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NIROP FRIDLEY
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Project Completion Report

Revision No. 00

Pilot-Scale Study to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Anoka County Riverfront Park

Naval Industrial Reserve Ordnance Plant Fridley

Fridley, Minnesota

Contract No. N62467-98-D-0995
Contract Task Order No. 0024

January 2002

PREPARED FOR

Department of the Navy, Southern Division
Naval Facilities Engineering Command
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January 25, 2002

Mr. Jeff Meyers
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RE: Contract No. N62467-98-D-0995
Contract Task Order 0024 – Naval Industrial Reserve Ordnance Plant (NIROP) Fridley, Minnesota
Project Completion Report for Anoka County Riverfront Park – Pilot-Scale Study

Dear Mr. Meyers:

CH2M HILL Constructors, Inc. (CCI) is pleased to provide the enclosed Project Completion Report for the field work associated with the Pilot-Scale Study at the Anoka County Park near the Naval Industrial Reserve Ordnance Plant (NIROP) Fridley, Minnesota.

If you have any questions or comments regarding the enclosed, please do not hesitate to contact me at (216) 623-0402, extension 13.

Sincerely,

CH2M HILL Constructors, Inc.

B. Venky Venkatesh
Project Manager

cc: See Attached Distribution List
CCI Project File No. 153691

NIROP Fridley
ACP VegOil Pilot-Scale Study
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Project Completion Report

Pilot-Scale Study to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Anoka County Riverfront Park

Naval Industrial Reserve Ordnance Plant Fridley, Minnesota

Revision No. 00

Contract No. N62467-98-D-0995
Contract Task Order 0024

Submitted to:

U.S. Naval Facilities
Engineering Command
Southern Division

Prepared by:

CH2MHILL
Constructors, Inc.

115 Perimeter Center Place, N.E.
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Atlanta, GA 30346

January 2002

Project Completion Report
Pilot-Scale Study to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Anoka County Riverfront Park

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Engineering Command
Southern Division

Prepared by:

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January 2002

Prepared/Approved By:

B. Venky Venkatesh, Project Manager — Date

Approved By:

R. Scott Newman, Program Manager — Date

Client Acceptance:

U.S. Navy Responsible Authority — Date

CH2MHILL
Constructors, Inc.

Certificate of Completion

CH2M HILL Constructors, Inc., attests that, to the best of its knowledge and belief, the Pilot-Scale Study to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Anoka County Riverfront Park, at Naval Industrial Reserve Ordnance Plant, Fridley, Minnesota, delivered under Contract No. N62467-98-D-0995, Contract Task Order (CTO) No. 0024, has been completed, inspected, and tested, and is in compliance with the contract.

_____ _____

Project QC Manager Date

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Acronyms

ACP	Anoka County Riverfront Park
ASTM	American Society for Testing Materials
bgs	Below ground surface
CCI	CH2M HILL Constructors, Inc.
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CTO	Contract Task Order
^{o}C	Degrees Celsius
DFOW	Definable Feature of Work
DO	Dissolved oxygen
EFA	Environmental Field Activity
EMR	Environmental Management Resources, Inc.
GWTF	Groundwater treatment facility
MCES	Metropolitan Council of Environmental Services
MDH	Minnesota Department of Health
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MCES	Metropolitan Council Environmental Serevices
MPCA	Minnesota Pollution Control Agency
NAVFAC	Naval Facilities Engineering Command
NIROP	Naval Industrial Reserve Ordnance Plant
NPDES	National Pollutant Discharge Elimination System
NTR	Navy Technical Representative
NTU	Nephelometric turbidity unit
Parsons ES	Parsons Engineering Science
ppb	Parts per billion
PPE	Personal Protective Equipment
ppm	parts per million
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
ROD	Record of Decision
SDS	State Disposal System
TCE	Trichloroethene
TOC	total organic carbon
TtNUS	TetraTech NUS
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
VOC	volatile organic compound

Executive Summary

This report summarizes the well installation and development, soil and groundwater sampling, aquifer testing, and vegetable oil injection performed by CH2M HILL Constructors, Inc. (CCI) at the Anoka County Riverfront Park near the Naval Industrial Reserve Ordnance Plant in Fridley, Minnesota. This work was performed for Southern Division, Naval Facilities Engineering Command, under contract number N62467-98-D-0995, Contract Task Order 0024.

The remedial actions described in this report were completed to conduct a pilot-scale study for enhanced in-situ bioremediation of chlorinated solvents using vegetable oil injection at the Anoka County Riverfront Park. The scope of work included the following:

- Installation of one new background monitoring well in the vicinity of existing monitoring well MS-46S, three vegetable oil injection wells, nine groundwater monitoring wells and three contingency monitoring wells
- Baseline (i.e., pre-injection) sampling of groundwater at the newly installed injection wells, groundwater monitoring wells, contingency monitoring wells, and existing monitoring wells MS-46S, 27S and MS-47S
- Pre-injection aquifer testing (hydraulic conductivity) of the three injection wells and seven monitoring wells
- Plumbing of the injection wells and injection of approximately 3,600 gallons of food-grade vegetable oil (estimated 1,200 gallons per well)
- Post-injection aquifer testing (hydraulic conductivity) of the previously-tested three injection wells
- Surveying of the newly installed injection and monitoring wells
- Post-injection sampling of groundwater and vegetable oil (if present) at the newly installed monitoring and injection wells at 2, 5, 8 and 12 months after injection
- Sampling and analysis for disposal characterization
- Disposal of generated wastes

The work was performed in accordance with the approved Work Plan (Parsons Engineering Science, September 2001) and complied with all applicable federal, state, and local regulations, codes and standards. A final inspection of the field work was performed by the Navy Technical Representative and representatives of CCI. The work was determined to be satisfactory. It is recommended that groundwater sampling be performed at the established 2-, 5-, 8-, and 12-month intervals.

1.0 Introduction

CH2M HILL Constructors, Inc. (CCI) has been contracted by the Department of the Navy, Southern Division, Naval Facilities Engineering Command (NAVFAC), under Contract No.-N62467-98-D-0995, Contract Task Order (CTO) 0024 to perform remediation activities at the Anoka County Riverfront Park (ACP) near the Naval Industrial Reserve Ordnance Plant (NIROP) in Fridley, Minnesota.

The purpose of this Project Completion Report is to document the completion of the well installations and vegetable oil injection at the ACP near NIROP Fridley. Parsons Engineering Science (Parsons ES) will compile, analyze, and interpret all data in a Field Application Results Report to be submitted to the regulatory agencies at the completion of the pilot-scale study.

During this field event, United States Geological Survey (USGS), collected soil and groundwater samples for microbial analysis. The results of this study will be reported by USGS as a separate report. Also, USGS conducted an oil imaging study by adding colloidal iron and magnetite solution to the vegetable oil emulsion. The results of this study will also be reported by USGS as a separate report.

The field work documented under this report was performed in accordance with the following documents:

- Management approach outlined in the CCI *Contract Management Plan* (July 1998)
- CCI *Basewide Work Plan* Revision 00 (May 2000)
- Parsons ES *Work Plan for Field Application to Enhance In-Situ Bioremediation of Chlorinated Solvents Via Vegetable Oil Injection at the Naval Industrial Reserve Ordnance Plant (NIROP) Fridley, Minnesota* Final (September 2001)
- U.S. Environmental Protection Agency (USEPA) *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (1998)

CCI provided project management, health and safety oversight and quality control during the execution of the field work. Primary subcontractors were: 1) Bergerson-Caswell, Inc., who performed the well installation and development; and 2) Environmental Management Resources, Inc. (EMR), who performed sampling, waste management, and vegetable oil injection. Soils Engineering Testing and EnChem, Incorporated provided geotechnical testing and chemical analytical services respectively under contract to EMR. Superior FCR Landfill, Inc. provided disposal services for special waste soil. The Navy Technical Representative (NTR) from the Navy's Environmental Field Activity (EFA) Midwest office provided oversight of field activities.

1.1 Document Organization

This Project Completion Report is organized into six sections and six appendices. A brief description of each section is presented below.

Section 1.0 Introduction includes a summary of the scope of the project, site setting, and regulatory framework for the work described in this report.

Section 2.0 Field Work Execution provides a summary of the activities undertaken during the performance of the work described in this report.

Section 3.0 Waste Management provides a summary of waste management activities, including waste collection, storage, characterization, transportation, and disposal.

Section 4.0 Health and Safety documents the implementation of the Site Safety and Health program during the performance of the work described in this report.

Section 5.0 Conclusions and Recommendations provides information on any conclusions and recommendations drawn by CCI during the performance of the work described in this report.

Section 6.0 References lists the references used in completing the work described in this report.

Supplemental information is contained in the following appendices:

- Appendix A Notifications, Records and Approval Letters
  - Appendix A1 Well Installation Notifications and Construction Verifications
  - Appendix A2 Well Installation Records
  - Appendix A3 MDH Well Installation and Injection Variance Approval Letters
- Appendix B Boring Logs and Pump Test Data
  - Appendix B1 Gamma Logs
  - Appendix B2 Report of Subsurface Borings and Borehole Logs
  - Appendix B3 Well Logs
  - Appendix B4 Well Pump Test Data
  - Appendix B5 Well Development Forms
- Appendix C Analytical Results
  - Appendix C1 Field Headspace Analysis Logs
  - Appendix C2 Soil Total Organic Carbon and Volatile Organic Compound Analytical Data Summary
  - Appendix C3 Soil Bulk Density Analytical Data
  - Appendix C4 Groundwater Sampling Information Forms
  - Appendix C5 Groundwater Analytical Data Summary
  - Appendix C6 Waste Soil Analytical Data Summary
  - Appendix C7 Waste Liquids Analytical Data Summary
  - Appendix C8 Chain of Custody Forms

- Appendix D As-built Drawings
  - Appendix D1 Well Locations
  - Appendix D2 Injection System Diagram
- Appendix E Waste Disposal Documentation
  - Appendix E1 Waste Disposal Log
  - Appendix E2 Waste Soil Profile
  - Appendix E3 Waste Soil Manifest
  - Appendix E4 Waste Water Profile
  - Appendix E5 Waste Water Manifest
- Appendix F Representative Project Photographs

1.2 Project Scope

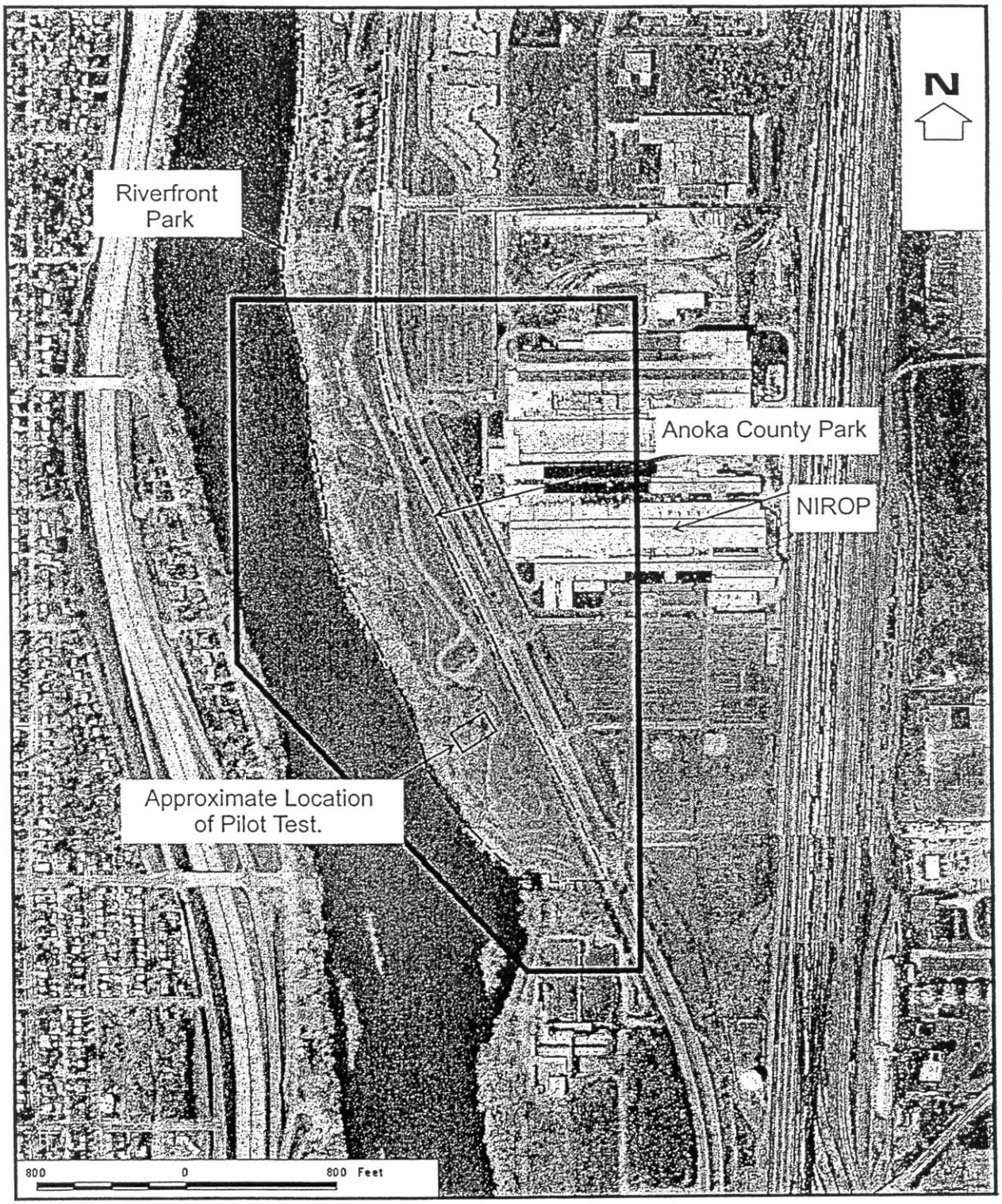
The scope of work for the project consisted of the following activities:

- Mobilization
- Pilot-scale system installation and soil sampling
- Baseline sampling
- Pre-injection sampling and aquifer testing
- Injection of vegetable oil
- Post-injection aquifer testing
- Post-injection system sampling
- Sampling and analysis of soil and water for disposal characterization
- Disposal of generated wastes
- Restoring disturbed areas
- Demobilization

1.3 Site History

ACP and NIROP Fridley are located near the twin cities of Minneapolis and St. Paul, Minnesota. As shown on Figure 1-1, ACP is just east of the Mississippi River and lies on a broad, flat outwash terrace.

The Record of Decision (ROD) for groundwater remediation at the NIROP Fridley site was signed in September 1990 by representatives of the U.S. Navy, USEPA Region V, and the Minnesota Pollution Control Agency (MPCA). The remedial action in the ROD specified hydraulic containment and recovery of all future migration of contaminated groundwater from the NIROP Fridley and the recovery, to the extent feasible, of contamination downgradient of the NIROP Fridley site. The selected remedy included the installation and operation of groundwater extraction wells, with a two-phased plan for disposal of groundwater from the well extraction system. This plan originally specified that contaminated groundwater located offsite and downgradient of the NIROP Fridley site in ACP would be allowed to naturally dissipate. However, discussions between Parsons ES, CCI, USEPA, the Minnesota Pollution Control Agency (MPCA), Anoka County Parks, TechLaw, TetraTech NUS (TtNUS), the Minnesota Department of Health (MDH), and Southern Division NAVFAC, it was led to the decision to perform a pilot-scale test to



Courtesy of Parsons Engineering Science, Inc.

Figure 1-1
Location of Vegetable Oil Injection Pilot Test
NIROP Fridley, Minnesota

determine if vegetable oil injection is a viable treatment option for volatile organic compounds (VOCs) in groundwater at the NIROP facility and adjacent areas including the ACP.

Under the Phase I Plan, groundwater from the extraction system would be discharged to an existing sanitary sewer with treatment provided at a local wastewater treatment facility. Under the Phase II Plan, a groundwater treatment facility (GWTF) would be constructed and operated at NIROP Fridley to provide long-term groundwater treatment. Treated groundwater from the onsite groundwater treatment facility would then be discharged to the Mississippi River via a National Pollutant Discharge Elimination System (NPDES)/ Metropolitan Council of Environmental Services (MCES) State Disposal System (SDS) storm sewer discharge permit.

A groundwater extraction and treatment system was constructed based on design documents approved by USEPA and MPCA. Construction of the original groundwater extraction system included the installation of four extraction wells (AT-1A, AT-2, AT-3A, and AT-4) and a specific capacity test on each of these extraction wells to determine sustainable pumping rates in each well. Additional investigation, which included groundwater sampling and analysis, indicated that groundwater pretreatment was required prior to discharge to the sanitary sewer owned by MCES to meet MCES discharge limits. As a result, a pretreatment system was also constructed at the NIROP Fridley site for use during the interim Phase I discharge to the sanitary sewer.

The groundwater extraction system and pretreatment facilities began operating in September 1992. Monitoring of the extraction system performance and groundwater via an extensive monitoring well network has been performed since startup in accordance with the procedures described in the *Remedial Action Work Plan for Groundwater Remediation* which was approved by USEPA and MPCA (TtNUS, January 2000).

As required by the ROD, an evaluation of the effectiveness of the groundwater extraction system in achieving hydraulic containment of contaminated groundwater from the site during the initial 90-day operating period was submitted to USEPA and MPCA in December 1992. The document concluded that additional groundwater extraction well(s) would be needed to achieve effective capture and hydraulic containment of contaminated groundwater. A work plan for upgrading the original groundwater extraction system was prepared and approved by USEPA and MPCA (TtNUS, January 2000). As provided in the work plan, two additional extraction wells (AT-5A and AT-5B) were constructed and placed into operation in June 1995. A modification to the groundwater extraction system was completed in May 2001 with the addition of four extraction wells (AT-7, AT-8, AT-9 and AT-10) and the abandonment of three extraction wells (AT-1A, AT-2 and AT-4) and two unused water supply production wells (Unique Numbers 206695 and 234001). The combined groundwater extraction system, consisting of seven extraction wells, is currently in operation.

The concentrations of trichloroethene (TCE) and other VOCs in the combined discharge from the extraction wells have decreased as much as two orders of magnitude since startup of the system in 1992. By March 1995, the concentrations decreased to levels where pretreatment of the groundwater was no longer necessary to comply with the MCES discharge limits and the combined discharge from the extraction wells was discharged directly to the sanitary sewer from March 1995 to December 10, 1998.

Construction of the Phase II onsite groundwater treatment facility began in September 1997 and was completed and operating in December 1998. When the onsite treatment facility was placed into operation discharge to the MCES sanitary sewer system was terminated. The combined discharge from the extraction system is now processed through a feed system and air stripping units for treatment before the effluent groundwater is discharged to the Mississippi River through Outfall 020 (NPDES/SDS Permit MN0000710). The effluent discharge is monitored to ensure that the NPDES/SDS requirements are met.

1.4 Regulatory Framework

The installation and construction actions were conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). A ROD for implementation of a groundwater remediation system was signed in 1990 by representatives of the U.S. Navy, USEPA Region V, and MPCA.

Installation and development of all wells was performed by a state-licensed well contractor. All drilling and well installations conformed to MDH Rules (Chapter 4725 - Wells and Borings) and MDH-approved variances.

A copy of the MDH variance approvals is included in Appendix A.

2.0 Field Work Execution

2.1 Definable Features of Work

The work performed at the site is described using nine definable features of work (DFOW). Each DFOW is described in the following sections.

- Mobilization and site preparatory work
- Pilot-scale system installation and soil sampling
- Baseline sampling
- Pre-injection sampling and aquifer testing
- Injection of vegetable oil
- Post-injection aquifer testing
- Post-injection system sampling
- Sampling and analysis for disposal characterization
- Site restoration and demobilization

2.2 Mobilization and Site Preparatory Work

Upon CCI approval of all required submittals, all resources necessary to efficiently and completely perform the scope of work for this task were mobilized to the site. The resources included, but were not limited to, personnel, equipment, materials, supplies, lower-tier Subcontractors, and support facilities (e.g., project support trailer, decontamination facilities, waste containment facilities, material and equipment storage, cellular phones, water, portable sanitary facilities, etc.) to support the work activities at the site.

Site preparatory work was the first physical activity at the site and involved the staging of material and equipment, demarcation of work zones and identification and location of utilities. Temporary barricades and caution signs were provided around the work areas.

2.3 Installation of Injection and Monitoring Wells

Prior to installation of the wells, a test boring was performed for each of the wells at the specified location to collect lithologic information. As each boring was advanced, one soil sample was collected from close vertical proximity to the center of the screened interval. The soil sample was shipped to an offsite laboratory and analyzed for TOC, VOC, and bulk density. Sampling procedures are described in Section 2.6.

Borehole diameters were a minimum of 4 inches larger than the outside diameter of the casing and well screen. Borings were completed by Bergerson-Caswell, Incorporated, a State-licensed well contractor (License #27058). The boreholes for all wells were completed using hollow stem augers. Table 2-1 provides a construction summary of the installed wells. Two additional wells (PES-BG-2 and PES-BG-3) were installed due to an oversight by the field team. It was decided that these two wells could be used as additional background wells and should not be abandoned.

TABLE 2-1
Well Construction Summary

Identification	Well Diameter (inches)	Total Depth (feet bgs)	Screened Interval (feet bgs)
Background Wells			
PES-BG-1	3.0	74	35-45
PES-BG-2	3.0	74	35-45
PES-BG-3	3.0	74	35-45
Injection Wells			
PES-INJ-1	3.0	70	35-45
PES-INJ-2	3.0	70	40-50
PES-INJ-3	3.0	70	40-50
Monitoring Wells			
PES-MW-1	3.0	70	35-45
PES-MW-2	3.0	60	35-45
PES-MW-3	3.0	40	30-40
PES-MW-4	3.0	40	30-40
PES-MW-5	3.0	40	30-40
PES-MW-6	3.0	60	35-45
PES-MW-7	3.0	70	40-50
PES-MW-8	3.0	40	30-40
PES-MW-9	3.0	40	30-40
Contingency Wells			
PES-CW-1	2.0	40	30-40
PES-CW-2	2.0	40	30-40
PES-CW-3	2.0	40	30-40

bgs – below ground surface

After well installation was completed, Summit Envirosolutions performed gamma logging of the boreholes to determine subsurface geology information. Well and boring records were submitted to MDH. Copies of installation notifications and verifications are provided in Appendix A. Copies of well boring records and gamma logs are provided in Appendix B.

All well screens and casings were new, constructed of Schedule 40 polyvinyl chloride (PVC) and were straight and plumb. Well screens were factory slotted with 0.020-inch openings. Screens were installed beneath the water table at the approximate intervals listed in Table 2-1. The casing of each well was fitted with a threaded PVC bottom cap and a locking top cap.

The annular space in each well was filled with a filter pack, a bentonite seal, and casing grout between the well string and the borehole wall. The filter pack consisted of clean 10 to 20 silica sand and extended from the bottom of the hole to at least 2 feet above the top of the well screen. As the annular space was being filled, the well string was centered and suspended so that it did not rest on the bottom of the hole.

A 2-foot thick filter pack seal was installed in each well above the filter pack using sodium bentonite. The bentonite was hydrated before placement and was installed by tremie pump methods.

The casing grout in each well extended from the top of the bentonite seal to approximately 2 feet below ground surface (bgs). The grout was composed of neat cement and mixed with potable water. All grout was pumped using a tremie pipe.

Each well was finished with a concrete surface collar that extended to the ground surface. Each well casing was completed above grade, with a steel protective casing to protect the well. Three 3-inch diameter steel ballard posts were installed radially around each well completion to protect the well head and a lockable lid was installed on the guard pipe. The identity of the well was permanently marked on the protective sleeve. The ballard posts were recessed approximately 2 feet into the ground and set in concrete.

Installed wells (with the exception of wells PES-BG-2 and PES-BG-3) were developed no sooner than 24 hours after installation to allow for grout curing. Development was accomplished using a submersible pump. The pump was regularly raised and lowered through the screened interval while development was underway so that fines were agitated and removed from the entire screened interval. Development continued until a minimum of 10 casing volumes of water had been removed from each well and pH, temperature, specific conductance, dissolved oxygen (DO), and water clarity (turbidity) stabilized. Well development records are provided in Appendix B.

All development equipment was decontaminated as described in the Site Specific Health and Safety Plan. Characterization, management, and disposal of generated development water were performed in accordance with the approved Work Plan (Parsons ES, September 2001).

2.4 Pre-Oil Injection Testing

Slug tests were conducted before and after oil injection on the three newly installed injection wells to estimate the hydraulic conductivity of unconsolidated deposits at the site and to estimate the impact of oil injection. In addition, slug tests were conducted prior to oil injection on seven monitoring wells. Slug testing was performed after baseline geochemical and contaminant sampling were completed. Both falling head and rising head tests were performed in sequence.

The falling head test is the first step in the two-step slug testing procedure. The following steps describe procedures followed during performance of the falling head test:

- All downhole equipment was decontaminated prior to initiating the test.
- Wells were opened at least 24 hours prior to testing to allow the water level to stabilize. The protective casings remained locked prior to testing to prevent vandalism.
- The static water level was measured in each well to the nearest 0.01-foot.
- The pressure transducer was lowered into the well and the displaced water was allowed to return to its static level.
- The slug was lowered into the well to just above the static water level.
- The data logger was turned on and the slug was quickly lowered below the water table.

- Data recording was stopped when the water level recovered approximately 80 to 90 percent from the initial displacement.

In the second step of the slug testing procedure, a rising head test was performed. The steps for this process are described below:

- The water level was measured in each well to the nearest 0.01-foot.
- The data logger was turned on and the slug was quickly withdrawn from the well.
- Data recording was stopped when the water level recovered approximately 80 to 90 percent from the initial displacement.

Copies of pump test data are provided in Appendix B.

2.5 Baseline Geochemical Conditions and Contaminant Profiles

During the advancement of borings for the installation of the injection, groundwater monitoring, and contingency monitoring wells, soil samples were collected and analyzed for parameters listed in Table 2-2.

TABLE 2-2
Baseline Soil And Groundwater Sampling Parameters

Analyte	Method	Location
Soil		
Total Organic Carbon (TOC)	E415.1	L
Volatile Organic Compound (VOC)	SW8260B	L
Bulk Density	ASTM D2937-94	L
Groundwater		
Oxidation/Reduction Potential (ORP)	Direct-reading Meter	F
Dissolved Oxygen (DO)	Direct-reading Meter	F
pH	Direct-reading Meter	F
Specific Conductance	Direct-reading Meter	F
Temperature	Direct-reading Meter	F
Ferrous Iron (Fe^{+2})	Colorimetric, Hach Method 8146	F
Manganese (Mn)	Colorimetric, Hach Method 8034	F
Hydrogen Sulfide (H_2S)	Colorimetric, Hach Method 8131	F
Sulfate (SO_4)	Colorimetric, Hach Method 8051	F
Alkalinity	Titrimetric, Hach Method 8221	F
Ammonia (NH_3)	Colorimetric, Hach Method 8155	F
Carbon Dioxide (CO_2)	Titrimetric, CHEMetrics Method 4500	F
Chloride (Cl)	Titrimetric, Hach Kit 8P	F
Nitrate (NO_3)+, Nitrite (NO_2)	E300.1 and 353.2	L
Hydrogen (H^+)	AM-20-GAX (modified SW8015)	L
Methane (CH_4), Ethane (C_2H_6), Ethene (C_2H_4)	SW5021	L
TOC	SW9060	L
VOCs	SW8260B	L

L – Laboratory; F – Field

After installation of the injection, groundwater monitoring, and contingency monitoring wells, each of these new wells (except PES-BG-1, PES-BG-2 and PES-BG-3) and previously installed monitoring wells MS-46S, MS-27S, and MS-47S were sampled and analyzed for parameters listed in Table 2-2 to characterize initial (baseline) site-specific geochemical and contaminant conditions and to evaluate the potential for existing reductive dehalogenation, future enhanced reductive dehalogenation, and any expected changes in the above profile as a result of substrate addition. Sampling procedures are described in Section 2.6.

2.6 Sampling and Analysis

Soil and groundwater sampling, sample handling and storage, chain-of-custody, shipment, and sample analyses were performed in accordance with the procedures provided in the Quality Assurance Project Plan (QAPP) included in the approved Work Plan (Parsons ES, 2001).

As each boring was advanced prior to well installation, one soil sample from each well was obtained using a 24-inch long, 2-inch diameter split spoon sampler. Samples were collected from close vertical proximity to the center of the screened interval to be installed. Samples were shipped to EnChem, Incorporated and analyzed for the parameters listed in Table 2-2.

Prior to starting the groundwater sampling procedure, the area around the existing and new monitoring wells was cleared of foreign materials, such as brush, rocks, and debris to prevent sampling equipment from inadvertently contacting debris and potentially becoming contaminated. Each sampling location was also inspected for the integrity of the protective cover, lock, external surface seal, concrete pad, cap, datum reference, and internal surface seal. It was noted that previously installed monitoring well MS-27s did not have a protective cap.

Prior to removing any water from the well, the static water level was measured to the nearest 0.01 foot using an electric water-level probe. After measuring the static water level, the volume of water to be purged from the monitoring was calculated.

Groundwater was purged from the well until a minimum of three well casing volumes were removed and water quality parameters (temperature, specific conductance, pH, DO, and turbidity) had stabilized and were recorded within the following acceptable ranges: ±0.1 degrees Celsius (°C), ±5 percent; ±0.1 pH units, ±2 percent; and less than 5 nephelometric turbidity units (NTUs), respectively. Sampling techniques specified in the site-specific MPCA document *Superfund Voluntary Investigation and Cleanup Programs, Sampling Standard Operating Procedure at Anoka County Park Pilot-Scale Study for Enhanced in-situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection, Revision 2* (MPCA, August 2001) were used for well sampling and purging.

A submersible bladder pump was used to extract groundwater samples from the injection and monitoring wells. The water was carefully poured down the inner walls of the sample container to minimize aeration of the sample. Sample containers were completely filled so that no air space remained in the container.

All glassware used in the field laboratory analyses was cleaned prior to use by thoroughly washing with a solution of Alconox® and water, and rinsing with distilled water and isopropyl alcohol to prevent interference or cross contamination between measurements.

When concentrations of an analyte were greater than the range detectable by the analytical method, the analysis was repeated by diluting the groundwater sample with distilled water until the analyte concentration fell to a level within the range of the method.

All field analyses performed using the Hach®portable colorimeter or titration kit were performed in accordance with the manufacturer-specified procedures.

Soil samples collected prior to well installation and baseline groundwater samples for laboratory analysis were shipped to EnChem, Inc. for analysis.

A summary of soil, baseline groundwater, and vegetable oil sample analytical results is presented in Appendix C. Data validation, as required by the QAPP (Parsons ES, September 2001), will be performed by CCI and the data validation reports will be included in the Field Application Results Report to be prepared by Parsons ES at the end of the pilot-scale study.

Waste characterization samples were collected to evaluate the handling, transportation, and disposal requirements of wastes (soil and water) generated during well installation activities.

Soil, decontamination water, purge water and quality control samples were collected using disposable sampling equipment in accordance with procedures outlined in Work Plan (Parsons ES, 2001). Analytical parameters for the soil sample collected for disposal characterization and combined decontamination and well development water were based on disposal facility requirements. The soil sample obtained for disposal characterization was collected using a stainless steel hand auger from a roll-off container. After the decontamination and well development water were combined in the temporary storage tank, one water sample was collected.

The soil, groundwater, decontamination/purge water, and vegetable oil samples were shipped to EnChem, Inc. for analysis. Analytical results of the soil sample revealed no hazardous constituents and the soil was classified as special waste. Results of the water sample also revealed no hazardous constituents and the water was discharged to the onsite GWTF and off site to the Metropolitan Council Environmental Services Disposal Site #1 for treatment and disposal.

A summary of waste characterization analytical results is presented in Appendix C.

2.7 Vegetable Oil Injection

After the background geochemical and contaminant sampling and slug testing had been completed, an emulsion of 3,600 gallons of food-grade soybean oil/lecithin and 7,200 gallons of groundwater was injected into the three new injection wells. In addition, USGS added magnetite to the oil/lecithin/water emulsion that was injected to injection well PES-INJ-1 and added colloidal iron to the oil/lecithin/water emulsion that was injected to injection well PES-INJ-3. No magnetite or colloidal iron was added to the oil/lecithin/water emulsion that was injected to injection well PES-INJ-2. The magnetite and colloidal iron was added in order to study the migration of vegetable oil in the aquifer. The results of this study will be submitted by USGS as a separate report.

Prior to injection, a temporary mechanical packer was installed in each well below the screened interval. The injection system and each injection point were then filled with groundwater to remove entrapped air and to pressure-test the system. Site groundwater from wells 45S, 45I and MS-53PC was used for the injection to promote the development of a healthy microbial population and avoid adverse changes to site geochemistry. Two 550-gallon mixing tanks were used to contain groundwater mixed with magnetite and one 1,200-gallon mixing tank was used to contain groundwater mixed with colloidal iron prior to injection.

The vegetable oil/lecithin mixture was pumped from tanks using an air operated double diaphragm pump. Water was pumped from tanks using an electric sump pump and an air-operated double diaphragm pump. The flow rate of the oil/lecithin mixture and water was monitored using flowmeters. After passing through the flowmeters, the oil/lecithin and water were emulsified using an in-line stainless steel mixer. The emulsified solution was then injected into the three injection wells until a total of 10,800 gallons of emulsion had been injected into the shallow unconfined aquifer (i.e., 3,600 gallons of vegetable oil-lecithin/water emulsion into each well). Native groundwater continued to be injected until approximately 60 gallons of native groundwater per well had been injected. This post injection water served to distribute the emulsion further into the aquifer in the immediate vicinity of the injection wells. After the injection process had been completed, slug tests were conducted as described in Section 2.4 to estimate the hydraulic conductivity of unconsolidated deposits in the area of injection and to estimate the impact of oil injection.

A diagram of the injection system is provided in Appendix D.

2.8 Site Restoration and Demobilization

Upon completion of the work at each location, all field equipment, temporary facilities, and other miscellaneous items (e.g., barricades, caution tapes and signs) resulting from or used in the field operations were removed.

Personnel and equipment were decontaminated prior to leaving the area to avoid the possibility of inadvertently spreading contamination. Equipment was decontaminated to remove all contamination that may have adhered to the equipment components as a result of the remedial action. Decontamination was performed in accordance with the approved *Modification to the Extraction System and Abandonment of Production Wells Work Plan, Addendum 1* (CCI, August 2000) and the applicable provisions of 29 Code of Federal Regulations (CFR) 1910.120.

Due to adverse weather conditions in December 2001, areas requiring seeding will be restored in spring 2002.

3.0 Waste Management

The following types of waste were generated during the remedial activities:

- Soil
- Decontamination/well development water
- Well purge water and laboratory testing water
- Disposable personal protective equipment

All wastes were handled, stored, transported, and disposed of in accordance with the approved Work Plan (Parsons ES, September 2001) and all applicable federal, state and local waste management regulations. The wastes were characterized in accordance with the requirements of 40 CFR 261 using generator knowledge of the materials and sample analytical results.

One truckload of material from the installation of the wells was transported to Waste Management, Inc. in Elk River, Minnesota, for disposal as construction debris.

