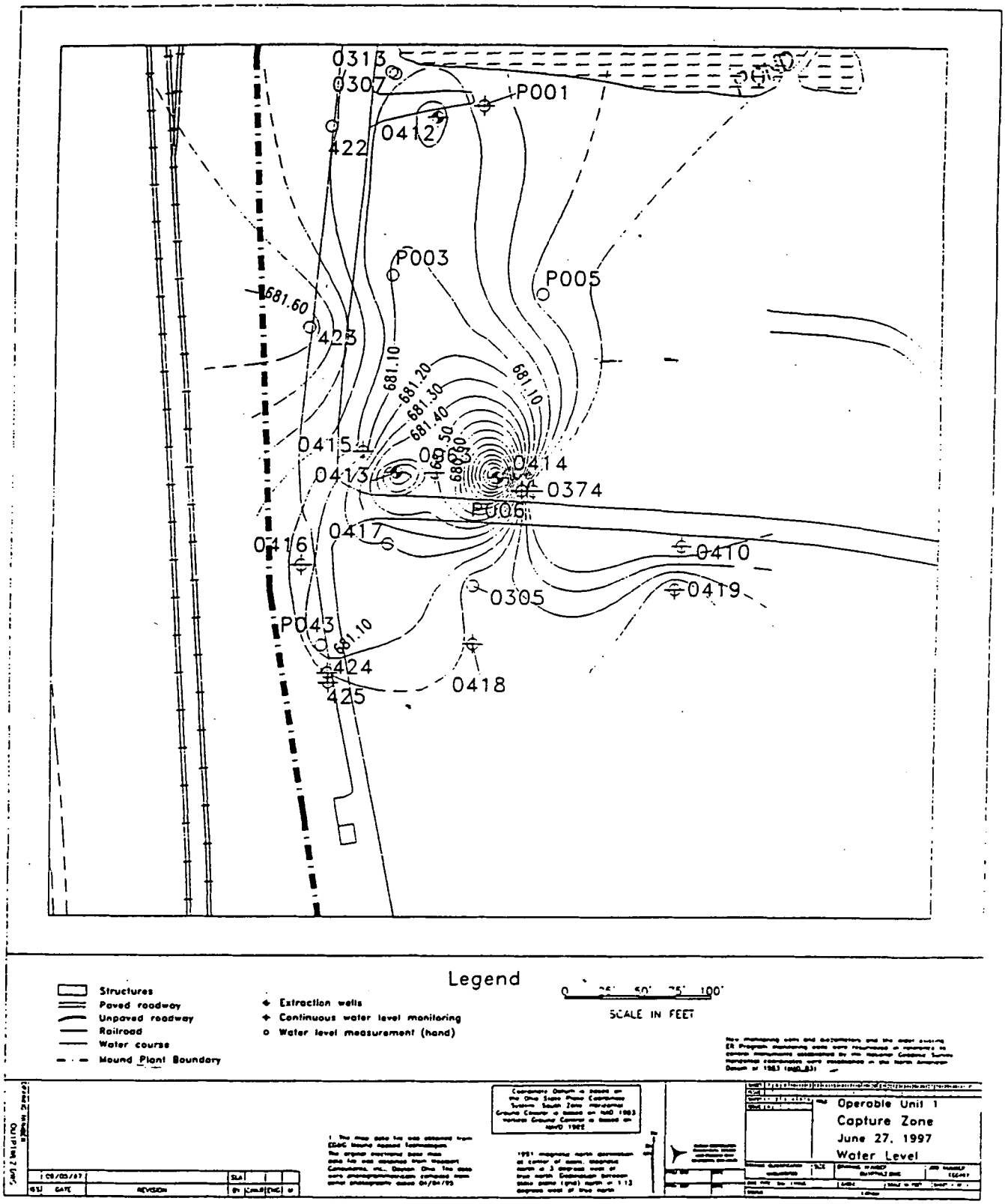

Figure 2.4. Groundwater potentiometric surface for June 27, 1997.

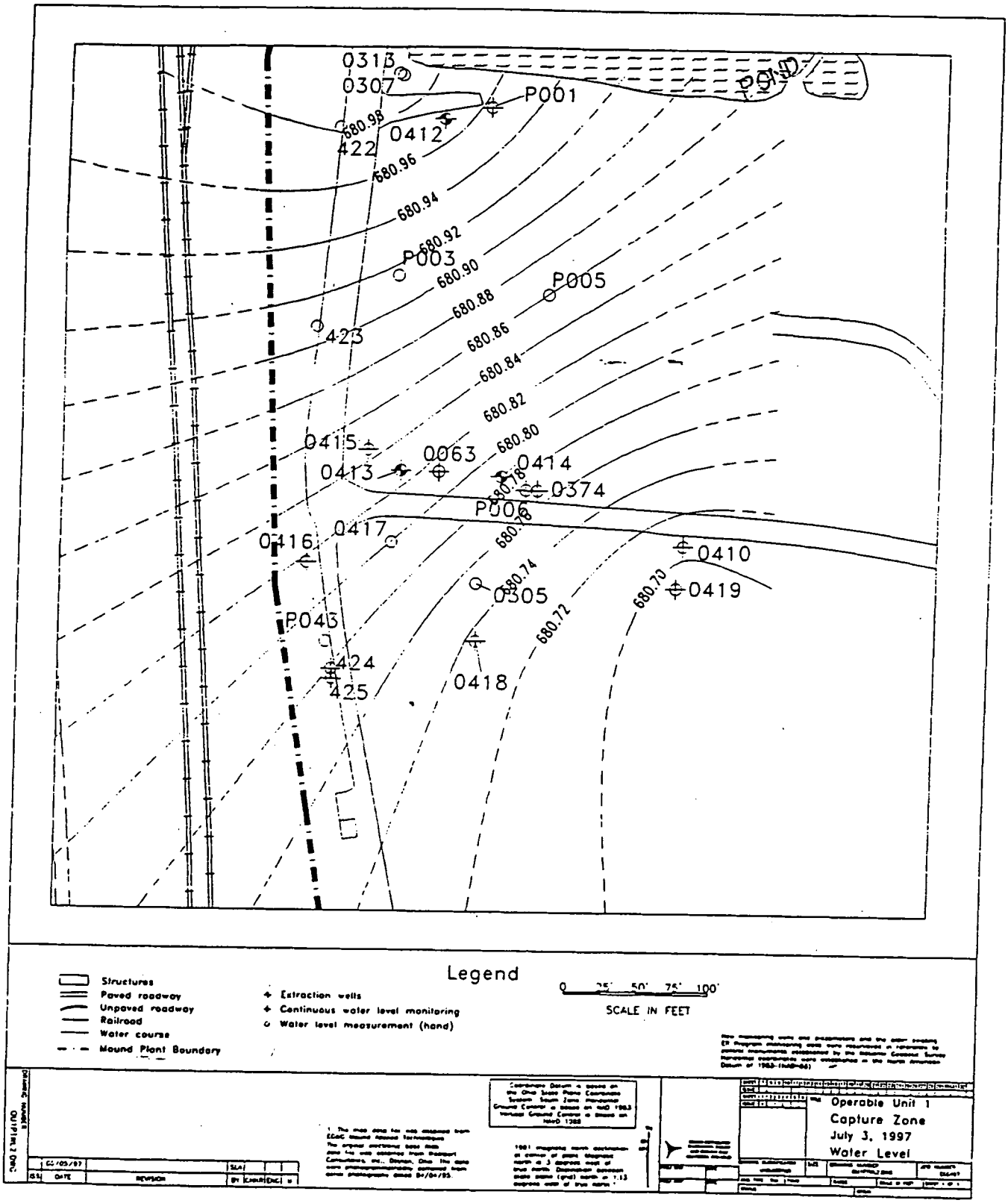

Figure 2.5. Groundwater potentiometric surface for July 3, 1997.

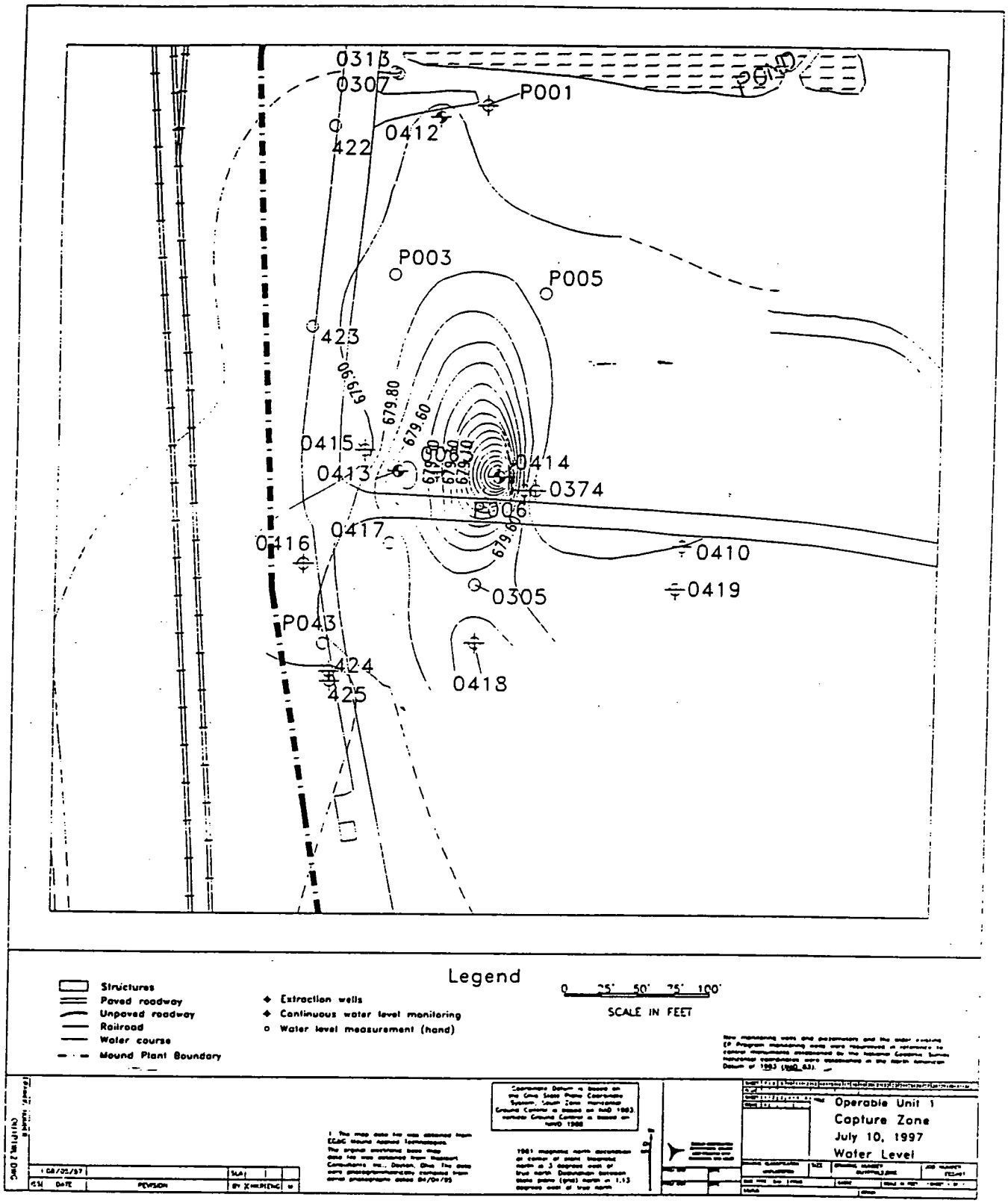

Figure 2.6. Groundwater potentiometric surface for July 10, 1997.

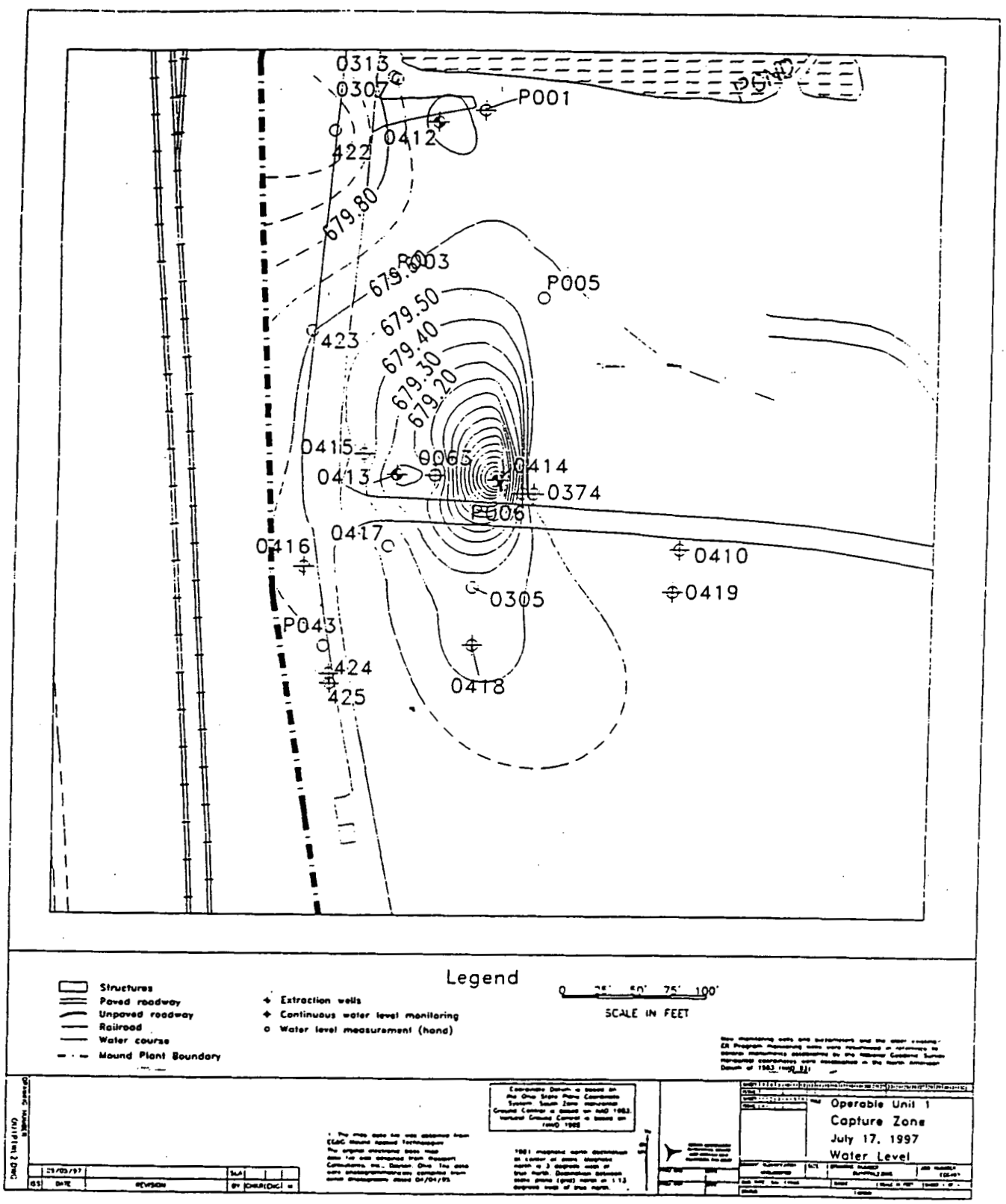

Figure 2.7. Groundwater potentiometric surface for July 17, 1997.