Removed soil and personal protective equipment (PPE) was placed in two roll-off containers and transported to Superior FCR Landfill, Inc., in Buffalo, Minnesota, for disposal as non-hazardous special waste. A total of 40 cubic yards of soil and PPE were disposed of as special waste.

Water generated from the development, pump tests and material decontamination was contained in 55-gallon drums and subsequently transferred to a portable holding tank prior to being discharged to the onsite GWTF for treatment and disposal. A total of 4,000 gallons of water was discharged to the GWTF. Water generated from well purging, field laboratory testing and decontamination was contained in 55-gallon drums and subsequently removed using a 2,500-gallon vacuum tanker. This purge/decontamination and laboratory testing water was transported offsite for disposal to the MCES sewer system. A total of 450 gallons was discharged to the sewer system. The subcontractors provided polyethylene sheeting and temporary berming materials for the temporary storage tank. Daily inspections of the containment/storage area was performed to verify there were no ruptures to containers or other conditions that could result in a release, and to ensure all containers were properly labeled, with labels visible, and to maintain good housekeeping.

Prior to scheduling any waste shipment, a waste disposal approval package for each waste stream was submitted to the NTR. The package included a waste profile naming NIROP Fridley as the generator of the waste, analytical summary tables applicable to the waste, and a completed waste manifest. Shipping papers for all waste streams were prepared in accordance with regulations established in 49 CFR 172. Waste disposal documentation is located in Appendix E**.**

All miscellaneous office waste and general non-contaminated construction debris and PPE (such as caution tapes, barricades, signs, packing materials) were disposed of as special waste with accumulated soil.

A log of all generated wastes was maintained at the site. A copy of the waste disposal log is included in Appendix E**.**

4.0 Health and Safety

The Site-Specific Health and Safety Plan (CCI, August 2000, Appendix B) and the approved addendum (Parsons ES, September 2001, Appendix A) was satisfactorily implemented during the remedial action at NIROP Fridley.

Daily tailgate safety meetings were conducted prior to the start of field work. In addition, weekly safety inspections were performed by CCI.

5.0 Conclusions and Recommendations

The installation and construction actions were conducted in accordance with CERCLA and the ROD for implementation of a groundwater remediation system signed in 1990 by representatives of the U.S. Navy, USEPA Region V, and MPCA.

The installation and development of injection and monitoring wells were performed by a State-licensed well contractor. All drilling, well installations, and well development conformed to established MDH rules and approved variances. Well construction records were submitted to the MDH.

The work was performed in accordance with the approved Work Plan (Parsons ES, September 2001) and complied with all applicable federal, state, and local regulations, codes and standards. A final inspection of the field work was performed by the NTR and representatives of CCI. The work was determined to be satisfactory.

It is recommended that groundwater sampling be performed at the established 2-, 5-, 8-, and 12-month intervals. Analytical results from each of these sampling events should be evaluated to determine the effectiveness of the vegetable oil injection process.

6.0 References

CH2M HILL Constructors, Inc. July 1998. *Contract Management Plan*, U.S. Naval Facilities Engineering Command Southern Division. Contract Number N62467-98-D-0095

CH2M HILL Constructors, Inc. May 2000. *Basewide Work Plan*. Naval Industrial Reserve Ordnance Plant Fridley, Fridley, Minnesota.

CH2M HILL Constructors, Inc. August 2000. *Modification to the Extraction System and Abandonment of Production Wells Work Plan, Addendum 1*. Naval Industrial Reserve Ordnance Plant Fridley, Fridley, Minnesota.

Minnesota Pollution Control Agency. August 2001. *Superfund Voluntary Investigation and Cleanup Programs, Sampling Standard Operating Procedure at Anoka County Park Pilot-Scale Study for Enhanced in-situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection, Revision 2*.

Parsons Engineering Science. September 2001. *Work Plan for Field Application to Enhance In-Situ Bioremediation of Chlorinated Solvents Via Vegetable Oil Injection at the Naval Industrial Reserve Ordnance Plant (NIROP) Fridley, Minnesota* Final.

TetraTech, NUS. January 2000. *Remedial Action Work Plan for Groundwater Remediation*, . Naval Industrial Reserve Ordnance Plant Fridley, Fridley, Minnesota.

U.S. Army Corps of Engineers. September 1996. *Safety and Health Requirements Manual*, EM 385-1-1.

Appendix A

Notifications and Records

Appendix A1

Well Installation Notifications and Verifications

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669268

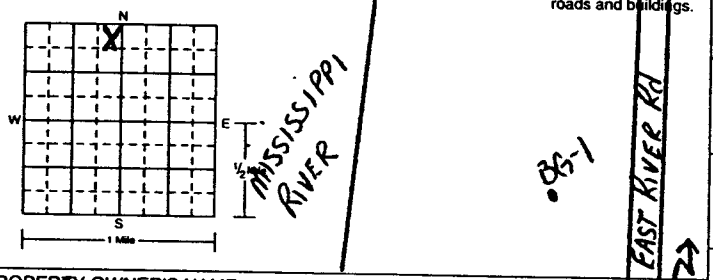
WELL LOCATION

County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA CTY PARK, FRIDLEY, 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.

PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER Lake Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S NAVY

Well owner's mailing address if different than property owner's address indicated above.

JOEL SANDERS
Southern Div. Naval Facilitation
Erlle Command
2155 EAGLE DR. NORTH CHARLESTON, SC. 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD, SAND TOPSOIL	BLACK	MEDIUM	0	2
SAND	BROWN	SOFT	2	6
SAND	TAN-BRN	SOFT	6	8
SAND	TAN	SOFT	8	14
SAND	BROWN	SOFT	16	22
Course Sand	BROWN	SOFT	22	26
SILT - SANDY SILT DAMP	BROWN	SOFT	26	28
SANDY SILT - DAMP	BROWN	SOFT	28	30
SAND - Wet	BROWN	MEDIUM	30	36
FINE SAND	BROWN	SOFT	36	42
VERY FINE SAND	BROWN	SOFT	42	44
FINE SAND	BROWN	SOFT	44	52
FINE SAND - V. FINE SAND	BROWN	SOFT	52	54
V. FINE SAND	BROWN	SOFT	54	58
V. FINE SAND - FINE SAND	BROWN	SOFT	58	60
FINE SAND	BROWN	SOFT	60	74

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

BG-1

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669268

WELL DEPTH (completed): 73 ft. Date Work Completed: 10-18-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☑ Monitoring ☐ Heating/Cooling ☐ Irrigation ☐ Community PWS ☐ Industry/Commercial ☐ Environ. Bore Hole ☐ Noncommunity PWS ☐ Remedial ☐ Dewatering ☐

CASING: Drive Shoe? ☐ Yes ☐ No ☐ Steel ☐ Threaded ☐ Welded ☑ Plastic ☐

CASING DIAMETER	WEIGHT	HOLE DIAM.
3 in. to 34 ft.	lbs./ft.	10 in. to 73 ft.
3 in. to 44-73 ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type: ____ Diam. 3"
Slot/Gauze: .020 Length: 10'
Set between 34 ft. and 44 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-18-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ____ Model ____
☑ Casing Protection ____ ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 50 to 73 ft. 2 ☐ yds. ☑ bags
from 0 to 28 ft. 7 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell, Inc — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henrich — 11-9-01
Authorized Representative Signature — *Date*

Glenn Holmen — 10-18-01
Name of Driller — *Date*

IC# 140-0020

HE-01205-07 (Rev. 2/99)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 671106

WELL LOCATION

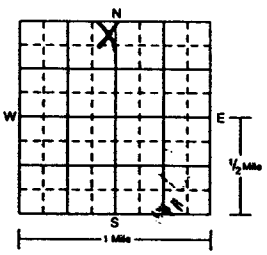
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NENW

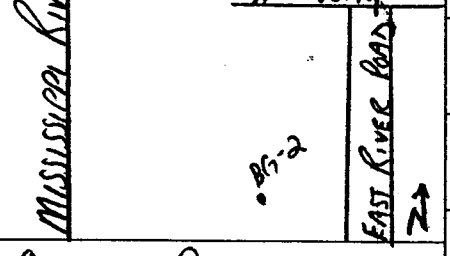
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CO. PARK, FRIDLEY

~~or Fire Number~~: 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION ENGG COMMAND
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
CLAY TOPSOIL - SAND	DK. RED/BRN	MEDIUM	0	2
SAND	RED/BRN - TAN	SOFT	2	4
SAND	TAN	SOFT	4	12
Med. SAND	BROWN	SOFT	12	14
SAND + ROCK	BRN - BLUE	MEDIUM	14	16
M-F SAND	TAN	SOFT	16	22
ROCKY SAND	BROWN	MEDIUM	22	24
ROCK		HARD	24	26
FINE SAND	GRAY	SOFT	26	28
SANDSTONE - SAND	GRAY	MEDIUM	28	30
SANDY CLAY	GRAY	SOFT	30	32
FINE SAND	GRAY	SOFT	32	40
SAND	BROWN	SOFT	40	46
FINE SAND	BROWN	SOFT	46	58
FINE SILTY SAND	BROWN	SOFT	58	60
FINE SAND	BROWN	SOFT	60	72
M-F SAND	BROWN	SOFT	72	74

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

BG-2

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 671106

140-0020

WELL DEPTH (completed): 73 ft. Date Work Completed: 10-16-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: Drive Shoe? ☐ Yes ☐ No ☐ Steel ☐ Threaded ☐ Welded ☑ Plastic ☐

CASING DIAMETER / WEIGHT:
- 3 in. to 34 ft. ____ lbs./ft.
- 3 in. to 44-73 ft. ____ lbs./ft.
- ____ in. to ____ ft. ____ lbs./ft.

HOLE DIAM.: 10 in. to 73 ft.

SCREEN: PVC
Make: JOHNSON
Type: ____
Slot/Gauze: .020
Set between: 34 ft. and 44 ft.
OPEN HOLE from ____ ft. to ____ ft.
Diam.: 3"
Length: 10'
FITTINGS: ____

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-16-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
- from 50 to 70 ft. 2 ☐ yds. ☑ bags
- from 0 to 28 ft. 17 ☐ yds. ☑ bags
- from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL, INC — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henrich — 11-12-01
Authorized Representative Signature — *Date*

Alan Holmes — 10-16-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 671105

WELL LOCATION

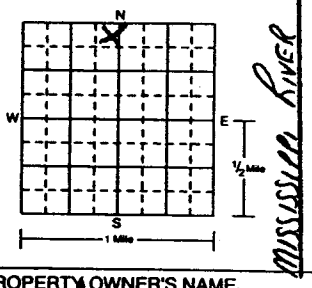
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

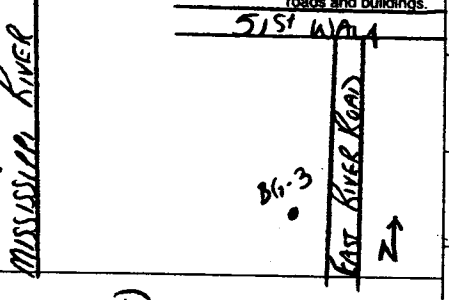
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CO. PARK, FRIDLEY

~~or Fire Number~~ 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERLOC COMMAND
2155 EAGLE DR.
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD - SAND	BLACK	MEDIUM	0	2
SAND	BROWN	SOFT	2	4
SAND	BRN TAN	SOFT	4	12
SAND	TAN	SOFT	12	20
SAND + ROCK	BROWN	HARD	20	24
SILTY SAND	GRAY	SOFT	26	28
SILTY SAND - SAND	GRY - GRTAN	SOFT	28	30
FINE SAND	GRAY	SOFT	30	32
SAND	GRAY	SOFT	32	36
FINE SAND	GRAY	SOFT	36	44
FINE SAND	BROWN	SOFT	44	48
SAND	BROWN	SOFT	48	56
SILTY SAND	BROWN	SOFT	56	60
SAND	BROWN	SOFT	60	72
V. FINE SAND	BROWN	SOFT	72	74

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

BG-3

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 671105

WELL DEPTH (completed): 73 ft. Date Work Completed: 10-17-01

DRILLING METHOD: ☐ Cable Tool ☒ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☒ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☒ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☒ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 34 ft.		lbs./ft.	10 in. to 73 ft.
3 in. to 44-73 ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type:
Slot/Gauze: .020
Set between 34 ft. and 44 ft.

OPEN HOLE from ____ ft. to ____ ft.
Diam. 3"
Length 10'
FITTINGS:

STATIC WATER LEVEL: 28 ft. ☒ below ☐ above land surface Date measured 10-17-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☒ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☒ Yes ☐ No
Grout Material ☒ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 50 to 70 ft. 2 ☐ yds. ☒ bags
from 0 to 28 ft. 18 ☐ yds. ☒ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☒ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type; ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

VARIANCE: Was a variance granted from the MDH for this well? ☒ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL, INC — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henning — 11-12-01
Authorized Representative Signature — *Date*

Glen Holman — 11-17-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669269

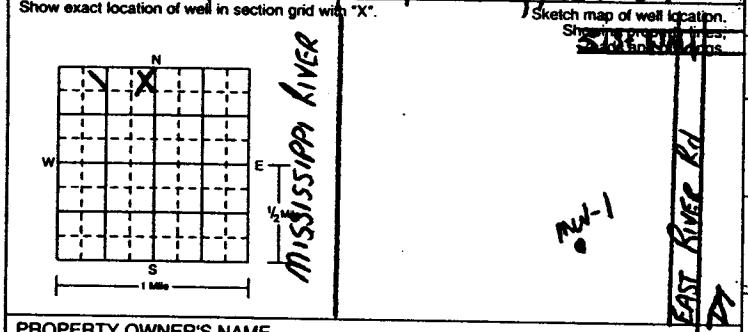
WELL LOCATION

County Name: ANOKA

Township Name: FRIDLEY | Township No.: 30 | Range No.: 24 | Section No.: 27 | Fraction: NE ¼ NE ¼ NW ¼

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA Cty PARK, FRIDLEY, 55421 | or Fire Number

Show exact location of well in section grid with "X". Sketch map of well location. Show roads, rivers, buildings and other landmarks.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.
1350 BUNKER Lake Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.
SOUTHERN DIV. NAVAL FACILITATION
ER66 COMMAND
2155 EAGLE DR
NORTH CHARLESTON, SC. 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD to SAND	BROWN	MEDIUM	0	2
SAND	BROWN	SOFT	2	4
M. SAND - FINE SAND	BRN-TAN	SOFT	4	6
FINE SAND	BRN-TAN	SOFT	6	12
COURSE SAND	BROWN	SOFT	12	14
FINE SAND	BRN-TAN	SOFT	14	20
Med - COURSE SAND	BROWN	SOFT	20	26
ROCK	1	HARD	26	28
CLAY	BROWN	HARD	28	32
CLAY - FINE SAND	BROWN	HARD	32	34
FINE SAND	BROWN	SOFT	34	36
FINE SAND	BROWN	SOFT	38	44
Medium SAND	BROWN	SOFT	44	48
FINE SAND	BROWN	SOFT	48	54
SILTY SAND	BROWN	SOFT	54	56
V. FINE SAND	BROWN	SOFT	56	62
MED. SAND	BROWN	SOFT	62	64
FINE SAND	BROWN	SOFT	64	68

Use a second sheet if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.
MW-1

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669269

WELL DEPTH (completed): 70 ft. | Date Work Completed: 10-25-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted ☐

DRILLING FLUID: NONE | WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ___ ft. to ___ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic | Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER	WEIGHT	HOLE DIAM.
3 in. to 35 ft.	lbs./ft.	10 in. to 70 ft.
3 in. to 45-70 ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type:
Slot/Gauze: .020
Set between: 35 ft. and 45 ft.
OPEN HOLE from ___ ft. to ___ ft.
Diam.: 3"
Length: 10'
FITTINGS:

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-25-01

PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ___ Model ___
☑ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 55 to 30 ft. 2 ☐ yds. ☑ bags
from 0 to 30 ft. 19 ☐ yds. ☑ bags
from ___ to ___ ft. ___ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ___ feet ___ direction ___ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ___
Manufacturer's name ___
Model number ___ HP ___ Volts ___
Length of drop pipe ___ ft. Capacity ___ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell, Inc — 27058
Licensee Business Name — Lic. or Reg. No.

John W. Hemes — 11-9-01
Authorized Representative Signature — Date

Glen Holman — 10/25/01
Name of Driller — Date

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669270

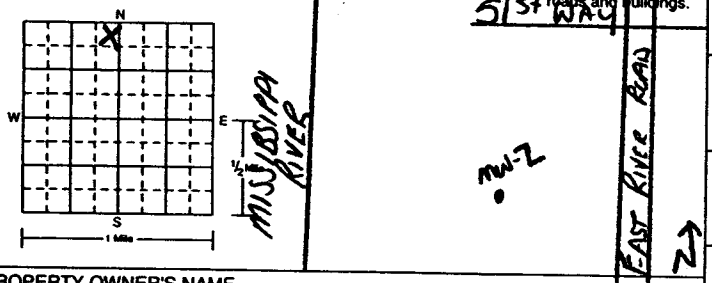
WELL LOCATION

County Name: ANOKA

Township Name: FRIDLEY | Township No.: 30 | Range No.: 24 | Section No.: 27 | Fraction: NE NE NW

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA Cty PARK, FRIDLEY, 55421

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION
ERUG COMMAND
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD TOPSOIL	DK. BROWN	MEDIUM	0	2
SAND	BROWN	MEDIUM	2	6
SAND	BRN-TAN	MEDIUM	6	10
M-COURSE SAND	BROWN	SOFT	10	14
M-FINE SAND	BRN-TAN	SOFT	16	18
FINE SAND	BRN-TAN	SOFT	18	22
MED SAND	BROWN	SOFT	22	24
M-C SAND	BROWN	SOFT	24	26
ROCKY SAND	BROWN	HARD	26	28
SANDY CLAY	BROWN	MEDIUM	28	32
FINE SAND	BROWN	SOFT	34	42
V. FINE SAND	BROWN	SOFT	42	46
FINE SAND	BROWN	SOFT	46	48
FINE SAND - SILTY SAND	BROWN	SOFT	48	50
V. FINE SAND	BROWN	SOFT	50	54
SILTY SAND	BROWN	SOFT	54	56
FINE SAND	BROWN	SOFT	56	62
V. FINE SAND	BROWN	SOFT	62	70

Use a second sheet if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-2

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669270

WELL DEPTH (completed): 62 ft. | Date Work Completed: 10-30-01

DRILLING METHOD: ☐ Cable Tool ☒ Auger ☐ ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☒ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☒ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☒ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

HOLE DIAM.: 10 in. to 62 ft.

CASING DIAMETER / WEIGHT:
3 in. to 35 ft. ____ lbs./ft.
3 in. to 45-62 ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.

SCREEN: PVC
Make: JOHNSON
Type: ____ Diam.: 3"
Slot/Gauze: .020 Length: 10'
Set between 35 ft. and 45 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☒ below ☐ above land surface Date measured 10-30-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ____ Model ____
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☒ Yes ☐ No
Grout Material ☒ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 30 ft. 19 ☐ yds. ☒ bags
from 55 to 62 ft. 1 ☐ yds. ☒ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☒ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

VARIANCE
Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL, INC. — Licensee Business Name | 27058 — Lic. or Reg. No.

John W. Henrich — Authorized Representative Signature | 11-9-01 — Date

Glen Holmes — Name of Driller | 10/30/01 — Date

IC# 140-0020

HE-01205-07 (Rev. 2/99)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669271

WELL LOCATION

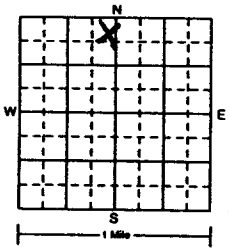
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

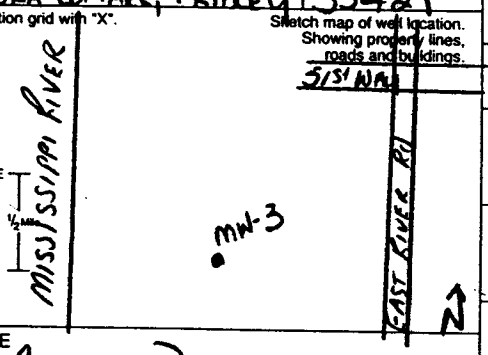
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER ROAD, ANOKA CO. PARK, FRIDLEY

~~or Fire Number~~: 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION
ERG6 COMMAND
2155 EAGLE DRIVE
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD - SANDY TOPSOIL	BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	6
MED. SAND	BRN-TAN	SOFT	6	10
M-COURSE SAND	BROWN	SOFT	10	14
MED. SAND	BROWN	SOFT	14	16
FINE SAND	BRN-TAN	SOFT	16	22
FINE SAND - MED - COURSE SAND	BRN-TAN	SOFT	22	24
FINE SAND	BRN-TAN	SOFT	24	26
M-C SAND	BROWN	SOFT	26	28
F-C SILTY SAND	BROWN	SOFT	28	30
FINE SILTY SAND	BROWN	SOFT	30	38
FINE SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-3

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669271

WELL DEPTH (completed): 40 ft. Date Work Completed: 11-1-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER	WEIGHT	HOLE DIAM.
3 in. to 30 ft.	lbs./ft.	10 in. to 40 ft.
in. to ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: Make JOHNSON Type PVC Slot/Gauze .020 Set between 30 ft. and 40 ft. Diam. 3" Length 10' FITTINGS:

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 11-1-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 15 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell Inc. — Licensee Business Name — Lic. or Reg. No. 27058

John W. Henrich — Authorized Representative Signature — Date 11-9-01

Alan Helmer — Name of Driller — Date 11-1-01

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669272

WELL LOCATION

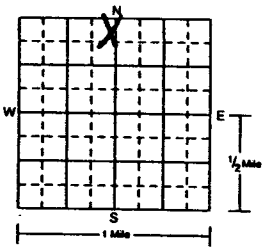
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

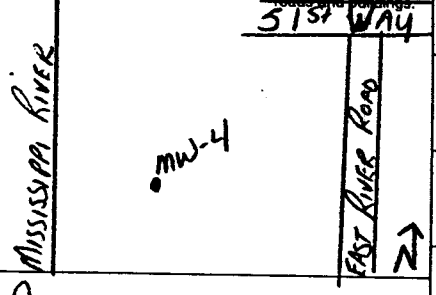
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA CO. PARK, FRIDLEY, 55421

~~or Fire Number~~

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA City PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION
ERGO Command
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD, SAND, TOPSOIL	BROWN	Medium	0	2
FINE SAND	BROWN	SOFT	2	4
FINE SAND	BRN-TAN	SOFT	4	10
FINE-MED SAND	BRN-TAN	SOFT	10	12
MED SAND	BROWN	SOFT	12	16
FINE SAND	BRN-TAN	SOFT	16	26
FINE SAND	BROWN	SOFT	26	28
MED SAND	BROWN	SOFT	28	30
COURSE SAND-SILTY SAND	BROWN	SOFT	30	32
MED SILTY SAND	BROWN	SOFT	32	38
MED. SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-4

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669272

WELL DEPTH (completed): 40 ft. Date Work Completed: 11-2-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ___ ft. to ___ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER	WEIGHT	HOLE DIAM.
3 in. to 30 ft.	lbs./ft.	10 in. to 40 ft.
in. to ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type: Diam. 3"
Slot/Gauze: .020 Length: 10'
Set between 30 ft. and 40 ft. FITTINGS:

OPEN HOLE from ___ ft. to ___ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 11-2-01

PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ___ Model ___
☑ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 15 ☐ yds. ☑ bags
from ___ to ___ ft. ___ ☐ yds. ☐ bags
from ___ to ___ ft. ___ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ___ feet ___ direction ___ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ___
Manufacturer's name ___
Model number ___ HP ___ Volts ___
Length of drop pipe ___ ft. Capacity ___ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell, Inc. — Licensee Business Name
27058 — Lic. or Reg. No.
Johnny Henrid — Authorized Representative Signature — Date 11/12/01
Glenn Holmes — Name of Driller — Date 11/2/01

IC# 140-0020

HE-01205-07 (Rev. 2/99)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669273

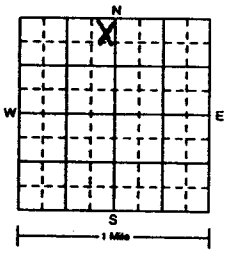
WELL LOCATION

County Name: ANOKA

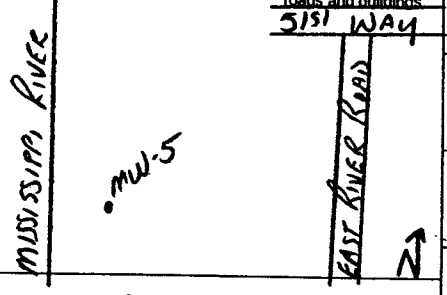
Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CTY PARK, FRIDLEY, 55421 (~~or Fire Number~~)

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN NAVAL FACILITATION - ERUL COMMAND
2155 EAGLE DR.
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD, FINE SAND	BROWN	MEDIUM	0	2
F-M-C SAND	BROWN	SOFT	2	4
M-C SAND	BROWN	SOFT	4	10
MED. SAND	BROWN	SOFT	10	14
FINE SAND	BRN-TAN	SOFT	14	20
MED. SAND	BRN-TAN	SOFT	20	24
MED. SAND	BROWN	SOFT	24	28
MED-COURSE SAND	BROWN	SOFT	28	30
MED. SAND	BROWN	SOFT	30	36
FINE SAND	BROWN	SOFT	36	38
MED. SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-5

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669273

WELL DEPTH (completed): 40 ft. Date Work Completed: 11-2-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ___ ft. to ___ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER / WEIGHT:
3 in. to 30 ft. ___ lbs./ft.
___ in. to ___ ft. ___ lbs./ft.
___ in. to ___ ft. ___ lbs./ft.

HOLE DIAM.: 10 in. to 40 ft.

SCREEN: PVC
Make: JOHNSON
Type: ___ Diam. 3"
Slot/Gauze: .020 Length 10'
Set between 30 ft. and 40 ft. FITTINGS: ___

OPEN HOLE from ___ ft. to ___ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 11-2-01

PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ___ Model ___
☑ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 15 ☐ yds. ☑ bags
from ___ to ___ ft. ___ ☐ yds. ☐ bags
from ___ to ___ ft. ___ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ___ feet ___ direction ___ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ___
Manufacturer's name ___
Model number ___ HP ___ Volts ___
Length of drop pipe ___ ft. Capacity ___ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson - Caswell, Inc — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henning — 11-12-01
Authorized Representative Signature — *Date*

Glenn Holmes — 11-2-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

MINNESOTA UNIQUE WELL NO. 669274

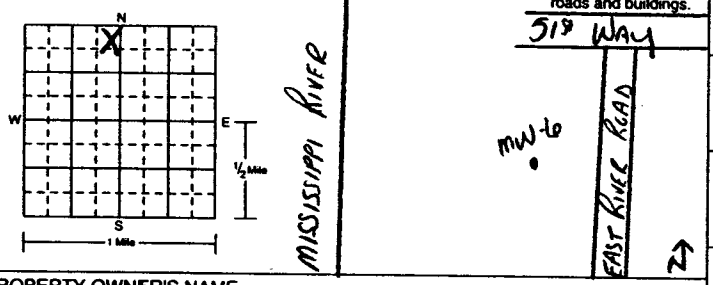
WELL LOCATION

County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

House Number/Street Name, City, and Zip Code of Well Location ~~or Fire Number~~: EAST RIVER RD, ANOKA CTY PARK, FRIDLEY, 55421

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.
1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.
SOUTHERN DIV. NAVAL FACILITATION - ERGL COMMAND
2155 EAGLE DRIVE
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD, TOPSOIL	BLACK	MEDIUM	0	2
MED. SAND	BROWN	SOFT	2	6
MED. SAND	BRN-TAN	SOFT	6	10
M-C SAND - F. SAND	BRN-BRN TAN	SOFT	10	12
FINE SAND	BRN-TAN	SOFT	12	14
MED. SAND	BROWN	SOFT	14	18
FINE SAND	BROWN	SOFT	18	20
F-M SAND	BROWN	SOFT	20	22
MED. SAND	BROWN	SOFT	22	26
COURSE SAND	BROWN	SOFT	26	28
SANDY CLAY	BROWN	MEDIUM	28	32
FINE SAND	BROWN	SOFT	32	50
SILTY SAND	BROWN	SOFT	50	52
FINE SAND	BROWN	SOFT	52	56
FINE SAND-SILTY SAND	BROWN	SOFT	56	60
FINE SAND	BROWN	SOFT	60	62
V. FINE SAND	BROWN	SOFT	62	64

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.
MW-6

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669274

WELL DEPTH (completed): 60 ft. Date Work Completed: 10-29-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ___ ft. to ___ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic; Drive Shoe? ☐ Yes ☐ No; ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 35 ft.		lbs./ft.	10 in. to 60 ft.
3 in. to 45-60 ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type: ___ Diam. 3"
Slot/Gauze: .020 Length: 10'
Set between 35 ft. and 45 ft. FITTINGS: ___

OPEN HOLE from ___ ft. to ___ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-29-01

PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ___ Model ___
☑ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 30 ft. 19 ☐ yds. ☑ bags
from 55 to 60 ft. 1 ☐ yds. ☑ bags
from ___ to ___ ft. ___ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ___ feet ___ direction ___ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ___
Manufacturer's name ___
Model number ___ HP ___ Volts ___
Length of drop pipe ___ ft. Capacity ___ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell, Inc — Licensee Business Name — Lic. or Reg. No. 27058

John W. Henrich — Authorized Representative Signature — Date 10/12/01

Allen Helmen — Name of Driller — Date 10-29-01

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

MINNESOTA UNIQUE WELL NO. 669275

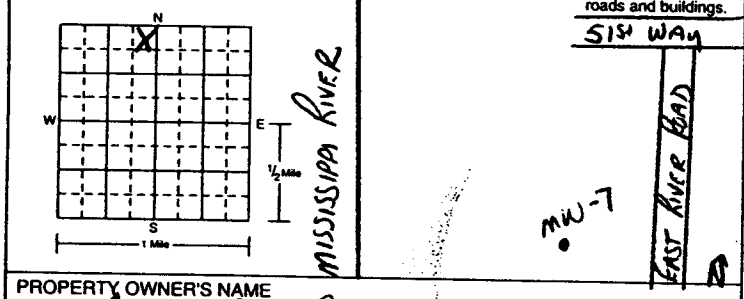
WELL LOCATION

County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

House Number, Street Name, City, and Zip Code of Well Location or Fire Number: EAST RIVER RD, ANOKA CO. PARK, FRIDLEY, 55421

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA CTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION, ERGO COMMAND
2155 EAGLE DR.
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
TOPSOIL - SAND	BROWN	MEDIUM	0	2
SAND	BROWN	SOFT	2	6
MED. SAND	BRN-TAN	SOFT	6	10
FINE SAND	BRN-TAN	SOFT	10	12
FINE SAND	BROWN	SOFT	14	16
FINE SAND	BRN-TAN	SOFT	16	18
F-M SAND	BROWN	SOFT	18	20
MED. SAND	BROWN	SOFT	20	22
M-C SAND	BROWN	SOFT	22	26
M-C SAND, FINE SAND	BRN-BRN-TAN	SOFT	26	28
CLAY - M-C SAND	BRN - BRNTAN	MEDIUM	28	30
COURSE SAND	BROWN	SOFT	30	32
CLAY	BROWN	SOFT	32	34
CLAY & FINE SAND	BROWN	MEDIUM	34	36
FINE SAND	BROWN	SOFT	36	52
V. FINE SAND	BROWN	SOFT	52	56
FINE SAND	BROWN	SOFT	56	62
FINE SAND - SILTY SAND	BROWN	SOFT	62	64
FINE SAND	BROWN	SOFT	64	70

Use second sheet if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.
MW-7

01-13453

WELL DEPTH (completed): 70 ft. Date Work Completed: 10-25-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ___ ft. to ___ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 40 ft.		lbs./ft.	10 in. to 70 ft.
3 in. to 50-70 ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type: ___ Diam. 3"
Slot/Gauze: .020 Length: 10'
Set between 40 ft. and 50 ft. FITTINGS: ___

OPEN HOLE from ___ ft. to ___ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-25-01

PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ___ Model ___
☑ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 35 ft. 20 ☐ yds. ☑ bags
from 60 to 70 ft. 1 ☐ yds. ☑ bags
from ___ to ___ ft. ___ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ___ feet ___ direction ___ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ___
Manufacturer's name ___
Model number ___ HP ___ Volts ___
Length of drop pipe ___ ft. Capacity ___ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell, Inc — Licensee Business Name — Lic. or Reg. No. 27058
John W. Henning — Authorized Representative Signature — Date 11/12/01
Allen Holman — Name of Driller — Date 10/25/01

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669275

IC# 140-0020

HE-01205-07 (Rev. 2/99)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

MINNESOTA UNIQUE WELL NO. 669276

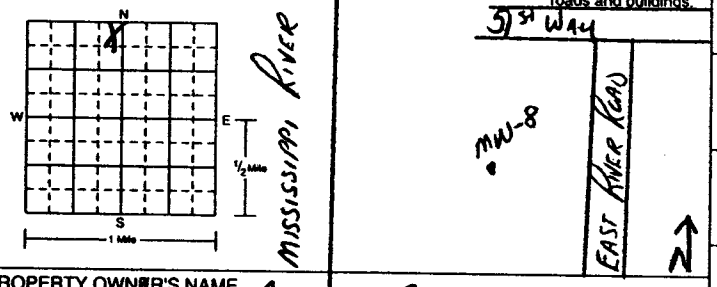
WELL LOCATION

County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CO. PARKS, FRIDLEY, 55421 (or Fire Number ____)

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.

PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.
1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.
SOUTHERN DIV. NAVAL FACILITATION - ER66 COMMAND
2155 EAGLE DRIVE
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD TOPSOIL	DK BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	6
MED. SAND	BROWN	SOFT	6	10
M-C SAND	BROWN	SOFT	10	14
Med SAND	BROWN	SOFT	14	16
M-F SAND	BROWN-TAN	SOFT	16	18
FINE SAND	BRN-TAN	SOFT	18	22
MED SAND	BROWN	SOFT	22	24
M-C SAND	BROWN	SOFT	24	26
M-C SAND - SANDY SILT	BROWN	SOFT	26	28
COURSE SANDY SILT	BROWN	MEDIUM	28	30
SANDY SILT	BROWN	SOFT	30	34
SILTY SAND - SANDY CLAY	BROWN	HARD	34	36
FINE SAND	BROWN	SOFT	36	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.
MW-8

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669276

WELL DEPTH (completed): 40 ft. Date Work Completed: 10-31-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐ ____

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐ ____

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐ ____

CASING DIAMETER / WEIGHT:
3 in. to 30 ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.

HOLE DIAM.: 10 in. to 40 ft.; ____ in. to ____ ft.; ____ in. to ____ ft.

SCREEN: Make JOHNSON; Type PVC; Diam. 3"; Slot/Gauze .020; Length 10'; Set between 30 ft. and 40 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-31-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____
☑ Casing Protection ____ ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 15 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2468

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell Inc — 27058
Licensee Business Name — Lic. or Reg. No.

John W. Kennard — 11-12-01
Authorized Representative Signature — Date

Glenn Helmen — 10/29/01
Name of Driller — Date

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669277

WELL LOCATION

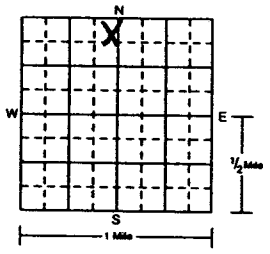
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

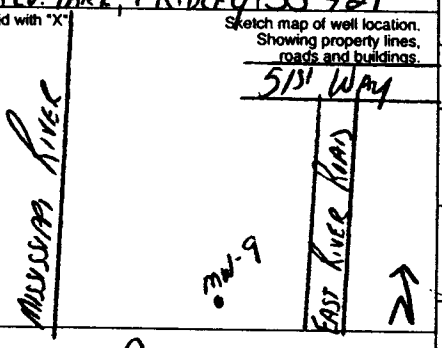
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CO. PARK, FRIDLEY 55421

~~or Fire Number~~

Show exact location of well in section grid with "X"



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION-ERGLO COMMANDS
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD TOPSOIL	BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	6
MED. SAND	BROWN-TAN	SOFT	6	8
M-F SAND	BRN TAN	SOFT	8	10
FINE SAND	BRN TAN	SOFT	10	12
MED. SAND	BROWN	SOFT	12	16
M-F SAND	BRN TAN	SOFT	16	18
FINE SAND	BRN TAN	SOFT	18	26
M-C SAND	BROWN	SOFT	26	28
SANDSTONE - M-C SAND		MEDIUM	28	30
SAND - CLAY	BROWN	HARD	30	32
SANDY CLAY	BROWN	MEDIUM	32	36
FINE SAND	BROWN	SOFT	36	38
MED. SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-9

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669277

WELL DEPTH (completed): 40 ft. Date Work Completed: 10-31-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic ☐ Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 30 ft.		lbs./ft.	10 in. to 40 ft.
in. to ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: Make JOHNSON; Type ____; Slot/Gauze .020; Set between 30 ft. and 40 ft.; Diam. 3"; Length 10'; FITTINGS: ____

OPEN HOLE: from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-31-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____; ☑ Casing Protection ____ ☑ 12 in. above grade; ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No

Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite

from 0 to 25 ft. 15 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____

Manufacturer's name ____

Model number ____ HP ____ Volts ____

Length of drop pipe ____ ft. Capacity ____ g.p.m.

Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell Inc — Licensee Business Name — Lic. or Reg. No. 27058

John W. Heinz — Authorized Representative Signature — Date 10-12-01

Alan Holmes — Name of Driller — Date 10-31-01

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669278

WELL LOCATION

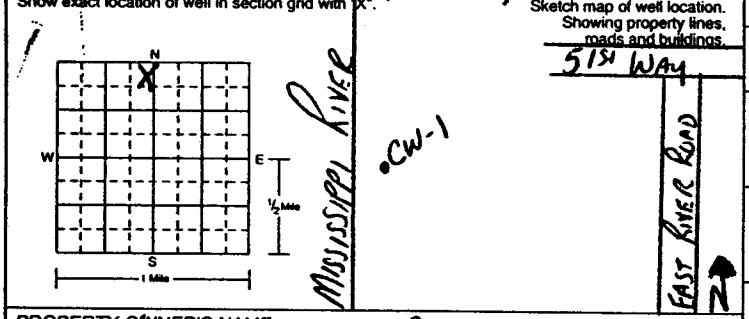
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE¼ NE¼ NW¼

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA Co. PARK, FRIDLEY, 55421

or Fire Number

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.

PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERGG COMMAND
2155 EAGLE DR.
NORTH CHARLESTON - SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD SAND	BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	4
M-C SAND	BROWN	SOFT	4	10
MED. SAND	BROWN	SOFT	10	24
FINE SAND	BROWN	SOFT	24	28
M-C SAND	BROWN	SOFT	28	32
FINE SILTY SAND	BROWN	SOFT	32	34
FINE SAND	BROWN	SOFT	34	36
FINE SAND - M-C SAND	BROWN	SOFT	36	38
M-C SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

CW-1

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669278

WELL DEPTH (completed): 40 ft. Date Work Completed: 11-5-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic ☐ Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER	WEIGHT	HOLE DIAM.
2 in. to 30 ft.	lbs./ft.	8 in. to 40 ft.
in. to ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: PVC Make JOHNSON Type ____ Diam. 2" Slot/Gauze .010 Length 10' Set between 30 ft. and 40 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 11-5-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ____ ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 9 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell Inc — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henning — 11-12-01
Authorized Representative Signature — *Date*

Alan Yolmen — 11-5-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669279

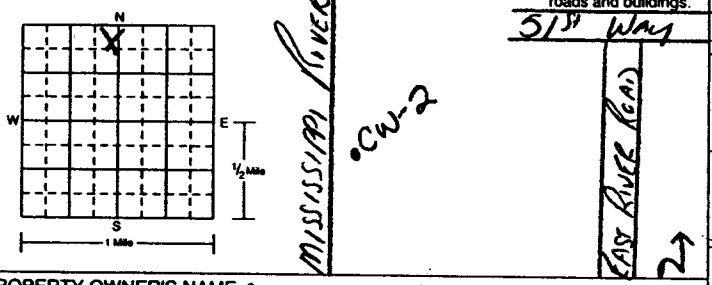
WELL LOCATION

County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

House Number/Street Name, City, and Zip Code of Well Location or Fire Number: EAST RIVER Rd, ANOKA Co. PARK, FRIDLEY, 55421

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.
1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.
SOUTHERN DIV. NAVAL FACILITATION - ERGG COMMAND,
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD FINE SAND	DK. BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	4
F-C SAND	BROWN	SOFT	4	6
M-C SAND	BROWN	SOFT	6	10
Med. SAND	BROWN	SOFT	10	12
Med. SAND	BRN-TAN	SOFT	12	14
M-F SAND	BRN TAN	SOFT	14	16
M-C SAND	BROWN	SOFT	16	24
M-F SAND	BROWN	SOFT	24	26
M-SAND	BROWN	SOFT	26	32
FINE SILTY SAND	BROWN	SOFT	32	34
FINE SAND	BROWN	SOFT	36	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.
CW-2

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669279

WELL DEPTH (completed): 40 ft. Date Work Completed: 11-5-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic ☐ Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER	WEIGHT	HOLE DIAM.
2 in. to 30 ft.	lbs./ft.	8 in. to 40 ft.
in. to ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: Make JOHNSON; Type ____; Diam. 2"; Slot/Gauze .010; Length 10'; Set between 30 ft. and 40 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 29 ft. ☑ below ☐ above land surface Date measured 11-5-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ____ ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 9 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL INC. — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henrich — 11-12-01
Authorized Representative Signature — *Date*

Glen Holmen — 11-5-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669280

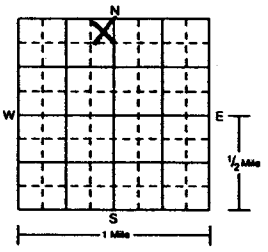
WELL LOCATION

County Name: ANOKA

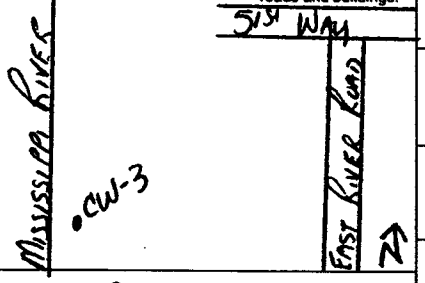
Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CO. PARK, FRIDLEY — ~~or Fire Number~~ 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERGG COMMAND
2155 EAGLE DR.
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD, SAND, V.FINE SAND	BRN - TAN	MEDIUM	0	2
CLAY	BRN GRY	MEDIUM	2	4
V. FINE - MED. SAND	BROWN	SOFT	4	6
C-SAND - ROCK	BROWN	HARD	6	8
M-C SAND - FINE SAND	BROWN	SOFT	8	10
M-C SAND	BROWN	SOFT	10	12
M-F SAND	BROWN	SOFT	12	14
MED. SAND	BROWN	SOFT	14	18
MED. SAND	BRN TAN	SOFT	18	22
M-C SAND	BROWN	SOFT	22	26
MED. SAND	BROWN	SOFT	26	30
M-FINE SAND	BROWN	SOFT	30	32
MED. SAND	BROWN	SOFT	32	34
MC SAND - CLAY	BROWN	MEDIUM	34	36
CLAY	BROWN	MEDIUM	36	38
FINE SILTY SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

CW-3

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669280

WELL DEPTH (completed): 40 ft. — Date Work Completed: 11-2-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO — FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic — Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT
2 in. to 30 ft.		____ lbs./ft.
____ in. to ____ ft.		____ lbs./ft.
____ in. to ____ ft.		____ lbs./ft.

HOLE DIAM.: 8 in. to 40 ft.; ____ in. to ____ ft.; ____ in. to ____ ft.

SCREEN: PVC — Make: JOHNSON — Type: ____ — Slot/Gauze: .010 — Set between 30 ft. and 40 ft. — Diam.: 2" — Length: 10' — FITTINGS: ____

OPEN HOLE: from ____ ft. to ____ ft.

STATIC WATER LEVEL: 31 ft. ☑ below ☐ above land surface — Date measured: 11-2-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ____ ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 9 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed — Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON - CASWELL INC — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henrich — 11-12-01
Authorized Representative Signature — *Date*

Alan Ulmer — 11-2-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669281

WELL LOCATION

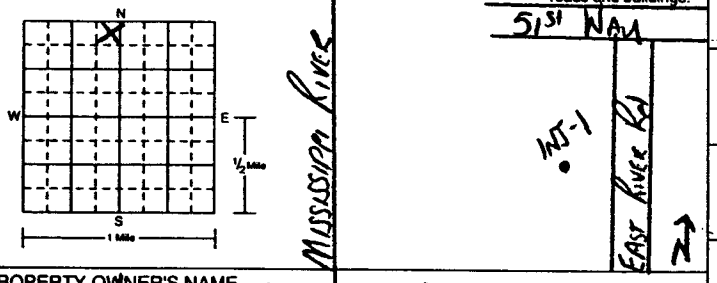
County Name: ANOKA

Township Name: FRIDLEY | Township No.: 30 | Range No.: 24 | Section No.: 27 | Fraction: NE NE NW

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd ANOKA Co. PARKS, FRIDLEY

or Fire Number: 55421

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERG6 COMMAND
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD SAND	BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	6
M-F SAND	BRN TAN	SOFT	6	8
FINE SAND	BRN TAN	SOFT	8	22
ROCK		HARD	22	26
CLAY	BROWN	HARD	26	28
CLAY - SANDY CLAY	BROWN	HARD	28	30
SANDY CLAY	BROWN	MEDIUM	30	32
FINE SAND	BROWN	SOFT	32	34
SILTY SAND F. SAND	BROWN	SOFT	34	36
FINE SAND	BROWN	SOFT	36	48
FINE SAND - V. FINE SAND	BROWN	SOFT	48	50
V. FINE SAND	BROWN	SOFT	50	56
FINE SAND - SILTY SAND	BROWN	SOFT	56	58
V. FINE SAND	BROWN	SOFT	58	60
FINE SAND	BROWN	SOFT	60	64
FINE SAND - SILTY SAND	BROWN	SOFT	66	68
FINE SAND	BROWN	SOFT	68	70

Use a second sheet if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

PES INJ-1

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669281

WELL DEPTH (completed): 70 ft. | Date Work Completed: 10-24-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO — FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☑ INJECTION

CASING: ☐ Steel ☑ Plastic — Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded

CASING DIAMETER / WEIGHT:
3 in. to 35 ft. ____ lbs./ft.
3 in. to 45-70 ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.

HOLE DIAM.: 10 in. to 70 ft.

SCREEN: PVC
Make: JOHNSON
Type: ____ Diam. 3"
Slot/Gauze: 020 Length 10'
Set between 35 ft. and 45 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-24-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ____ Model ____
☑ Casing Protection ____ ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 30 ft. 19 ☐ yds. ☑ bags
from 55 to 70 ft. 2 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2418

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL INC — 27058
Licensee Business Name — Lic. or Reg. No.

John W. Henrich — 11-12-01
Authorized Representative Signature — Date

Glen Palmer — 10/24/01
Name of Driller — Date

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669282

WELL LOCATION

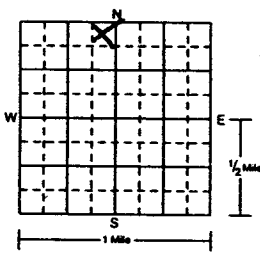
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

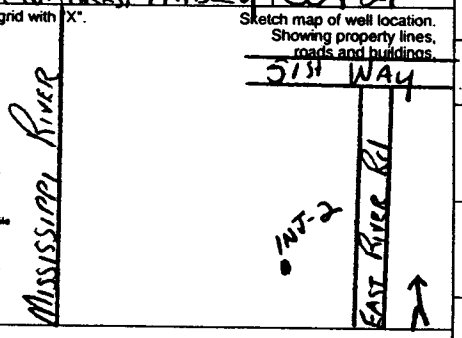
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CO. PARKS, FRIDLEY

~~of Fire Number~~: 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ER66 COMMAND
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD SAND	BROWN	MEDIUM	0	2
SAND	BROWN	SOFT	2	6
SAND	BRN TAN	SOFT	6	10
FINE SAND	BRN TAN	SOFT	10	12
FINE SAND COARSE SAND	BROWN-TAN	SOFT	12	14
C-SAND MED. SAND	BROWN	SOFT	14	16
COURSE SAND	BROWN	SOFT	18	30
CLAY SANDY CLAY	BROWN	MEDIUM	30	32
FINE SAND	BROWN	SOFT	32	36
MED. SAND	BROWN	SOFT	36	40
FINE SAND	BROWN	SOFT	40	54
MED. SAND	BROWN	SOFT	54	56
FINE SAND	BROWN	SOFT	56	66
MED. SAND	BROWN	SOFT	66	68
M.SAND - FINE SAND	BROWN	SOFT	68	70

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

PES INJ-2

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669282

WELL DEPTH (completed): 70 ft. Date Work Completed: 10-24-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☐ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☑ INJECTION

CASING: ☐ Steel ☑ Plastic; Drive Shoe? ☐ Yes ☐ No; ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 40 ft.		lbs./ft.	10 in. to 70 ft.
3 in. to 50-70 ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type: [redacted] Diam.: 3"
Slot/Gauze: .020 Length: 10'
Set between: 40 ft. and 50 ft. FITTINGS:

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured: 10-24-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ____ Model ____
☑ Casing Protection ____ ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 60 to 70 ft. 1½ ☐ yds. ☑ bags
from 0 to 35 ft. 20 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL INC. — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Hemind — 11-12-01
Authorized Representative Signature — *Date*

Alan Holman — 10-24-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669283

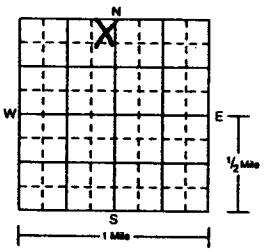
WELL LOCATION

County Name: ANOKA

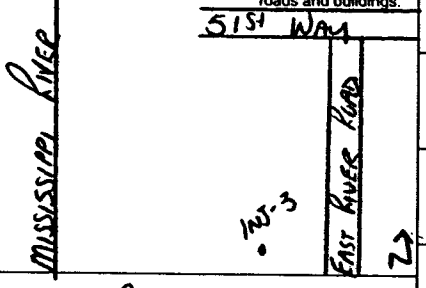
Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CO. PARK, FRIDLEY 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERG6 Command
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD - SAND	BROWN	MEDIUM	0	2
SAND	BROWN	SOFT	2	6
SAND	BRN TAN	SOFT	6	12
C-SAND	BROWN	SOFT	12	14
Med. SAND	BROWN	SOFT	14	16
Course SAND	BROWN	SOFT	18	20
Med. SAND	BROWN	SOFT	20	24
Course SAND	BROWN	SOFT	24	26
C. SAND + ROCK	BROWN	HARD	26	28
Course SAND	BROWN	SOFT	28	32
FINE SANDY CLAY	BROWN	MEDIUM	32	34
FINE SANDY CLAY - FINE SAND	BROWN	MEDIUM	34	36
FINE SAND	BROWN	SOFT	36	56
Med. SAND	BROWN	SOFT	56	60
FINE SAND	BROWN	SOFT	60	64
FINE SILTY SAND	BROWN	SOFT	64	66
FINE SAND	BROWN	SOFT	66	70

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

PES INJ-3

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669283

WELL DEPTH (completed): 70 ft. Date Work Completed: 10-22-01

DRILLING METHOD: ☐ Cable Tool ☒ Auger ☐ ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☒ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☐ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☒ INJECTION

CASING: ☐ Steel ☒ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 40 ft.		lbs./ft.	10 in. to 70 ft.
3 in. to 50-70 ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type: ____ Diam. 3"
Slot/Gauze: .020 Length: 10'
Set between 40 ft. and 50 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☒ below ☐ above land surface Date measured 10-22-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ____ Model ____
☒ Casing Protection ____ ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☒ Yes ☐ No
Grout Material ☒ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 60 to 70 ft. 1 ☐ yds. ☒ bags
from 0 to 35 ft. 20 ☐ yds. ☒ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☒ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

VARIANCE
Was a variance granted from the MDH for this well? ☒ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergelson-Caswell Inc. — Licensee Business Name — Lic. or Reg. No. 27058

John W. Henrich — Authorized Representative Signature — Date 11-12-01

Steve Hemen — Name of Driller — Date 10-22-01

HE-01205-07 (Rev. 2/99)

IC# 140-0020

Appendix A2

Well Installation Records

MINNESOTA MDH DEPARTMENT OF HEALTH

Monitoring Well Permit Application

Minnesota Department of Health, Well Management Section
P. O. Box 64975
St. Paul, Minnesota 55164-0975
(651) 215-0811 or 1-800-383-9808

MDH USE ONLY
Amount Received NC Govt
Date Received 9-27-01
Source Codes: Well (4901) Site (4903)
Deposit Number
Not Approved
Date Approved 9-27-01 TM
Site Permit Number

Make check or money order payable to the Minnesota Department of Health or supply required credit card information (separate sheet). Mail completed application and fee to the Minnesota Department of Health, Well Management Section, P. O. Box 64975, St. Paul, Minnesota 55164-0975. ATTN: Cashier.

CHECK ALL BOXES THAT APPLY

		FEE
☐	Motor fuel retail outlet or petroleum bulk storage site or agricultural chemical site.	$120/Site
☐	Site permit exists. Permit Number:	None
☒	Well owned by state or local government.	None
☐	All other monitoring wells.	$120/Well
☐	Reconstruction requiring a permit.	$120/Well (None for site permit or well in MGT.

SEP 2001 RECEIVED

1. A. LEGAL DESCRIPTION OF WELL LOCATION

COUNTY ANOKA

Township Name	Township Number	Range Number	Section Number	Smallest Quarter Largest	MN Unique Well Number	Depth	At-grade
FRIDLEY	30 N	24 W	27	¼ NE ¼ NE ¼ NW ¼	669268	70±	
	N	W		¼ ¼ ¼ ¼	669269	70±	
	N	W		¼ ¼ ¼ ¼	669270	70±	
	N	W		¼ ¼ ¼ ¼	669271	40±	
	N	W		¼ ¼ ¼ ¼	669272	40±	

B. Well Site Address EAST RIVER ROAD, ANOKA CO PARK, FRIDLEY, MN 55421
Numerical Street Address — City — Zip Code

C. Sketch (attach map identifying well location and Minnesota Unique Well Number and include distance from nearest road intersection).

2. ☐ Check this box for wells constructed through a CONFINING LAYER or INTO BEDROCK, submit the following information: Well diameter, grout material, drilling method, grouting method, casing materials, cross-sectional diagram of well, and cross-section of anticipated geologic formations.

3. ☐ Check this box for AT-GRADE WELLS, submit the following information: an explanation of why the well casing cannot terminate 12 inches above ground, a map showing the location of the proposed well referenced to a permanent landmark or property boundaries, and cross-sectional diagram of the well cap and vault.

4. Well Contractor Name: BERGERSON CASWELL	Registration or License Number: 27058
Contact Person: ROB CATTO	Telephone Number (including Area Code): (763) 479-3121
5. Consultant Name: CH2M HILL CONSTRUCTORS, INC. VENKY VENKATEH	Telephone Number (including Area Code): (216) 623-0402
6. Well Owner Name: MR JOEL SANDERS U.S. NAVY, SOUTHERN DIV. NAVAL FACILITIES ENGG. COMMAND	Contact Person: MR. JOEL SANDERS
Well Owner Mailing Address (including City and Zip Code): 2155 EAGLE DRIVE, NORTH CHARLESTON, S.C. 29406	Telephone Number (including Area Code): (843) 820-5562
7. Property Owner Name: ANOKA CO. PARKS DEPARTMENT	Contact Person: MR. JEFF PERRY
Property Owner Mailing Address (including City and Zip Code): 1350 BUNKER LAKE BLVD, ANDOVER, MN 55304	Telephone Number (including Area Code): (763) 767-2896

REQUIRED SIGNATURES ON PAGE 2

669268 | 669269 | 669270 | 669271 | 669272

SEP 2001
RECEIVED
WELL MGT.

Billing Address for Maintenance Permits: MR. JOEL SANDERS

Well Owner Name: US NAVY, Southern Division, Naval Facilities Engineering Command,

Well Owner Mailing Address: 2155 Eagle Dr
N. Charleston, SC 29406

Name of Property Owner or Agent (Please Print): MR. JEFF DORRY

X Signature of Property Owner or Agent:

Name of Well Owner or Agent (Please Print): MR. JOEL SANDERS

X Signature of Well Owner or Agent:

I certify that all the information provided in this application is true and complete. I understand that falsification of facts may result in forfeiture of all rights to licensing/registration as a well contractor/monitoring well contractor in accordance with Minnesota Statutes, Chapter 103I.

Name of Licensed or Registered Contractor (Please Print): BERGERSON CASWELL

Signature of Licensed or Registered Contractor: John W. Hamrud

Date: 9/26/01

Failure to submit permit application and to receive permit approval prior to the beginning of monitoring well construction is a violation of Minnesota Statutes, Chapter 103I and may result in the assessment of an administrative penalty.

A permit application must accompany Notice of Intent to Construct a monitoring well.

Monitoring Well Permit Application

Minnesota Department of Health, Well Management Section
P. O. Box 64975
St. Paul, Minnesota 55164-0975
(651) 215-0811 or 1-800-383-9808

MDH USE ONLY
Amount Received NC Govt
Date Received 9-27-01
Source Code: Well (4901) Site (4903)
Deposit Number
Not Approved
Date Approved 9-27-01 MV
Site Permit Number

Make check or money order payable to the Minnesota Department of Health or supply required credit card information (separate sheet). Mail completed application and fee to the Minnesota Department of Health, Well Management Section, P. O. Box 64975, St. Paul, Minnesota 55164-0975. ATTN: Cashier.

CHECK ALL BOXES THAT APPLY

		FEE
☐	Motor fuel retail outlet or petroleum bulk storage site or agricultural chemical site.	$120/Site
☐	Site permit exists. Permit Number _____.	None
☒	Well owned by state or local government.	None
☐	All other monitoring wells.	$120/Well
☐	Reconstruction requiring a permit.	$120/Well (None for site permit or government).

SEP 2001 RECEIVED WELL MGT.

1. A. LEGAL DESCRIPTION OF WELL LOCATION COUNTY ANOKA

Township Name	Township Number	Range Number	Section Number	Smallest Quarter Largest	MN Unique Well Number	Depth	At-grade
FRIDLEY	30 N	24 W	27	NE NE NW	669273	40±	
	N	W			669274	70±	
	N	W			669275	70±	
	N	W			669276	40±	
	N	W			669277	40±	

B. Well Site Address EAST RIVER ROAD, ANOKA CO PARK, FRIDLEY, MN 55421
Numerical Street Address City Zip Code

C. Sketch (attach map identifying well location and Minnesota Unique Well Number and include distance from nearest road intersection).

2. ☐ Check this box for wells constructed through a CONFINING LAYER or INTO BEDROCK, submit the following information: Well diameter, grout material, drilling method, grouting method, casing materials, cross-sectional diagram of well, and cross-section of anticipated geologic formations.

3. ☐ Check this box for AT-GRADE WELLS, submit the following information: an explanation of why the well casing cannot terminate 12 inches above ground, a map showing the location of the proposed well referenced to a permanent landmark or property boundaries, and cross-sectional diagram of the well can and vault.

4. Well Contractor Name: BERGERSON CASWELL	Registration or License Number: 27058
Contact Person: ROB CATTO	Telephone Number (including Area Code): (763) 479-3121
5. Consultant Name: CH2M HILL CONSTRUCTORS, INC. VENKY VENKATEH	Telephone Number (including Area Code): (216) 623-0402
6. Well Owner Name: MR JOEL SANDERS U.S. NAVY, SOUTHERN DIV. NAVAL FACILITIES ENG. COMMAND	Contact Person: MR. JOEL SANDERS
Well Owner Mailing Address (including City and Zip Code): 2155 EAGLE DRIVE, NORTH CHARLESTON, S.C. 29406	Telephone Number (including Area Code): (843) 820-5562
7. Property Owner Name: ANOKA CO. PARKS DEPARTMENT	Contact Person: MR. JEFF PERRY
Property Owner Mailing Address (including City and Zip Code): 1350 BUNKER LAKE BLVD, ANDOVER, MN 55304	Telephone Number (including Area Code): (763) 767-2896

REQUIRED SIGNATURES ON PAGE 2

669273	669274	669275	669276	669277

SEP 2001 RECEIVED WELL MGT.

Billing Address for Maintenance Permits: MR. JOEL SANDERS

Well Owner Name: US NAVY, Southern Division, Naval Facilities Engineering Command,

Well Owner Mailing Address: 2155 Eagle Dr, N. Charleston, SC 29406

Name of Property Owner or Agent (Please Print): MR. JEFF DORRY

X Signature of Property Owner or Agent:

Name of Well Owner or Agent (Please Print): MR. JOEL SANDERS

X Signature of Well Owner or Agent:

I verify that all the information provided in this application is true and complete. I understand that misrepresentation of facts may result in forfeiture of all rights to licensure/registration as a well contractor or monitoring well contractor in accordance with Minnesota Statutes, Chapter 1031.

Name of Licensed or Registered Contractor (Please Print): BERGERSON CASWELL

Signature of Licensed or Registered Contractor: John W. Hennard

Date: 9/26/01

Failure to submit permit application and fee and receive permit approval prior to the beginning of monitoring well construction is a violation of Minnesota Statutes, Chapter 1031 and may result in the assessment of an administrative penalty.

* Provide supplemental variance request for monitoring wells.

MINNESOTA MDH DEPARTMENT OF HEALTH

Monitoring Well Permit Application

Minnesota Department of Health, Well Management Section
P. O. Box 64975
St. Paul, Minnesota 55164-0975
(651) 215-0811 or 1-800-383-9808

MDH USE ONLY
Amount Received NC Govt
Date Received 9-27-01
Source Code: Well (4901) Site (4903)
Deposit Number
Not Approved
Date Approved 9-27-01 MN
Site Permit Number

Make check or money order payable to the Minnesota Department of Health or supply required credit card information (separate sheet). Mail completed application and fee to the Minnesota Department of Health, Well Management Section, P. O. Box 64975, St. Paul, Minnesota 55164-0975. ATTN: Cashier.

CHECK ALL BOXES THAT APPLY

		FEE
☐	Motor fuel retail outlet or petroleum bulk storage site or agricultural chemical site.	$120/Site
☐	Site permit exists. Permit Number _____	None
☒	Well owned by state or local government.	None
☐	All other monitoring wells.	$120/Well
☐	Reconstruction requiring a permit.	$120/Well (None for site permit holders)

SEP 2001 RECEIVED

1. A. LEGAL DESCRIPTION OF WELL LOCATION COUNTY ANOKA

Township Name	Township Number	Range Number	Section Number	Smallest Quarter Largest	MN Unique Well Number	Depth	At-grade
FRIDLEY	30 N	24 W	27	NE NE NW	669278	40±	
↓	↓ N	↓ W	↓	¼ ¼ ¼ ¼	669279	40±	
↓	↓ N	↓ W	↓	¼ ¼ ¼ ¼	669280	40±	
	N	W		¼ ¼ ¼ ¼			
	N	W		¼ ¼ ¼ ¼			

B. Well Site Address EAST RIVER ROAD, ANOKA CO PARK, FRIDLEY, MN 55421
Numerical Street Address City Zip Code

C. Sketch (attach map identifying well location and Minnesota Unique Well Number and include distance from nearest road intersection).

2. ☐ Check this box for wells constructed through a CONFINING LAYER or INTO BEDROCK, submit the following information: Well diameter, grout material, drilling method, grouting method, casing materials, cross-sectional diagram of well, and cross-section of anticipated geologic formations.

3. ☐ Check this box for AT-GRADE WELLS, submit the following information: an explanation of why the well casing cannot terminate 12 inches above ground, a map showing the location of the proposed well referenced to a permanent landmark or property boundaries, and cross-sectional diagram of the well can and vault.

4. Well Contractor Name: BERGERSON CASWELL	Registration or License Number: 27058
Contact Person: ROB CATTO	Telephone Number (including Area Code): (763) 479-3121
5. Consultant Name: CH2M HILL CONSTRUCTORS, INC. VENKY VENKATEH	Telephone Number (including Area Code): (216) 623-0402
6. Well Owner Name: MR JOEL SANDERS U.S. NAVY, SOUTHERN DIV. NAVAL FACILITIES ENGG. COMMAND	Contact Person: MR. JOEL SANDERS
Well Owner Mailing Address (including City and Zip Code): 2155 EAGLE DRIVE, NORTH CHARLESTON, S.C. 29406	Telephone Number (including Area Code): (843) 820-5562
7. Property Owner Name: ANOKA CO. PARKS DEPARTMENT	Contact Person: MR. JEFF PERRY
Property Owner Mailing Address (including City and Zip Code): 1350 BUNKER LAKE BLVD, ANDOVER, MN 55304	Telephone Number (including Area Code): (763) 767-2896

REQUIRED SIGNATURES ON PAGE 2

669278	669279	669280	

SEP 2001
RECEIVED
WELL MGT.

All owner of the well(s) listed in I. A. on page 1 of this application. I agree I will be responsible for obtaining maintenance permits and for sealing the well(s) in accordance with Minnesota Statutes, section 103I.205 and Minnesota Rules, Chapter 4727.

Mailing Address for Maintenance Permits: MR. JOEL SANDERS

Well Owner Name: U.S. NAVY Southern Division, Naval Facilities Engineering Command,

Well Owner Mailing Address: 2155 Eagle Dr.

N. Charleston, SC 29406

Name of Property Owner or Agent (Please Print): MR. JEFF PERRY

X Signature of Property Owner or Agent:

Name of Well Owner or Agent (Please Print): MR. JOEL SANDERS

X Signature of Well Owner or Agent:

I certify that all the information provided in this application is true and complete. I understand that falsification of facts may result in forfeiture of all rights to licensing/registration as a well contractor/sealing well contractor in accordance with Minnesota Statutes, Chapter 103I.

Name of Licensed or Registered Contractor (Please Print): BERGERSON CASWELL

Signature of Licensed or Registered Contractor:

Date: 9/27/01

Failure to submit permit application and the and receive permit approval prior to the beginning of sealing well construction is a violation of Minnesota Statutes, Chapter 103I and may result in the assessment of an administrative penalty.

A permit application must accompany variance request for monitoring wells.

MN Form 4
ACD 140-0-0

Monitoring Well Permit Application

Minnesota Department of Health, Well Management Section
P. O. Box 64975
St. Paul, Minnesota 55164-0975
(651) 215-0811 or 1-800-383-9808

MDH USE ONLY
Amount Received: NC Govt
Date Received: 10-26-01
Source Code: Well (4901) Site (4903)
Deposit Number:
Not Approved:
Date Approved: 10-27-01
Site Permit Number:

Make check or money order payable to the Minnesota Department of Health or supply required credit card information (separate sheet). Mail completed application and fee to the Minnesota Department of Health, Well Management Section, P. O. Box 64975, St. Paul, Minnesota 55164-0975. ATTN: Cashier.

CHECK ALL BOXES THAT APPLY

		FEE
☐	Motor fuel retail outlet or petroleum bulk storage site or agricultural chemical site.	$120/Site
☐	Site permit exists. Permit Number _____	None
☒	Well owned by state or local government.	None
☐	All other monitoring wells.	$120/Well
☐	Reconstruction requiring a permit.	$120/Well (None for site permit or government)

OCT 2001 RECEIVED WELL MGT.

1. A. LEGAL DESCRIPTION OF WELL LOCATION

COUNTY ANOKA

Township Name	Township Number	Range Number	Section Number	Smallest Quarter Largest	MN Unique Well Number	Depth	At-grade
FRIDLEY	30 N	24 W	27	" NE" NE" NW"	671105	70±	
↓	↓ N	↓ W	↓	" ↓" ↓" ↓"	671106	70±	
	N	W		" " " "			
	N	W		" " " "			
	N	W		" " " "			

B. Well Site Address EAST RIVER ROAD, ANOKA CO. PARK, FRIDLEY, MN. 55421
Numerical Street Address — City — Zip Code

C. Sketch (attach map identifying well location and Minnesota Unique Well Number and include distance from nearest road intersection).

2. ☐ Check this box for wells constructed through a CONFINING LAYER or INTO BEDROCK, submit the following information: Well diameter, grout material, drilling method, grouting method, casing materials, cross-sectional diagram of well, and cross-section of anticipated geologic formations.

3. ☐ Check this box for AT-GRADE WELLS, submit the following information: an explanation of why the well casing cannot terminate 12 inches above ground, a map showing the location of the proposed well referenced to a permanent landmark or property boundaries, and cross-sectional diagram of the well cap and vault.

4. Well Contractor Name: BERGERSON CASWELL	Registration or License Number: 27058
Contact Person: ROB CAHO	Telephone Number (including Area Code): (763) 479-3121
5. Consultant Name: CH2M HILL CONSTRUCTORS, INC. VENKY VENKATESH	Telephone Number (including Area Code): (216) 623-0402 EXT. 13
6. Well Owner Name: U.S. NAVY, SOUTHERN DIV. NAVAL FACILITIES ENGG COMMAND	Contact Person: MR JOEL SANDERS
Well Owner Mailing Address (including City and Zip Code): 2155 EAGLE DRIVE, NORTH CHARLESTON, S.C. 29406	Telephone Number (including Area Code): (843) 820-5562
7. Property Owner Name: ANOKA CO. PARKS DEPARTMENT	Contact Person: MR JEFF PERRY
Property Owner Mailing Address (including City and Zip Code): 1350 BUNKER LAKE BLVD. ANDOVER, MN. 55304	Telephone Number (including Area Code): (763) 767-2896

REQUIRED SIGNATURES ON PAGE 2

621105	621106			

OCT 2001
RECEIVED
WELL MGT.