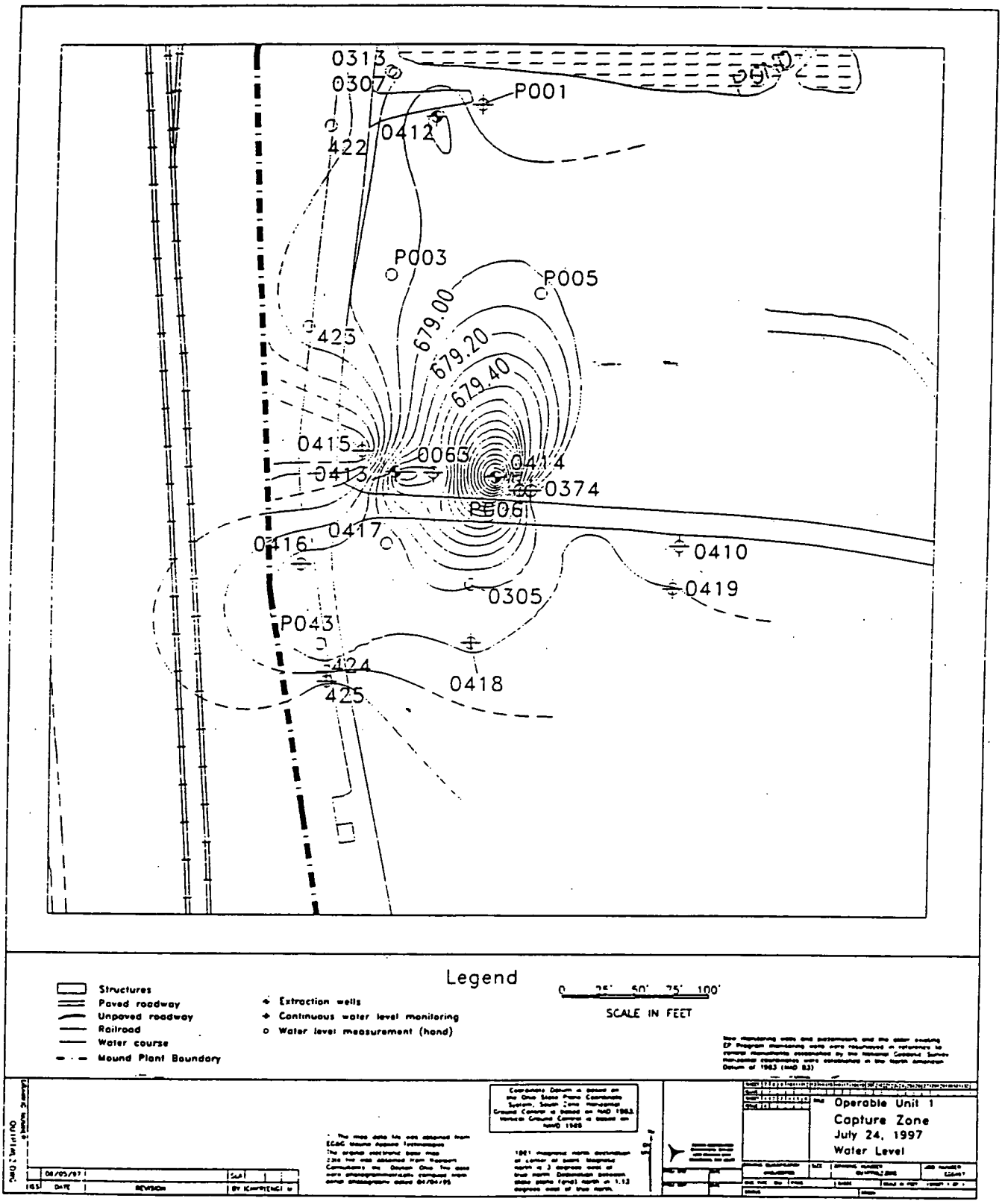

Figure 2.8. Groundwater potentiometric surface for July 24, 1997.

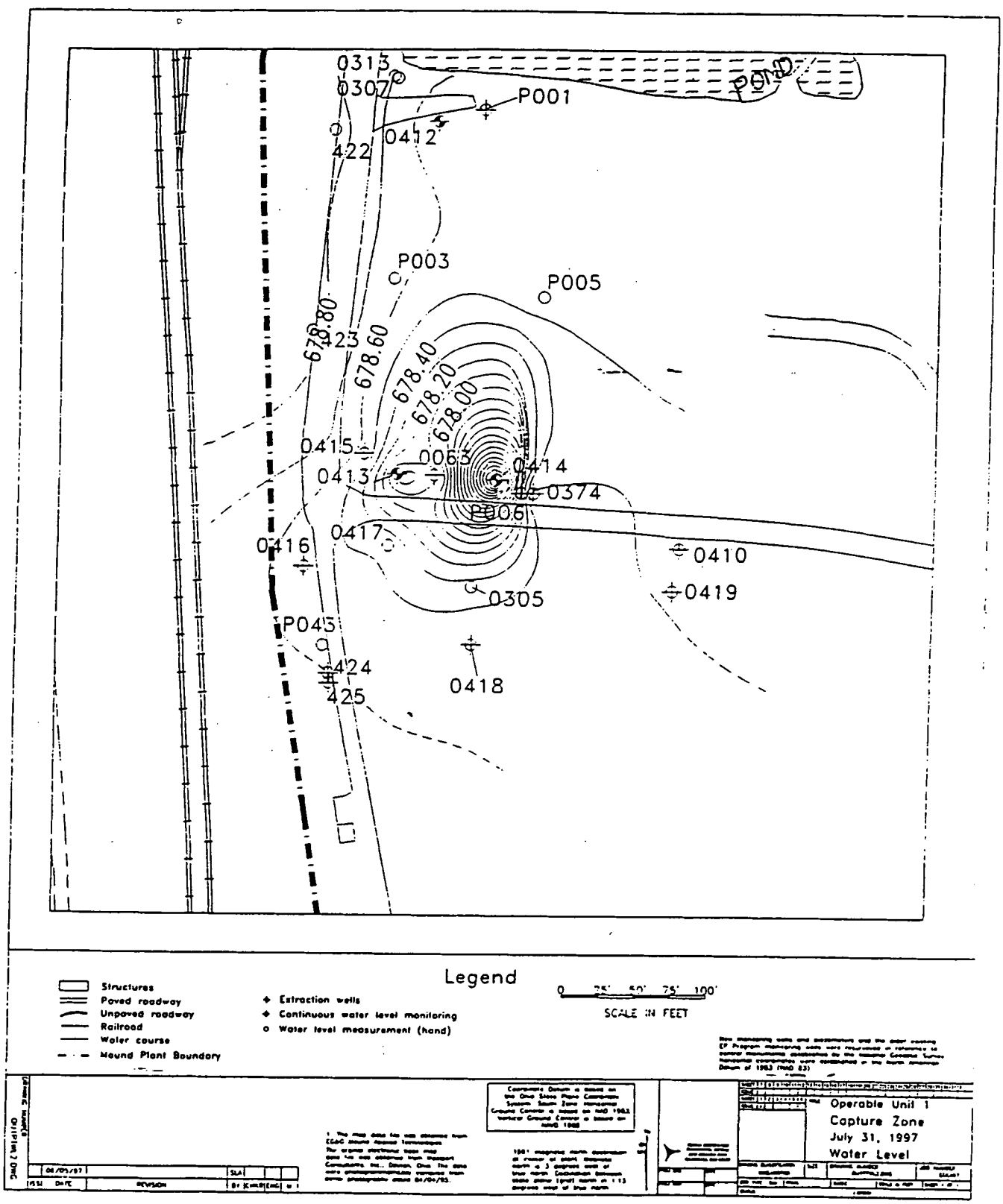

Figure 2.9. Groundwater potentiometric surface for July 31, 1997.

3.0 CONTINUOUS WATER LEVEL MONITORING RESULTS FOR JUNE AND JULY, 1997

To assess the potential fluctuations in water levels due to external sources such as the Mound production wells, water levels were monitored continuously at 13 locations surrounding the pump-and-treat system. This continuous monitoring was provided by individual Telog Level Trackers 2100. These Trackers are dataloggers / pressure transducers automatically record water levels. This instrumentation was installed in 13 monitoring wells on April 21, 1997. Figure 1. shows the location of the monitoring wells and extraction wells that contain Trackers. The dataloggers have been programmed to collect a water level measurement every 15 minutes. Once a week when the hand water level measurements are collected and each datalogger is downloaded into a Telog Data Transfer Unit (DTU). The DTU is returned to the office where the data is uploaded into a database that contains records for each well.

Hydrographs of continuous water level data for late April through July 1997 are shown in Appendix A (figures A.1 through A.15). The hydrographs reflect the natural water level fluctuations that occur in the Upper Buried Valley Aquifer. Abrupt increases in ground water levels due to rain events and stage increase of the Great Miami River occur frequently through out the year. Increases up to six feet were recorded at P001 from July 1, 1993 to May, 1994 (DOE, 1995). In early June 1997, a five day ground water level increase occurred due to precipitation which caused water levels in some wells to rise nearly seven feet (see Appendix A). The ground water levels were declining from the high on May 7, 1997.

Additionally, there were three more peaks seen in most of the hydrographs in June and July 1997 (Appendix A). These peaks range from 0.0 to 2.5 feet and were due to periods where the pump and treatment system was shut off for maintenance purposes. The negative peaks with high amplitude and short span were due to periods where that particular well was sampled.

Since the start of this monitoring the plant has been supplied by production well 3 (0076). Many of the hydrographs reveal the daily pumping of the production well. Monitoring well 0419 is most affected by production well 3 producing a daily drawdown of 0.4 feet between 0600 and 1000. Monitoring well 0374 has a 0.1 foot drawdown that occurs in the late afternoon each day. Based on a qualitative review of the other hydrographs the daily peak drawdown at all other monitoring wells used for this study is less 0.05 feet.

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DOE. 1995. "Operable Unit 9 Continuous Water Level Monitoring Results for the Buried Valley Aquifer May, 1993 through May, 1994." Environmental Restoration Program, U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

DOE. 1996. "OU-1 Pump-and-Treat System Design"

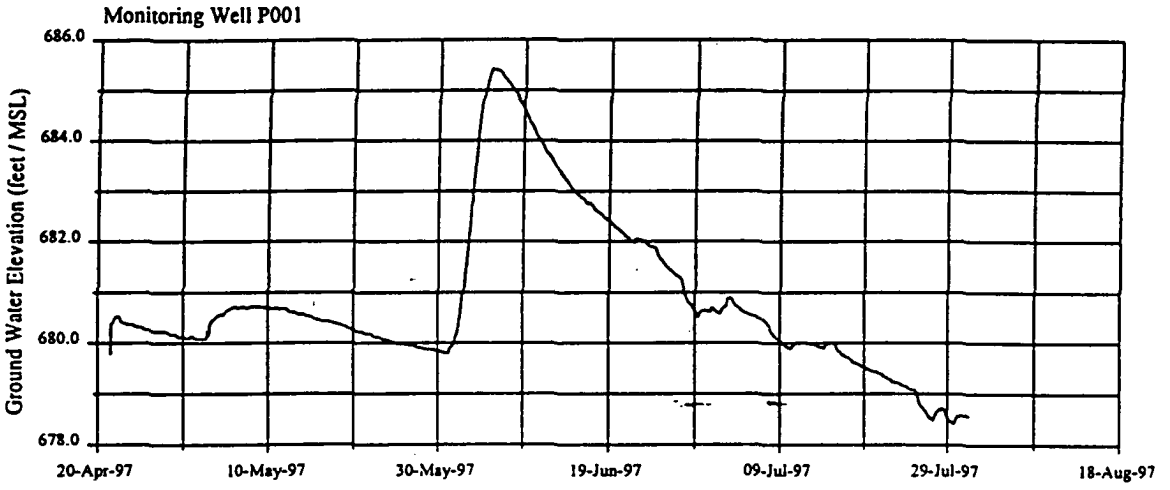


Figure A.1. Hydrograph of monitoring well P001.

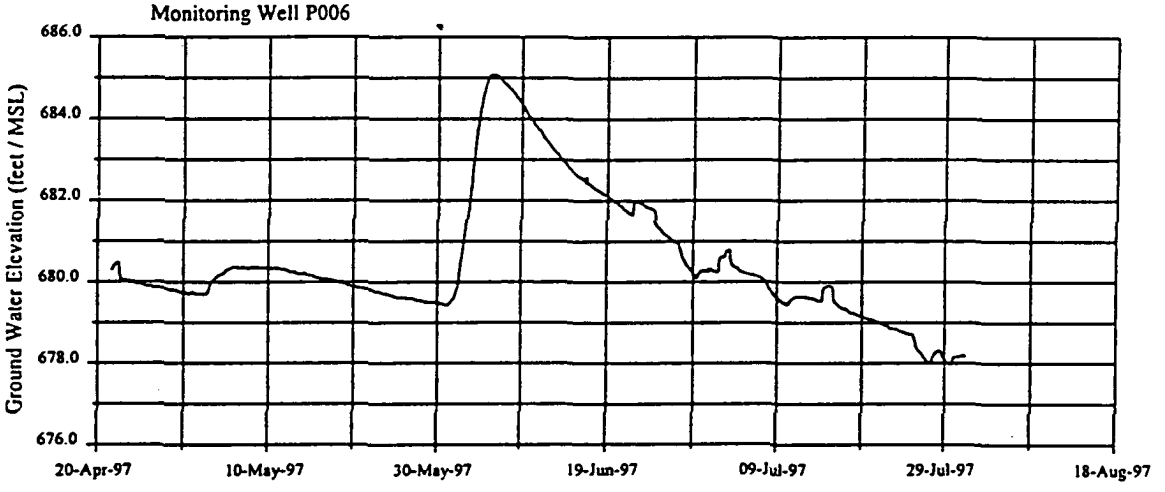
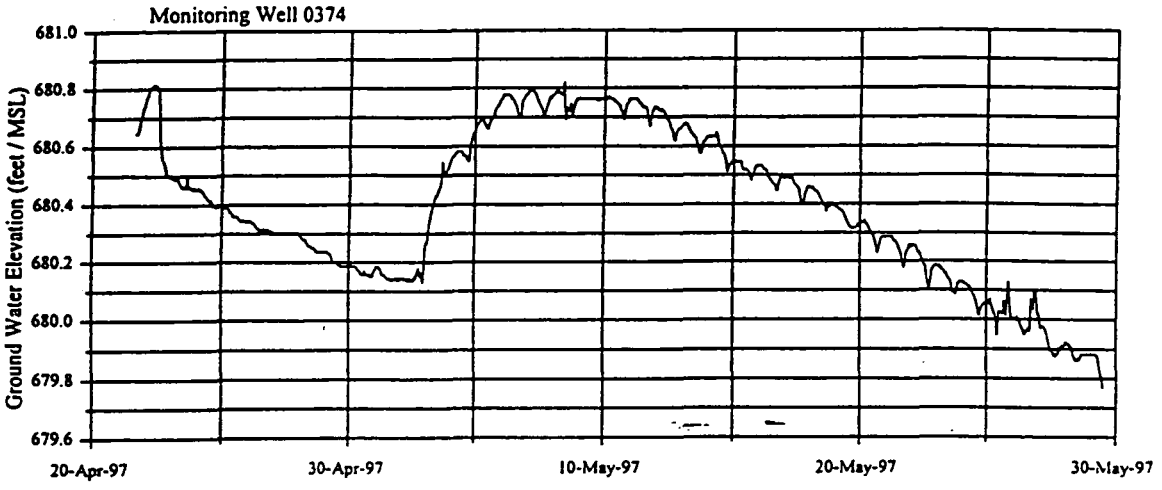


Figure A.2. Hydrograph of monitoring well P006.