Billing Address for Maintenance Permits: MR. JOEL SANDERS

Well Owner Name: US NAVY Southern Division, Naval Facilities Engineering Command,

Well Owner Mailing Address: 2155 Eagle Dr
N. Charleston, SC 29406

Name of Property Owner or Agent (Please Print): MR. JEFF PERRY

X Signature of Property Owner or Agent:

Name of Well Owner or Agent (Please Print): MR. JOEL SANDERS

X Signature of Well Owner or Agent:

Name of Licensed or Registered Contractor (Please Print): BERGERSON CASWELL

Signature of Licensed or Registered Contractor:

Date: 10/26/01

A permit application must accompany variance request for monitoring wells.

27058 MN DEPT. OF HEALTH - WELL MANAGEMENT SECTION -- CONSTRUCTION VERIFICATION 669281

This is to verify that this office has received notification that a water well (Minnesota Unique Well Number 669281) is to be located at:

County: ANOKA Township Name: FRIDLEY Received: 09/27/2001
Township No.: 030 Range: 24 Section: 27 ¼ NE¼ NE¼ NW¼
Street Address: EAST RIVER ROAD FRIDLEY 55421-

This well must be constructed in accordance with Minnesota Rules on Wells and Borings. If withdrawing more than 10,000 gal/day or 1 million gal/year, a Water Appropriation Permit is required from the Dept. of Natural Resources at 651/296-4800. Any unused well on this property must be sealed by a licensed water well contractor. MDH staff may be on site to inspect the well construction.

JOHN W. HENRICH
BERGERSON-CASWELL, INC.
5115 INDUSTRIAL STREET
MAPLE PLAIN, MN 55359

WELL OWNER AND ADDRESS

U.S.NAVY, SOUTHERN DIVISION
NAVAL FAC.ENGINEERING COMMAND
2155 EAGLE DRIVE
NORTH CHARLESTON, SC 29406

If well is for a public water supply, this should not be construed as approval of plans.

27058 MN DEPT. OF HEALTH - WELL MANAGEMENT SECTION -- CONSTRUCTION VERIFICATION 669282

This is to verify that this office has received notification that a water well (Minnesota Unique Well Number 669282) is to be located at:

County: ANOKA Township Name: FRIDLEY Received: 09/27/2001
Township No.: 030 Range: 24 Section: 27 ¼ NE¼ NE¼ NW¼
Street Address: EAST RIVER ROAD FRIDLEY 55421-

This well must be constructed in accordance with Minnesota Rules on Wells and Borings. If withdrawing more than 10,000 gal/day or 1 million gal/year, a Water Appropriation Permit is required from the Dept. of Natural Resources at 651/296-4800. Any unused well on this property must be sealed by a licensed water well contractor. MDH staff may be on site to inspect the well construction.

JOHN W. HENRICH
BERGERSON-CASWELL, INC.
5115 INDUSTRIAL STREET
MAPLE PLAIN, MN 55359

WELL OWNER AND ADDRESS

U.S.NAVY, SOUTHERN DIVISION
NAVAL FAC.ENGINEERING COMMAND
2155 EAGLE DRIVE
NORTH CHARLESTON, SC 29406

If well is for a public water supply, this should not be construed as approval of plans.

27058 MN DEPT. OF HEALTH - WELL MANAGEMENT SECTION -- CONSTRUCTION VERIFICATION 669283

This is to verify that this office has received notification that a water well (Minnesota Unique Well Number 669283) is to be located at:

County: ANOKA Township Name: FRIDLEY Received: 09/27/2001
Township No.: 030 Range: 24 Section: 27 ¼ NE¼ NE¼ NW¼
Street Address: EAST RIVER ROAD FRIDLEY 55421-

This well must be constructed in accordance with Minnesota Rules on Wells and Borings. If withdrawing more than 10,000 gal/day or 1 million gal/year, a Water Appropriation Permit is required from the Dept. of Natural Resources at 651/296-4800. Any unused well on this property must be sealed by a licensed water well contractor. MDH staff may be on site to inspect the well construction.

JOHN W. HENRICH
BERGERSON-CASWELL, INC.
5115 INDUSTRIAL STREET
MAPLE PLAIN, MN 55359

WELL OWNER AND ADDRESS

U.S.NAVY, SOUTHERN DIVISION
NAVAL FAC.ENGINEERING COMMAND
2155 EAGLE DRIVE
NORTH CHARLESTON, SC 29406

If well is for a public water supply, this should not be construed as approval of plans.

Appendix A3

MDH Well Installation and Injection Variance Approval Letters

Minnesota Pollution Control Agency
Metro District
520 Lafayette Road North
St. Paul, MN 55155-4194

FAX

Date: 5-7-03

Number of pages including cover sheet 7

To:
Dan Owens
SOUTHDIV NAVFAC

Phone
Fax Phone 8-1-843-820-7465
CC:

From: Dave Douglas
MN Pollution Control Agency

Phone 651-296-7818
Fax Phone

REMARKS: ☐ Urgent ☐ For your review ☐ Reply ASAP ☐ Please Comment

Dan, a copy of the veggie oil pilot study variance from MDH and the variance application.
Dave

MINNESOTA MDH DEPARTMENT OF HEALTH

COPY

Protecting, maintaining and improving the health of all Minnesotans

October 26, 2001

RECEIVED

Refer to: TN2408a

OCT 29 2001

MPCA, Metro District
Site Remediation

Mr. Joel Sanders, P.E.
Department of the Navy – Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
2155 Eagle Drive
North Charleston, South Carolina 29419-9010

Dear Mr. Sanders:

Subject: Request for a Variance from Minnesota Rules, Chapter 4725, to Inject Soybean Oil, Lecithin, and Magnetite/Ferrous Iron to Enhance In-Situ Bioremediation in the NE ¼ of the NE ¼ of the NW ¼ of Section 27, Township 30 North, Range 24 West, Anoka County, Minnesota.

This letter is in response to your request for a variance from Minnesota Rules, Chapter 4725, to inject a vegetable oil solution into three wells in Anoka County Riverfront Park, located in Fridley, Anoka County The park is located immediately west of the Naval Industrial Ordnance Plant (NIROP). The purpose of the variance is to allow a pilot-scale investigation to assess the effectiveness of adding vegetable oil to enhance in-situ bioremediation of groundwater contaminated with chlorinated solvents. A plume of contaminated groundwater has been identified in the park.

Details of the injection proposal, bioremediation mechanisms, and groundwater monitoring are included in the "Final Work Plan for Field Application to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection", dated September 19, 2001, and prepared by Parson's Engineering Science, Inc. (hereinafter referred to as Final Work Plan). A one-time injection of a total of approximately 3600 gallons of food-grade soybean oil, 300 pounds of food-grade lecithin, and 30 pounds of magnetite/ferrous iron particles mixed with a fatty acid dispersant will be injected in three wells (PES-INJ-1, PES-INJ-2, and PES-INJ-3). Approximately 7000 gallons of native ground water will also be injected. Details of the soybean oil, lecithin, and magnetite materials are included in a September 21, 2001, submittal from Mr. Venky Venkatesh of CH2M Hill Constructors, Inc. This submittal is an attachment to the variance request application. This submittal was further amended, based on a communication via electronic mail on October 22, 2001, from Mr. Venky Venkatesh to Mr. Michael Convery of my staff, to eliminate the use of mineral oil as a dispersant for the magnetite. The dispersion of the vegetable oil solution and effectiveness of bioremediation will be monitored for at least one year after injection using 13 monitoring wells, sampled at roughly 2, 5, 8, and 12 months after injection.

Minnesota Rules, part 4725.2050, prohibits the use of wells or borings for disposal of surface water, groundwater, or any other liquid, gas, or chemical. The purpose of this rule provision is to protect groundwater quality.

In accordance with Minnesota Rules, Chapter 4725, and based on the information provided in your variance request application and attachments, **your request for a variance is granted.** The variance is granted because of the need for remediation of ground water contamination at the site. Enhanced bioremediation is being investigated because hydraulic controls have not been fully effective in reducing contaminant levels, especially in the park. The area of highest ground water contamination within the park appears to be a stagnation point in the ground water flow regime at the site and is not greatly influenced by the ground water extraction occurring at the NIROP facility, upgradient of the park. The variance is granted with the following conditions:

1. You must contact Mr. Steve Bennett of the MDH at (651) 643-2113 at least 24 hours prior to the start of injection.
2. The ground water monitoring plan, as detailed in Sections 4 and 5 of the Final Work Plan, must be followed.
3. The contingency plan, as detailed in Section 6 and in Attachment 2 of Appendix D shall be followed to mitigate generation and migration of vinyl chloride.
4. The Field Application Results Report, top be prepared by Parsons Engineering Science, Inc., shall be submitted to the MDH within 30 days of completion of the report and approval by the U.S. Navy.

All other requirements of Minnesota Rules, Chapter 4725, are in effect.

Alternative measures or conditions attached to the variance have the force of law and effect of applicable rule. If a party violates the alternative measures or conditions attached to the variance, the party is subject to enforcement actions and penalties provided in the applicable law or rule.

The variance is conditioned upon the applicable acceptance of and compliance with the conditions of the variance. Failure of the applicant to comply with the conditions of the variance will result in the immediate expiration of the variance.

If you have any questions, please contact Mr. Ed Schneider at (651) 215-0827 or Mr. Steve Bennett at (651) 643-2113.

Sincerely:

Kathy Svanda

for Daniel A. Wilson, Manager
Well Management Section
Division of Environmental Health
P.O. Box 64975
St. Paul, Minnesota 55164-0975

DAW:MPC:dg
cc: Jeff Perry, Anoka County Parks and Recreation
David Douglas, Minnesota Pollution Control Agency
Tom Bloom, U.S. Environmental Protection Agency
Venky Venkatesh, CH2M Hill Constructors, Inc.
Daniel Griffiths, Parsons Engineering Science, Inc.

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, S.C. 29419-9010

Code ES32
20 September 2001

RECEIVED
SEP 25 2001
MPCA, Metro District
Site Remediation

Minnesota Department of Health
Attn: Mr. Edward C. Schneider
Well Management Section, Metro Square Building
Post Office Box 64975
St. Paul, MN 55164-0975

Subj: VARIANCE REQUEST APPLICATION, PILOT-SCALE STUDY TO ENHANCE IN-SITU BIOREMEDIATION OF CHLORINATED SOLVENTS AT THE ANOKA COUNTY PARK, FRIDLEY, MN

Dear Mr. Schneider:

Attached is a completed Variance Request Application for the planned pilot-scale study to enhance in-situ bioremediation of chlorinated solvents at the Anoka County Park in Fridley, MN.

The variance is specifically sought for the following:

1. Installation of 8 monitoring wells that are deeper than the MDH allowed 50' maximum. These 8 monitoring wells will be installed to a depth of 70' to help with imaging the distribution of vegetable oil.

2. Injection of emulsified food-grade soybean vegetable oil. The emulsion will consist of approximately 300 pounds of non-toxic natural food-grade lecithin, 3,600 gallons of food-grade soybean oil, 30 pounds of non-toxic magnetite or ferrous iron particles, and 7,000 gallons of native extracted ground water.

Similar vegetable oil injection studies have been performed at several sites throughout the country by Parsons Engineering Science. The results of which were presented to you at the NIROP Facility in February of this year. The oil imaging study will be performed by USGS to delineate the distribution of vegetable oil injected. Non-toxic magnetite or ferrous iron particles will be added to the emulsion to enhance the sensitivity of the measuring instruments to image the oil. Product information on vegetable oil and lecithin is attached for your information. Also, MSDS sheets for the magnetite and ferrous iron particles are also included for your review.

All field work will be performed in accordance with MPCA and US EPA Region 5 approved Work Plan titled "*Work Plan for Field Application to Enhance In-Situ Bioremediation of Chlorinated Solvents Via Vegetable Oil Injection at the Naval Industrial Reserve Ordnance Plant (NIROP) Fridley, Minnesota, prepared by Parsons Engineering Science, Inc. dated September 2001*".

Subj: VARIANCE REQUEST APPLICATION, PILOT-SCALE STUDY TO ENHANCE IN-SITU BIOREMEDIATION OF CHLORINATED SOLVENTS AT THE ANOKA COUNTY PARK, FRIDLEY, MN

The field work is scheduled to start on October 15, 2001. We look forward to your approval of the request prior to October 10, 2001. We agree to comply with any conditions required by the Minnesota Department of Health.

If you have any questions regarding this, please contact me at (843) 820-5562. We would be glad to arrange for teleconference calls with Navy Technical Staff, Parsons, and/or USGS if you desire to talk to the technical experts in this field.

Sincerely,

JOEL SANDERS, P.E.
Remedial Project Manager
Installation Restoration Branch II

Copy to:
Navy Technical Representative, ROICC (Mr. Mark Conti)
US EPA Region 5 (Mr. Tom Bloom)
MPCA (Mr. Dave Douglas)
Minnesota Dept. of Health (Mr. Michael Convery)
CH2MHill Constructors, Inc. (Mr. Venky Venkatesh)
Tetra Tech NUS, Inc. (Mr. Mark Sladic)

VARIANCE REQUEST APPLICATION

MINNESOTA DEPARTMENT OF HEALTH
Well Management Section, Metro Square Building
P.O. Box 64975, St. Paul, Minnesota 55164-0975
(651) 215-0811 or 1-800-383-9808
TDD (651) 215-0707 and Fax (651) 215-0978

MDH USE ONLY
TN Number _____
Date Received _____
Amount Received _____
Deposit No. _____
Receipt Codes: General Program - 4921
Disclosure Program - 4932

The party requesting the variance must submit the request in writing, to the address listed on the back of this form, along with the nonrefundable $120 application fee.

ID No. of Water Well Status Report (if applicable) _____

In counties or governmental units which currently have a well program delegation agreement, the variance request must be submitted to both the Minnesota Department of Health and to the delegated program for review.

The variance request must contain the following information. (Please print or type)

A. Name of Applicant (i.e., well/boring/sewer/other owner) Joel Sanders		**Company Name (if applicable)** US Navy, Southern Division, Naval Facilities Engg Command	
Street Address 2155 Eagle Dr.			
City N. Charleston	**State** SC	**Zip** 29406	**Telephone No.** ( ) 843-820-5562
B. Name of Property Owner (if different from above) Jeff Perry		**Company Name (if applicable)** Anoka County Parks Department	
Street Address 1350 Bunker Lake Blvd.			
City Andover	**State** MN	**Zip** 55304	**Telephone No.** ( ) 763-767-2896
C. Name of Contractor (if applicable) Rob Caho		**Company Name (if applicable)** Bergerson-Caswell, Inc. MDH License# 27058	
Street Address 5115 Industrial St.			
City Maple Plain	**State** MN	**Zip** 55359	**Telephone No.** ( ) 763-479-3121

D. Well or Boring Location	**Fraction** ¼ ¼ ¼	**Section No.**	**Range No.**	**Township No.**	**Township Name**	**County**

Street Address of Well or Boring East River Road, Anoka County Park

City	**State**	**Zip**	**Fire No.**	**MN Unique Well No. (if known)**
Fridley	MN	55421		

E. Rule(s) from which variance is requested (cite specific rule[s]). (1) 4725.6650 - depth of 8 wells will be 70', which is > 50' allowed

(2) 4725.2050 - Injection of ~ 3,600 gal of food-grade soybean oil; ~ 300 lbs of food-grade lecithin; ~ 7,000 gal of native groundwater; and ~ 30 pounds of non-toxic magnetite of ferrous iron particles

F. Reason(s) rule cannot be met (include supporting evidence). The deeper wells are required for imaging the oil to delineate the distribution of oil. The vegetable oil is used to enhance bioremediation. The lecithin is added as an emulsifier. Native groundwater is added to better emulsify the oil prior to injection. The magnetite or ferrous iron particles are added to do the imaging study. Product information and MSDS sheets for the vegetable oil, lecithin, magnetite, and ferrous iron are included for your review.

G. Alternative or additional protective measures to be taken to assure a comparable degree of protection to health or the environment.
Sampling and analyses of groundwater will be performed at 2, 5, 8, and 12 months as specified in Section 4.4 & 4.7 the Final Work Plan Rev.1, Dt Sep.19, 2001. All the wells will be properly sealed in accordance with MDH requirements after the completion of the study.

H. Well Information					
	Estimated Depth	**Casing Depth**	**Casing Diameter**	**Casing Type**	**Method of Drilling**
	Depth to Water	**Grout Materials**			
	Description of Construction Methods and Anticipated Geologic Conditions.				
	Refer to Section 4.3 of Final Work Plan, Rev. 1, Dated September 19, 2001.				

I. **A scaled map showing the location of the well or boring in relation to property lines, structures, utilities, and contamination sources (use additional sheets as necessary and note distances from contamination sources and wells on adjacent properties).** Refer to Figure 1-1 of the Final Work Plan for Map

Please include the following information for a variance request from isolation distances.

A. **Description of the age, design, size, and type of construction of any existing or potential contaminant sources (such as septic systems; petroleum storage; unused, unsealed wells; etc.). Include contamination sources on adjacent properties.**

Refer to Work Plan Section 2.0 for details.

B. **Information on the soil type from a soil survey, percolation test, or soil boring report.**

Refer to Work Plan Section 2.0, Table 2.1 for details.

C. **Other relevant information, such as any testing, inspection, or certification data (please attach reports or data).**

Refer to Section 4.0 of the Work Plan

Incomplete applications cannot be processed and will be returned to the applicant. Please submit a complete application including application fees, scaled map, and signatures of well owner and contractor (if applicable). Please include with this request any relevant information necessary to properly evaluate the request and a copy of any review of any contamination sources by a local or state unit of government under other applicable regulations.

The nonrefundable variance fee of $120 along with the variance application, signed by the applicant and the contractor, with supportive information, must be returned to the Well Management Section, Minnesota Department of Health, Metro Square Building, P.O. Box 64975, St. Paul, Minnesota 55164-0975.

This variance is conditioned upon the applicants acceptance of, and compliance with the conditions of this variance. Failure by the applicant to comply with the conditions prescribed in this variance will result in the immediate expiration of this variance.

If the variance is granted, I agree to comply with any conditions required by the Minnesota Department of Health.

Date	First Applicant Name (print) Joel Sanders	First Applicant Signature
Date	Second Applicant Name (print)	Second Applicant Signature
Date	Contractor Name (print)	Contractor Signature

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669268

WELL LOCATION

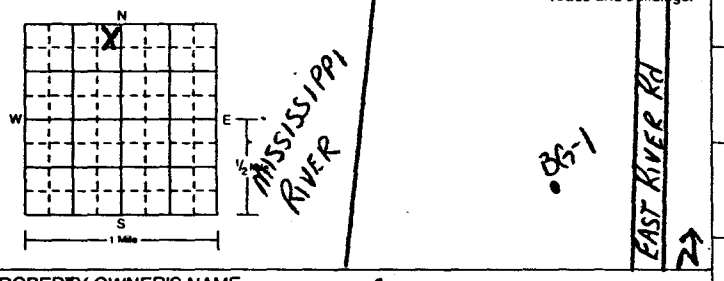
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA CTY PARK, FRIDLEY, 55421

~~or Fire Number~~

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location indicated above.

1350 BUNKER Lake Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S NAVY

Well owner's mailing address if different than property owner's address indicated above.

JOEL SANDERS
Southern Div. Naval Facilitation
ERLG Command
2155 EAGLE DR. NORTH CHARLESTON, SC. 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD, SAND TOPSOIL	BLACK	MEDIUM	0	2
SAND	BROWN	SOFT	2	6
SAND	TAN-BRN	SOFT	6	8
SAND	TAN	SOFT	8	14
SAND	BROWN	SOFT	16	22
Course Sand	BROWN	SOFT	22	26
SILT - SANDY SILT-DAMP	BROWN	SOFT	26	28
SANDY SILT-DAMP	BROWN	SOFT	28	30
SAND-Wet	BROWN	MEDIUM	30	36
FINE SAND	BROWN	SOFT	36	42
VERY FINE SAND	BROWN	SOFT	42	44
FINE SAND	BROWN	SOFT	44	52
FINE SAND-V.FINE SAND	BROWN	SOFT	52	54
V.FINE SAND	BROWN	SOFT	54	58
V.FINE SAND-FINE SAND	BROWN	SOFT	58	60
FINE SAND	BROWN	SOFT	60	74

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

BG-1

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669268

WELL DEPTH (completed): 73 ft. Date Work Completed: 10-18-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ___ ft. to ___ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic ☐ Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER	WEIGHT	HOLE DIAM.
3 in. to 34 ft.	lbs./ft.	10 in. to 73 ft.
3 in. to 44-73 ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type:
Slot/Gauze: .020
Set between 34 ft. and 44 ft.
Diam. 3"
Length 10'
FITTINGS:

OPEN HOLE from ___ ft. to ___ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-18-01

PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ___ Model ___
☑ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 50 to 73 ft. 2 ☐ yds. ☑ bags
from 0 to 28 ft. 7 ☐ yds. ☑ bags
from ___ to ___ ft. ___ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ___ feet ___ direction ___ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ___
Manufacturer's name ___
Model number ___ HP ___ Volts ___
Length of drop pipe ___ ft. Capacity ___ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL, INC — Licensee Business Name — Lic. or Reg. No. 27058

Johnny W. Glenick — Authorized Representative Signature — Date 11-9-01

Glen Holmen — Name of Driller — Date 10-18-01

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 671106

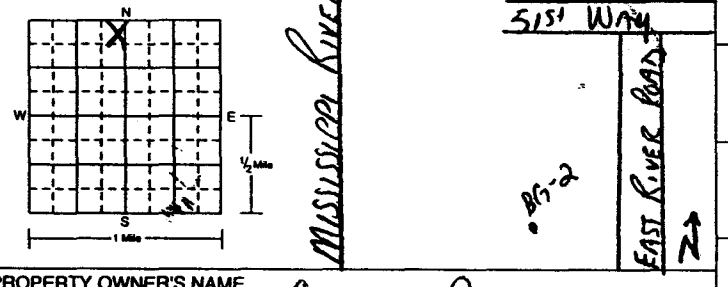
WELL LOCATION

County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NENW

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CO. PARK, FRIDLEY — ~~or Fire Number~~ 55421

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION ENGG COMMAND
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
CLAY TOPSOIL - SAND	DK. RED/BRN	MEDIUM	0	2
SAND	RED/BRN - TAN	SOFT	2	4
SAND	TAN	SOFT	4	12
Med. SAND	BROWN	SOFT	12	14
SAND & ROCK	BRN - BLUE	MEDIUM	14	16
M-F SAND	TAN	SOFT	16	22
ROCKY SAND	BROWN	MEDIUM	22	24
ROCK		HARD	24	26
FINE SAND	GRAY	SOFT	26	28
SANDSTONE - SAND	GRAY	MEDIUM	28	30
SANDY CLAY	GRAY	SOFT	30	32
FINE SAND	GRAY	SOFT	32	40
SAND	BROWN	SOFT	40	46
FINE SAND	BROWN	SOFT	46	58
FINE SILTY SAND	BROWN	SOFT	58	60
FINE SAND	BROWN	SOFT	60	72
M-F SAND	BROWN	SOFT	72	74

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

BG-2

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 671106

140-0020

WELL DEPTH (completed): 73 ft. Date Work Completed: 10-16-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ___ ft. to ___ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 34 ft.		lbs./ft.	10 in. to 73 ft.
3 in. to 44-73 ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: PVC Make: JOHNSON Type: Slot/Gauze: .020 Set between: 34 ft. and 44 ft. Diam.: 3" Length: 10' FITTINGS:

OPEN HOLE from ___ ft. to ___ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured: 10-16-01

PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ___ Model ___ ☑ Casing Protection ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material: ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 50 to 70 ft. 2 ☐ yds. ☑ bags
from 0 to 28 ft. 77 ☐ yds. ☑ bags
from ___ to ___ ft. ___ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ___ feet ___ direction ___ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ___
Manufacturer's name ___
Model number ___ HP ___ Volts ___
Length of drop pipe ___ ft. Capacity ___ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL, INC — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henrich — 11-12-01
Authorized Representative Signature — *Date*

Alan Nelson — 10-16-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 671105

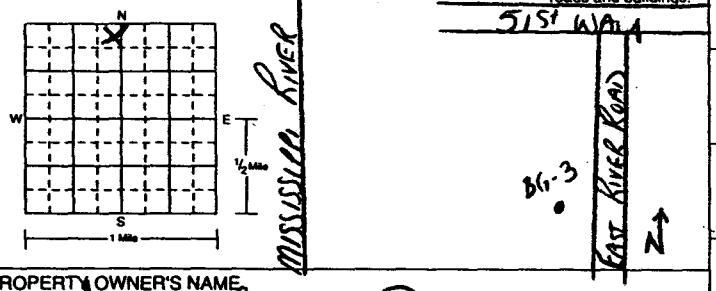
WELL LOCATION

County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA Co. PARK, FRIDLEY 55421 ~~or Fire Number~~

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERLOC COMMAND
2155 EAGLE DR.
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD - SAND	BLACK	MEDIUM	0	2
SAND	BROWN	SOFT	2	4
SAND	BRN TAN	SOFT	4	12
SAND	TAN	SOFT	12	20
SAND + ROCK	BROWN	HARD	20	24
SILTY SAND	GRAY	SOFT	26	28
SILTY SAND - SAND	GRY - GRY TAN	SOFT	28	30
FINE SAND	GRAY	SOFT	30	32
SAND	GRAY	SOFT	32	36
FINE SAND	GRAY	SOFT	36	44
FINE SAND	BROWN	SOFT	44	48
SAND	BROWN	SOFT	48	56
SILTY SAND	BROWN	SOFT	56	60
SAND	BROWN	SOFT	60	72
V. FINE SAND	BROWN	SOFT	72	74

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

BG-3

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 671105

WELL DEPTH (completed): 73 ft. Date Work Completed: 10-17-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

HOLE DIAM.

CASING DIAMETER / WEIGHT

3 in. to 34 ft.	lbs./ft.	10 in. to 73 ft.
3 in. to 44-73 ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: PVC Make: JOHNSON Type: Diam. 3" Slot/Gauze: .020 Length: 10' Set between 34 ft. and 44 ft. FITTINGS:

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-17-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No

Grout Material: ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite

from 50	to 70 ft.	2	☐ yds. ☑ bags
from 0	to 28 ft.	18	☐ yds. ☑ bags
from	to ft.		☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____

Manufacturer's name ____

Model number ____ HP ____ Volts ____

Length of drop pipe ____ ft. Capacity ____ g.p.m.

Type; ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL, INC — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henning — 11-12-01
Authorized Representative Signature — *Date*

Glen Holmes — 11-17-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669281

WELL LOCATION

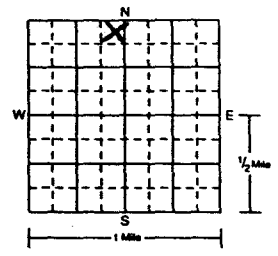
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

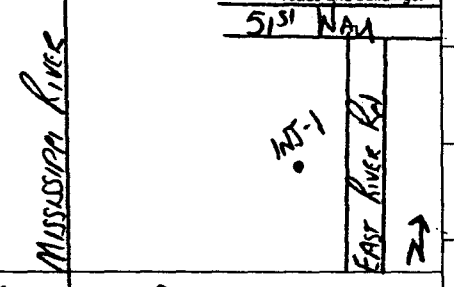
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd ANOKA Co PARKS, FRIDLEY

or Fire Number: 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERGG Command
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD SAND	BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	6
M-F SAND	BRN TAN	SOFT	6	8
FINE SAND	BRN TAN	SOFT	8	22
ROCK		HARD	22	26
CLAY	BROWN	HARD	26	28
CLAY - SANDY CLAY	BROWN	HARD	28	30
SANDY CLAY	BROWN	MEDIUM	30	32
FINE SAND	BROWN	SOFT	32	34
SILTY SAND F. SAND	BROWN	SOFT	34	36
FINE SAND	BROWN	SOFT	36	48
FINE SAND - V. FINE SAND	BROWN	SOFT	48	50
V. FINE SAND	BROWN	SOFT	50	56
FINE SAND - SILTY SAND	BROWN	SOFT	56	58
V. FINE SAND	BROWN	SOFT	58	60
FINE SAND	BROWN	SOFT	60	64
FINE SAND - SILTY SAND	BROWN	SOFT	66	68
FINE SAND	BROWN	SOFT	68	70

Use a second sheet if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

PES INJ-1

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669281

WELL DEPTH (completed): 70 ft. Date Work Completed: 10-24-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☑ INJECTION

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded

CASING DIAMETER	WEIGHT	HOLE DIAM.
3 in. to 35 ft.	lbs./ft.	10 in. to 70 ft.
3 in. to 45-70 ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: PVC Make: JOHNSON Type: Diam. 3" Slot/Gauze: .020 Length: 10' Set between 35 ft. and 45 ft. FITTINGS:

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-24-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No

Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite

from	to		
0	30 ft.	19	☐ yds. ☑ bags
55	70 ft.	2	☐ yds. ☑ bags
	ft.		☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____

Manufacturer's name ____

Model number ____ HP ____ Volts ____

Length of drop pipe ____ ft. Capacity ____ g.p.m.

Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2418

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL INC — Licensee Business Name — Lic. or Reg. No. 27058

John W. Henrich — Authorized Representative Signature — Date 11-12-01

Allen Helmer — Name of Driller — Date 10/24/01

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669282

WELL LOCATION

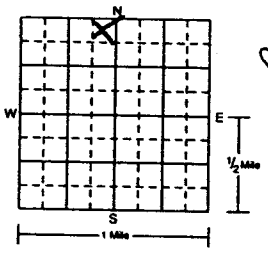
County Name: ANOKA

Township Name: FRIDLEY | Township No.: 30 | Range No.: 24 | Section No.: 27 | Fraction: NE ¼ NE ¼ NW ¼

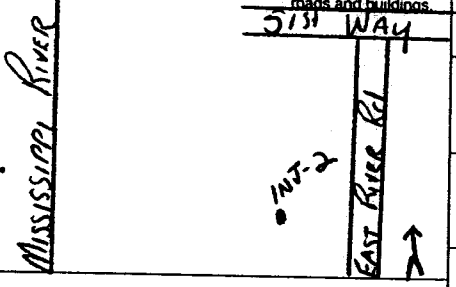
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CO. PARKS, FRIDLEY

~~or Fire Number~~: 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ER66 COMMAND
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD SAND	BROWN	MEDIUM	0	2
SAND	BROWN	SOFT	2	6
SAND	BRN TAN	SOFT	6	10
FINE SAND	BRN TAN	SOFT	10	12
FINE SAND COARSE SAND	BROWN-TAN	SOFT	12	14
C-SAND MED. SAND	BROWN	SOFT	14	16
COURSE SAND	BROWN	SOFT	18	30
CLAY SANDY CLAY	BROWN	MEDIUM	30	32
FINE SAND	BROWN	SOFT	32	36
MED. SAND	BROWN	SOFT	36	40
FINE SAND	BROWN	SOFT	40	54
MED. SAND	BROWN	SOFT	54	56
FINE SAND	BROWN	SOFT	56	66
MED. SAND	BROWN	SOFT	66	68
M.SAND - FINE SAND	BROWN	SOFT	68	70

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

PES INJ-2

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669282

WELL DEPTH (completed): 70 ft. | Date Work Completed: 10-24-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO — FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☐ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☑ INJECTION

CASING: ☐ Steel ☑ Plastic — Drive Shoe? ☐ Yes ☐ No — ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 40 ft.		lbs./ft.	10 in. to 70 ft.
3 in. to 50-70 ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: Make JOHNSON; Type PVC; Slot/Gauze .020; Set between 40 ft. and 50 ft.; Diam. 3"; Length 10'; FITTINGS:

OPEN HOLE: from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface — Date measured 10-24-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No

Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite

from 60	to 70 ft.	1½	☐ yds. ☑ bags
from 0	to 35 ft.	20	☐ yds. ☑ bags
from	to ft.		☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed — Date installed ____

Manufacturer's name ____

Model number ____ HP ____ Volts ____

Length of drop pipe ____ ft. Capacity ____ g.p.m.

Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL INC. — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Hemind — 11-12-01
Authorized Representative Signature — *Date*

Alan Holmes — 10-24-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

MINNESOTA UNIQUE WELL NO. 669283

WELL LOCATION

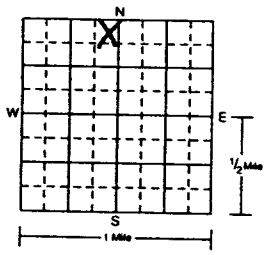
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE. NE. NW

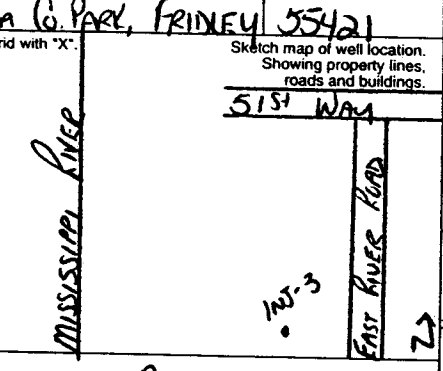
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA Co. PARK, FRIDLEY

~~or Fire Number~~: 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERGG Command
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD - SAND	BROWN	MEDIUM	0	2
SAND	BROWN	SOFT	2	6
SAND	BRN TAN	SOFT	6	12
C-SAND	BROWN	SOFT	12	14
Med. SAND	BROWN	SOFT	14	16
Course SAND	BROWN	SOFT	18	20
Med. SAND	BROWN	SOFT	20	24
Course SAND	BROWN	SOFT	24	26
C. SAND + ROCK	BROWN	HARD	26	28
Course SAND	BROWN	SOFT	28	32
FINE SANDY CLAY	BROWN	MEDIUM	32	34
FINE SANDY CLAY - FINE SAND	BROWN	MEDIUM	34	36
FINE SAND	BROWN	SOFT	36	56
Med. SAND	BROWN	SOFT	56	60
FINE SAND	BROWN	SOFT	60	64
FINE SILTY SAND	BROWN	SOFT	64	66
FINE SAND	BROWN	SOFT	66	70

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

PES INJ-3

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669283

IC# 140-0020

WELL DEPTH (completed): 70 ft. Date Work Completed: 10-22-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☐ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☑ INJECTION

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded

CASING DIAMETER / WEIGHT:
- 3 in. to 40 ft. ____ lbs./ft.
- 3 in. to 50-70 ft. ____ lbs./ft.
- ____ in. to ____ ft. ____ lbs./ft.

HOLE DIAM.: 10 in. to 70 ft.

SCREEN: Make JOHNSON; Type PVC; Slot/Gauze .020; Set between 40 ft. and 50 ft.; Diam. 3"; Length 10'; FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-22-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
- Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
- from 60 to 70 ft. 1 ☐ yds. ☑ bags
- from 0 to 35 ft. 20 ☐ yds. ☑ bags
- from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____

Manufacturer's name ____

Model number ____ HP ____ Volts ____

Length of drop pipe ____ ft. Capacity ____ g.p.m.

Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergelson-Caswell Inc. — Licensee Business Name — Lic. or Reg. No. 27058

John W. Henrich — Authorized Representative Signature — Date 11-12-01

Steve Helmer — Name of Driller — Date 10-22-01

HE-01205-07 (Rev. 2/99)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669269

WELL LOCATION

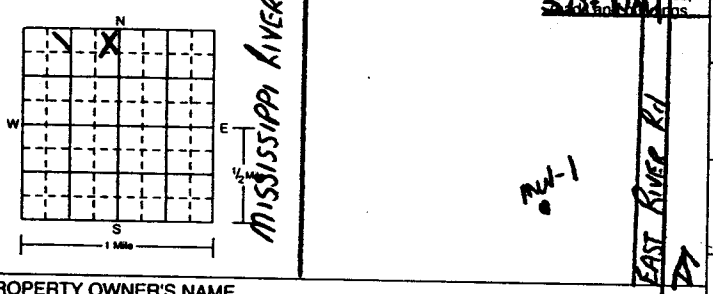
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA Cty PARK, FRIDLEY,

or Fire Number: 55421

Show exact location of well in section grid with "X". Sketch map of well location. Show nearby roads, buildings, etc.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER Lake Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION
ER66 COMMAND
2155 EAGLE DR
NORTH CHARLESTON, SC. 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD to SAND	BROWN	MEDIUM	0	2
SAND	BROWN	SOFT	2	4
M. SAND - FINE SAND	BRN-TAN	SOFT	4	6
FINE SAND	BRN-TAN	SOFT	6	12
COURSE SAND	BROWN	SOFT	12	14
FINE SAND	BRN-TAN	SOFT	14	20
Med - COURSE SAND	BROWN	SOFT	20	26
ROCK	1	HARD	26	28
CLAY	BROWN	HARD	28	32
CLAY - FINE SAND	BROWN	HARD	32	34
FINE SAND	BROWN	SOFT	34	36
FINE SAND	BROWN	SOFT	38	44
Medium SAND	BROWN	SOFT	44	48
FINE SAND	BROWN	SOFT	48	54
SILTY SAND	BROWN	SOFT	54	56
V. FINE SAND	BROWN	SOFT	56	62
MED. SAND	BROWN	SOFT	62	64
FINE SAND	BROWN	SOFT	64	68

Use a second sheet if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-1

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669269

WELL DEPTH (completed): 70 ft. Date Work Completed: 10-25-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ___ ft. to ___ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic ☐ Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER	WEIGHT	HOLE DIAM.
3 in. to 35 ft.	lbs./ft.	10 in. to 70 ft.
3 in. to 45-70 ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type:
Slot/Gauze: .020
Set between 35 ft. and 45 ft.
Diam. 3"
Length 10'
FITTINGS:

OPEN HOLE from ___ ft. to ___ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-25-01

PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ___ Model ___
☑ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 55 to 30 ft. 2 ☐ yds. ☑ bags
from 0 to 30 ft. 19 ☐ yds. ☑ bags
from ___ to ___ ft. ___ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ___ feet ___ direction ___ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ___
Manufacturer's name ___
Model number ___ HP ___ Volts ___
Length of drop pipe ___ ft. Capacity ___ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell, Inc — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henrich — 11-9-01
Authorized Representative Signature — *Date*

Glenn Holmes — 10/25/01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669270

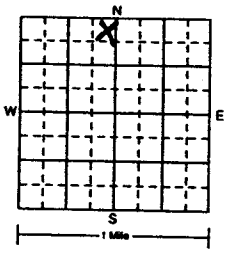
WELL LOCATION

County Name: ANOKA

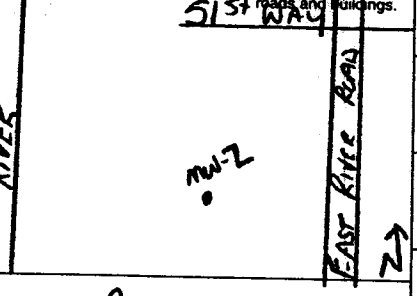
Township Name: FRIDLEY | Township No.: 30 | Range No.: 24 | Section No.: 27 | Fraction: NE NE NW

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CTY PARK, FRIDLEY, 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION
ERUG COMMAND
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD TOPSOIL	DK. BROWN	MEDIUM	0	2
SAND	BROWN	MEDIUM	2	6
SAND	BRN-TAN	MEDIUM	6	10
M-COURSE SAND	BROWN	SOFT	10	14
M-FINE SAND	BRN-TAN	SOFT	16	18
FINE SAND	BRN-TAN	SOFT	18	22
MED SAND	BROWN	SOFT	22	24
M-C SAND	BROWN	SOFT	24	26
ROCKY SAND	BROWN	HARD	26	28
SANDY CLAY	BROWN	MEDIUM	28	32
FINE SAND	BROWN	SOFT	34	42
V. FINE SAND	BROWN	SOFT	42	46
FINE SAND	BROWN	SOFT	46	48
FINE SAND - SILTY SAND	BROWN	SOFT	48	50
V. FINE SAND	BROWN	SOFT	50	54
SILTY SAND	BROWN	SOFT	54	56
FINE SAND	BROWN	SOFT	56	62
V. FINE SAND	BROWN	SOFT	62	70

Use a second sheet if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-2

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669270

WELL DEPTH (completed): 62 ft. | Date Work Completed: 10-30-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO — FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic — Drive Shoe? ☐ Yes ☐ No — ☐ Threaded ☐ Welded ☐

CASING DIAMETER	WEIGHT	HOLE DIAM.
3 in. to 35 ft.	lbs./ft.	10 in. to 62 ft.
3 in. to 45-62 ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type:
Slot/Gauze: .020
Set between 35 ft. and 45 ft.
Diam. 3"
Length 10'
FITTINGS:

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface — Date measured 10-30-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 30 ft. 19 ☐ yds. ☑ bags
from 55 to 62 ft. 1 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed — Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell, Inc. — Licensee Business Name — Lic. or Reg. No. 27058

John W. Henrich — Authorized Representative Signature — Date 11-9-01

Glen Holmes — Name of Driller — Date 10/30/01

IC# 140-0020

HE-01205-07 (Rev. 2/99)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669271

WELL LOCATION

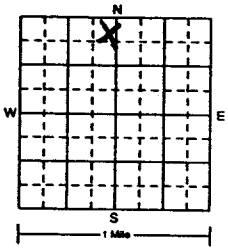
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

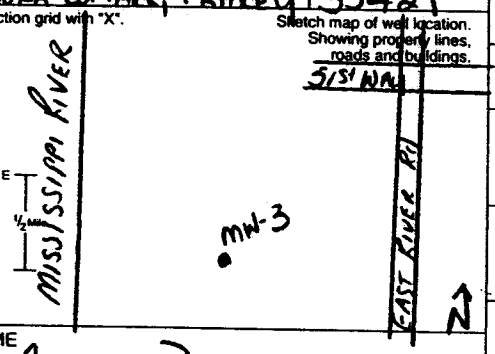
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER ROAD, ANOKA CO. PARK, FRIDLEY

~~or Fire Number~~: 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION
ERLG COMMAND
2155 EAGLE DRIVE
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD - SANDY TOPSOIL	BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	6
MED. SAND	BRN-TAN	SOFT	6	10
M-COURSE SAND	BROWN	SOFT	10	14
MED. SAND	BROWN	SOFT	14	16
FINE SAND	BRN-TAN	SOFT	16	22
FINE SAND - MED - COARSE SAND	BRN-TAN	SOFT	22	24
FINE SAND	BRN-TAN	SOFT	24	26
M-C SAND	BROWN	SOFT	26	28
F-C SILTY SAND	BROWN	SOFT	28	30
FINE SILTY SAND	BROWN	SOFT	30	38
FINE SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-3

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669271

WELL DEPTH (completed): 40 ft. Date Work Completed: 11-1-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ___ ft. to ___ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER	WEIGHT	HOLE DIAM.
3 in. to 30 ft.	lbs./ft.	10 in. to 40 ft.
in. to ft.	lbs./ft.	in. to ft.
in. to ft.	lbs./ft.	in. to ft.

SCREEN: Make JOHNSON Type PVC Diam. 3" Slot/Gauze .020 Length 10' Set between 30 ft. and 40 ft. FITTINGS:

OPEN HOLE from ___ ft. to ___ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 11-1-01

PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ___ Model ___ ☑ Casing Protection ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No

Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite

from	to		
0 ft.	25 ft.	15	☐ yds. ☑ bags
ft.	ft.		☐ yds. ☐ bags
ft.	ft.		☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ___ feet ___ direction ___ type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ___

Manufacturer's name ___

Model number ___ HP ___ Volts ___

Length of drop pipe ___ ft. Capacity ___ g.p.m.

Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☐ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell Inc. — *Licensee Business Name* — 27058 *Lic. or Reg. No.*

John W. Henrich — *Authorized Representative Signature* — 11-9-01 *Date*

Alan Helmer — *Name of Driller* — 11-1-01 *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669272

WELL LOCATION

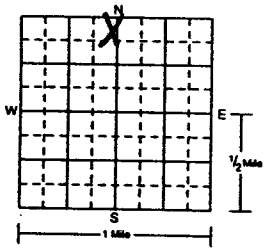
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

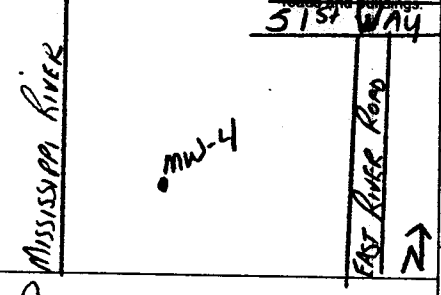
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA CO. PARK, FRIDLEY, 55421

~~or Fire Number~~

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA City PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION
ERGle Command
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD, SAND, TOPSOIL	BROWN	Medium	0	2
FINE SAND	BROWN	SOFT	2	4
FINE SAND	BRN-TAN	SOFT	4	10
FINE-MED SAND	BRN-TAN	SOFT	10	12
MED SAND	BROWN	SOFT	12	16
FINE SAND	BRN-TAN	SOFT	16	26
FINE SAND	BROWN	SOFT	26	28
MED SAND	BROWN	SOFT	28	30
COURSE SAND-SILTY SAND	BROWN	SOFT	30	32
MED SILTY SAND	BROWN	SOFT	32	38
MED. SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-4

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669272

WELL DEPTH (completed): 40 ft. Date Work Completed: 11-2-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER / WEIGHT:
3 in. to 30 ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.

HOLE DIAM.: 10 in. to 40 ft.

SCREEN: PVC
Make: JOHNSON
Type: ____ Diam. 3"
Slot/Gauze: .020 Length: 10'
Set between 30 ft. and 40 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 11-2-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ____ Model ____
☑ Casing Protection ____ ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 15 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 24108

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell, Inc. — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henrich — 11/12/01
Authorized Representative Signature — *Date*

Glen Holmes — 11/2/01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669273

WELL LOCATION

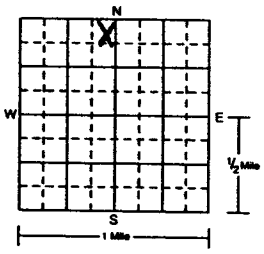
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

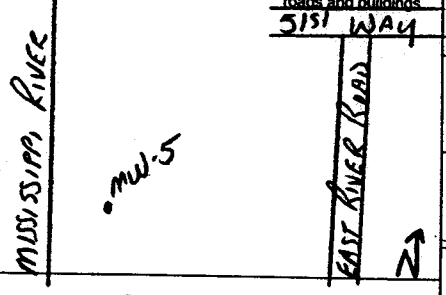
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CTY PARK, FRIDLEY, 55421

~~or Fire Number~~

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME

ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME

U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN NAVAL FACILITATION - ERLG COMMAND
2155 EAGLE DR.
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD, FINE SAND	BROWN	MEDIUM	0	2
F-M-C SAND	BROWN	SOFT	2	4
M-C SAND	BROWN	SOFT	4	10
MED. SAND	BROWN	SOFT	10	14
FINE SAND	BRN-TAN	SOFT	14	20
MED. SAND	BRN-TAN	SOFT	20	24
MED SAND	BROWN	SOFT	24	28
MED-COURSE SAND	BROWN	SOFT	28	30
MED. SAND	BROWN	SOFT	30	36
FINE SAND	BROWN	SOFT	36	38
MED. SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-5

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY

669273

IC# 140-0020

WELL DEPTH (completed): 40 ft.

Date Work Completed: 11-2-01

DRILLING METHOD
☐ Cable Tool ☐ Driven ☐ Dug
☑ Auger ☐ Rotary ☐ Jetted
☐ _____

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO
FROM _____ ft. to _____ ft.

USE
☐ Domestic ☑ Monitoring ☐ Heating/Cooling
☐ Irrigation ☐ Community PWS ☐ Industry/Commercial
☐ Environ. Bore Hole ☐ Noncommunity PWS ☐ Remedial
☐ Dewatering ☐ _____

CASING
Drive Shoe? ☐ Yes ☐ No
☐ Steel ☐ Threaded ☐ Welded
☑ Plastic ☐ _____

CASING DIAMETER / WEIGHT
3 in. to 30 ft. _____ lbs./ft.
_____ in. to _____ ft. _____ lbs./ft.
_____ in. to _____ ft. _____ lbs./ft.

HOLE DIAM.
10 in. to 40 ft.
_____ in. to _____ ft.
_____ in. to _____ ft.

SCREEN
Make JOHNSON
Type PVC
Slot/Gauze .020
Set between 30 ft. and 40 ft.
Diam. 3"
Length 10'
FITTINGS: _____

OPEN HOLE
from _____ ft. to _____ ft.

STATIC WATER LEVEL
28 ft. ☑ below ☐ above land surface Date measured 11-2-01

PUMPING LEVEL (below land surface)
_____ ft. after _____ hrs. pumping _____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer _____ Model _____
☑ Casing Protection _____ ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 15 ☐ yds. ☑ bags
from _____ to _____ ft. _____ ☐ yds. ☐ bags
from _____ to _____ ft. _____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION
_____ feet _____ direction _____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed _____
Manufacturer's name _____
Model number _____ HP _____ Volts _____
Length of drop pipe _____ ft. Capacity _____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ _____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON - CASWELL, INC. — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henrich — 11-12-01
Authorized Representative Signature — *Date*

Glenn Holmes — 11-2-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669274

WELL LOCATION

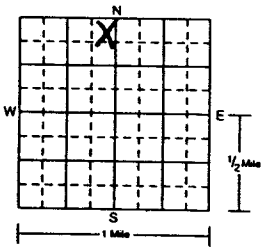
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

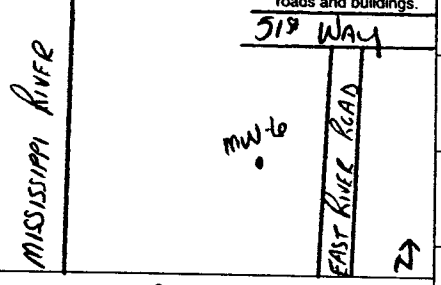
House Number/Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CTY PARK, FRIDLEY, 55421

~~or File Number~~

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERGL COMMAND
2155 EAGLE DRIVE
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD, TOPSOIL	BLACK	MEDIUM	0	2
MED. SAND	BROWN	SOFT	2	6
MED. SAND	BRN-TAN	SOFT	6	10
M-C SAND - F. SAND	BRN-BRN TAN	SOFT	10	12
FINE SAND	BRN-TAN	SOFT	12	14
MED. SAND	BROWN	SOFT	14	18
FINE SAND	BROWN	SOFT	18	20
F-M SAND	BROWN	SOFT	20	22
MED. SAND	BROWN	SOFT	22	26
COURSE SAND	BROWN	SOFT	26	28
SANDY CLAY	BROWN	MEDIUM	28	32
FINE SAND	BROWN	SOFT	32	50
SILTY SAND	BROWN	SOFT	50	52
FINE SAND	BROWN	SOFT	52	56
FINE SAND-SILTY SAND	BROWN	SOFT	56	60
FINE SAND	BROWN	SOFT	60	62
V. FINE SAND	BROWN	SOFT	62	64

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-6

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669274

WELL DEPTH (completed): 60 ft. Date Work Completed: 10-29-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 35 ft.		lbs./ft.	10 in. to 60 ft.
3 in. to 45-60 ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type: ____ Diam. 3"
Slot/Gauze: .020 Length 10'
Set between 35 ft. and 45 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-29-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____
☑ Casing Protection ____ ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 30 ft. 19 ☐ yds. ☑ bags
from 55 to 60 ft. 1 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell, Inc — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henrich — 10/12/01
Authorized Representative Signature — *Date*

Allen Helmen — 10-29-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669275

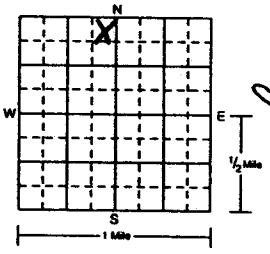
WELL LOCATION

County Name: ANOKA

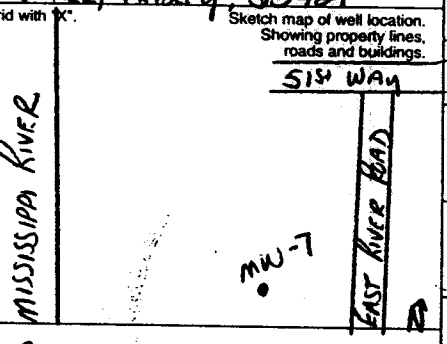
Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

House Number, Street Name, City, and Zip Code of Well Location or Fire Number: EAST RIVER RD, ANOKA CO. PARK, FRIDLEY, 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA CTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION, ERGG COMMAND
2155 EAGLE DR.
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
TOPSOIL - SAND	BROWN	MEDIUM	0	2
SAND	BROWN	SOFT	2	6
MED. SAND	BRN-TAN	SOFT	6	10
FINE SAND	BRN-TAN	SOFT	10	12
FINE SAND	BROWN	SOFT	14	16
FINE SAND	BRN-TAN	SOFT	16	18
F-M SAND	BROWN	SOFT	18	20
MED. SAND	BROWN	SOFT	20	22
M-C SAND	BROWN	SOFT	22	26
M-C SAND FINE SAND	BRN-BRN-TAN	SOFT	26	28
CLAY - M-C SAND	BRN - BRNTAN	MEDIUM	28	30
COURSE SAND	BROWN	SOFT	30	32
CLAY	BROWN	SOFT	32	34
CLAY & FINE SAND	BROWN	MEDIUM	34	36
FINE SAND	BROWN	SOFT	36	52
V. FINE SAND	BROWN	SOFT	52	56
FINE SAND	BROWN	SOFT	56	62
FINE SAND - SILTY SAND	BROWN	SOFT	62	64
FINE SAND	BROWN	SOFT	64	70

Use separate sheet if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.
MW-7

01-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY

669275

WELL DEPTH (completed): 70 ft.

Date Work Completed: 10-25-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO
FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic
Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 40 ft.		lbs./ft.	10 in. to 70 ft.
3 in. to 50-70 ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type:
Slot/Gauze: .020
Set between 40 ft. and 50 ft.
Diam. 3"
Length 10'
FITTINGS:

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-25-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ____ Model ____
☑ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 35 ft. 20 ☐ yds. ☑ bags
from 60 to 70 ft. 1 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION
____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell, Inc — 27058
Licensee Business Name — Lic. or Reg. No.

John W. Henning — 11/12/01
Authorized Representative Signature — Date

Allan Holmes — 10/25/01
Name of Driller — Date

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669276

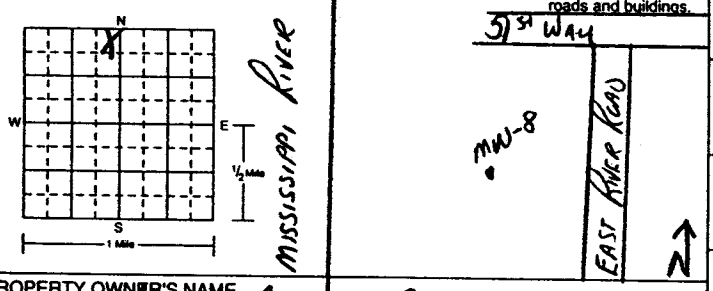
WELL LOCATION

County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

House Number, Street Name, City, and Zip Code of Well Location (or Fire Number): EAST RIVER Rd, ANOKA Co. PARKS, FRIDLEY, 55421

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.
1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.
SOUTHERN DIV. NAVAL FACILITATION - ER66 COMMAND
2155 EAGLE DRIVE
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD TOPSOIL	DK BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	6
MED. SAND	BROWN	SOFT	6	10
M-C SAND	BROWN	SOFT	10	14
Med SAND	BROWN	SOFT	14	16
M-F SAND	BROWN-TAN	SOFT	16	18
FINE SAND	BRN-TAN	SOFT	18	22
MED SAND	BROWN	SOFT	22	24
M-C SAND	BROWN	SOFT	24	26
M-C SAND - SANDY SILT	BROWN	SOFT	26	28
COURSE SANDY SILT	BROWN	MEDIUM	28	30
SANDY SILT	BROWN	SOFT	30	34
SILTY SAND - SANDY CLAY	BROWN	HARD	34	36
FINE SAND	BROWN	SOFT	36	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.
MW-8

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669276

WELL DEPTH (completed): 40 ft. Date Work Completed: 10-31-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic ☐ Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER / WEIGHT:
3 in. to 30 ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.

HOLE DIAM.: 10 in. to 40 ft.

SCREEN: PVC Make JOHNSON Type ____ Diam. 3" Slot/Gauze .020 Length 10' Set between 30 ft. and 40 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-31-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ____ ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 15 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell Inc — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Renard — 11-12-01
Authorized Representative Signature — *Date*

Glenn Holmen — 10/29/01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

MINNESOTA UNIQUE WELL NO. 669277

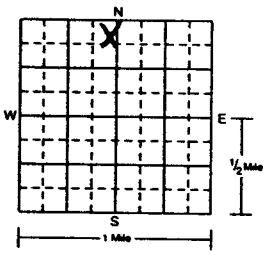
WELL LOCATION

County Name: ANOKA

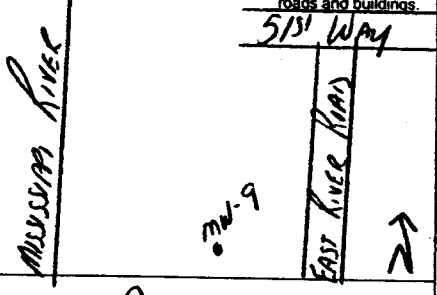
Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER Rd, ANOKA Co. PARK, FRIDLEY 55421 (~~or Fire Number~~)

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION-ERULO COMMANDS
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD TOPSOIL	BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	6
MED. SAND	BROWN-TAN	SOFT	6	8
M-F SAND	BRN TAN	SOFT	8	10
FINE SAND	BRN TAN	SOFT	10	12
MED. SAND	BROWN	SOFT	12	16
M-F SAND	BRN TAN	SOFT	16	18
FINE SAND	BRN TAN	SOFT	18	26
M-C SAND	BROWN	SOFT	26	28
SANDSTONE - M-C SAND		MEDIUM	28	30
SAND - CLAY	BROWN	HARD	30	32
SANDY CLAY	BROWN	MEDIUM	32	36
FINE SAND	BROWN	SOFT	36	38
MED. SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MW-9

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669277

IC# 140-0020

WELL DEPTH (completed): 40 ft. Date Work Completed: 10-31-01

DRILLING METHOD: ☐ Cable Tool ☑ Auger ☐ Driven ☐ Rotary ☐ Dug ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
3 in. to 30 ft.		lbs./ft.	10 in. to 40 ft.
in. to ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN: PVC
Make: JOHNSON
Type: ____ Diam. 3"
Slot/Gauze: .020 Length: 10'
Set between 30 ft. and 40 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 10-31-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ____ Model ____
☑ Casing Protection ____ ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 15 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell Inc — 27058
Licensee Business Name — *Lic. or Reg. No.*

John W. Henry — 11-12-01
Authorized Representative Signature — *Date*

Alan Holmes — 10-31-01
Name of Driller — *Date*

HE-01205-07 (Rev. 2/99)

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669278

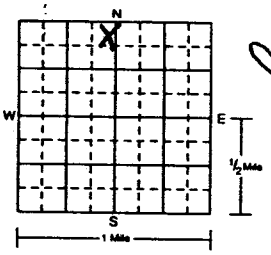
WELL LOCATION

County Name: ANOKA

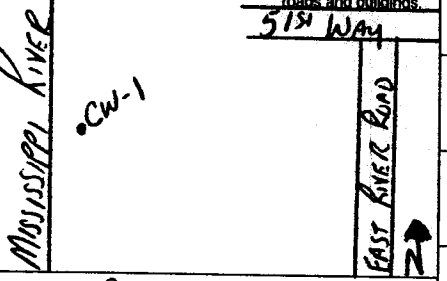
Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE. NE. NW.

House Number, Street Name, City, and Zip Code of Well Location or Fire Number: EAST RIVER Rd, ANOKA Co. PARK, FRIDLEY, 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL JANNERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERGG COMMAND
2155 EAGLE DR.
NORTH CHARLESTON - SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD SAND	BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	4
M-C SAND	BROWN	SOFT	4	10
MED. SAND	BROWN	SOFT	10	24
FINE SAND	BROWN	SOFT	24	28
M-C SAND	BROWN	SOFT	28	32
FINE SILTY SAND	BROWN	SOFT	32	34
FINE SAND	BROWN	SOFT	34	36
FINE SAND - M-C SAND	BROWN	SOFT	36	38
M-C SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

CW-1

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669278

WELL DEPTH (completed): 40 ft. Date Work Completed: 11-5-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

HOLE DIAM.: 8 in. to 40 ft.

CASING DIAMETER / WEIGHT:
2 in. to 30 ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.

SCREEN: PVC
Make: JOHNSON
Type: ____ Diam. 2"
Slot/Gauze: .010 Length: 10'
Set between 30 ft. and 40 ft. FITTINGS: ____

OPEN HOLE: from ____ ft. to ____ ft.

STATIC WATER LEVEL: 28 ft. ☑ below ☐ above land surface Date measured 11-5-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ____ Model ____
☑ Casing Protection ____ ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 9 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION
____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Bergerson-Caswell Inc — Licensee Business Name — Lic. or Reg. No. 27058

John W. Henning — Authorized Representative Signature — Date 11-12-01

Allen Yolmen — Name of Driller — Date 11-5-01

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669279

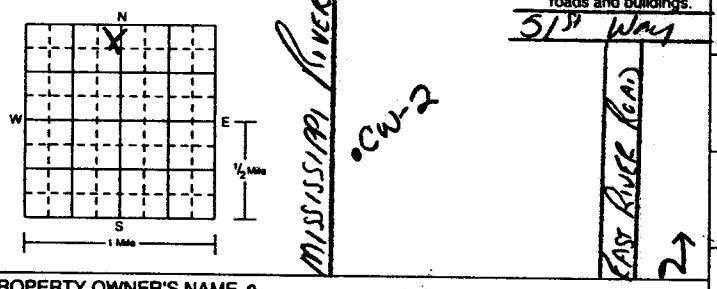
WELL LOCATION

County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE ¼ NE ¼ NW ¼

House Number/Street Name, City, and Zip Code of Well Location or Fire Number: EAST RIVER Rd ANOKA Co. PARK, FRIDLEY, 55421

Show exact location of well in section grid with "X". Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE Blvd
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITIATION - ERUG COMMAND,
2155 EAGLE DR.
NORTH CHARLESTON SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD FINE SAND	DK. BROWN	MEDIUM	0	2
FINE SAND	BROWN	SOFT	2	4
F-C SAND	BROWN	SOFT	4	6
M-C SAND	BROWN	SOFT	6	10
Med. SAND	BROWN	SOFT	10	12
Med. SAND	BRN-TAN	SOFT	12	14
M-F SAND	BRN TAN	SOFT	14	16
M-C SAND	BROWN	SOFT	16	24
M-F SAND	BROWN	SOFT	24	26
M-SAND	BROWN	SOFT	26	32
FINE SILTY SAND	BROWN	SOFT	32	34
FINE SAND	BROWN	SOFT	36	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

CW-2

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669279

WELL DEPTH (completed): 40 ft. Date Work Completed: 11-5-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic Drive Shoe? ☐ Yes ☐ No ☐ Threaded ☐ Welded ☐

CASING DIAMETER		WEIGHT	HOLE DIAM.
2 in. to 30 ft.		lbs./ft.	8 in. to 40 ft.
in. to ft.		lbs./ft.	in. to ft.
in. to ft.		lbs./ft.	in. to ft.

SCREEN Make JOHNSON Type PVC Diam. 2" Slot/Gauze .010 Length 10' Set between 30 ft. and 40 ft. FITTINGS:

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 29 ft. ☑ below ☐ above land surface Date measured 11-5-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION: ☐ Pitless adapter manufacturer ____ Model ____ ☑ Casing Protection ____ ☑ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION: Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 9 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE: Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL Inc. — Licensee Business Name — Lic. or Reg. No. 27058

John G. Henrich — Authorized Representative Signature — Date 11-12-01

Glen Holmen — Name of Driller — Date 11-5-01

HE-01205-07 (Rev. 2/99)

IC# 140-0020

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 669280

WELL LOCATION

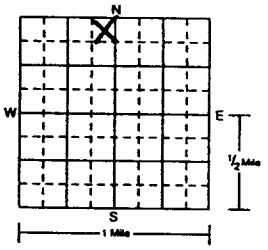
County Name: ANOKA

Township Name	Township No.	Range No.	Section No.	Fraction
FRIDLEY	30	24	27	NE NE NW

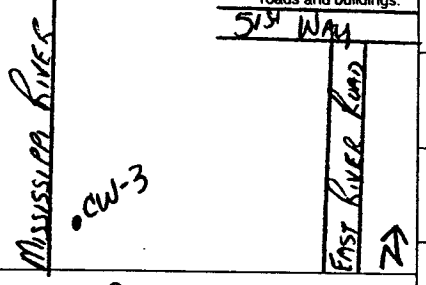
House Number, Street Name, City, and Zip Code of Well Location: EAST RIVER RD, ANOKA CO. PARK, FRIDLEY

~~or Fire Number~~: 55421

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME: ANOKA COUNTY PARKS

Property owner's mailing address if different than well location address indicated above.

1350 BUNKER LAKE BLVD
ANDOVER MN 55304

WELL OWNER'S NAME: U.S. NAVY - JOEL SANDERS

Well owner's mailing address if different than property owner's address indicated above.

SOUTHERN DIV. NAVAL FACILITATION - ERGL COMMAND
2155 EAGLE DR.
NORTH CHARLESTON, SC 29406

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
SOD, SAND, V.FINE SAND	BRN - TAN	MEDIUM	0	2
CLAY	BRN GRY	MEDIUM	2	4
V. FINE - MED. SAND	BROWN	SOFT	4	6
C. SAND - ROCK	BROWN	HARD	6	8
M-C SAND - FINE SAND	BROWN	SOFT	8	10
M-C SAND	BROWN	SOFT	10	12
M-F SAND	BROWN	SOFT	12	14
MED. SAND	BROWN	SOFT	14	18
MED. SAND	BRN TAN	SOFT	18	22
M-C SAND	BROWN	SOFT	22	26
MED. SAND	BROWN	SOFT	26	30
M. FINE SAND	BROWN	SOFT	30	32
MED. SAND	BROWN	SOFT	32	34
M-C SAND - CLAY	BROWN	MEDIUM	34	36
CLAY	BROWN	MEDIUM	36	38
FINE SILTY SAND	BROWN	SOFT	38	40

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

CW-3

01-E-13453

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 669280

WELL DEPTH (completed): 40 ft. Date Work Completed: 11-2-01

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☑ Auger ☐ Rotary ☐ Jetted ☐

DRILLING FLUID: NONE

WELL HYDROFRACTURED? ☐ YES ☑ NO FROM ____ ft. to ____ ft.

USE: ☐ Domestic ☐ Irrigation ☐ Environ. Bore Hole ☑ Monitoring ☐ Community PWS ☐ Noncommunity PWS ☐ Dewatering ☐ Heating/Cooling ☐ Industry/Commercial ☐ Remedial ☐

CASING: ☐ Steel ☑ Plastic; Drive Shoe? ☐ Yes ☐ No; ☐ Threaded ☐ Welded ☐

HOLE DIAM.: 8 in. to 40 ft.

CASING DIAMETER / WEIGHT:
2 in. to 30 ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.
____ in. to ____ ft. ____ lbs./ft.

SCREEN: PVC
Make: JOHNSON
Type: ____ Diam. 2"
Slot/Gauze: .010 Length: 10'
Set between 30 ft. and 40 ft. FITTINGS: ____

OPEN HOLE from ____ ft. to ____ ft.

STATIC WATER LEVEL: 31 ft. ☑ below ☐ above land surface Date measured 11-2-01

PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

WELL HEAD COMPLETION
☐ Pitless adapter manufacturer ____ Model ____
☑ Casing Protection ____ ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? ☑ Yes ☐ No
Grout Material ☑ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from 0 to 25 ft. 9 ☐ yds. ☑ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags
from ____ to ____ ft. ____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION: ____ feet ____ direction ____ type
Well disinfected upon completion? ☐ Yes ☐ No

PUMP
☑ Not installed Date installed ____
Manufacturer's name ____
Model number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

VARIANCE
Was a variance granted from the MDH for this well? ☑ Yes ☐ No TN# 2408

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

BERGERSON-CASWELL INC — 27058
Licensee Business Name — Lic. or Reg. No.

John W. Henrich — 11-12-01
Authorized Representative Signature — Date

Glen Hillman — 11-2-01
Name of Driller — Date

HE-01205-07 (Rev. 2/99)

IC# 140-0020

Appendix B

Boring Logs and Pump Test Data

Appendix B1

Gamma Logs

Summit Envirosolutions, Inc.
1217 Bandana Boulevard North
Saint Paul, Minnesota 55105-5114
2331Silvernail Road, PMB 72
Pewaukee, Wisconsin 53072-5402
www.summite.com/services/geophysical.htm

Phone:(800) 323-5601 Fax:(651) 647-0888
Cell: (651) 238-1198 Res:(763) 785-1876
E-mail: jtraen@summite.com

Downhole Services Manager - James H. Traen

Summit Envirosolutions ®

A full-service environmental engineering and consulting firm

PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-BG-1 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669268 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesbg1/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 73.5 feet **Reported Depth:** 73.5 feet **Depth Logged:** 72.83 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 36.5 in., PVC 34.5 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	73.5 feet	3 inch PVC	-3 feet	73.5 feet	
2.	SCREEN 34 to 44 feet						
3.	Bentonite SEAL 28 to 31 feet						
4.							