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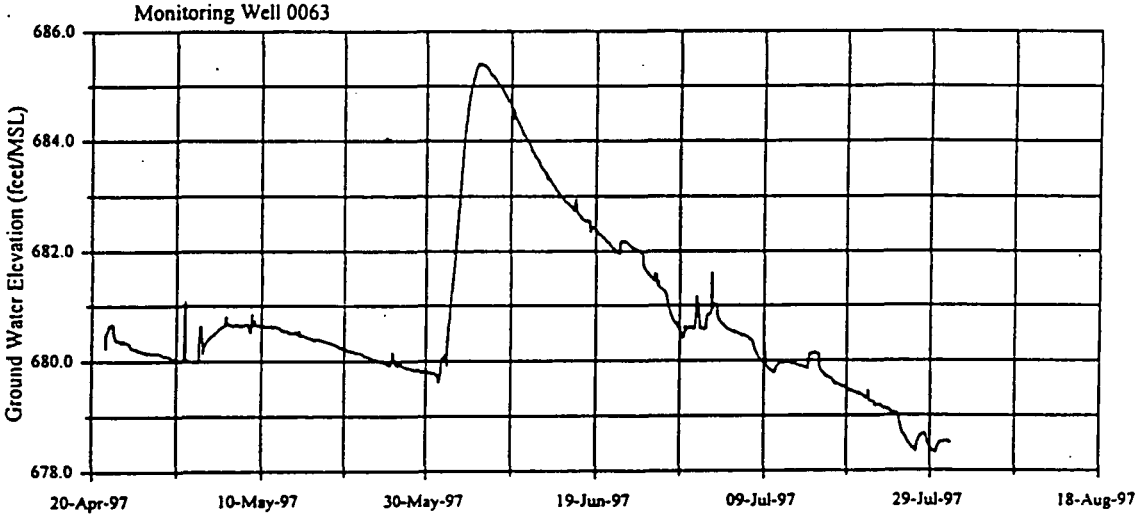

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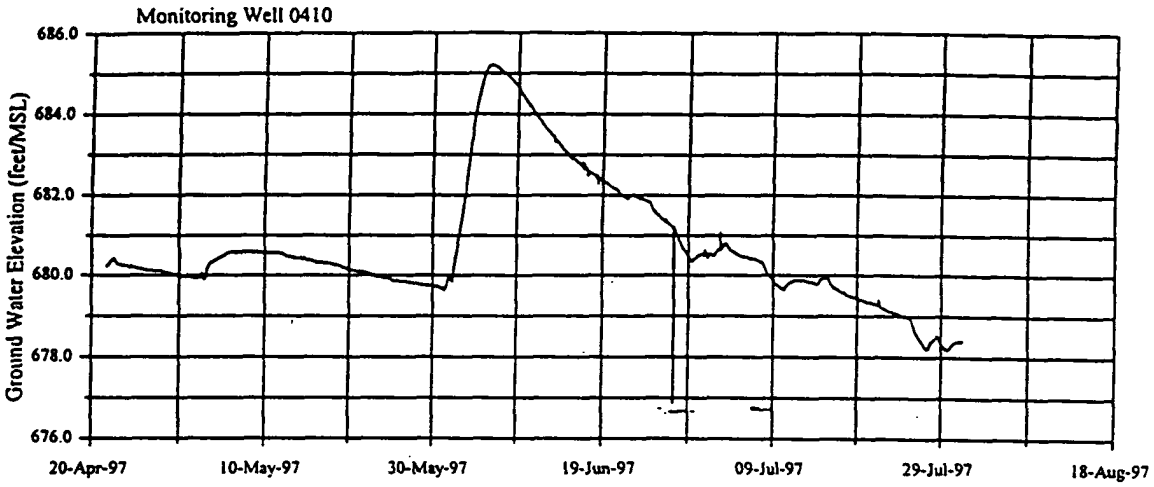

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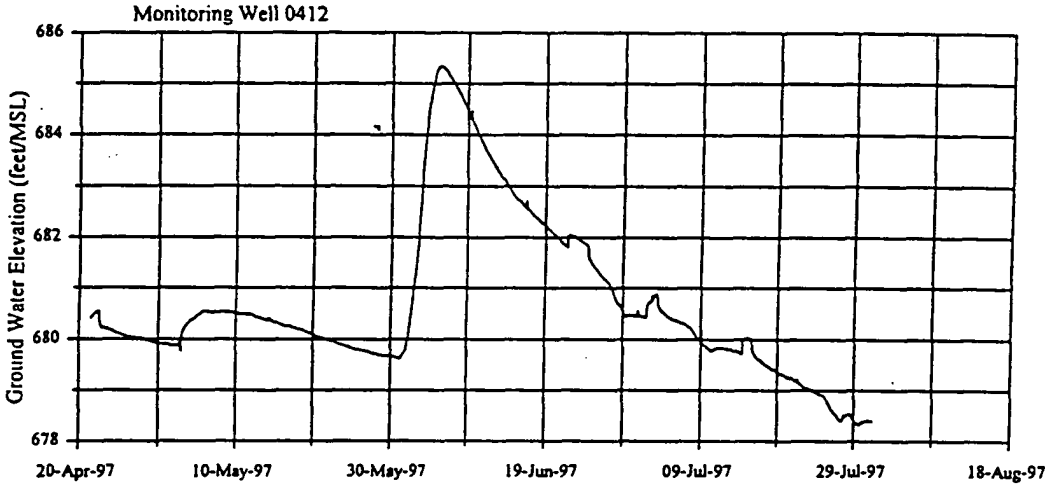

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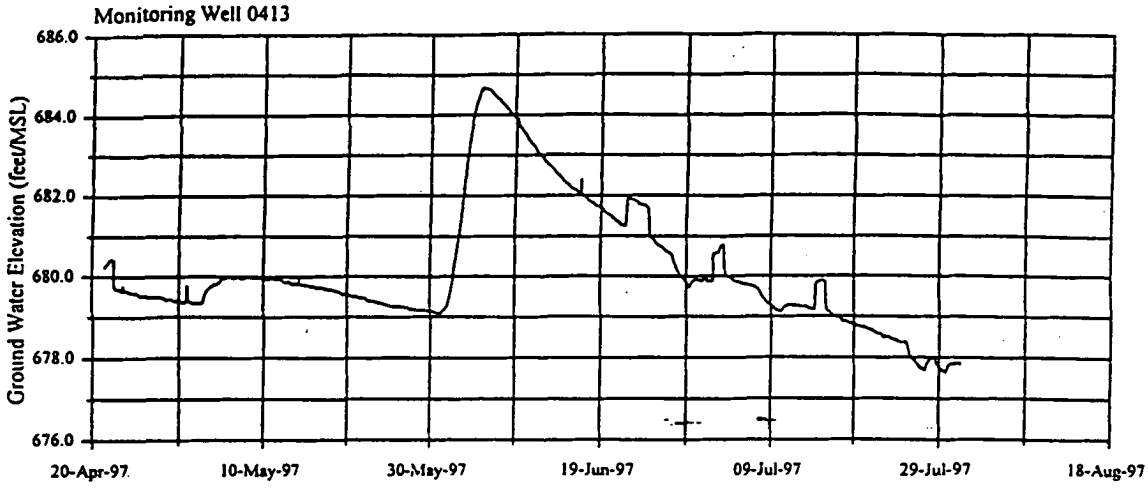

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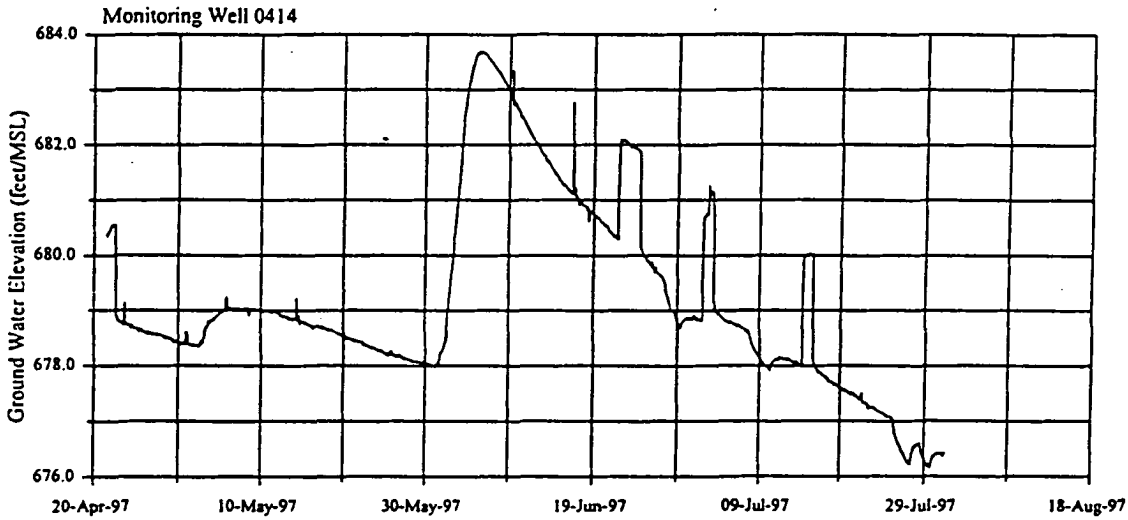

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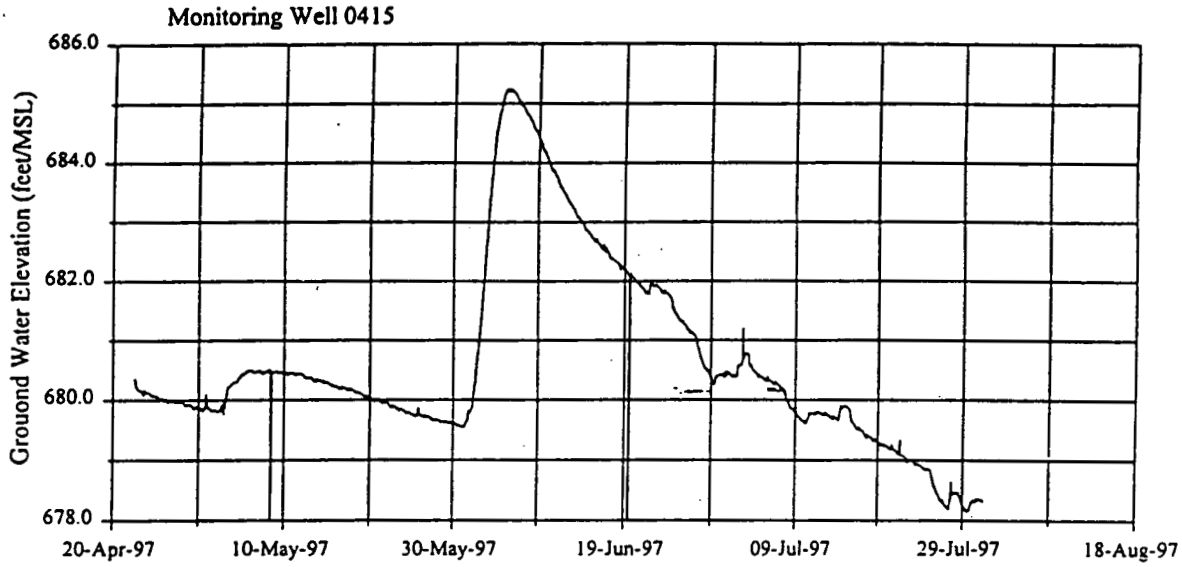

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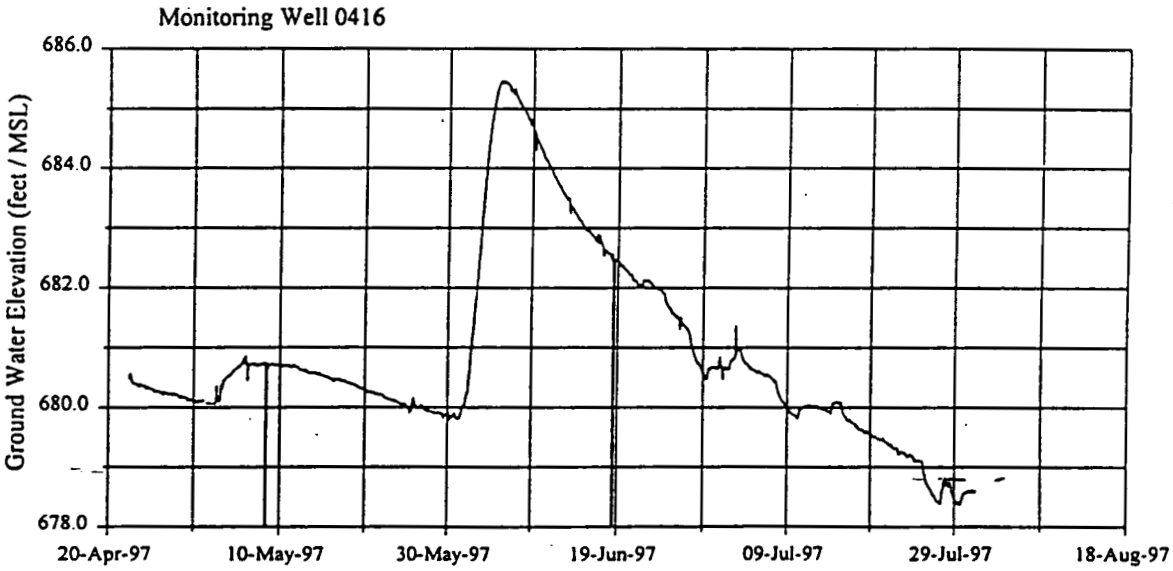

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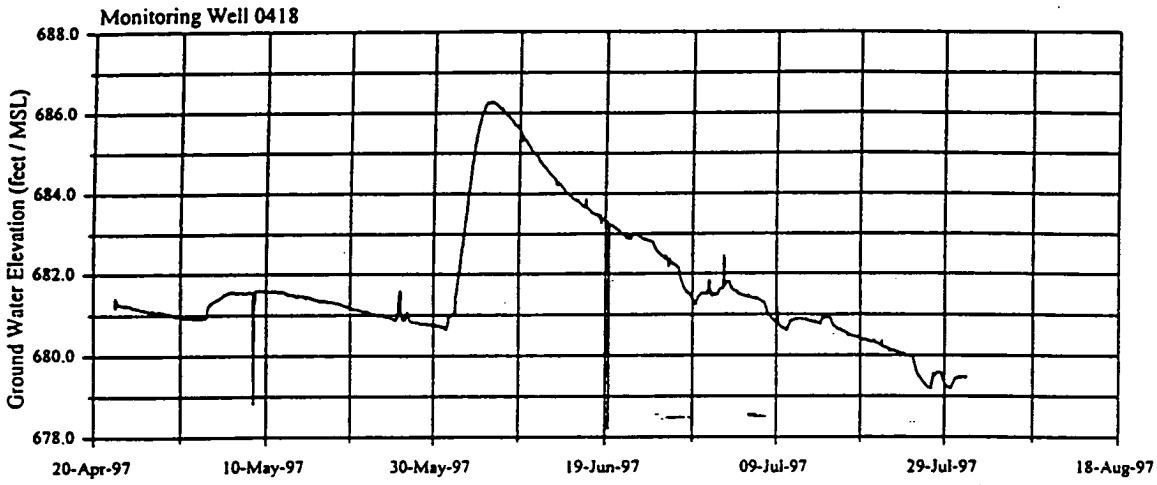

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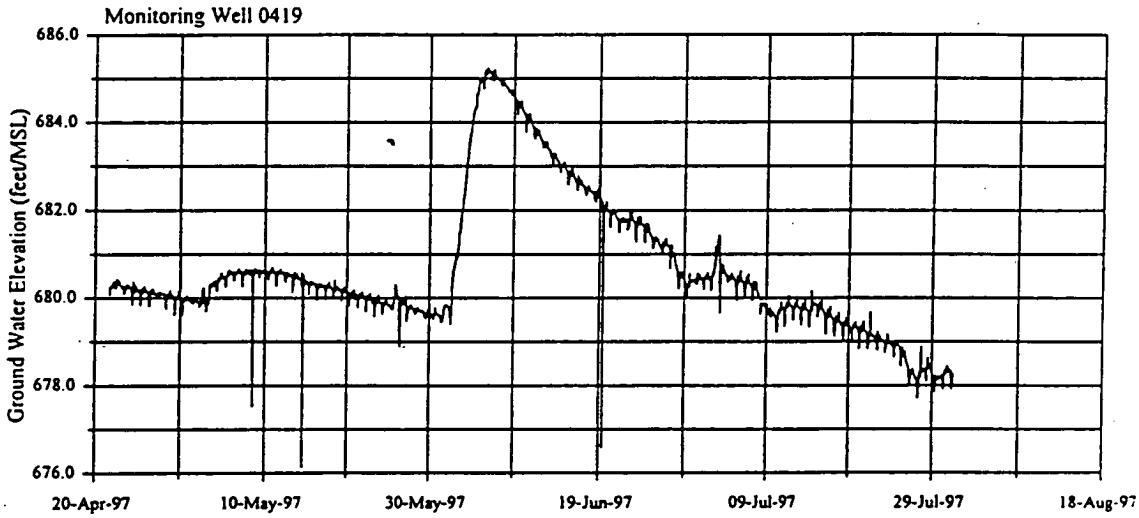