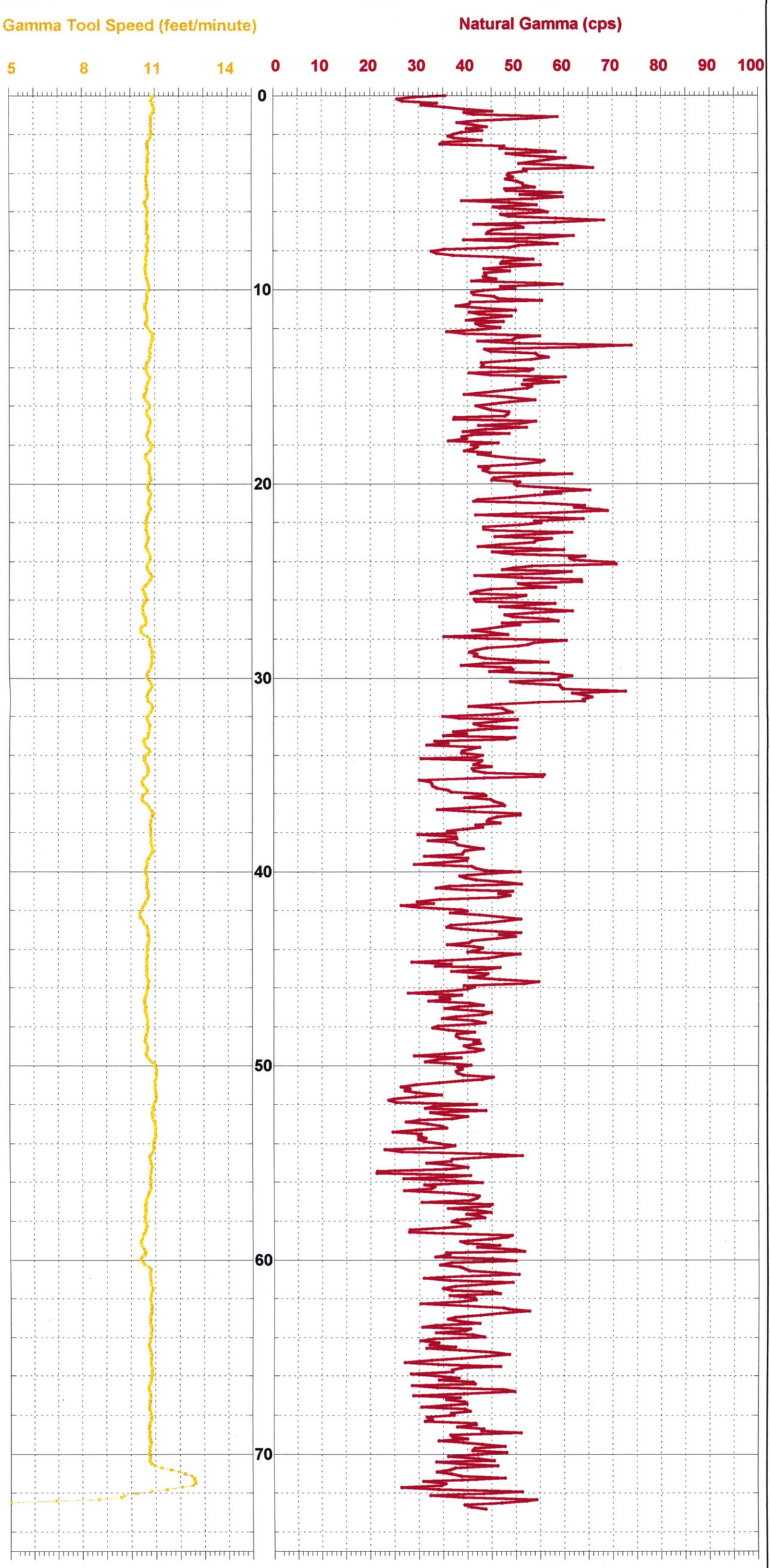
Drilling Method: Auger **Date Drilled:** 10/18/2001 **Fluid Level:** 28.77 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** October 17, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1. Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			73feet	0feet
2.										
3.										
4.										

Remarks: Conclusions and recommendations associated with formation contacts are based, in part, on information Summit obtained from current sources. Summit's depictions of these contacts are based partially on Summit's observations along with review and comments provided by the appropriate state or federal agencies. Verification of the authenticity or accuracy of this information is not warranted or guaranteed by Summit.

NIROP - Well No. PES-BG-1 - October 31, 2001



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Downhole Services Manager - James H. Traen

Summit Envirosolutions ®

A full-service environmental engineering and consulting firm

PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-INJ-1 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669281 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesinj1/up.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 70 feet **Reported Depth:** 70 feet **Depth Logged:** 69 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 36 in., PVC 34.25 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	70 feet	3 inch PVC	-3 feet	70 feet	
2.	SCREEN 35 to 45 feet						
3.	Bentonite SEAL 29 to 32 feet						
4.							

Drilling Method: Auger **Date Drilled:** 10/24/2001 **Fluid Level:** 28.50 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** October 17, 2001
Time Since Circulation: ?

LOGGING DATA

	Log Name	Run No.	Equipment Probe S/N	Equipment Logger S/N	Logging Dig. Int.	Logging Speed	Detector Type	Source Type	Source Size	Logged Inter. From	Logged Inter. To
1.	Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			69feet	0feet
2.											
3.											
4.											

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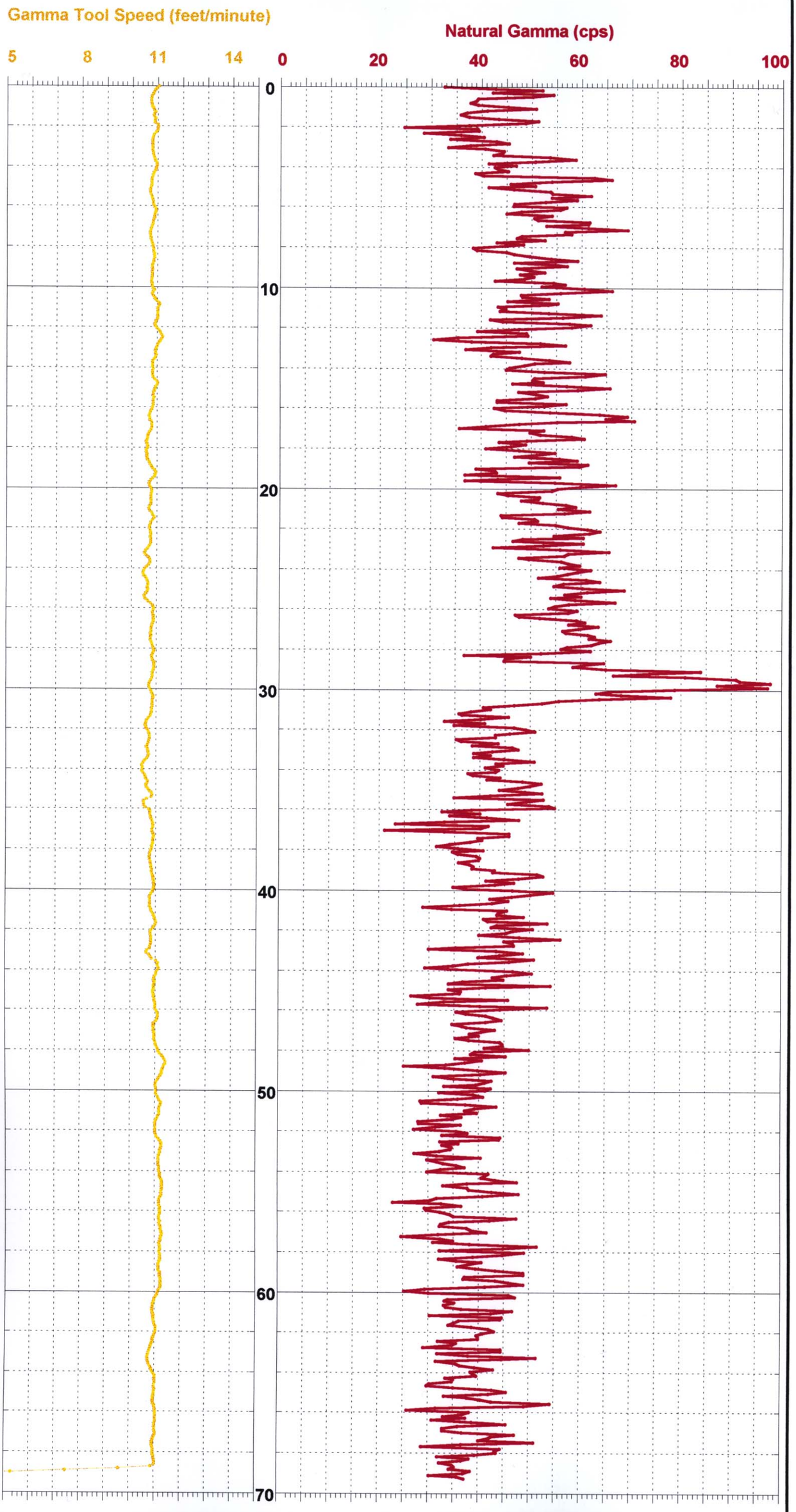
NIROP - Well No. PES-INJ-1 - October 31, 2001



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E-mail: jtraen@summite.com

Downhole Services Manager - James H. Traen

Summit Envirosolutions ®

A full-service environmental engineering and consulting firm

PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-INJ-2 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669282 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesinj2/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 70 feet **Reported Depth:** 70 feet **Depth Logged:** 69 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 38 in., PVC 36.00 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	70 feet	3 inch PVC	-3 feet	70 feet	
2.	SCREEN 40 to 50 feet						
3.	Bentonite SEAL 35 to 38 feet						
4.							

Drilling Method: Auger **Date Drilled:** 10/24/2001 **Fluid Level:** 28.90 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** November 6, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1. Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			69feet	0feet
2.										
3.										
4.										

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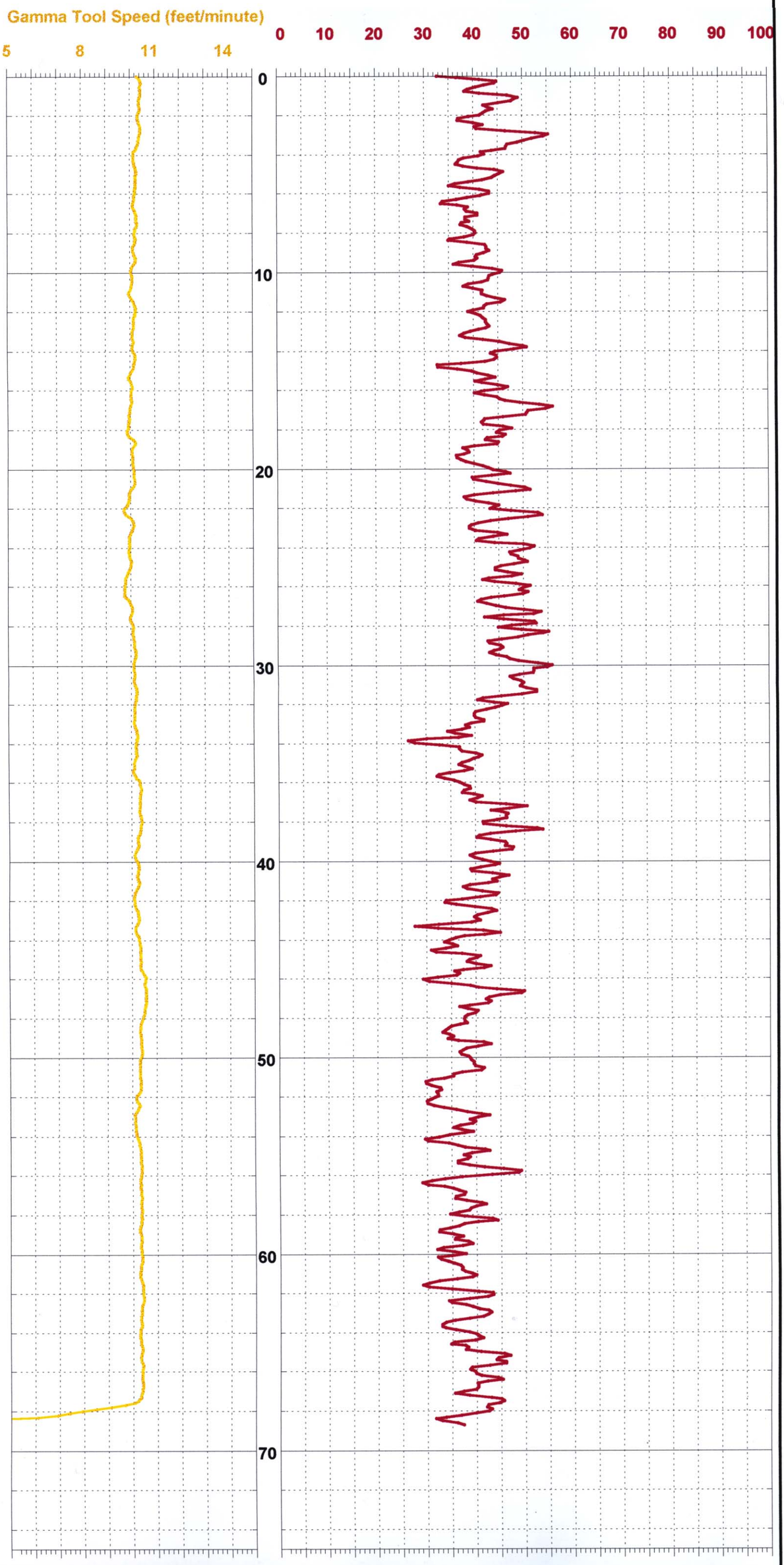
NIROP - Well No. PES-INJ-2 - November 6, 2001



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Downhole Services Manager - James H. Traen

Summit Envirosolutions®

A full-service environmental engineering and consulting firm

PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-INJ-3 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669283 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesinj3/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 70 feet **Reported Depth:** 70 feet **Depth Logged:** 70 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 36 in., PVC 33.75 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	70 feet	3 inch PVC	-3 feet	70 feet	
2.	SCREEN 40 to 50 feet						
3.	Bentonite SEAL 35 to 38 feet						
4.							

Drilling Method: Auger **Date Drilled:** 10/22/2001 **Fluid Level:** 28.92 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** October 31, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
	Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1.	Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			70feet	0feet
2.											
3.											
4.											

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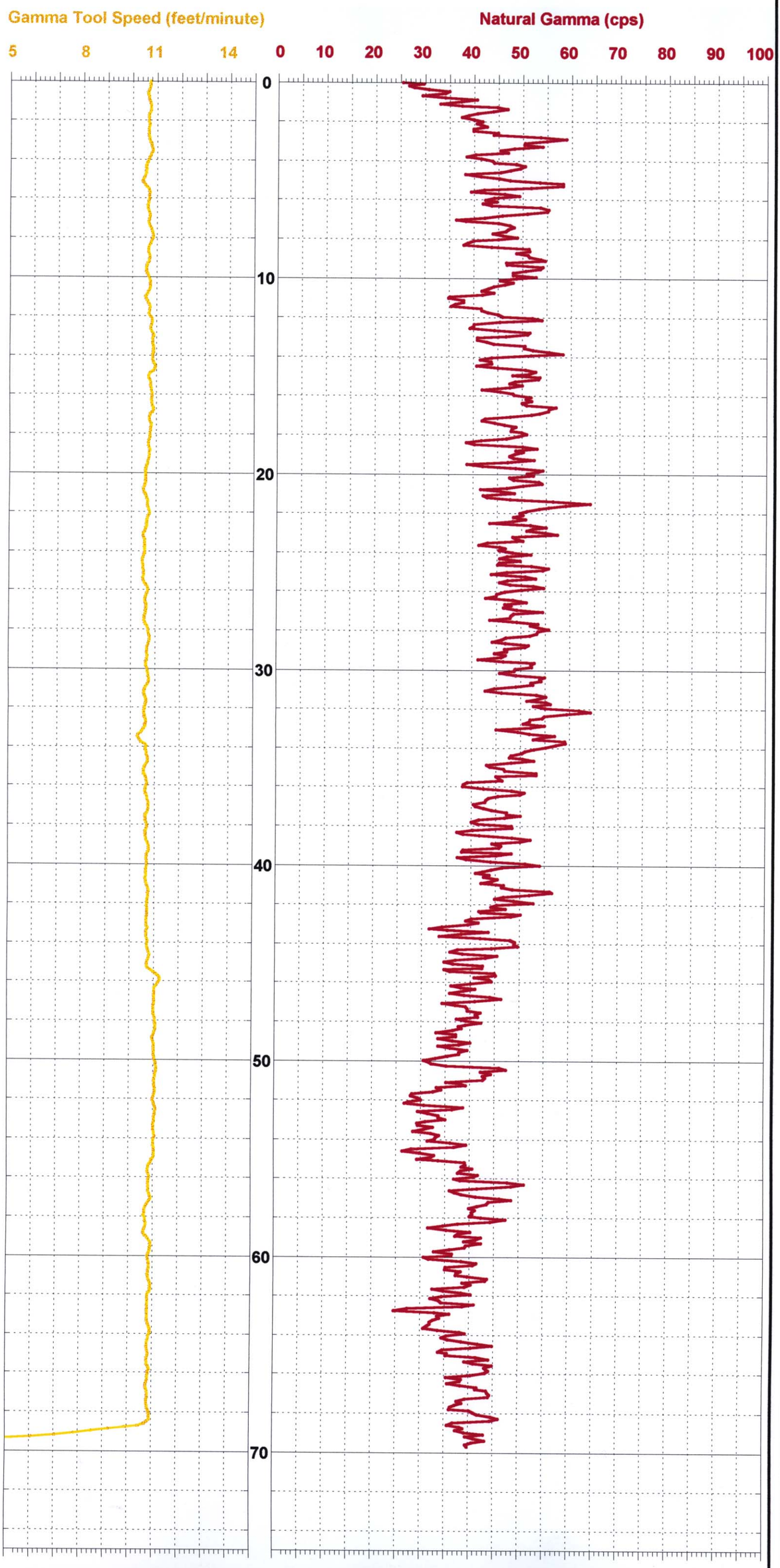
NIROP - Well No. PES-INJ-3 - October 31, 2001



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Downhole Services Manager - James H. Traen

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A full-service environmental engineering and consulting firm

PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-MW-1 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669269 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesmw1/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 70 feet **Reported Depth:** 70 feet **Depth Logged:** 71 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 35 in., PVC 33 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	70 feet	3 inch PVC	-3 feet	70 feet	
2.	SCREEN 35 to 45 feet						
3.	Bentonite SEAL 29 to 32 feet						
4.							

Drilling Method: Auger **Date Drilled:** 10/25/2001 **Fluid Level:** 28.74 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** October 31, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1. Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			71feet	0feet
2.										
3.										
4.										

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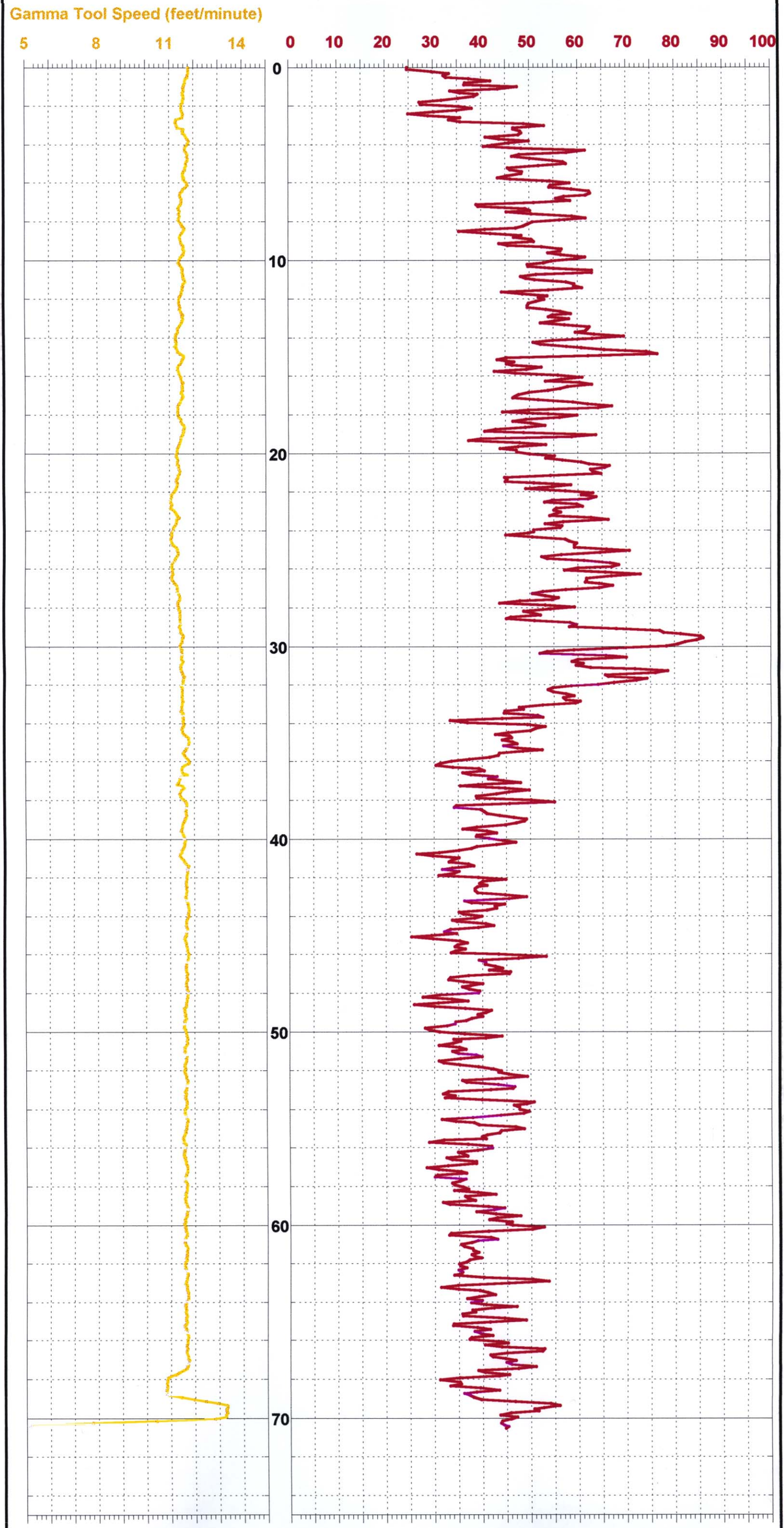
NIROP - Well No. PES-MW-1 - October 31, 2001



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Downhole Services Manager - James H. Traen

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PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-MW-2 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669270 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesmw2/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 62 feet **Reported Depth:** 62 feet **Depth Logged:** 61 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 35 in., PVC 33 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	62 feet	3 inch PVC	-3 feet	62 feet	
2.	SCREEN 35 to 45 feet						
3.	Bentonite SEAL 28 to 30 feet						
4.							

Drilling Method: Auger **Date Drilled:** 10/30/2001 **Fluid Level:** 28.50 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** October 31, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1. Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			61feet	0feet
2.										
3.										
4.										

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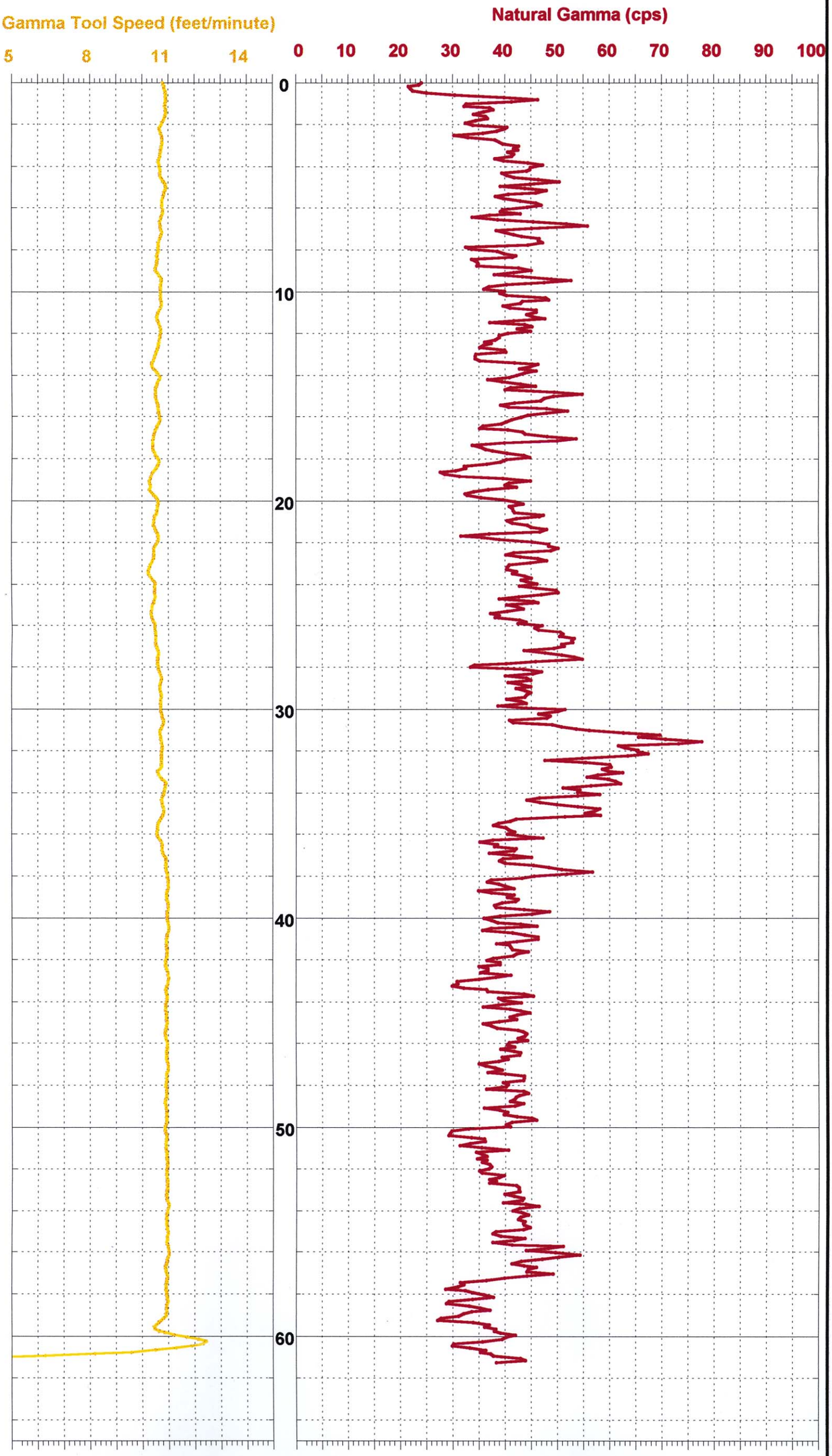
NIROP - Well No. PES-MW-2 - October 31, 2001



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PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-MW-3 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669271 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesmw3/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 40 feet **Reported Depth:** 40 feet **Depth Logged:** 40 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 35.5 in., PVC 33.25 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	40 feet	3 inch PVC	-3 feet	40 feet	
2.	SCREEN 30 to 40 feet						
3.	Bentonite SEAL 25 to 28 feet						
4.							

Drilling Method: Auger **Date Drilled:** 11/01/2001 **Fluid Level:** 29.51 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** November 6, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1. Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			40feet	0feet
2.										
3.										
4.										

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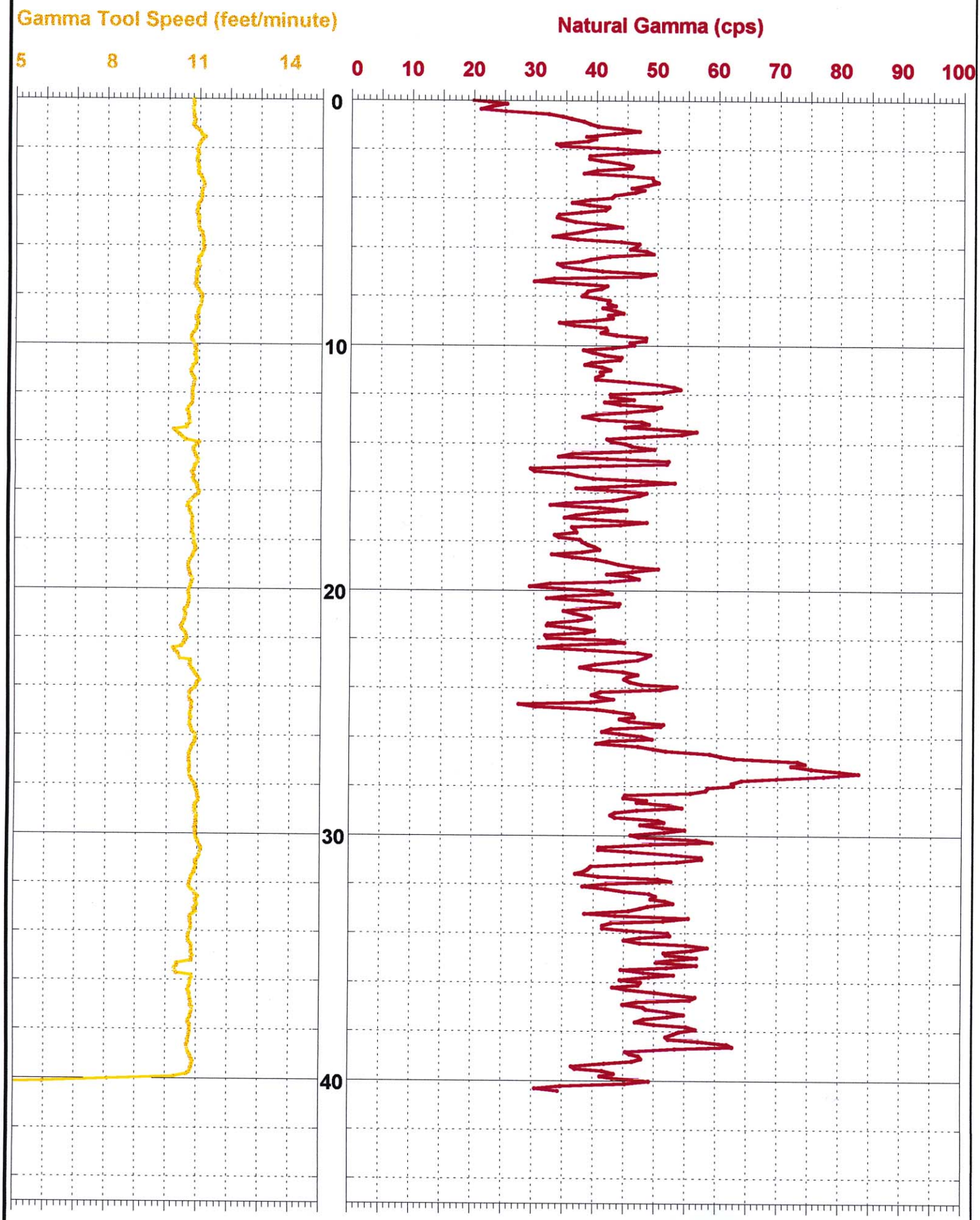
NIROP - Well No. PES-MW-3 - November 6, 2001



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PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-MW-4 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669272 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesmw4/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 40 feet **Reported Depth:** 40 feet **Depth Logged:** 40 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 39.5 in., PVC 37 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	40 feet	3 inch PVC	-3 feet	40 feet	
2.	SCREEN 30 to 40 feet						
3.	Bentonite SEAL 25 to 28 feet						
4.							

Drilling Method: Auger **Date Drilled:** 11/2/2001 **Fluid Level:** 31.40 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** November 6, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1. Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			40feet	0feet
2.										
3.										
4.										

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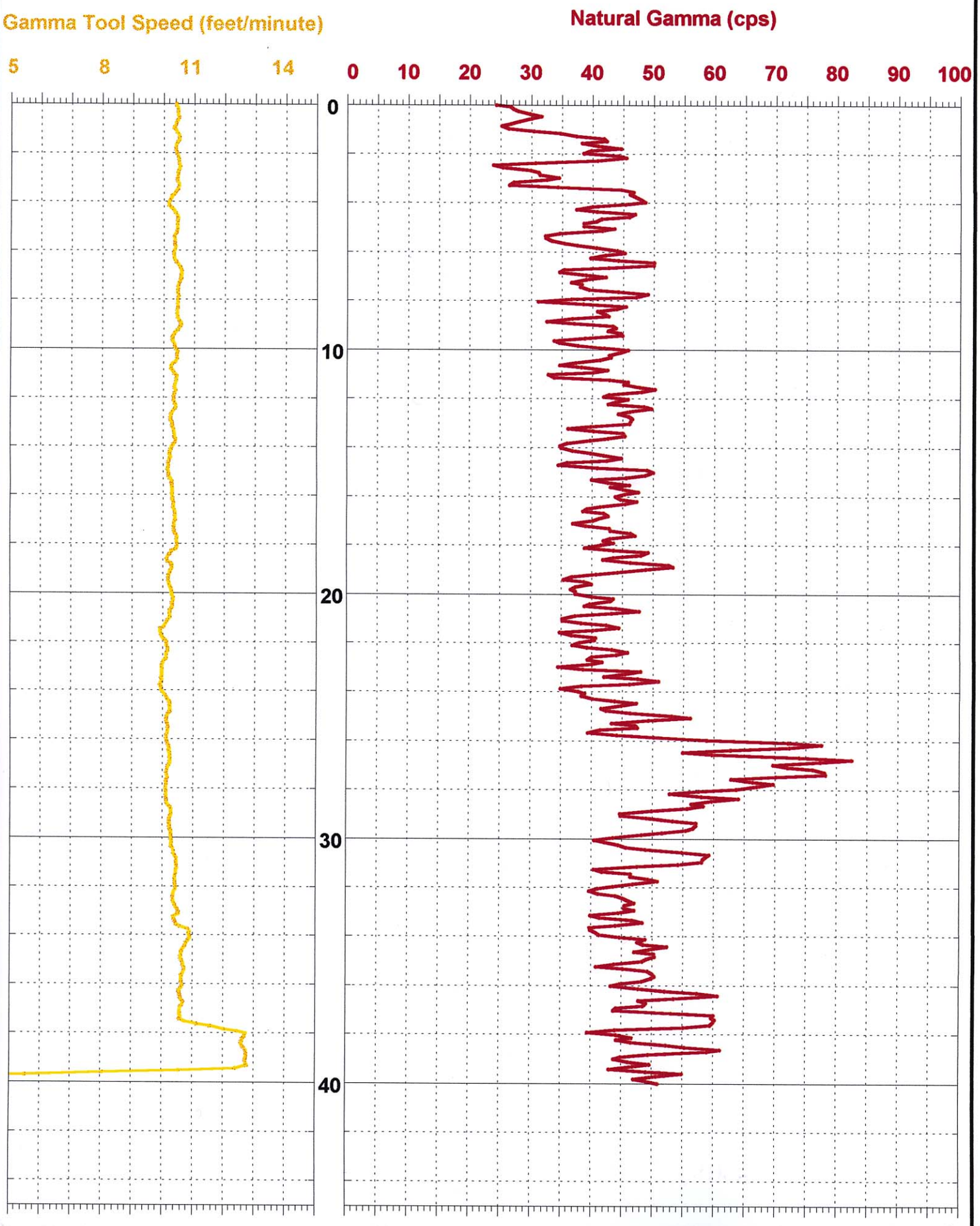
NIROP - Well No. PES-MW-4 - November 6, 2001



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PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-MW-5 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669273 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesmw5/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 40 feet **Reported Depth:** 40 feet **Depth Logged:** 40 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 39 in., PVC 36.75 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	40 feet	3 inch PVC	-3 feet	40 feet	
2.	SCREEN 30 to 40 feet						
3.	Bentonite SEAL 25 to 28 feet						
4.							

Drilling Method: Auger **Date Drilled:** 11/02/2001 **Fluid Level:** 31.43 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** November 7, 2001
Time Since Circulation: ?

LOGGING DATA

	Log Name	Run No.	Equipment Probe S/N	Equipment Logger S/N	Logging Dig. Int.	Logging Speed	Detector Type	Source Type	Source Size	Logged Inter. From	Logged Inter. To
1.	Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			40feet	0feet
2.											
3.											
4.											

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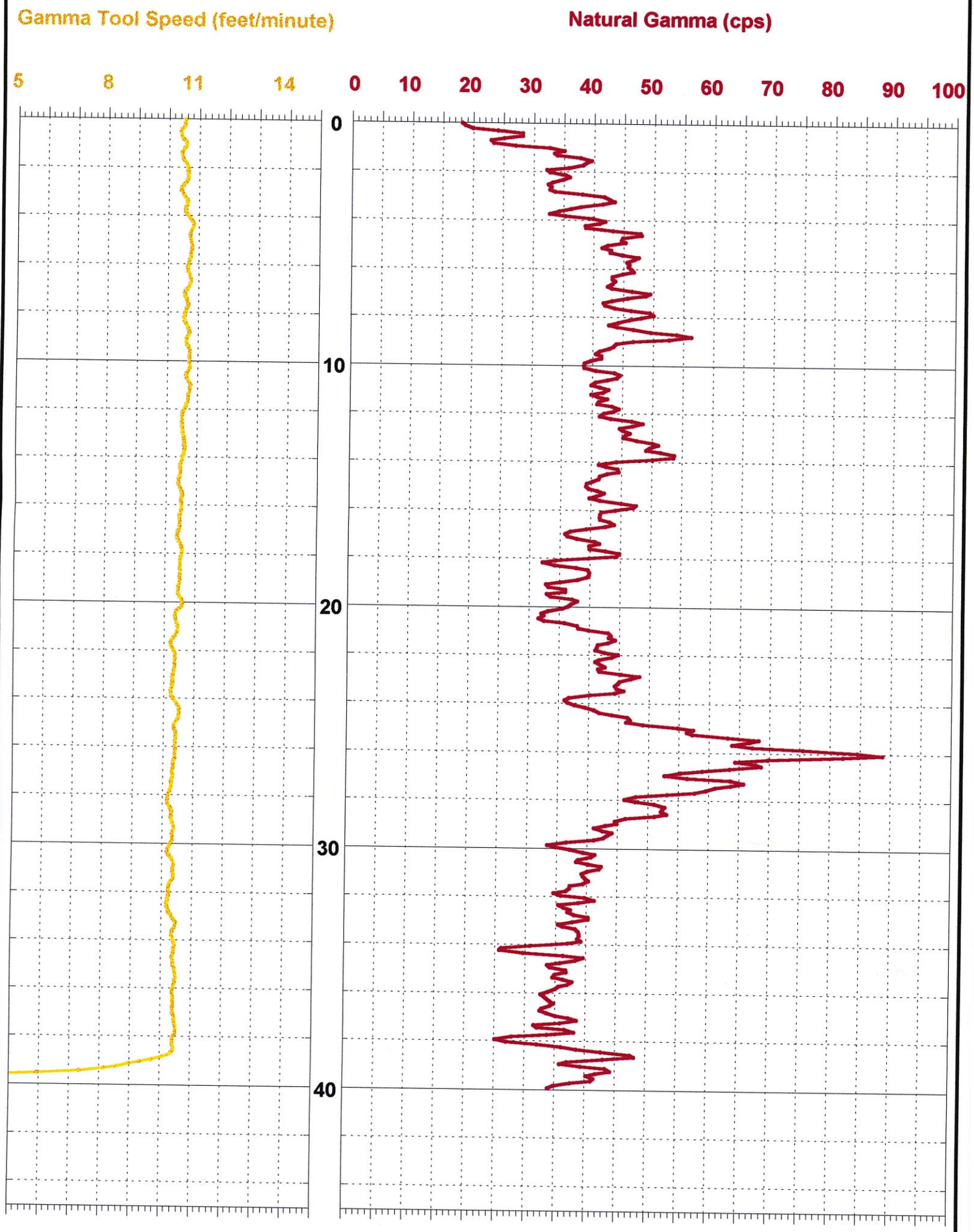
NIROP - Well No. PES-MW-5 - November 7, 2001



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Downhole Services Manager - James H. Traen

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PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-MW-6 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669274 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesmw6/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 60 feet **Reported Depth:** 60 feet **Depth Logged:** 60 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 35 in., PVC 33 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	60 feet	3 inch PVC	-3 feet	60 feet	
2.	SCREEN 35 to 45 feet						
3.	Bentonite SEAL 29 to 32 feet						
4.							

Drilling Method: Auger **Date Drilled:** 10/29/2001 **Fluid Level:** 28.51 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** October 31, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
	Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1.	Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			60feet	0feet
2.											
3.											
4.											

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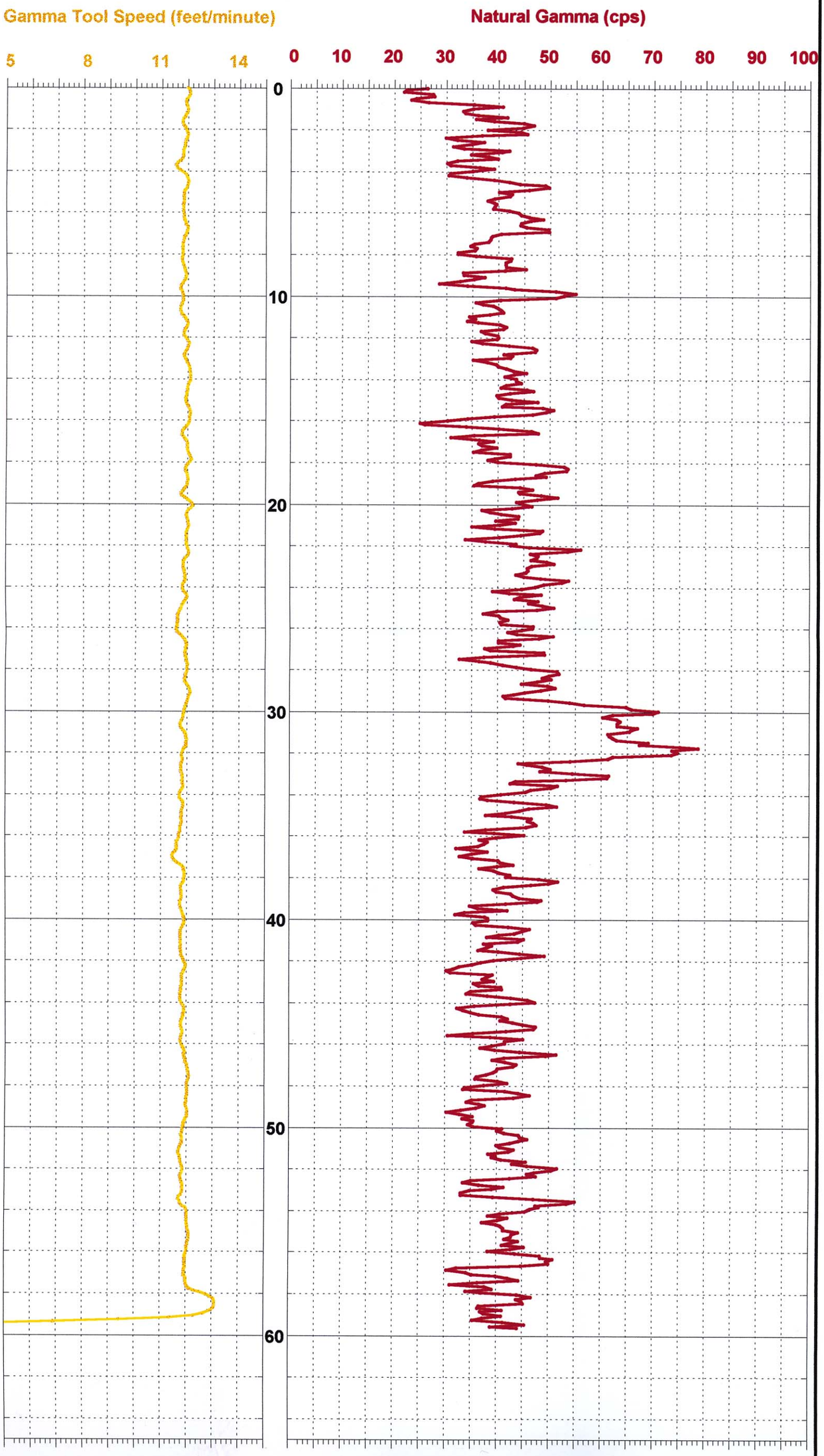
NIROP - Well No. PES-MW-6 - October 31, 2001



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PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-MW-7 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669275 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesmw7/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 70 feet **Reported Depth:** 70 feet **Depth Logged:** 70 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 36 in., PVC 33.50 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	70 feet	3 inch PVC	-3 feet	70 feet	
2.	SCREEN 40 to 50 feet						
3.	Bentonite SEAL 35 to 38 feet						
4.							

Drilling Method: Auger **Date Drilled:** 10/25/2001 **Fluid Level:** 28.85 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** November 6, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1. Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			70feet	0feet
2.										
3.										
4.										

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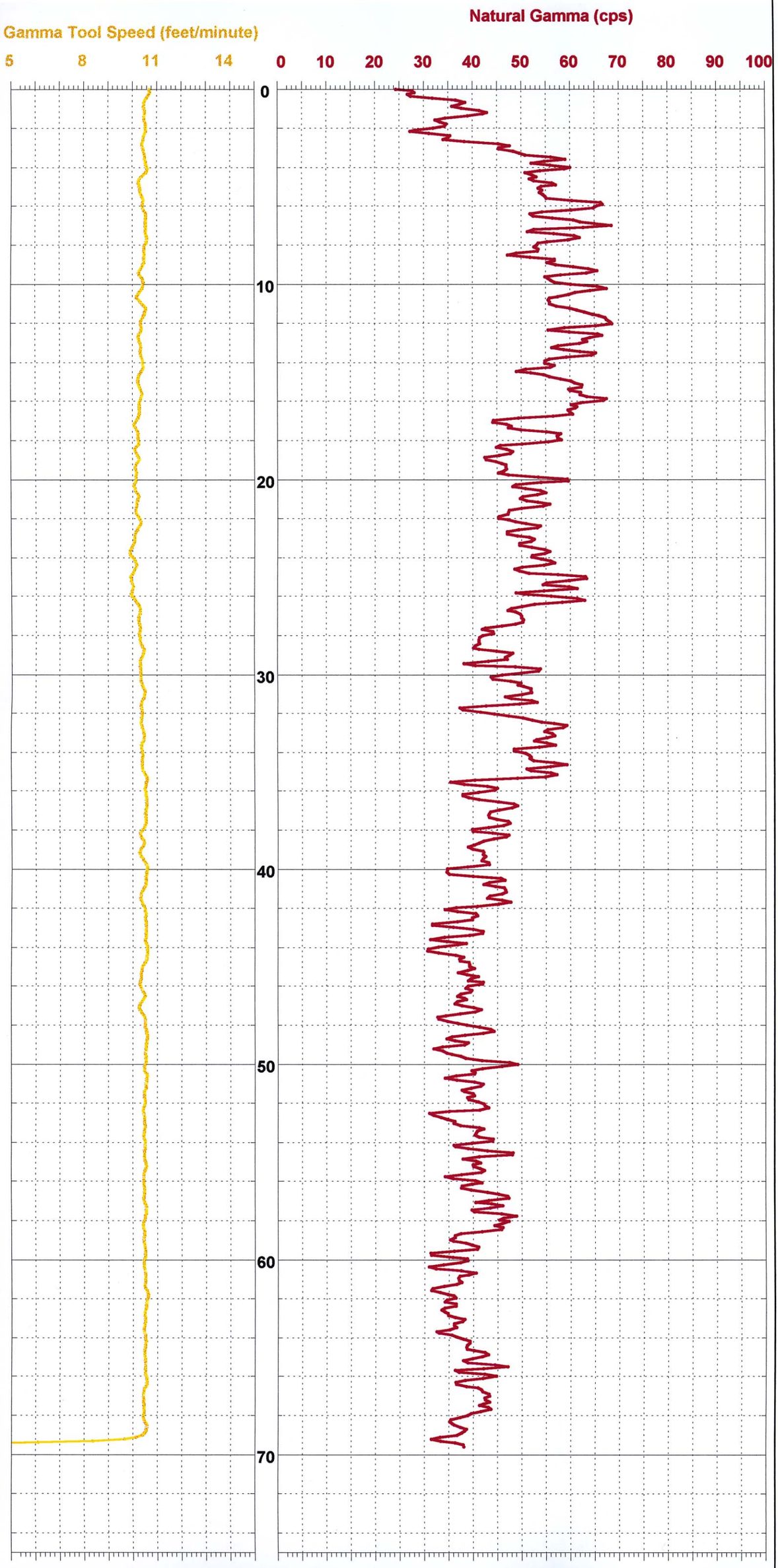
NIROP - Well No. PES-MW-7 - November 6, 2001



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PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-MW-8 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669277 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesmw8/up3.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 40 feet **Reported Depth:** 40 feet **Depth Logged:** 40 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 36.25 in., PVC 33.75 in

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	40 feet	3 inch PVC	-3 feet	40 feet	
2.	SCREEN 30 to 40 feet						
3.	Bentonite SEAL 25 to 28 feet						
4.							

Drilling Method: Auger **Date Drilled:** 10/31/2001 **Fluid Level:** 28.89 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** November 6, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
	Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1.	Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			40feet	0feet
2.											
3.											
4.											

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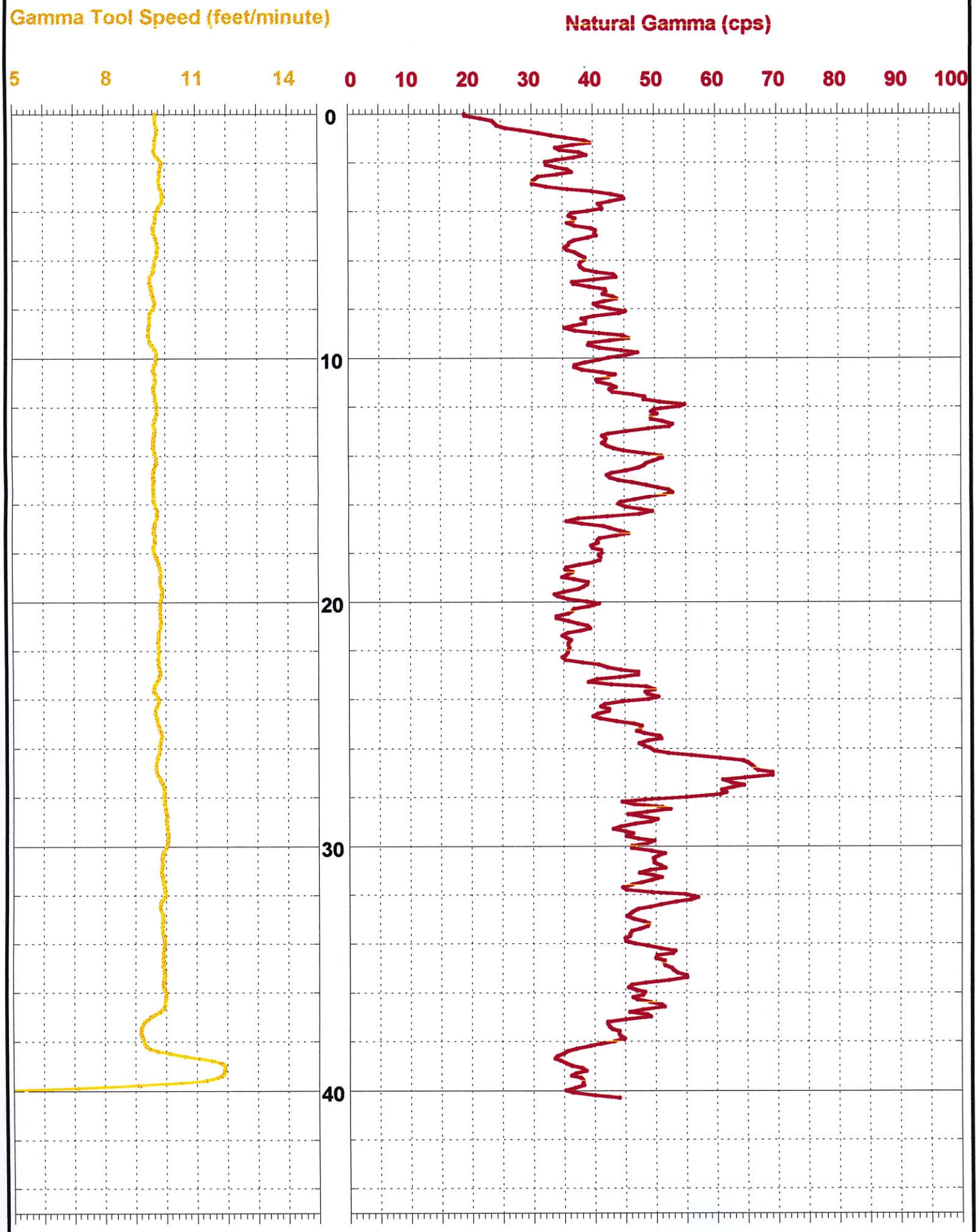
NIROP - Well No. PES-MW-8 - November 6, 2001



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PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-MW-9 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669276 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pesmw9/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 40 feet **Reported Depth:** 40 feet **Depth Logged:** 40 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 35 in., PVC 32.75 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	10 inch	0 feet	40 feet	3 inch PVC	-3 feet	40 feet	
2.	SCREEN 30 to 40 feet						
3.	Bentonite SEAL 25 to 28 feet						
4.							

Drilling Method: Auger **Date Drilled:** 10/31/2001 **Fluid Level:** 28.63 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** November 6, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
	Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1.	Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			40feet	0feet
2.											
3.											
4.											

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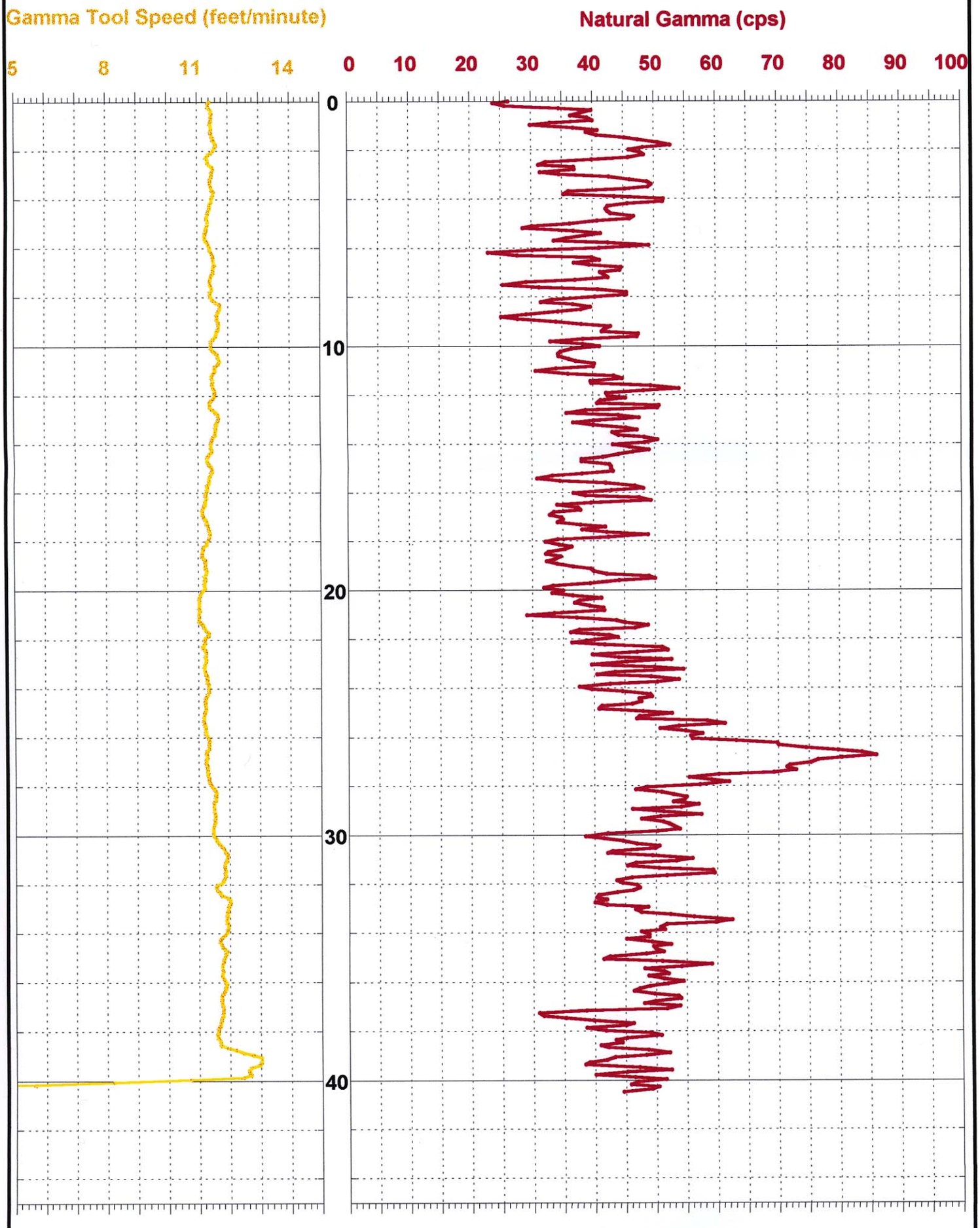
NIROP - Well No. PES-MW-9 - November 6, 2001



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PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-CW-1 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669278 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pescw1/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 40 feet **Reported Depth:** 40 feet **Depth Logged:** 40 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 33.5 in., PVC 35.0 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	6 inch	0 feet	40 feet	2 inch PVC	-3 feet	40 feet	
2.	SCREEN 30 to 40 feet						
3.	Bentonite SEAL 25 to 28 feet						
4.							

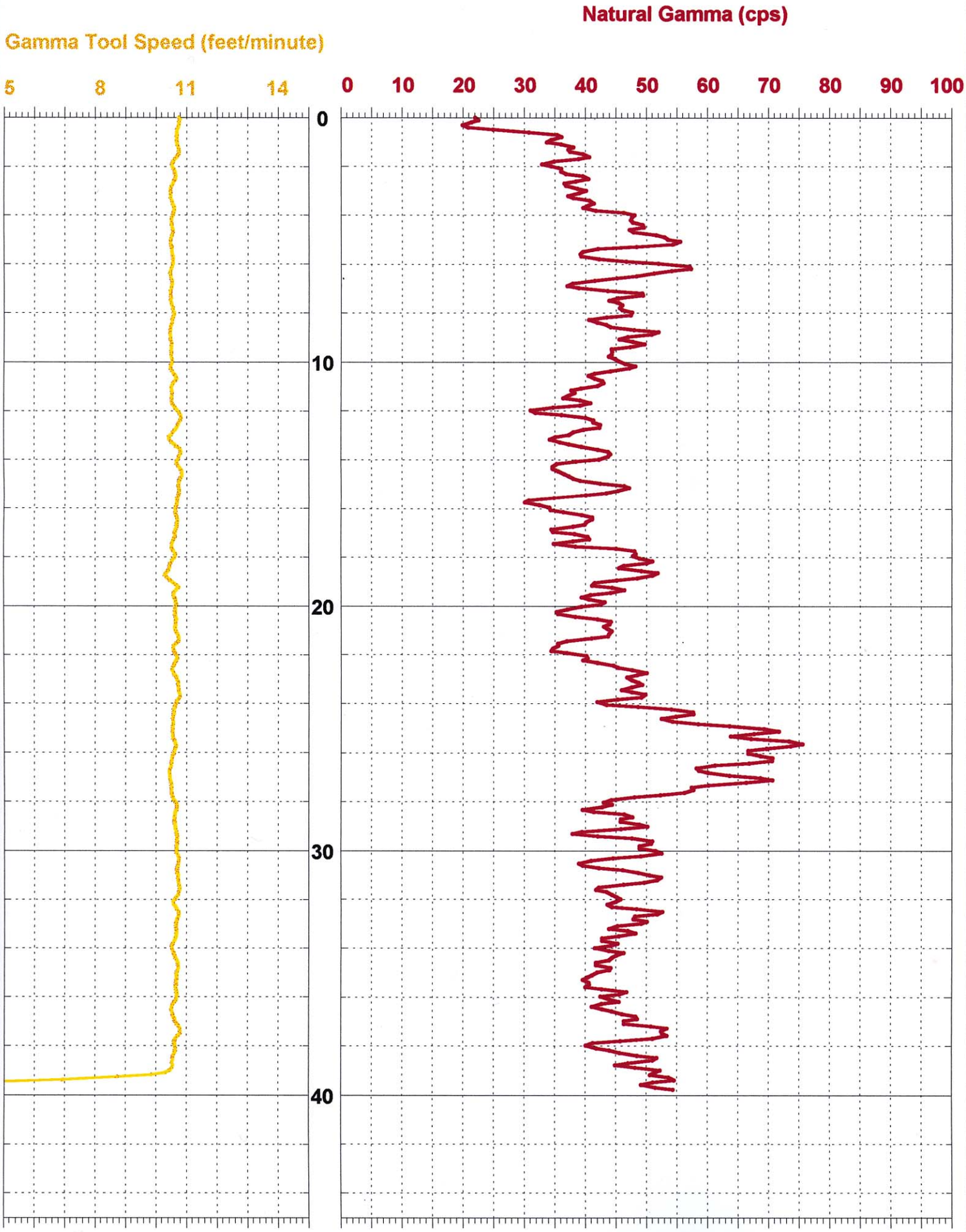
Drilling Method: Auger **Date Drilled:** 11/05/2001 **Fluid Level:** 30.43 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** November 7, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1. Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			40feet	0feet
2.										
3.										
4.										

Remarks: Conclusions and recommendations associated with formation contacts are based, in part, on information Summit obtained from current sources. Summit's depictions of these contacts are based partially on Summit's observations along with review and comments provided by the appropriate state or federal agencies. Verification of the authenticity or accuracy of this information is not warranted or guaranteed by Summit.

NIROP - Well No. PES-CW-1 - November 7, 2001



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Downhole Services Manager - James H. Traen

Summit Envirosolutions ®

A full-service environmental engineering and consulting firm

PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-CW-2 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669279 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pescw2/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 40 feet **Reported Depth:** 40 feet **Depth Logged:** 39 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 34.5 in., PVC 35.5 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	6 inch	0 feet	40 feet	2 inch PVC	-3 feet	40 feet	
2.	SCREEN 30 to 40 feet						
3.	Bentonite SEAL 25 to 28 feet						
4.							

Drilling Method: Auger **Date Drilled:** 11/05/2001 **Fluid Level:** 31.61 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** November 7, 2001
Time Since Circulation: ?

LOGGING DATA

	Log Name	Run No.	Equipment Probe S/N	Equipment Logger S/N	Logging Dig. Int.	Logging Speed	Detector Type	Source Type	Source Size	Logged Inter. From	Logged Inter. To
1.	Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			39feet	0feet
2.											
3.											
4.											

Remarks: Conclusions and recommendations associated with formation contacts are based, in part, on information Summit obtained from current sources. Summit's depictions of these contacts are based partially on Summit's observations along with review and comments provided by the appropriate state or federal agencies. Verification of the authenticity or accuracy of this information is not warranted or guaranteed by Summit.

NIROP - Well No. PES-CW-2 - November 7, 2001

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E-mail: jtraen@summite.com

Downhole Services Manager - James H. Traen

Summit Envirosolutions ®

A full-service environmental engineering and consulting firm

PROJECT NAME: NIROP - PILOT-SCALE STUDY

LOCATION

STREET ADDRESS: Anoka County Riverfront Regional Park
City: Fridley **County:** Anoka **State:** Minnesota

Well No: PES-CW-3 **Township:** 30N **Range:** 24W **Section:** 27 **Qtr. Section:**
Unique Well No.: 669280 **Project No.:** 1551-001 **Cutting Set No.:** MGS???? **File:** /pescw3/up2.gc0

GENERAL DATA

Well Owner: U.S. Navy
Engineering Co.: CH2MHILL Constructors, Inc.
Client: Environmental Management Resources Group
Drilling Co.: Bergerson-Caswell
Logging Unit/Truck: 201

Owner Rep.:
Engineer: Venky Venkatesh
Field Geologists: Sam Tate, Jon Bosak
Client Rep.: Scott Carney, Mike Goalen
Driller: Glen Holman, Jack Virnala
Other Services: none

BOREHOLE DATA

Depth Drilled: 40 feet **Reported Depth:** 40 feet **Depth Logged:** 40 feet
Depth Reference: grade **Elevation:** 834 feet **Stickup:** Steel 34 in., PVC 35.50 in.

	Bit Size	From	To	Casing Size	From	To	Comments
1.	6 inch	0 feet	40 feet	2 inch PVC	-3 feet	40 feet	
2.	SCREEN 30 to 40 feet						
3.	Bentonite SEAL 25 to 28 feet						
4.							

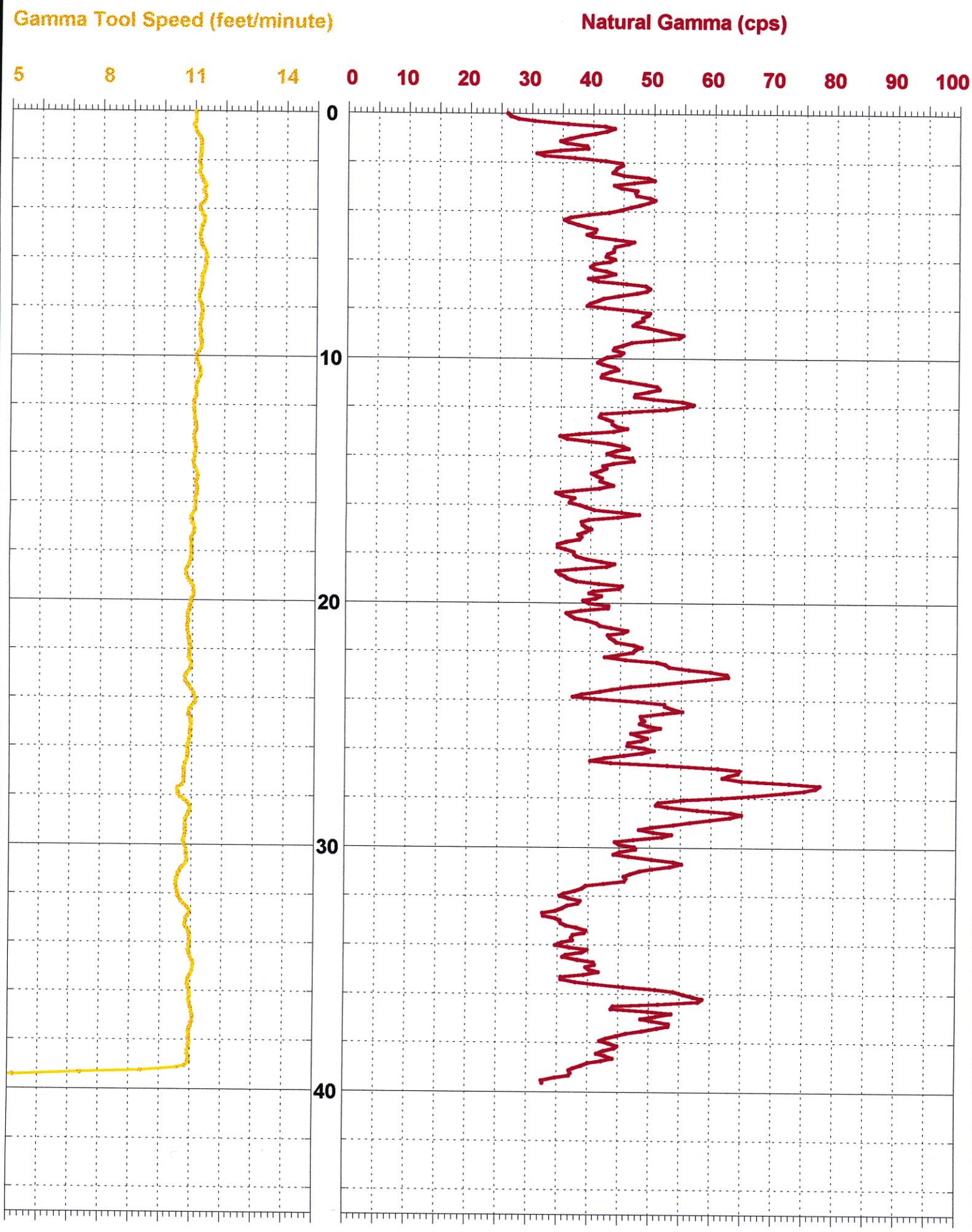
Drilling Method: Auger **Date Drilled:** 11/02/2001 **Fluid Level:** 34.32 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** November 7, 2001
Time Since Circulation: ?

LOGGING DATA

		Equipment		Logging		Detector	Source		Logged Inter.	
	Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To
1.	Nat. Gamma	two	2312	1038	0.1ft.	11ft./min.	Scintill.			40feet	0feet
2.											
3.											
4.											

Remarks: Conclusions and recommendations associated with formation contacts are based, in part, on information Summit obtained from current sources. Summit's depictions of these contacts are based partially on Summit's observations along with review and comments provided by the appropriate state or federal agencies. Verification of the authenticity or accuracy of this information is not warranted or guaranteed by Summit.