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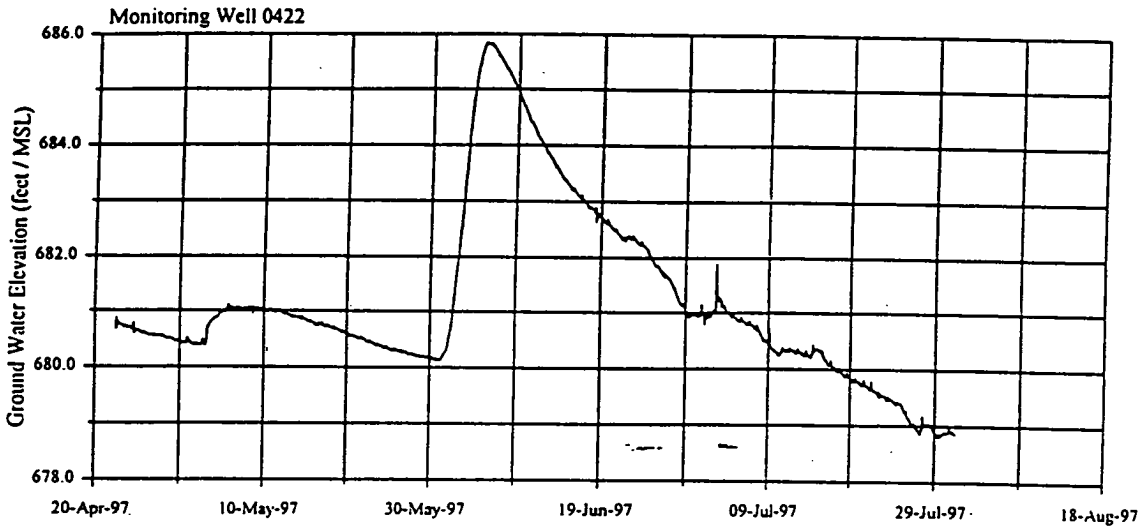

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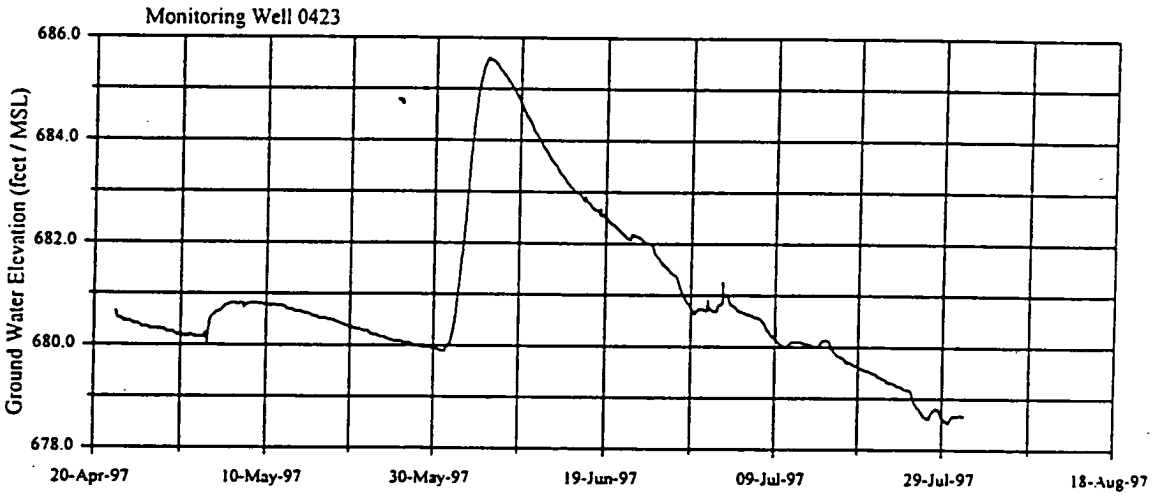

Figure A.14. Hydrograph of monitoring well 0423.

OU-1 PUMP-AND-TREAT SYSTEM CAPTURE ZONE MONITORING FROM AUGUST THROUGH SEPTEMBER 19,1997

MOUND PLANT
MIAMISBURG, OHIO

TECHNICAL MEMORANDUM

October 1997

Department Of Energy

EG&G Mound Applied Technologies

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ACKNOWLEDGMENTS

This report was prepared by Terran Corporation of Beavercreek, Ohio as report number TB-9742. It was completed under Task Order #16535 with EG&G Mound Applied Technologies. The authors were Roger W. McCready and Scott Hora. Word processing and graphics were prepared by Sandra L. Allen. Field work was conducted by Chris Ruef and Scott Hora. Potentiometric water level maps were prepared by Scott Hora.

1.0 INTRODUCTION

This report has been prepared as part of the Environmental Restoration (ER) Program at the U.S. Department of Energy (DOE) Mound Plant, Miamisburg, Ohio. Operable Unit One (OU-1) addresses possible chemical contamination of the buried valley aquifer which underlies the original southwest corner of the Mound Plant. OU-1 is in the remediation phase of the CERCLA. The remedial method chosen to remediate the OU-1 area is the pump-and-treat system.

Pump-and-treat systems are designed to contain and remove the contaminants dissolved in the ground water. Due to the relatively long duration of a pump-and-treat process, the objective is to minimize the total pumping rate to reduce treatment costs. The OU-1 groundwater contamination plume must be contained within the western and southern compliance boundaries. Containment is defined as an inward hydraulic gradient at a defined compliance boundary to prevent the movement of groundwater across this boundary. Therefore, the primary constraint is difference in head at the compliance boundary. The design strategy states that the optimal head difference to be 0.05 feet which is calculated from water level measurements taken manually.

The pump-and-treat system will be monitored for the first six months to define the capture zone created by the system. The hydraulic effectiveness of the pump-and-treat system will be determined by water level data from 20 monitoring wells in the area. Water level data will be collected via manual measurements and continuous monitoring instrumentation. The study area with extraction wells and monitoring well locations are shown in (Figure 1.1). This study began on April 21, 1997 when dataloggers were installed and continued until September 19, 1997. This report is a summary of the data collected and the results of hydraulic containment due to the pump-and-treat system from August through September 19, 1997.

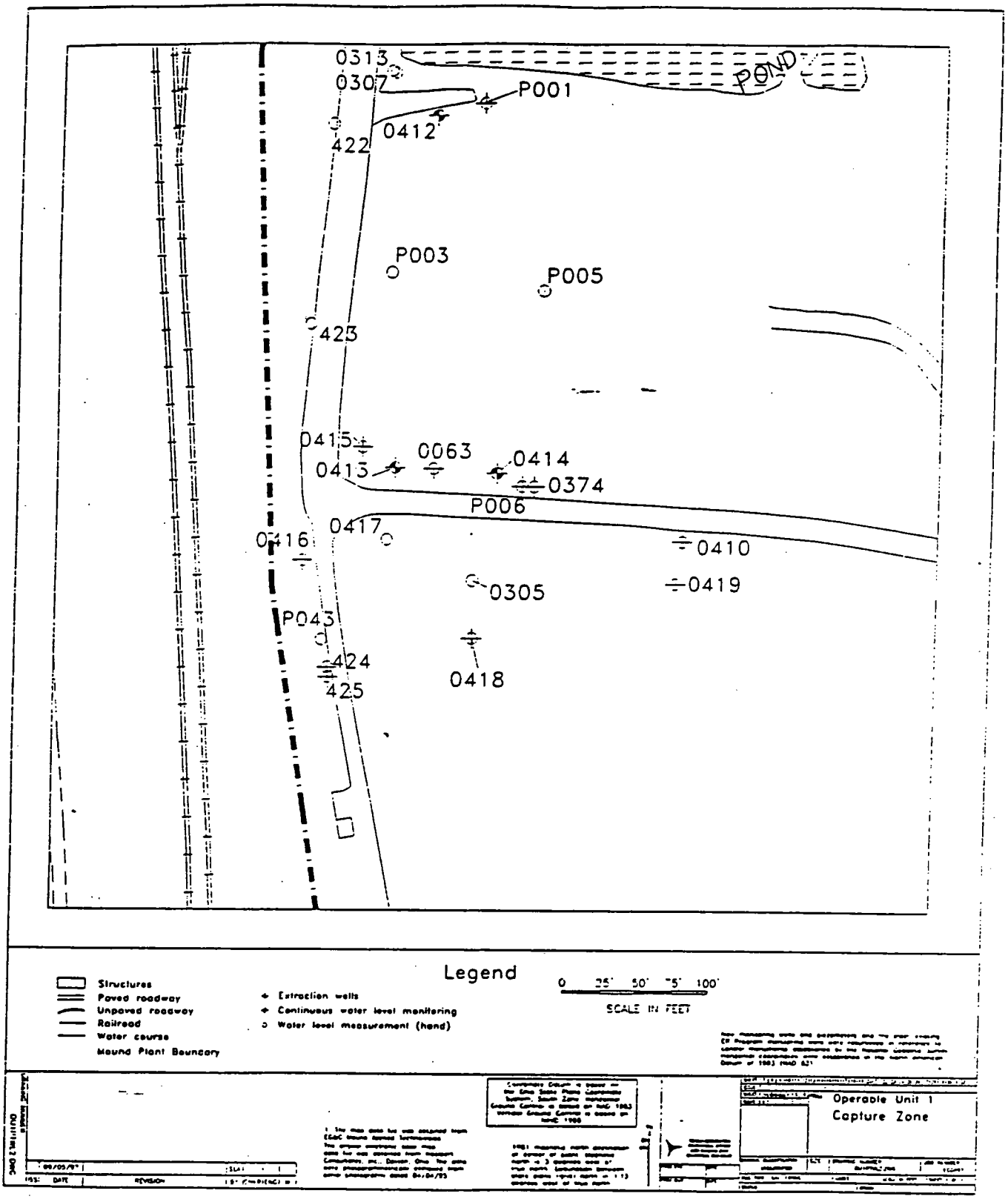

Figure 1.1. OU-1 Pump-and-Treat system capture zone monitoring study area.

2.0 WEEKLY WATER LEVELS AND CORRESPONDING POTENTIOMETRIC MAPS IN OU-1 AREA

The ground water levels in twenty monitoring wells and the three pump-and-treat extraction wells were measured manually once a week. Each set of weekly water level measurements were contoured to produce a potentiometric map of the water level surface for the Upper BVA. Table II.1 list the depth to water and water level elevation for the twenty monitoring wells and three extraction wells from August through September, 19, 1997.

Water level measurements were completed using standard protocol of the OU-9 QAPP (Revision 4, April 1995) SOP 3.1 Water Level Measurement (Revision 1, March 1992). Water level collection utilized an electric water level indicator that allows measurement to within 0.01 foot. The water levels are recorded and entered into a spreadsheet.

Preparation of the potentiometric water level maps is conducted in a three step process: (1) Data from each weekly measurement is entered into Golden Software Surfer were it is contoured; (2) The contours are edited by a hydrogeologist; (3) The map is digitized onto a base map.

Four sets of water level measurements were taken in August and another three sets in September, 1997. The potentiometric maps for each data set are displayed in figures 2.1 through 2.7. For both months, the potentiometric maps clearly show a cone of depression or capture zone which are all similar in shape.

Table II.1 OU-1 Weekly Water Levels for August through September 19, 1997

Monitoring Well		07-Aug-97 Water Level		14-Aug-97 Water Level		21-Aug-97 Water Level		28-Aug-97 Water Level	
Number	Elevation TOC	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation
		(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)
0063	705.60	27.57	678.03	27.58	678.02	27.30	678.30	27.28	678.32
0305	709.87	31.75	678.12	31.85	678.02	31.33	678.54	31.50	678.37
0307	716.10	37.71	678.39	37.83	678.27	37.32	678.78	37.50	678.60
0313	716.08	37.74	678.34	37.81	678.27	37.52	678.56	37.49	678.59
0374	706.29	28.29	678.00	38.32	667.97	28.15	678.14	27.98	678.31
0410	713.84	35.75	678.09	35.82	678.02	35.56	678.28	35.44	678.40
0412	717.00	38.82	678.18	38.89	678.11	38.60	678.40	38.46	678.54
0413	704.45	26.79	677.66	26.87	677.58	26.56	677.89	26.58	677.87
0414	705.85	29.80	676.05	29.94	675.91	29.60	676.25	29.60	676.25
0415	706.09	27.95	678.14	28.02	678.07	27.72	678.37	27.60	678.49
416	704.30	26.08	678.22	26.04	678.26	25.77	678.53	25.75	678.55
0417	705.07	26.92	678.15	27.01	678.06	26.58	678.49	26.66	678.41
0418	709.67	31.56	678.11	31.65	678.02	31.35	678.32	31.32	678.35
0419	716.41	38.31	678.10	38.35	678.06	38.02	678.39	38.10	678.31
0422	715.21	36.86	678.35	36.92	678.29	36.47	678.74	36.51	678.70
0423	709.12	30.85	678.27	30.89	678.23	30.50	678.62	30.49	678.63
0424	704.49	26.30	678.19	26.33	678.16	25.93	678.56	25.98	678.51
0425	704.58	26.36	678.22	26.42	678.16	25.83	678.75	25.76	678.82
P001	717.67	39.37	678.30	39.43	678.24	39.16	678.51	39.16	678.51
P003	707.46	29.24	678.22	29.29	678.17	28.99	678.47	28.96	678.50
P005	738.59	60.44	678.15	60.49	678.10	60.20	678.39	60.10	678.49
P006	705.96	27.97	677.99	28.07	677.89	27.84	678.12	27.78	678.18
P043	704.80	26.61	678.19	26.70	678.10	26.44	678.36	26.41	678.39

Table II.1 OU-1 Weekly Water Levels for June through August, 1997 (cont.)

Monitoring Well		05-Sept-97 Water Level		11-Sept-97 Water Level		19-Sept-97 Water Level			
Number	Elevation TOC	Below TOC	Elevation	Below TOC	Elevation	Below TOC	Elevation		
		(Feet)	(MSL)	(Feet)	(MSL)	(Feet)	(MSL)		
0063	705.60	27.44	678.16	27.55	678.05	27.75	677.85		
0305	709.87	31.59	678.28	31.32	678.55	32.05	677.82		
0307	716.10	37.68	678.42	37.81	678.29	38.01	678.09		
0313	716.08	37.68	678.40	37.8	678.28	37.99	678.09		
0374	706.29	29.12	677.17	28.35	677.94	28.54	677.75		
0410	713.84	35.67	678.17	35.82	678.02	36.05	677.79		
0412	717.00	38.65	678.35	38.88	678.12	39.07	677.93		
0413	704.45	26.69	677.76	26.85	677.60	27.07	677.38		
0414	705.85	29.84	676.01	30.02	675.83	30.34	675.51		
0415	706.09	27.87	678.22	27.99	678.10	28.2	677.89		
416	704.30	25.92	678.38	26.16	678.14	26.4	677.90		
0417	705.07	26.82	678.25	26.99	678.08	27.2	677.87		
0418	709.67	31.42	678.25	31.61	678.06	31.86	677.81		
0419	716.41	38.24	678.17	38.41	678.00	38.64	677.77		
0422	715.21	36.67	678.54	36.9	678.31	37.1	678.11		
0423	709.12	30.78	678.34	30.91	678.21	31.12	678.00		
0424	704.49	26.13	678.36	26.36	678.13	26.62	677.87		
0425	704.58	26.21	678.37	26.46	678.12	26.7	677.88		
P001	717.67	39.29	678.38	39.44	678.23	39.62	678.05		
P003	707.46	29.11	678.35	29.28	678.18	29.26	678.20		
P005	738.59	60.29	678.30	61.49	677.10	60.67	677.92		
P006	705.96	27.8	678.16	28.06	677.90	28.24	677.72		
P043	704.80	26.56	678.24	26.68	678.12	26.94	677.86		

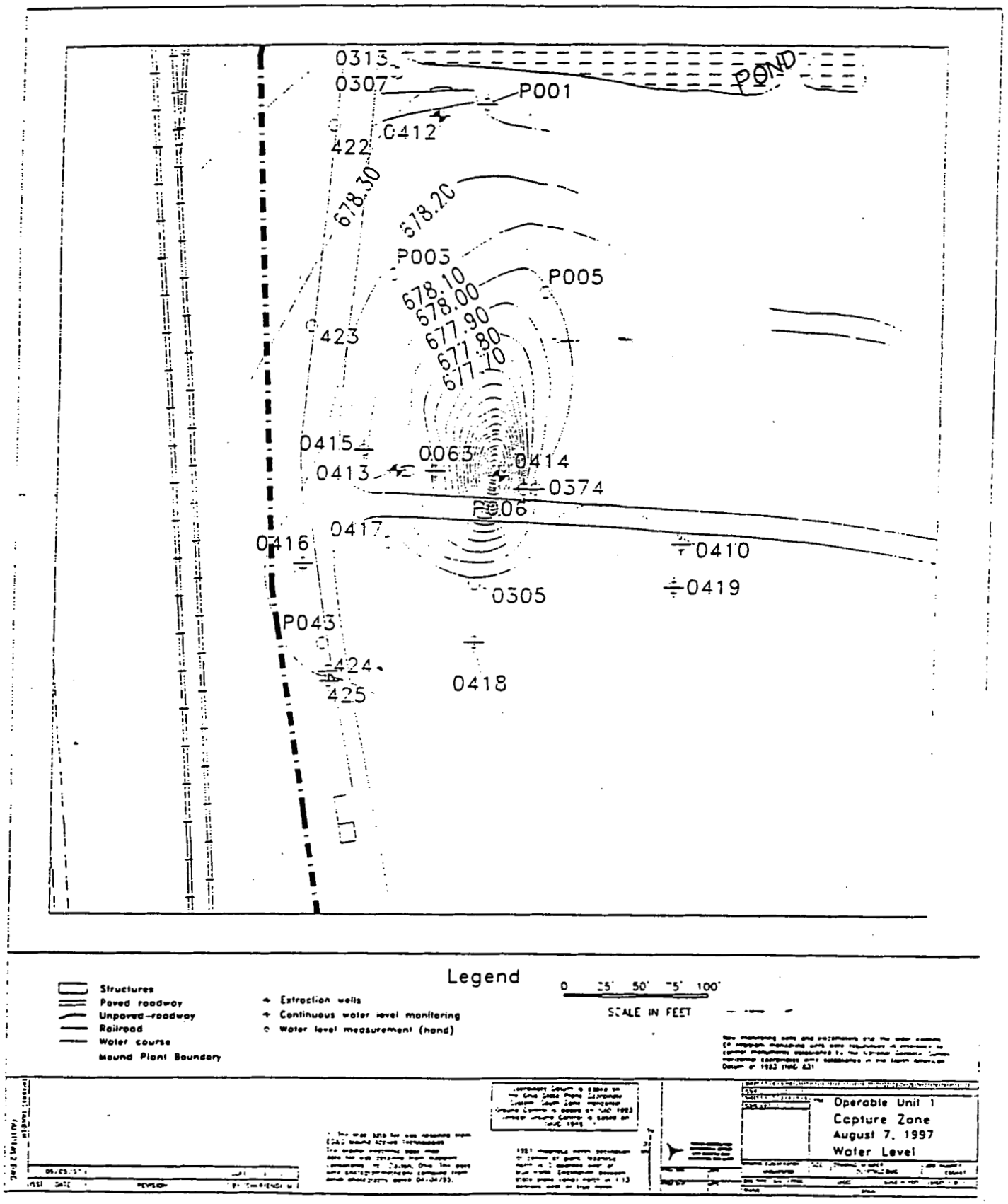

Figure 2.1. Groundwater potentiometric surface for August 7, 1997.

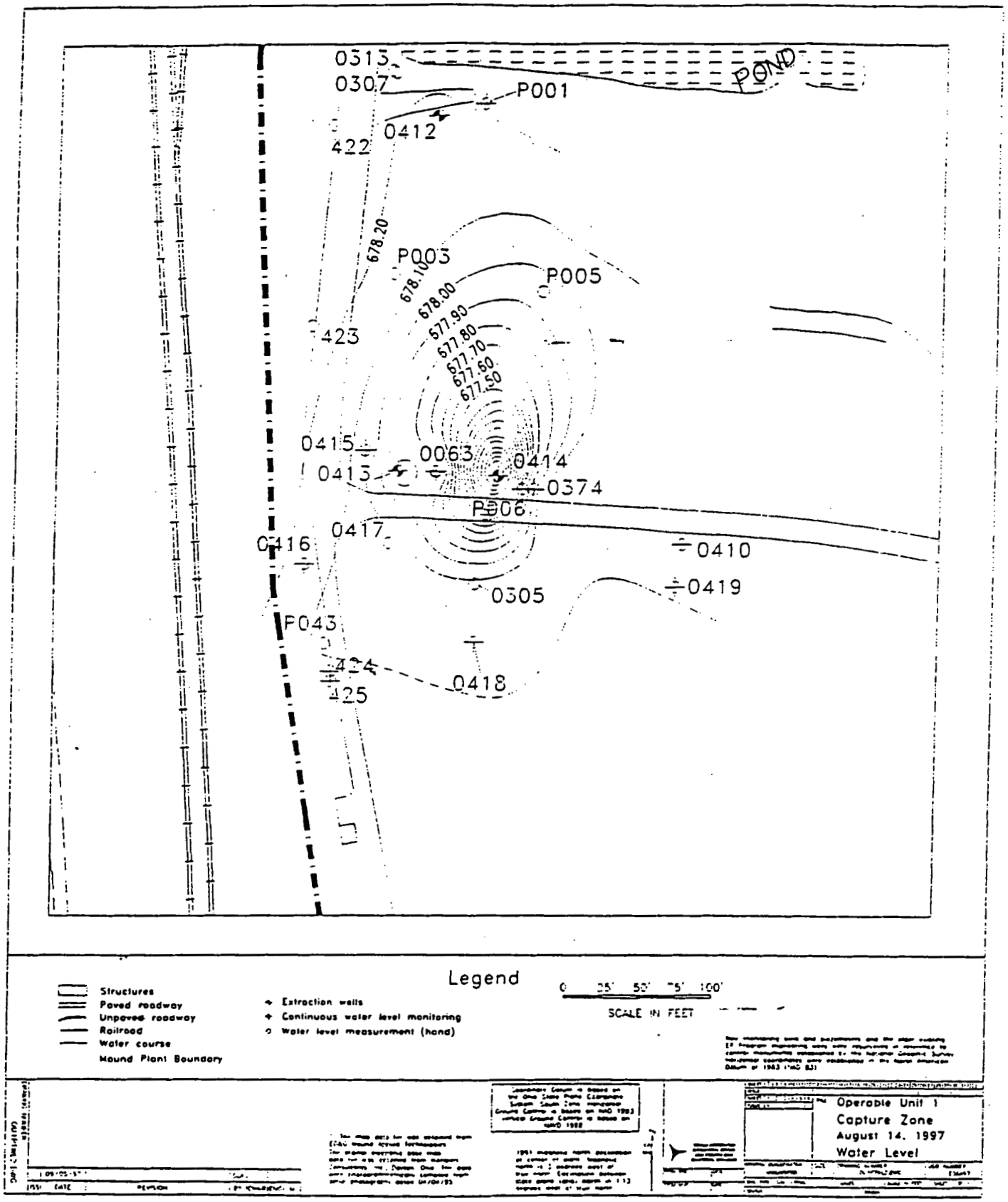

Figure 2.2. Groundwater potentiometric surface for August 14, 1997.

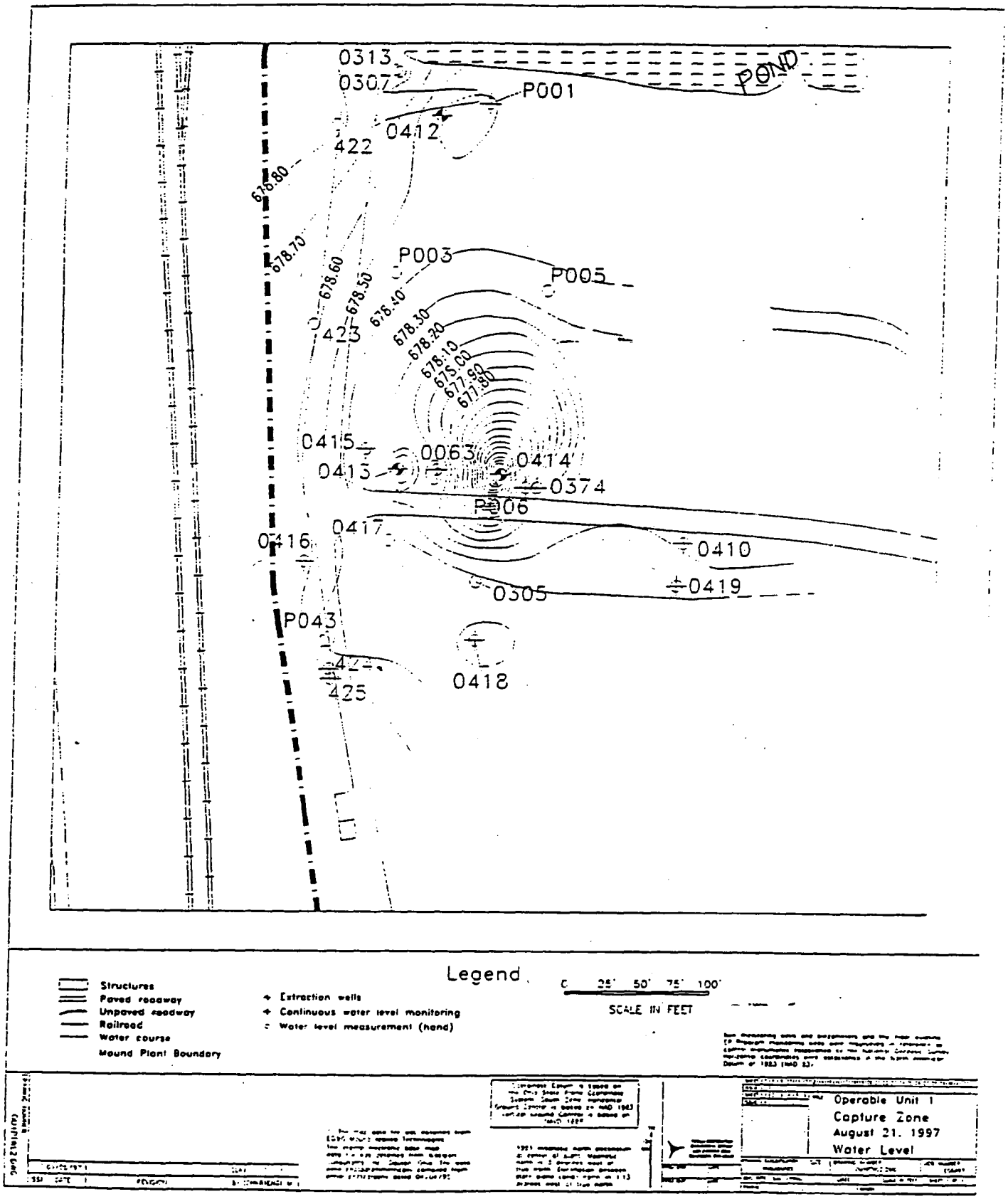

Figure 2.3. Groundwater potentiometric surface for August 21, 1997.

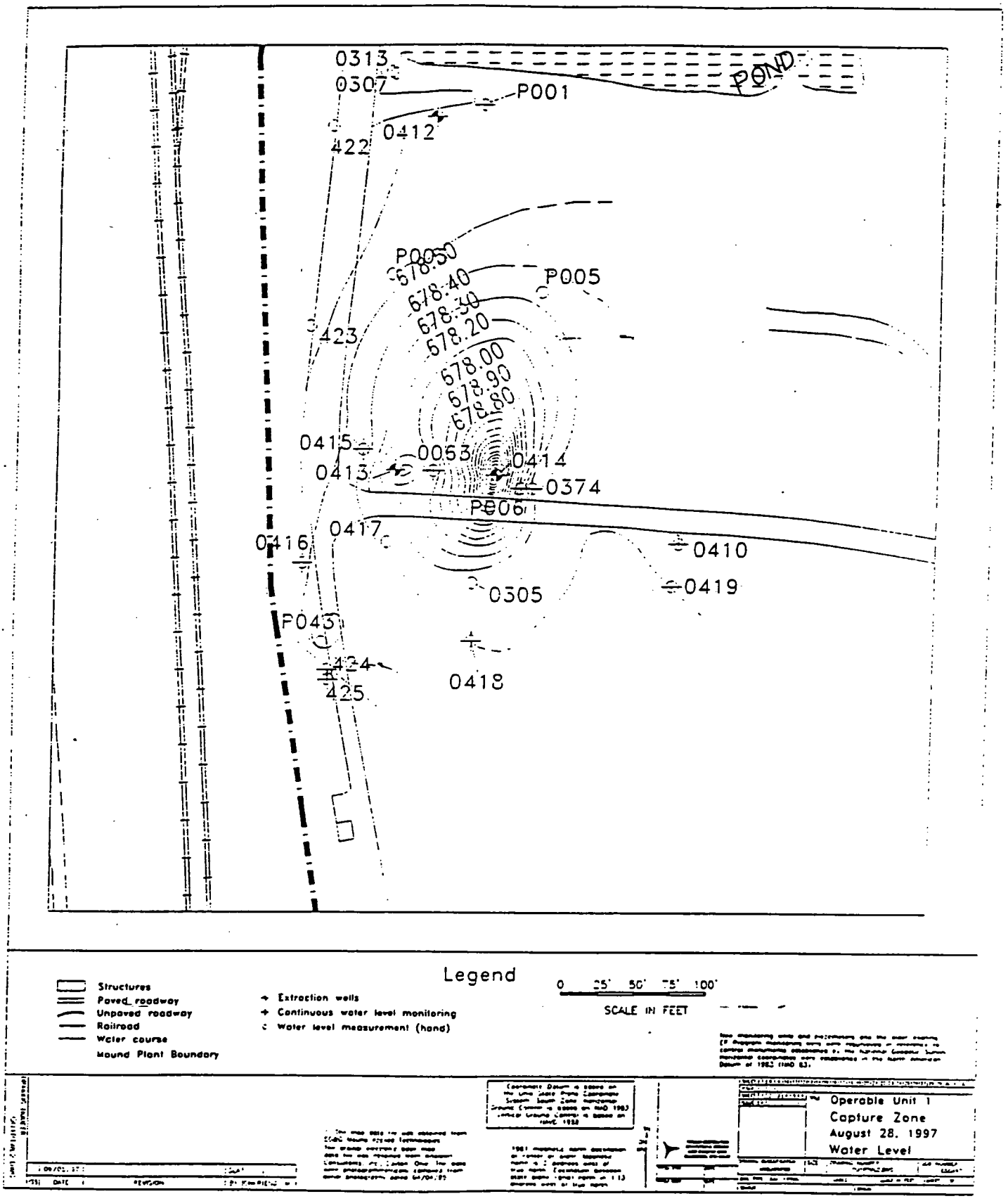

Figure 2.4. Groundwater potentiometric surface for August 28, 1997.

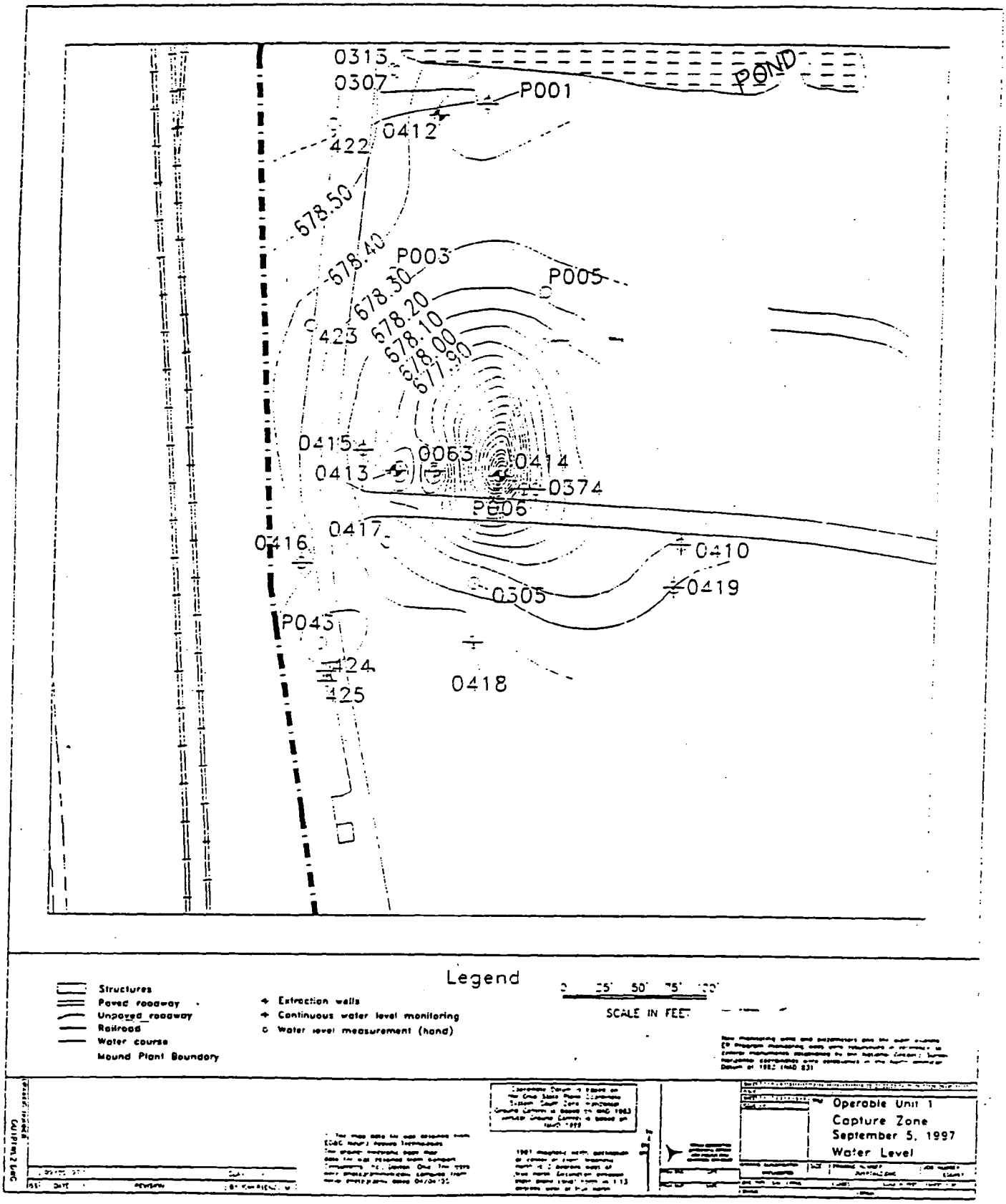

Figure 2.5. Groundwater potentiometric surface for September 5, 1997.

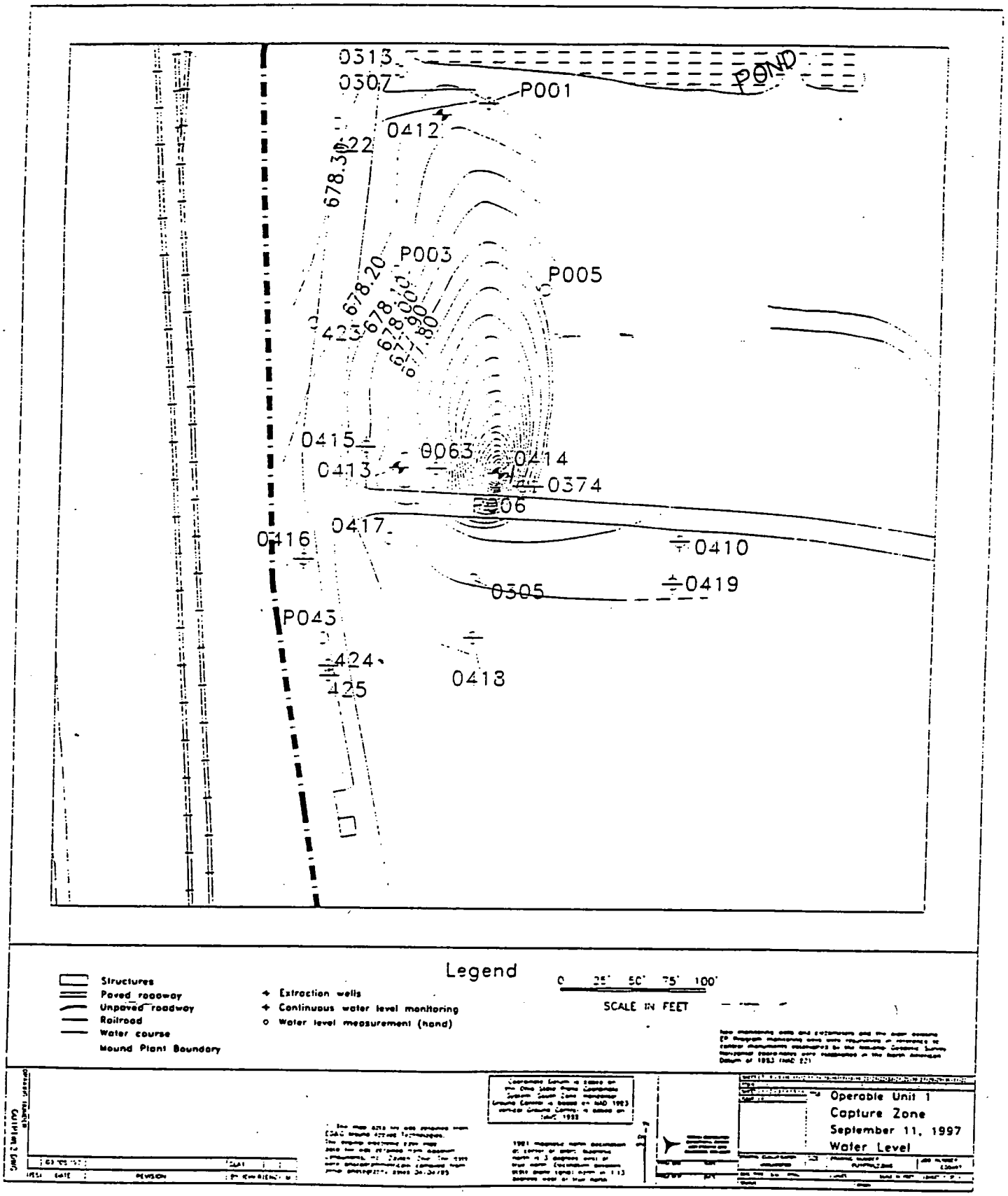

Figure 2.6. Groundwater potentiometric surface for September 11, 1997.

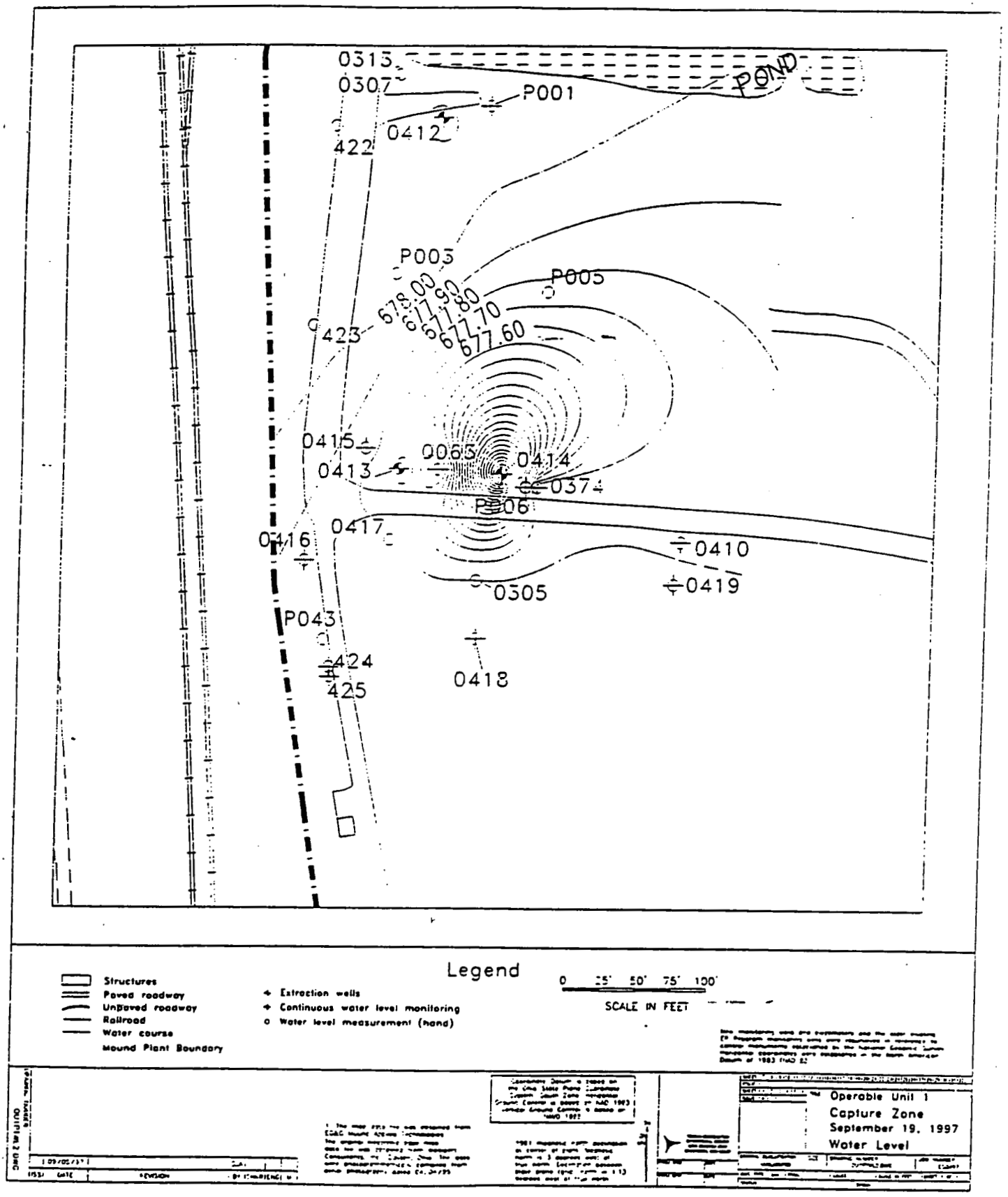

Figure 2.7. Groundwater potentiometric surface for September 19, 1997.

3.0 CONTINUOUS WATER LEVEL MONITORING RESULTS FROM AUGUST THROUGH SEPTEMBER 19, 1997

To assess the potential fluctuations in water levels due to external sources such as the Mound production wells, water levels were monitored continuously at 13 locations surrounding the pump-and-treat system. This continuous monitoring was provided by individual Telog Level Trackers 2100. These Trackers are dataloggers / pressure transducers which automatically record water levels. This instrumentation was installed in 13 monitoring wells on April 21, 1997. Figure 1. shows the location of the monitoring wells and extraction wells that contain Trackers. The dataloggers have been programmed to collect a water level measurement every 15 minutes. Once a week when the hand water level measurements are collected and each datalogger is downloaded into a Telog Data Transfer Unit (DTU). The DTU is returned to the office where the data is uploaded into a database that contains records for each well.

Hydrographs of continuous water level data for August through September 19, 1997 are shown in Appendix A (figures A.1 through A.14). The hydrographs reflect the natural water level fluctuations that occur in the Upper Buried Valley Aquifer. Abrupt increases in ground water levels due to rain events and stage increase of the Great Miami River occur frequently through out the year. One such increase is seen in mid August where ground water levels rose from 0.5 - 1 foot in just a few days. The ground water levels continued to decline from this high through September 19, 1997.

Additionally, there were two additional peaks seen in most of the hydrographs from August through September 1997 (Appendix A). These peaks range from 0.0 to 2.5 feet and were due to periods where the pump and treatment system was shut off for maintenance purposes. The negative peaks with high amplitude and short span were due to periods where that particular well was sampled.

Since the start of this monitoring the plant has been supplied by production well 3 (0076). Many of the hydrographs reveal the daily pumping of the production well. Monitoring well 0419 is most affected by production well 3 producing a daily drawdown of 0.4 feet between 0600 and 1000. Monitoring well 0374 has a 0.1 foot drawdown that occurs in the late afternoon each day. Based on a qualitative review of the other hydrographs the daily peak drawdown at all other monitoring wells used for this study is less 0.05 feet.

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DOE. 1995. "Operable Unit 9 Continuous Water Level Monitoring Results for the Buried Valley Aquifer May, 1993 through May, 1994." Environmental Restoration Program, U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

DOE. 1996. "OU-1 Pump-and-Treat System Design"

APPENDIX A

HYDROGRAPHS FOR MONITORING WELLS P001, P006, 0374, 0063, 0410, 0412, 0413, 0415, 0415, 0416,0418, 0419, 0422, 0423

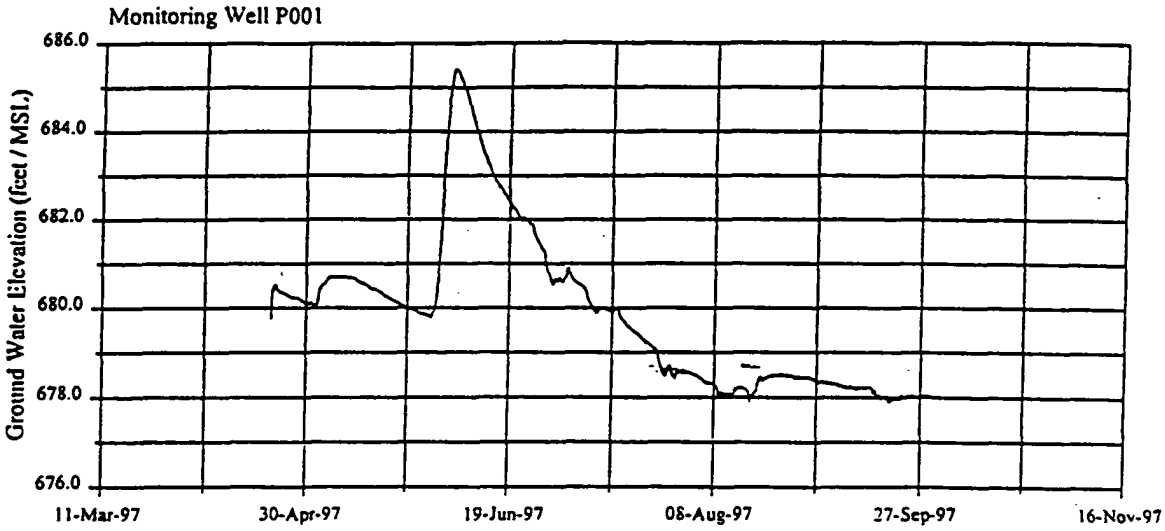

Figure A.1. Hydrograph of monitoring well P001.

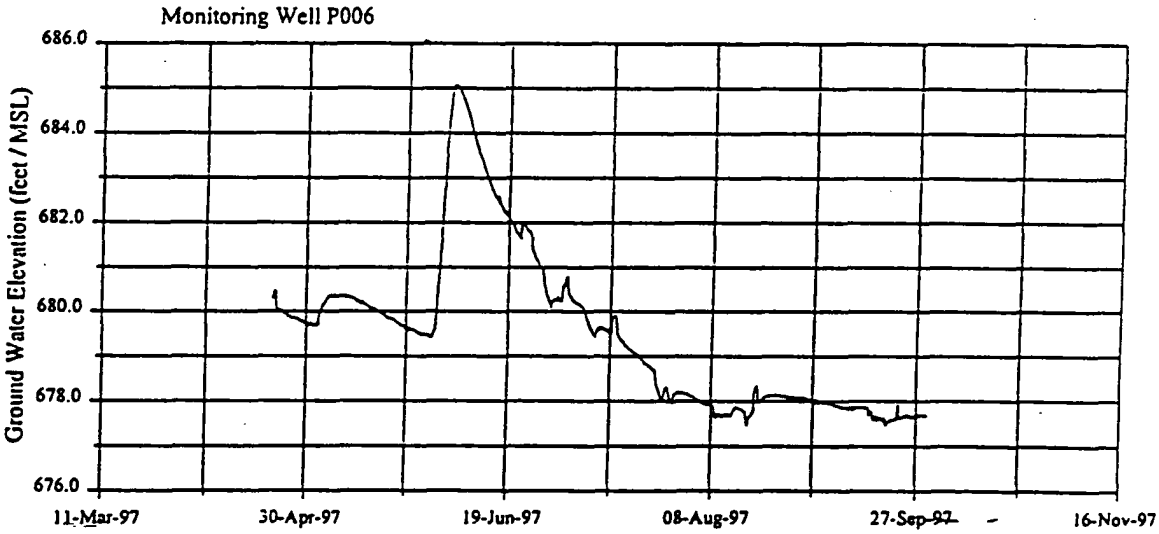

Figure A.2. Hydrograph of monitoring well P006.

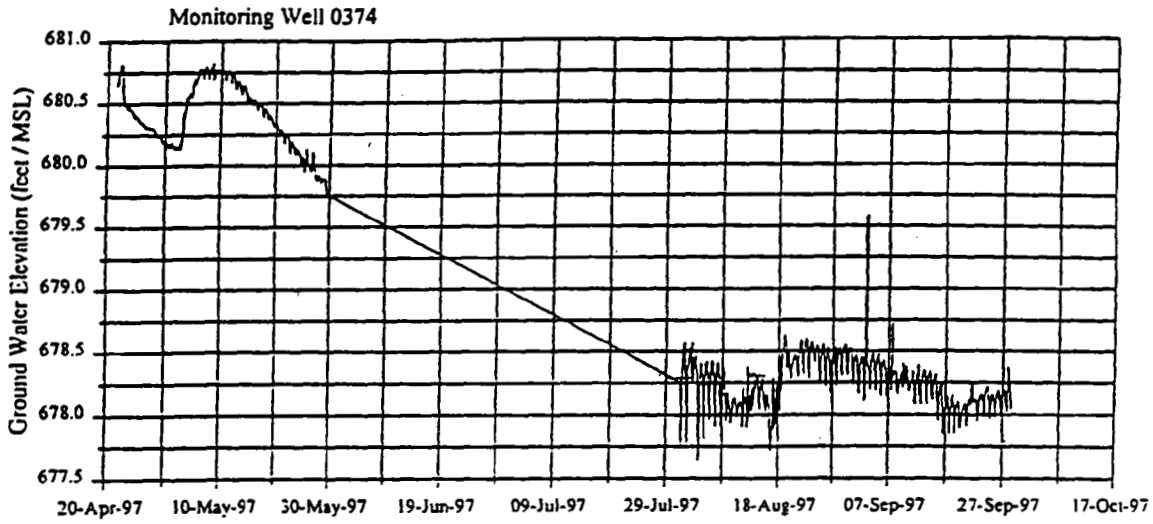

Figure A.3. Hydrograph of monitoring well 0374.

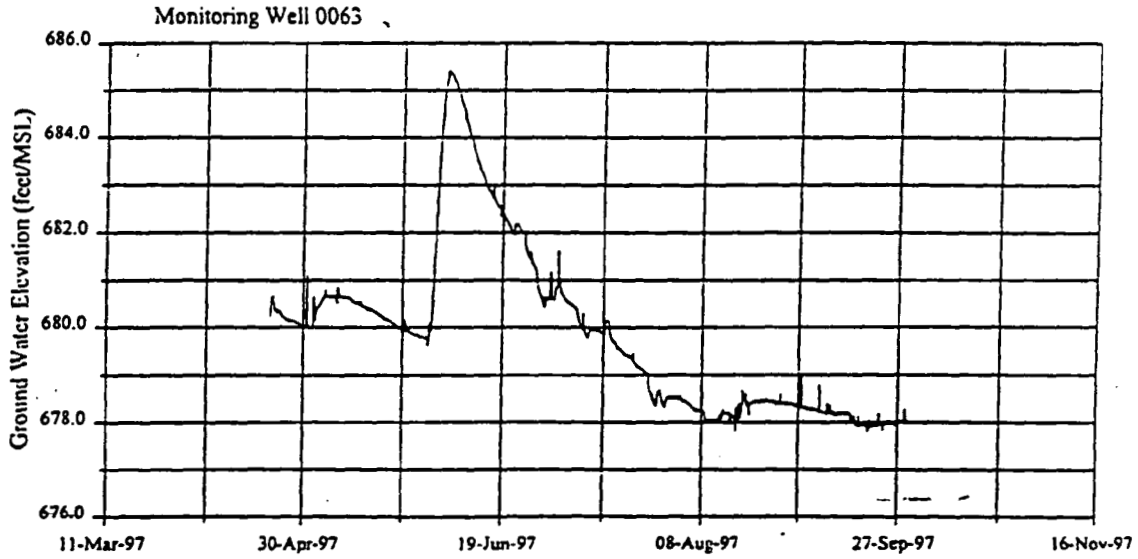

Figure A.4. Hydrograph of monitoring well 0063.

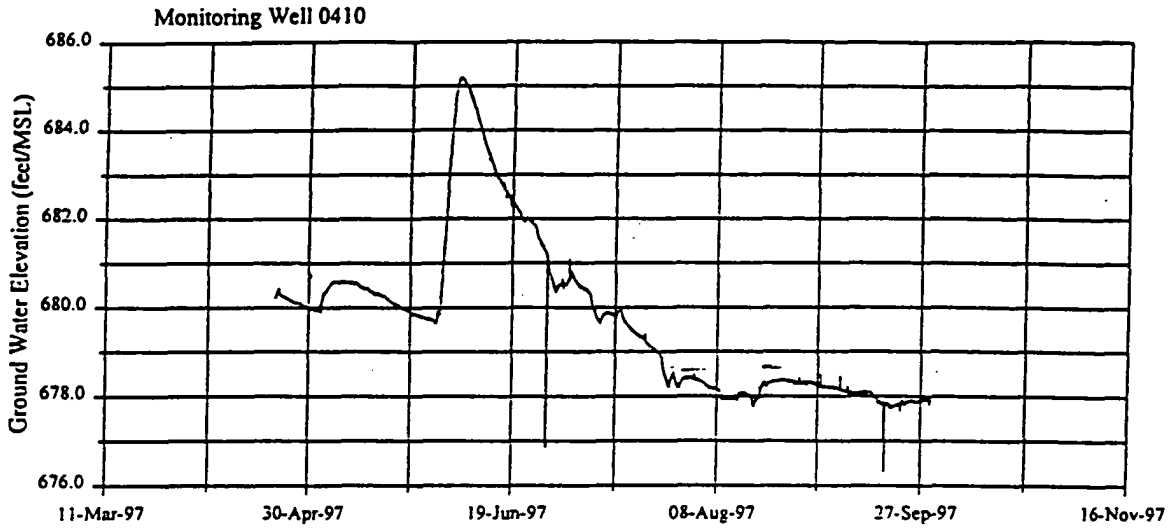

Figure A.5. Hydrograph of monitoring well 0410.

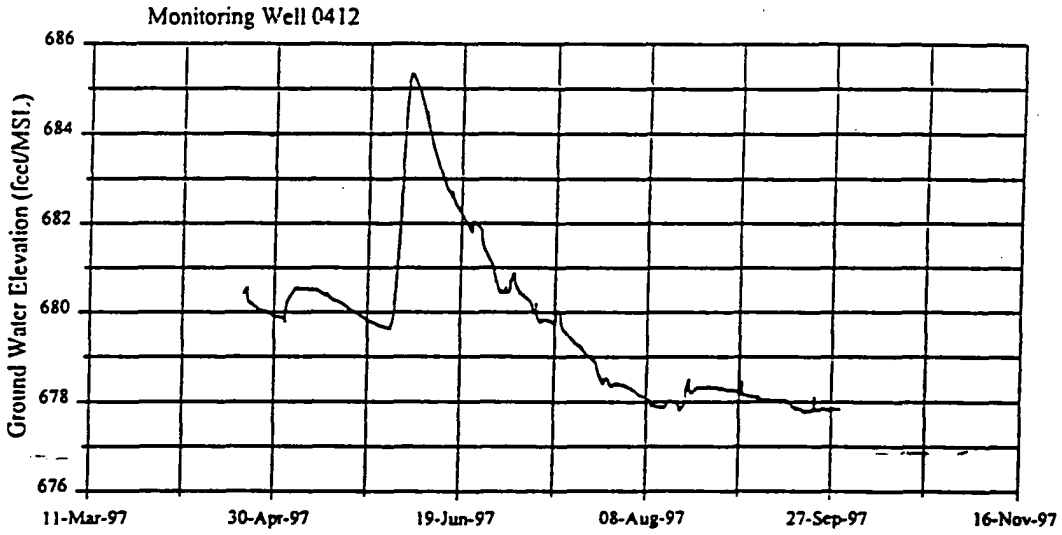

Figure A.6. Hydrograph of monitoring well 0412.

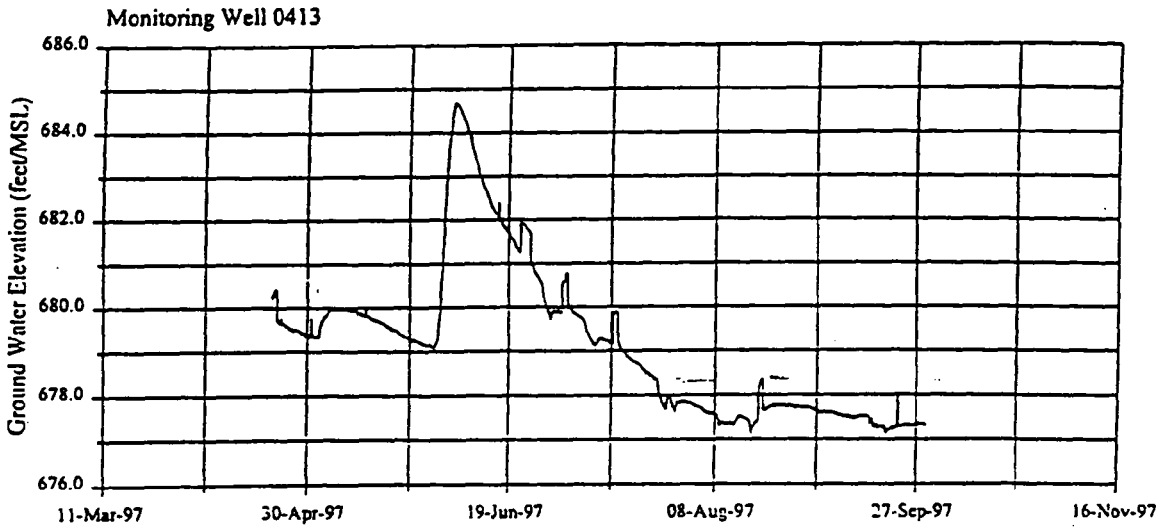

Figure A.7. Hydrograph of monitoring well 0413.

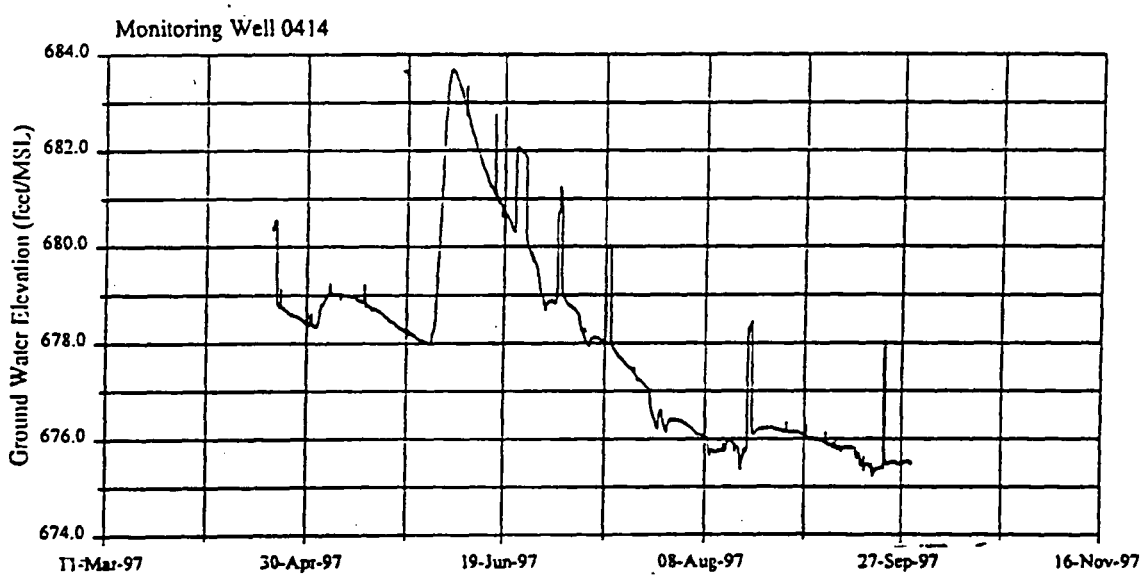

Figure A.8. Hydrograph of monitoring well 0414.

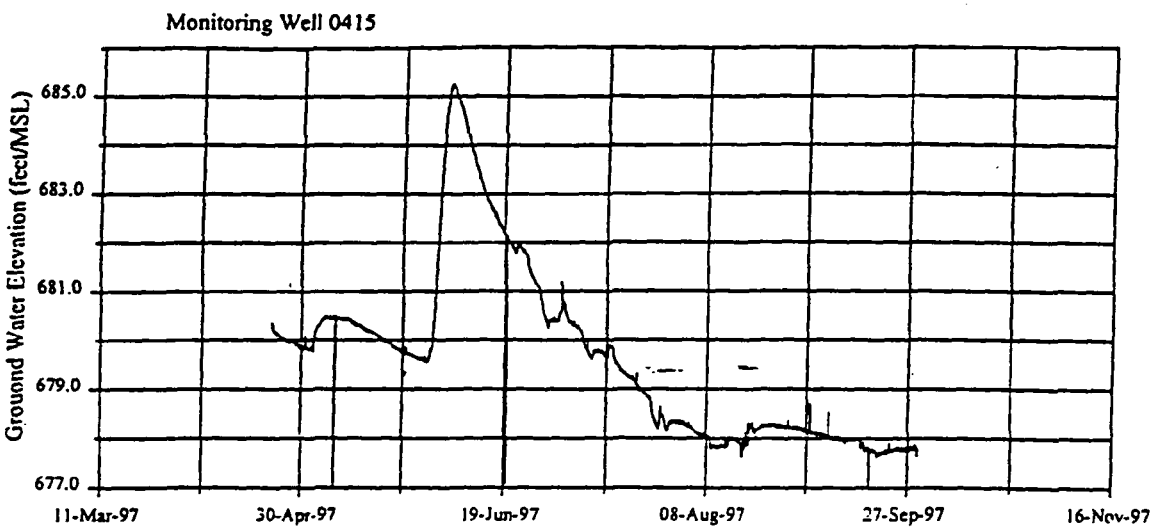

Figure A.9. Hydrograph of monitoring well 0415.

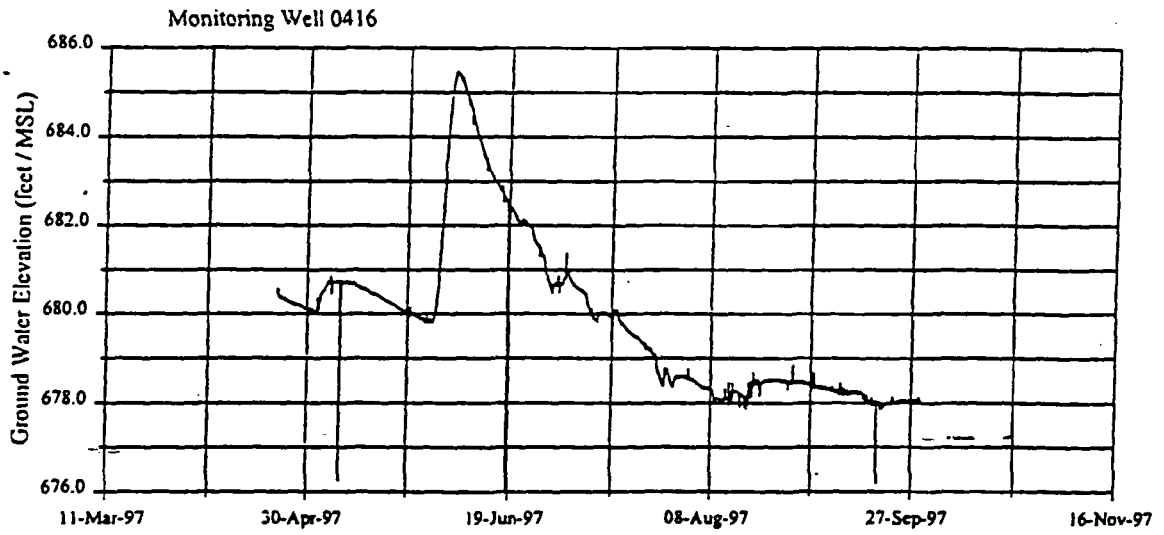

Figure A.10. Hydrograph of monitoring 0416.

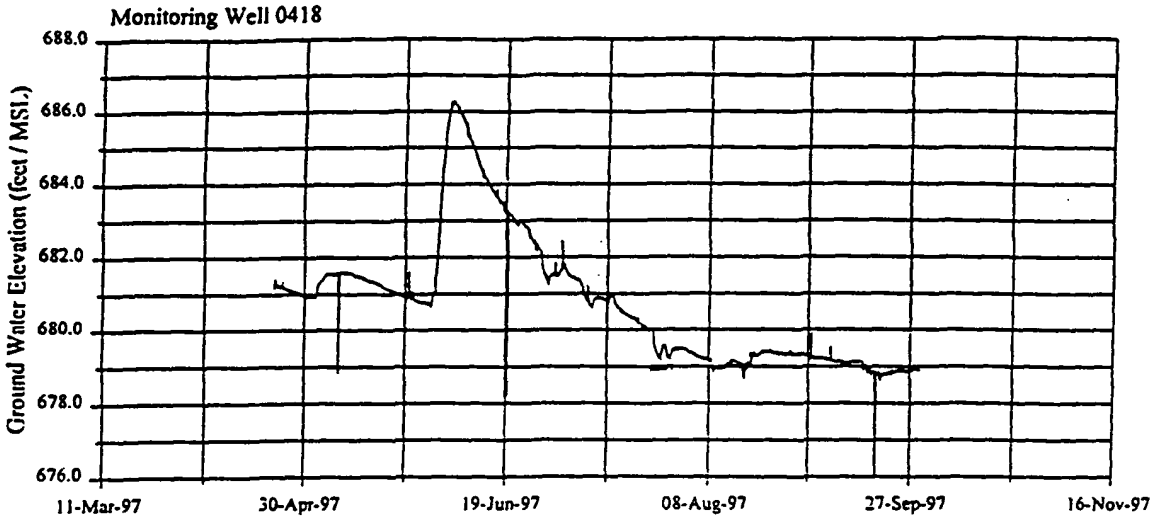

Figure A.11. Hydrograph of monitoring well 0418.

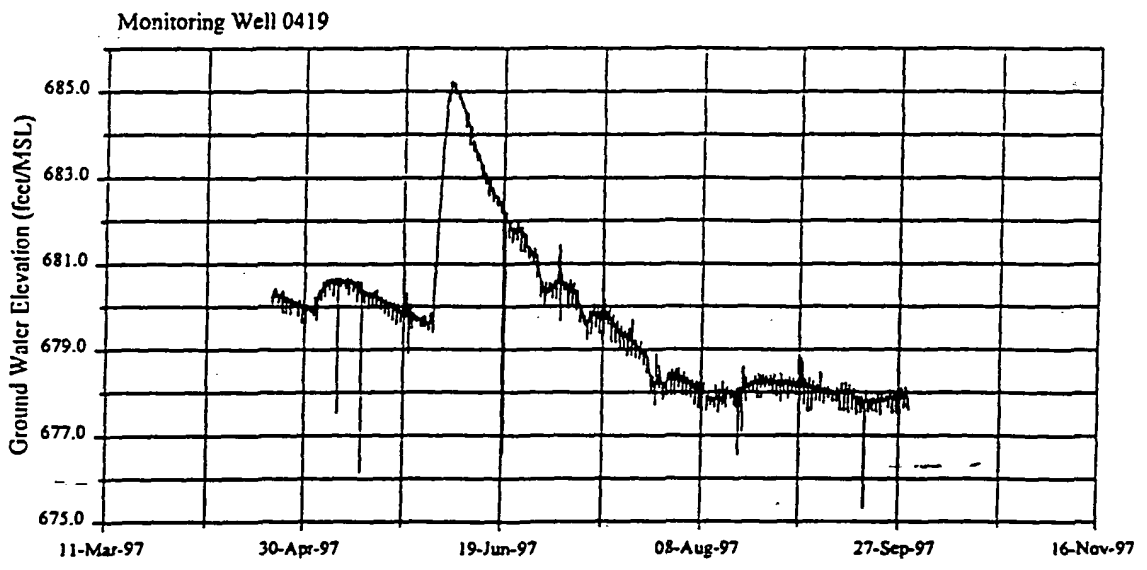

Figure A.12. Hydrograph of monitoring well 0419.

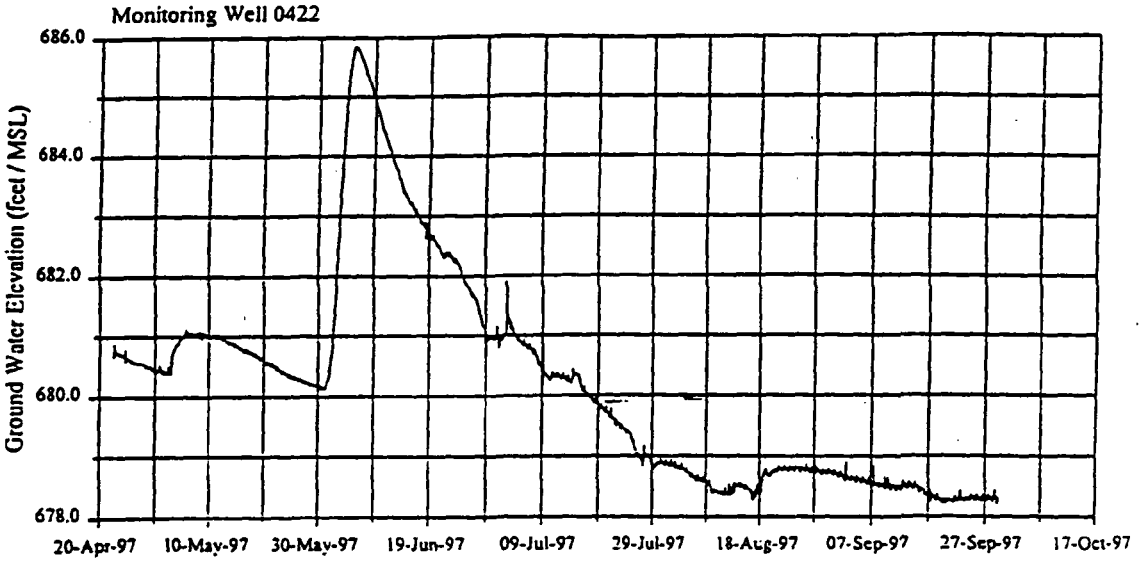

Figure A.13. Hydrograph of monitoring well 0422.

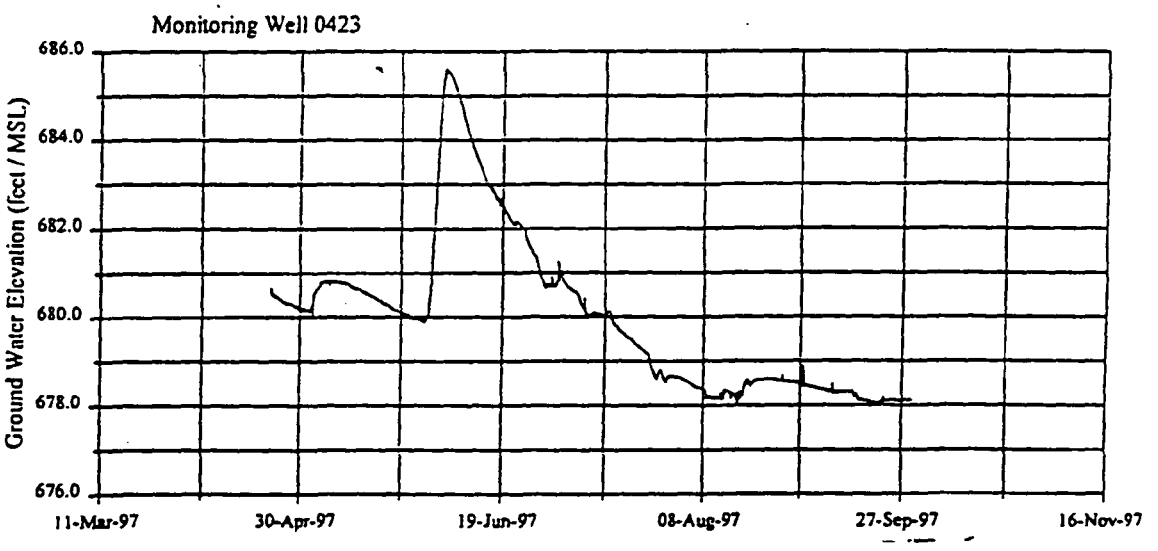

Figure A.14. Hydrograph of monitoring well 0423.

Attachment B

OU1 VOC CONTAMINANTS OF CONCERN

Date	Carbon Tetrachloride		Chloroform		1,2-Dichloroethane		Tetrachloroethene		Trichloroethene		Vinyl Chloride		cis 1,2-Dichloroethene		trans 1,2-Dichloroethene	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
02/20/97	1.9	<1.0	5.7	<1.0	<1.0	<1.0	20.9	<1.0	46.8	<1.0	<2.0	<2.0	43.6	<1.0	<1.0	<1.0
03/12/97	<1.0	<1.0	3.2	<1.0	<1.0	<1.0	17.9	<1.0	42.9	<1.0	<2.0	<2.0	3.0	<1.0	27.8	<1.0
03/19/97	<1.0	<1.0	3.2	<1.0	<1.0	<1.0	20.9	<1.0	48.1	<1.0	<2.0	<2.0	27.7	<1.0	<1.0	<1.0
04/09/97	<1.0	<1.0	2.1	<1.0	<1.0	<1.0	16.6	<1.0	21.2	<1.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0
04/21/97		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0		<1.0		<1.0
05/06/97	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	10.6	<1.0	13.4	<1.0	<2.0	<2.0	11.3	<1.0	<1.0	<1.0
06/04/97		<1.0		<1.0		<1.0		<1.0		<1.0		<2.0		<1.0		<1.0
06/18/97	<1.0	<1.0	2.6	<1.0	<1.0	<1.0	9.7	<1.0	25.8	<1.0	<2.0	<2.0	27.3	<1.0	<1.0	<1.0
07/09/97	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	10.6	<1.0	12.3	<1.0	<2.0	<2.0	13.6	<1.0	<1.0	<1.0
08/06/97	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	9.1	<1.0	7.3	<1.0	<2.0	<2.0	9.1	<1.0	<1.0	<1.0
09/10/97	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	8.5	<1.0	6.1	<1.0	<2.0	<2.0	7.5	<1.0	<1.0	<1.0
10/08/97	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.3	<1.0	5.3	<1.0	<2.0	<2.0	5.9	<1.0	<1.0	<1.0
11/20/97	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.0	<1.0	5.2	<1.0	<2.0	<2.0	5.6	<1.0	<1.0	<1.0
12/03/97	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.9	<1.0	5.2	<1.0	<2.0	<2.0	4.9	<1.0	<1.0	<1.0
97 AVG	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	12.0	<1.0	20.0	<1.0	<1.0	<1.0	13.3	<1.0	2.3	<1.0
97 SDEV	0.5	0.0	1.8	0.0	0.0	0.0	5.6	0.0	17.0	0.0	0.0	0.0	12.9	0.0	8.0	0.0
97 MAX	1.9	<1.0	5.7	<1.0	<1.0	<1.0	20.9	<1.0	48.1	<1.0	<1.0	<1.0	43.6	<1.0	27.8	<1.0
97 MIN	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.9	<1.0	5.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
97 SAMPLES	12	14	12	14	12	14	12	14	12	14	12	14	12	14	12	14

OU1 WATER QUALITY PARAMETERS

	pH		Calcium		Magnesium		Iron		Dissolved Oxygen	
Date	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
04/01/97		7.22								
04/09/97	6.60	7.00	133	117.0			<0.1	<0.1		10.40
04/15/97	6.90	7.50	125	107.0	38.2	36.6	<0.1	<0.1		
04/17/97	6.90	7.90								10.40
04/24/97	6.50	7.20	110	134.0	39.1	39.7	<0.1	<0.1		10.97
05/05/97	6.75	7.52	122	101.0	36.9	35.2	<0.1	<0.1	6.41	10.52
05/12/97	6.62	7.43	123	99.5	38.8	37.5			7.33	11.72
05/20/97	6.52	7.63	113	86.7	36.4	33.8	<0.1	<0.1	5.73	11.12
05/28/97	6.58	7.73	109	94.3	34.3	34.6	<0.1	<0.1	6.53	10.80
06/04/97	6.80	7.40	109	89.3	32.5	31.7			5.90	11.20
06/10/97	6.90	7.20	136	118.0						
06/17/97	6.50	7.20	113	93.6	35.1	34.6				
06/24/97	7.40	7.70	127	99.7						
07/01/97	7.49	7.96		91.1						
07/09/97	7.34	8.17	126	102.0						
07/16/97	7.20	8.22	121	104.0						
07/23/97	7.11	7.86	120	100.0						
07/30/97	7.05	7.90	117	98.8						
08/06/97	7.17	7.96	116	96.5						10.42
08/13/97	7.13	7.95	122	96.2						10.80
08/20/97	7.10	7.98	126	81.9						11.11
08/27/97	7.11	8.20	133	108.0					4.76	10.30
09/03/97	7.13	7.94	128	102.0						10.92
09/10/97	6.95	7.95	114	93.2						10.12
09/17/97	7.15	7.92	118	94.9						10.15
09/24/97	7.06	7.79	124	108.0					5.21	10.25
10/01/97	7.33	7.93	123	103.0						11.18
10/07/97	7.33	7.84	133	102.0						13.34
10/14/97	7.08	7.46	120	95.6						11.98
10/16/97	7.20	7.70								11.64
10/23/97	7.27	7.77	114	98.0						11.3
10/30/97	7.20	7.80	114	95.6						11.69
11/06/97	7.34	7.75	124	103						11.71
11/13/97	7.54	7.78	140	114						11.23
11/20/97	7.45	7.86	110	97.8						11.34
11/26/97	7.43	8.01	130	112						10.27
12/04/97	7.27	7.88	127	108						10.76
12/11/97	7.32	7.68	135	100						10.31
12/18/97	7.42	7.63								10.71
12/23/97	7.35	7.60								10.77