NIROP - Well No. PES-CW-3 - November 7, 2001



Appendix B2

Borehole Logs

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-BG-1
Boring Depth:	74 feet	MW #:	PES-BG-1
GW Encountered	approximately 30 feet	Surface Elevation:	
Static GW Level:		Start time/date:	10/17/01 14:00
Location:	20' Nouth of MS-46S	End time/date:	10/18/01 0855

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0 1	0-2	95%			0.0			ML	10yr/2/1, soft, homogenous, silt with fine sand moist. No odor or staining.
2 3	2-4	85%			1.0			SP	10yr/3/2, loose, homogenous, poorly graded medium coarse subangular sand, dry. No odor or staining.
4 5	4-6	65%			1.0			SP	10yr/6/1, loose, homogenous, poorly graded medium coarse subangular sand, moist. No odor or staining.
6 7	6-8	80%			1.0				
8 9	8-10	95%			1.0				
10 11	10-12	95%			1.0				

Boring Number: PES-BG-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12 13	12-14	90%			1.0			SW	10yr/5/2, loose, homogenous, well graded coarse sand with gravel up to 1" diameter, moist. Sand and gravel are subangular. No odor or staining.
14 15	14-16	5%			NA				No headspace sample - poor recovery
16 17	16-18	20%			1.0			SW	10yr/6/2, loose, homogenous, well graded coarse sand with very minor gravel clasts (up to 0.5" diameter), moist. Sand is subangular. No odor or staining.
18 19	18-20	15%			1.0				
20 21	20-22	50%			1.0			GP	10yr/5/2, loose, homogenous, poorly graded gravel with coarse sand, subangular, moist. No odor or staining.
22 23	22-24	15%			1.0				
24 25	24-26	50%			2.0			SW	10yr/5/2, loose, homogenous, well graded coarse and with occational gravel clasts up to 1" diameter, moist. Sand is subangular. No odor or staining.
26 27	26-28	65%			2.0			ML	10yr/3/3, medium density, homogenous, silt with fine sand, moist to wet below 30'). No odor or staining.
28									

Boring Number: PES-BG-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
# # 29 #	28-30	90%			2.0				
# # 30 #								SP	10yr/3/3, loose, homogenous, poorly graded fine to medium sand, wet. No odor or staining.
# # 31 #	30-32	80%			28.2				
# # 32 #									
# # 33 #	32-34	60%			112.1				
# # 34 #									
# # 35 #	34-36	30%			19.1			SP	10yr/3/3, loose, homogenous, poorly graded medium to coarse sand, wet. No odor or staining.
# # 36 #									
# # 37 #	36-38	50%			45.4				
# # 38 #									
# # 39 #	38-40	40%			NC				No headspace sample - USGS sample collected
# # 40 #								SP	10yr/3/3, loose, homogenous, poorly graded very fine sand, wet. No odor or staining.
41	40-42	55%			NC				No headspace sample - USGS sample collected
# # 42 #									
# # 43 #	42-44	60%			4.0				
# # 44 #									
# # 45 #	44-46				2.0				

Boring Number: PES-BG-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
46 47	46-48	15%			4.0			SP	10yr/3/3, loose, homogenous, poorly graded fine sand, wet. No odor or staining.
48 49	48-50	20%			5.0				
50 51	50-52	50%			11.7				
52 53	52-54	80%			3.1				
54 55	54-56	90%			4.2			SP	10yr/3/3, loose, homogenous, poorly graded very fine sand, wet. No odor or staining.
56 57	56-58	100%			2.1			SP	10yr/3/3, loose, homogenous, poorly graded fine sand, wet. No odor or staining.
58 59	58-60	50%			3.1			SP	10yr/3/3, loose, homogenous, poorly graded fine to medium sand, wet. No odor or staining.
60 61	60-62	90%			3.1			SP	10yr/3/3, loose, homogenous, poorly graded medium to coarse sand, wet. No odor or staining.
62								SP	10yr/3/3, loose, homogenous, poorly graded fine to medium sand, wet. No odor or staining.

Boring Number: PES-BG-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
63	62-64	90%			4.2				
64 65	64-66	100%			2.1			SP	10yr/3/3, loose, homogenous, poorly graded fine sand, wet. No odor or staining.
66 67	66-68	90%			3.1				
68 69	68-70	90%			5.3			SP	10yr/3/3, loose, homogenous, poorly graded medium sand, wet. No odor or staining.
70 71	70-72	50%			2.1			SP	10yr/3/3, loose, homogenous, poorly graded fine sand, wet. No odor or staining.
72 73	72-74	90%			2.1				
74 75									End of boring at 74 feet NC - Not collected
76 77									
78 79									

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan/Scott Carney	Boring #:	PES-BG-2
Boring Depth:		MW #:	
GW Encountered		Surface Elevation:	
Static GW Level:		Start time/date:	10/15/01 1020
Location:	20' South of MS-46S	End time/date:	10/16/01 1010

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0, 1	0-2	100%			0.9			ML	10yr/3/2, medium dense, homogenous, silt with fine sand, sand is subrounded, moist. No odor or staining.
2, 3	2-4	100%			1.8			SP	10yr/4/4, loose, homogenous, poorly graded fine, subrounded sand, moist. No odor or staining.
4, 5	4-6	50%			1.8			SP	10yr/7/2, loose, homogenous, poorly graded fine to medium subrounded sand, moist. No odor or staining.
								SP	10yr/5/3, loose, homogenous, poorly graded fine to medium subrounded sand, moist. No odor or staining.
6, 7	6-8	100%			0.9			SP	10yr/6/2, loose, homogenous, fine to medium poorly graded sand, moist. No odor or staining.
8, 9	8-10	65%			1.8				
10, 11	10-12	70%			1.8			SP	10yr/6/2, loose, homogenous, fine to medium poorly graded sand with minor gravel up to 0.5", moist. No odor or staining.

Boring Number: PES-BG-2 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	50%			1.8				
13									
14	14-16	15%			1.8			SW	10yr/6/2, loose, homogenous, medium well graded sand with occational gravel up to 1", moist. No odor or staining.
15									
16	16-18	50%			1.8			SW	10yr/6/2, loose, homogenous, medium to coarse well graded sand with occational gravel up to 0.5", moist. No odor or staining.
17									
18	18-20	15%			1.8				
19									
20	20-22	50%			2.7				
21									
22	22-24	20%			2.7			SW	10yr/6/2, loose, homogenous, well graded sand with gravel up to 1.25" (angular to subrounded), dry. Sand is subangular to subrounded. No odor or staining.
23									
24	24-26	5%			NC				
25									
26	26-28	50%			3.6			ML	10yr/3/4, stiff, very homogenous, very slow dilatancy, silty sand with occational peebles up to 0.25", moist. No odor or staining. Peebles are subrounded.
27					3.6				
28									

Boring Number:	PES-BG-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	50%			6.4				
30									
31	30-32	40%			13.7				
32								SP	10yr/4/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
33	32-34	100%			53.2				
34									
35	34-36	100%			29.3				
36									
37	36-38	100%			97.2				
38									
39	38-40	80%			9.1				
40								SP	10yr/4/3, loose, homogenous, fine poorly graded sand with very minor gravel up to 0.5", wet. No odor or staining.
41	40-42	85%			7.8				
42								SP	10yr/4/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
43	42-44	90%			10.5				
44									
45	44-46	90%			10.5				

Boring Number:	PES-BG-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
46								SP	10yr/4/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
47	46-48	15%			2.3				
48									
49	48-50	50%			5.0				
50									
51	50-52	60%			2.3				
52									
53	52-54	60%			1.3				
54									
55	54-56	90%			1.3				
56									
57	56-58	75%			1.3				
58									
59	58-60	75%			1.3				
60									
61	60-62	75%			1.3				
62									

Boring Number:	PES-BG-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
63	62-64	80%			1.3				
64	64-66	75%			1.3				10yr/4/3, loose, homogenous, poorly graded medium to coarse sand, wet. No odor or staining.
65									
66	66-68	10%			1.3				
67									
68	68-70	50%			1.3				
69									
70	70-72	50%			1.3				
71									
72	72-74	30%			1.3				
73									
74									End of boring at 74 feet NC - Not collected due to poor recovery
75									
76									
77									
78									
79									

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan/Scott Carney	Boring #:	PES-BG-3
Boring Depth:		MW #:	PES-BG-3
GW Encountered		Surface Elevation:	
Static GW Level:		Start time/date:	10/16/01 14:45
Location:	20' South of MS-46S	End time/date:	10/17/01 10:30

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0	0-2	100%			0.9			ML	10yr/2/1, medium density, homogenous, well graded sand with silt, dry grading to moist. No odor or staining.
1									
2	2-4	90%			0.9			SW	10yr/3/3, loose, homogenous, well graded fine to coarse sand (subrounded), dry. No odor or staining.
3									
4	4-6	90%			0.9			SW	10yr/6/2, loose, homogenous, well graded medium grained sand (subrounded), moist. No odor or staining.
5									
6	6-8	95%			0.9				
7									
8	8-10	95%			0.9				
9									
10	10-12				0.9				
11									

Boring Number: PES-BG-3 Project : NIROP Pilot-Scale Project Project #: 5427-001-01

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14				0.9			SW	10yr/6/2, loose, homogenous, well graded medium grained sand (subrounded), moist. No odor or staining.
13									
14	14-16				0.9				
15									
16	16-18				0.9				
17									
18	18-20				0.9				
19									
20	20-22				0.9			GW	10yr/5/3, loose, homogenous, well graded coarse sand (subangular) with significant gravel (up to 1" diameter), dry. No odor or staining.
21									
22	22-24				0.9				
23									
24	24-26				0.9			SP	10yr/3/3, loose, homogenous, poorly graded fine to medium grained sand, dry. No odor or staining.
25									
26	26-28				1.9			ML	10yr/4/3, medium density, homogenous, poorly graded silt with sand, moist to wet (29' bgs). No odor or staining.
27									
28								SP	See next page for description

Boring Number:	PES-BG-3	Project :	NIROP Pilot-Scale Project	Project #:	5427-001-01

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	100%			32.6				10yr/3/3, loose, homogenous, poorly graded fine sand (subrounded), wet. No odor or staining.
30	30-32	100%			64.3				
31									
32	32-34	100%			40.5				
33									
34	34-36	100%			23.7				
35									
36	36-38	100%			29.7				
37									
38	38-40	100%			10.2				
39									
40	40-42	40%			18.4				
41									
42	42-44	100%			4.1				
43									
44	44-46	50%			1.0				
45									

Boring Number:	PES-BG-3	Project :	NIROP Pilot-Scale Project	Project #:	5427-001-01

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
46	46-48	100%			2			SP	10yr/3/3, loose, homogenous, poorly graded fine sand (subrounded), wet. No odor or staining.
47									
48	48-50	20%			4.1				
49									
50	50-52	30%			2				
51									
52	52-54	30%			4.1				
53									
54	54-56	30%			2.0				
55									
56	56-58	50%			3.0			ML	10yr/3/3, loose, homogenous, poorly graded very fine sand with minor silt, wet. No odor or staining.
57									
58	58-60	20%			2.0				
59									
60	60-62	20%			1.0			SP	10yr/3/3, loose, homogenous, poorly graded fine to medium sand, wet. No odor or staining.
61									
62									

Boring Number: PES-BG-3 Project : NIROP Pilot-Scale Project Project #: 5427-001-01

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
63	62-64	20%			1.0			SP	10yr/3/3, loose, homogenous, poorly graded fine to medium sand, wet. No odor or staining.
64	64-66	100%			2.0				
65									
66	66-68	100%			1.0				
67									
68	68-70	50%			1.0				
69									
70	70-72	75%			2.0				
71									
72	72-74	50%			0.0			SP	10yr/3/3, loose, homogenous, poorly graded very fine sand, wet. No odor or staining.
73									
74									End of boring at 74 feet
75									
76									
77									
78									
79									

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-INJ-1
Boring Depth:	70 feet	MW #:	PES-INJ-1
GW Encountered	approximately 30 feet	Surface Elevation:	
Static GW Level:		Start time/date:	10/23/01 1335
Location:		End time/date:	10/24/01 0950

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0	0-2	90%			0.0			ML	10yr/2/1, medium dense, homogenous, silt with fine sand and organics, moist. No odor or staining.
1									
2	2-4	80%			0.0			SP	10yr/4/3, loose, homogenous, fine to medium poorly graded sand, dry. No odor or staining.
3									
4	4-6	80%			0.0			SP	10yr/5/2, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
5									
6	6-8	80%			0.0			SP	10yr/5/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
7									
8	8-10	90%			0.0				
9									
10	10-12	95%			0.0			SP	10yr/5/2, loose, homogenous, medium poorly graded sand with occational gravel up to 1", dry. No odor or staining.
11									
								SP	* see next page for description

Boring Number:	PES-INJ-1	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	90%			1.7			SP	10yr/5/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
13									
14	14-16	90%			1.7				
15									
16	16-18	60%			1.7				
17									
18	18-20	50%			1.7			SP	10yr/5/2, loose, homogenous, fine poorly graded sand with occational gravel up to 0.5", dry. No odor or staining.
19								SP	10yr/5/2, loose, homogenous, fine to medium poorly graded sand, moist. No odor or staining.
20	20-22	20%			1.7				
21									
22	22-24	0%							No sample collected - no recovery rock in tip of sampler
23									
24	24-26	5%			2.9				Poor recovery due to rock in tip of sampler
25									
26	26-28	90%			1.7			CH	10yr/3/3, very hard, very low plasticity, homogenous, fat silty clay, dry. No odor or staining.
27									
28									

Boring Number: PES-INJ-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	90%			4.1				
30								CH	10yr/3/3 with 2.5yr/4/3 mottling, very stiff, very low plasticity, fat clay with sand, moist to wet. No odor or staining.
31	30-32	90%			21.7				
32								SP	10yr/3/4, loose, homogenous, medium subangular poorly graded sand, wet. No odor or staining.
33	32-34	50%			45.2				
34								SP	10yr/3/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
35	34-36	90%			58.2				
36									
37	36-38	100%			7.6			SP	10yr/3/4, loose, homogenous, medium poorly graded sand, wet. No odor or staining.
38									
39	38-40	90%			11.1			SP	10yr/3/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
40									
41	40-42	90%			48.8				
42									
43	42-44	85%			7.6				
44									
45	44-46	40%			4.1				

Boring Number: PES-INJ-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
46	46-48	50%			5.0				
47									
48	48-50	50%			10.0				
49								SP	10yr/3/4, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
50	50-52	90%			6.2				
51									
52	52-54	75%			7.5				
53									
54	54-56	75%			5.0			SP	10yr/3/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
55									
56	56-58	90%			3.7				
57									
								ML	10yr/3/4, medium dense, homogenous, silt with fine sand, wet. No odor or staining.
58	58-60	90%			5.0			SP	10yr/3/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
59									
								SP	10yr/3/4, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
60	60-62	95%			2.7			SP	10yr/3/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
61									
62									

Boring Number:	PES-INJ-1	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
63	62-64	95%			6.2				
64, 65	64-66	90%			3.7			SP	10yr/3/4, loose, homogenous, fine to medium poorly graded sand, wet. No odor or staining.
66, 67	66-68	80%			5.0			SP	10yr/3/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
68, 69	68-70	90%			2.5				10yr/3/4, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
70, 71	70-72								End of boring at 70 feet
72, 73	72-74								
74, 75									
76, 77									
78, 79									

EMR INCORPORATED

VISUAL CLASSIFICATION OF SOILS

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-INJ-2
Boring Depth:	70 feet	MW #:	PES-INJ-2
GW Encountered	approximately 30 feet	Surface Elevation:	
Static GW Level:		Start time/date:	10/22/01 1235
Location:		End time/date:	10/22/01 1630

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0	0-2	80%			1.7			ML	10yr/2/1, medium dense, homogenous, silty sand with organics, moist. Sand is fine grained. No odor or staining.
1								ML	10yr/4/4, medium dense, homogenous, silt with organics and minor sand, dry. No odor or staining.
2	2-4	60%			0.0			SP	10yr/4/4, loose, very homogenous, poorly graded sand with minor silt, sand is fine grained and subangular, dry. No odor or staining.
3									
4	4-6	60%			1.7			SP	10yr/5/4, loose, homogenous, fine to medium grained poorly graded sand, dry. Sand is subangular. No odor or staining.
5									
6	6-8	90%			1.7			SP	10yr/6/2, loose, homogenous, fine to medium grained poorly graded sand, dry. No odor or staining.
7									
8	8-10	90%			1.7				
9									
10	10-12	90%			1.7			SP	10yr/6/2, loose, homogenous, fine to medium grained poorly graded sand with occational gravel up to 0.5", dry. No odor or staining.
11									

Boring Number:	PES-INJ-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12									
13	12-14	90%			1.7			SW	10yr/5/4, loose, homogenous, medium to coarse well graded sand with gravel up to 0.75", dry. No odor or staining.
14								SP	10yr/5/3, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
15	14-16	50%			1.7				
16	16-18	0%							No sample collect - no recovery
17									
18								SP	10yr/6/2, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
19	18-20	80%			2.8				
20									
21	20-22	80%			1.7				
22								SW	10yr/5/4, loose, homogenous, medium to coarse well graded sand with gravel up to 0.5", dry. No odor or staining.
23	22-24	40%			0.0				
24								SW	10yr/5/4, loose, homogenous, medium to coarse well graded sand with gravel up to 1.0", moist. No odor or staining.
25	24-26	30%			2.8				
26								SP	10yr/5/4, loose, homogenous, medium to coarse poorly graded sand with gravel up to 1.0", moist. No odor or staining.
27	26-28	30%			1.7				
28								GP	10yr/5/4, loose, homogenous, poorly graded gravel with sand, wet. No odor or staining.

Boring Number:	PES-INJ-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	40%			8.5				
30	30-32	100%			28.9			CH	10yr/3/3, hard, homogenous, silty fat clay, very low plasticity, dry. No odor or staining.
31								ML	2.5/4/4, medium dense, homogenous, silt with fine sand, moist. No odor or staining.
32	32-34	100%			108.5			SP	10yr/4/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
33									
34	34-36	100%			133.5				
35									
36	36-38	100%			34.6			SP	10yr/4/4, loose, homogenous, fine to medium poorly graded sand, wet. No odor or staining.
37									
38	38-40	100%			64.2			SP	10yr/4/4, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
39								SP	10yr/4/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
40	40-42	100%			22.1				
41									
42	42-44	90%			11.9				
43									
44	44-46	90%			15.3				
45									

Boring Number:	PES-INJ-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
46	46-48	90%			2.8			SP	10yr/4/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
47									
48	48-50	50%			5.1				
49									
50	50-52	60%			1.7				
51									
52	52-54	90%			1.7			SP	10yr/4/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
53									
54	54-56	90%			2.8			SP	10yr/4/4, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
55									
56	56-58	33%			1.7			SP	10yr/4/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
57									
58	58-60	90%			1.7				
59									
60	60-62	40%			1.7				
61									
62									

Boring Number: PES-INJ-2 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
63	62-64	80%			1.7			SP	10yr/4/4, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
64	64-66	90%			0.5				
65								SP	10yr/4/4, loose, homogenous, medium poorly graded sand, wet. No odor or staining.
66	66-68	80%			1.7				
67									
68	68-70	80%			0.5			SP	10yr/4/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
69									
70	70-72								End of boring at 70 feet
71									
72	72-74								
73									
74									
75									
76									
77									
78									
79									

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-INJ-3
Boring Depth:	70 feet	MW #:	PES-INJ-3
GW Encountered	approximately 30 feet	Surface Elevation:	
Static GW Level:		Start time/date:	10/19/01 0840
Location:		End time/date:	10/22/01 0900

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0	0-2	90%			0.0			ML	10yr/2/1, medium density, homogenous, silth with sand, moist. No odor or staining.
1									
2	2-4	100%			1.6			SP	10yr/4/4, loose, homogenous, poorly graded fine to medium sand, moist. Sand is subangular. No odor or staining.
3									
4	4-6	90%			1.6			SP	10yr/6/2, loose, homogenous, poorly graded fine to medium sand, moist. No odor or staining.
5									
6	6-8	100%			2.7				
7									
8	8-10	90%			1.6				
9									
10	10-12	90%			7.0			SP	10yr/6/2, loose, homogenous, poorly graded fine sand, moist. No odor or staining.
11									

Boring Number:	PES-INJ-3	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12 13	12-14	50%			3.8			SW	10yr/4/3, loose, homogenous, well graded coarse sand with gravel clasts up to 0.5", moist. Sand is subangular. No odor or staining.
14 15	14-16	50%			3.8			SP	10yr/6/2, loose, homogenous, poorly graded medium to coarse sand, moist. No odor or staining.
16 17	16-18	NR							No sample - poor recovery
18 19	18-20	50%			1.6				
20 21	20-22	50%			3.8			SP	10yr/6/2, loose, homogenous, poorly graded fine sand, moist. No odor or staining.
22 23	22-24	50%			3.8			SP	10yr/6/2, loose, homogenous, poorly graded medium to coarse sand, moist. No odor or staining.
24 25	24-26	40%			3.8			SP	10yr/5/2, loose, homogenous, poorly graded coarse sand with occational gravel up to 0.5", moist. Sand is subangular. No odor or staining.
26 27	26-28	30%			3.8			SP	10yr/5/2, loose, homogenous, poorly graded coarse sand with gravel up to 1.0", moist to wet. Sand is subangular. No odor or staining.
28								SP	10yr/5/2, loose, homogenous, poorly graded very coarse sand with gravel, wet. No odor or staining.

Boring Number: PES-INJ-3 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	15%			24.8				
30									
31	30-32	15%			9.7				
								ML	10yr/4/3, medium density, homogenous, silt with sand, wet. No odor or staining.
32								CL	2.5yr/3/4, firm, homogenous, medium plasticity, sandy lean clay, moist. No odor or staining.
33	32-34	50%			24.9				
34								SC	10yr/4/3, firm, homogenous, medium plasticity, clayey sand with silt, moist. No odor or staining.
35	34-36	90%			69.5				
36								SP	10yr/4/3, loose, homogenous, poorly graded very fine to fine sand, wet. No odor or staining.
37	36-38	20%			14.1				
38								SP	10yr/4/3, loose, homogenous, poorly graded fine to medium sand, wet. No odor or staining.
39	38-40	100%			28.2				
40									
41	40-42	50%			6.5				
42									
43	42-44	50%			18.4				
44									
45	44-46	60%			9.6				

Boring Number: PES-INJ-3 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groind water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
46	46-48	90%			34.6				
47									
48	48-50	80%			43.7			SP	10yr/4/3, loose, homogenous, poorly graded fine sand, wet. No odor or staining.
49									
50	50-52	10%			2.8				
51									
52	52-54	100%			2.8				
53									
54	54-56	100%			2.8				
55									
56	56-58	90%			3.9			SP	10yr/4/3, loose, homogenous, poorly graded medium sand, wet. No odor or staining.
57									
58	58-60	90%			3.9				
59									
60	60-62	85%			1.7			SP	10yr/4/3, loose, homogenous, poorly graded fine sand, wet. No odor or staining.
61									
62									

Boring Number:	PES-INJ-3	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
63	62-64	90%			1.7				
64 65	64-66	90%			2.8			SP	10yr/4/3, loose, homogenous, poorly graded very fine sand, wet. No odor or staining.
66 67	66-68	90%			0.0			SP	10yr/4/3, loose, homogenous, poorly graded fine to medium sand, wet. No odor or staining.
68 69	68-70	90%			0.0			SP	10yr/4/3, loose, homogenous, poorly graded medium sand, wet. No odor or staining.
70 71	70-72								End of boring at 70 feet
72 73	72-74								
74 75									
76 77									
78 79									

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-MW-1
Boring Depth:	70 feet	MW #:	PES-MW-1
GW Encountered	approximately 36 feet	Surface Elevation:	
Static GW Level:		Start time/date:	10/25/01 1000
Location:		End time/date:	10/25/01 140

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0	0-2	80%			1.4			ML	10yr/2/1, firm, medium density, homogenous, silt with fine sand and organics, dry. No odor or staining.
1								ML	10yr/6/4, loose, homogenous, silt with fine sand, dry. No odor or staining.
2	2-4	60%			0.0			SP	10yr/4/6, loose, homogenous, fine to medium subrounded poorly graded sand,dry. No odor or staining.
3									
4	4-6	75%			0.0			SP	10yr/4/3, loose, homogenous, fine to medium, subrounded poorly graded sand, dry. No odor or staining.
5									
6	6-8	75%			4.0			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
7								SP	10yr/6/2, loose, homogenous, fine poorly graded sand with occational peebles, dry. No odor or staining.
8	8-10	80%			4.0			SP	10yr/6/2, loose, homogenous, fine to medium poorly graded sand with occational peebles, dry. No odor or staining.
9									
10	10-12	80%			1.3				
11									

Boring Number:	PES-MW-1	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12									
13	12-14	90%			4.0			SW	10yr/3/3, compact, homogenous, well graded coarse sand with gravel up to 1", dry. No odor or staining.
14								SP	10yr/5/2, loose, homogenous, fine poorly graded sand with rare peebles, dry. No odor or staining.
15	14-16	8%			2.7				
16									
17	16-18	40%			4.0				
18									
19	18-20	80%			2.7				
20									
21	20-22	90%			5.4			SW	10yr/4/2, loose, homogenous, coarse well graded sand with occational gravel up to 1", dry. No odor or staining.
22								SP	10yr/4/4, loose, homogenous, fine to medium poorly graded sand with gravel up to 0.5", moist. No odor or staining
23	22-24	90%			5.4				
24								SP	10yr/4/3, loose, homogenous, medium to coarse poorly graded sand with occational gravel up to 1.25", moist. No odor or staining.
25	24-26	70%			4.0				
26									
27	26-28	25%			1.3				
28								CH	10yr/4/1, hard, dense, low plasticity, fat clay with minor peebles and rare gravel clasts up to 0.75", moist. No odor or staining.

Boring Number: PES-MW-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	90%			1.3				
30	30-32	80%			5.4				
31									
32	32-34	100%			45.9				
33								SP	10yr/4/3, loose, fine poorly graded subrounded sand, wet. No odor or staining.
34	34-36	10%			12.1				
35									
36	36-38	0%			NR				
37									
38	38-40	50%			2.7				
39									
40	40-42	90%			5.4				
41									
42	42-44	95%			8.1			SP	10yr/4/3, loose, medium poorly graded subrounded sand, wet. No odor or staining.
43									
44	44-46	80%			2.7				
45									

Boring Number: PES-MW-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
46	46-48	90%			2.7				
47									
48	48-50	90%			4.0			SP	10yr/4/3, loose, fine poorly graded subrounded sand, wet. No odor or staining.
49									
50	50-52	80%			5.4				
51									
52	52-54	90%			6.7			SP	10yr/4/3, loose, medium poorly graded subrounded sand, wet. No odor or staining.
53									
54	54-56	95%			4.0			ML	10yr/7/3, loose, homogenous, silt with fine sand, wet. No odor or staining.
55									
56	56-58	90%			2.7			SP	10yr/4/3, loose, fine poorly graded subrounded sand, wet. No odor or staining.
57									
58	58-60	95%			4.0			SP	10yr/4/3, loose, very fine poorly graded sand, wet. No odor or staining.
59									
60	60-62	90%			4.0				
61									
62								SP	10yr/4/3, loose, very fine poorly graded sand, wet. No odor or staining.

Boring Number: PES-MW-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
63	62-64	90%			2.7				
64	64-66	0%			4				
65									
66	66-68	90%			2.7				
67									
68	68-70	NR							No sample collected
69									
70	70-72								End of boring at 70 feet
71									
72	72-74								
73									
74									
75									
76									
77									
78									
79									

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-MW-2
Boring Depth:	60 feet	MW #:	PES-MW-2
GW Encountered	approximately 34 feet	Surface Elevation:	
Static GW Level:		Start time/date:	10/30/01 0855
Location:		End time/date:	10/30/01 1440

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0 1	0-2	60%			1.5			ML	10yr/2/1, medium density, homogenous, silt with fine sand and organics, dry. No odor or staining.
2 3	2-4	90%			3.0			SP	10yr/6/2, loose, homogenous, fine to medium poorly graded, subrounded sand, dry. No odor or staining.
4 5	4-6	80%			3.0			SP	10yr/5/4, loose, homogenous, medium to coarse poorly graded sand with occational peebles, dry. No odor or staining.
6 7	6-8	80%			4.5			SP	10yr/6/2, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
8 9	8-10	80%			4.5			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
10 11	10-12	70%			4.5			SP	10yr/6/2, loose, homogenous, fine to medium poorly graded sand with occational peebles, dry. No odor or staining.

Boring Number:	PES-MW-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	75%			6.0			SP	10yr/4/3, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
13									
14	14-16	0%			NC				
15									
16	16-18	60%			6.0			SP	10yr/6/2, loose, homogenous, fine to medium poorly\ graded sand, dry. No odor or staining.
17									
18	18-20	80%			3.0			SP	10yr/7/1, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
19									
20	20-22	60%			6.0			SP	10yr/6/2, loose, homogenous, fine poorly graded sand with rare peebles, dry. No odor or staining.
21									
22	22-24	60%			4.5			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
23									
24	24-26	80%			3.0			SP	10yr/4/2, loose, homogenous, medium to coarse poorly graded sand with gravel up to 1", moist. No odor or staining.
25									
26	26-28	50%			9.0			SP	10yr/4/2, loose, homogenous, coarse poorly graded sand with significant gravel up to 1.5", moist to wet. No odor or staining.
27									
28								ML	10yr/3/3, firm, medium density, silt with fine sand, moist to wet. No odor or staining.

Boring Number:	PES-MW-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	60%			12.0				
30	30-32	60%			15			CL	10yr/3/3, firm, medium density, homogenous, clayey sand, moist. No odor or staining.
31									
32	32-34	0%			NC				
33									
34	34-36	100%			22.5			SP	10yr/3/3, loose, homogenous, fine to medium poorly graded sand, wet. No odor or staining.
35									
36	36-38	40%			16.5			SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
37									
38	38-40	20%			13.5				
39									
40	40-42	75%			4.5				
41									
42	42-44	100%			30.0				
43									
								SP	10yr/3/3, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
44	44-46	90%			24.0			SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
45									

Boring Number:	PES-MW-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
46	46-48	50%			19.5			SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
47									
48	48-50	90%			4.5				
49								ML	10yr/3/3, soft, medium density, homogenous, silt with very fine sand, wet. No odor or staining.
50	50-52	90%			12.0			SP	10yr/3/3, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
51									
52	52-54	15%			10.5			SP	10yr/3/3, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
53									
54	54-56	90%			12.0			ML	10yr/3/3, firm, medium density, homogenous, silt with very fine sand, wet. No odor or staining.
55									
56	56-58	90%			9.0			SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
57								ML	10yr/3/3, firm, medium density, homogenous, silt with fine sand, wet. No odor or staining.
58	58-60	90%			6.0			SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
59								ML	10yr/3/3, firm, medium density, homogenous, silt with fine sand, wet. No odor or staining.
60	60-62	90%			7.5			SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
61									
62	62-64	90%			4.5				End of boring at 60 feet.

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-MW-3
Boring Depth:	40 feet	MW #:	PES-MW-3
GW Encountered	approximately 34 feet	Surface Elevation:	
Static GW Level:		Start time/date:	11/1/01 1110
Location:		End time/date:	11/1/01 1320

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0 1	0-2	90%			1.5			ML	10yr/4/1, medium density, homogenous, silt with sand, dry. No odor or staining.
2 3	2-4	60%			0.0			SP	10yr/5/6, loose, homogenous, fine poorly graded sand dry. Sand is subrounded. No odor or staining.
4 5	4-6	60%			0.0			SP	10yr/6/3, loose, homogenous, fine poorly graded sand with significant peebles, dry. No odor or staining.
6 7	6-8	80%			1.5				10yr/6/2, loose, homogenous, fine to medium poorly graded sand, dry. No odor or staining.
8 9	8-10	80%			1.5				10yr/5/6, loose, homogenous, fine poorly graded sand dry. No odor or staining.
10 11	10-12	90%			1.5				10yr/6/2, loose, homogenous, fine poorly graded sand with occational gravel up to 0.75", dry. No odor or staining.

Boring Number:	PES-MW-3	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	90%			3.1			SP	10yr/4/3, loose, homogenous, medium to coarse poorly graded sand with occational gravel, moist to wet. No odor or staining.
13									
14	14-16	90%			1.5			SP	10yr/6/2, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
15									
16	16-18	90%			1.5			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
17									
18	18-20	60%			1.5				
19									
20	20-22	80%			3.1				
21									
22	22-24	80%			3.1				
23									
24	24-26	85%			4.7			SP	10yr/5/3, loose, homogenous, medium poorly graded sand with oocational gravel up to 1", moist. No odor or staining.
25								SP	10yr/5/3, loose, homogenous, medium poorly graded sand, moist. No odor or staining
26	26-28	90%			4.7			SP	10yr/5/3, loose, homogenous, medium poorly graded sand with oocational gravel up to 1", moist. No odor or staining.
27									
28									

Boring Number:	PES-MW-3	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	80%			6.3			ML	10yr/4/4, medium dense, homogenous, silt with sand, moist to wet. Sand content increasing below 34'. No odor or staining.
30									
31	30-32	90%			19				
32									
33	32-34	90%			20.6				
34									
35	34-36	90%			NC				
36									
37	36-38	40%			23.8				
38								SP	10yr/4/4, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
39	38-40	70%			20.6				
40									End of boring at 40 feet NC - Not collected - bulk density sample
41	40-42								
42									
43	42-44								
44									
45	44-46								

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-MW-4
Boring Depth:	40 feet	MW #:	PES-MW-4
GW Encountered	approximately 34 feet	Surface Elevation:	
Static GW Level:		Start time/date:	11/1/01 1430
Location:		End time/date:	11/1/01 1610

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0 1	0-2	90%						ML	10yr/4/1, medium density, homogenous, silt with sand, dry. No odor or staining.
2 3	2-4	90%						SP	10yr/5/4, loose, homogenous, fine, subrounded poorly graded sand, dry. No odor or staining.
4 5	4-6	90%						SP	10yr/6/2, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
6 7	6-8	90%							
8 9	8-10	85%							
10 11	10-12	90%						SP	10yr/6/2, loose, homogenous, medium poorly graded sand, dry. No odor or staining.

Boring Number:	PES-MW-4	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	80%			2.2			SP	10yr/6/2, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
13									
14	14-16	80%			3.8				
15									
16	16-18	80%			3.8			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
17									
18	18-20	90%			3.8				
19									
20	20-22	90%			2.2				
21									
22	22-24	80%			5.3				
23									
24	24-26	80%			5.3				
25									
26	26-28	90%			14.5			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, moist. No odor or staining.
27									
28								SP	10yr/4/3, loose, homogenous, medium to coarse poorly graded sand, wet. No odor or staining.

Boring Number: PES-MW-4 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	15%			9.9				
30								SP	10yr/4/3, loose, homogenous, coarse poorly graded sand with occational subrounded peebles, wet. No odor or staining.
31	30-32	90%			26.7			ML	10yr/4/3, medium dense, homogenous, silt with sand wet. No odor or staining.
32									10yr/4/3, loose, homogenous, medium poorly graded sand, wet. No odor or staining. Pockets of fat clay in the last 4" of sample.
33	32-34	90%			29.7				
34									10yr/4/3, firm, homogenous, lean clay with sand, moist to wet. No odor or staining.
35	34-36	90%			20.6				
36									
37	36-38	90%			28.2				
38									10yr/4/3, loose, homogenous, medium poorly graded sand, wet. No odor or staining.
39	38-40	15%			6.8				
40									End of boring at 40 feet NC - Not collected - bulk density sample
41	40-42								
42									
43	42-44								
44									
45	44-46								

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-MW-5
Boring Depth:	40 feet	MW #:	PES-MW-5
GW Encountered	approximately 28 feet	Surface Elevation:	
Static GW Level:		Start time/date:	11/2/01 0920
Location:		End time/date:	11/2/01 1100

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0	0-2	1%			0.7			SP	10yr/3/2, loose, homogenous, very fine poorly graded sand, dry. No odor or staining.
1								SP	10yr/4/6, loose, homogenous, very fine poorly graded sand, dry. No odor or staining.
2	2-4	60%			2.3			SP	10yr/4/6, loose, homogenous, fine to medium poorly graded sand with peebles, dry. No odor or staining.
3									
4	4-6	60%			2.3			SP	10yr/6/2, loose, homogenous, medium to coarse poorly graded sand with peebles, dry. No odor or staining.
5									
6	6-8	80%			0.7			SP	10yr/6/2, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
7									
8	8-10	75%			2.3			SP	10yr/6/2, loose, homogenous, coarse poorly graded sand with gravel up to 1", dry. No odor or staining.
9								SP	10yr/4/6, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
10	10-12	90%			2.3			SP	10yr/6/2, loose, homogenous, fine to medium poorly graded sand, dry. No odor or staining.
11									

Boring Number:	PES-MW-5	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	90%			2.3			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
13									
14	14-16	90%			2.3				
15									
16	16-18	80%			2.3				
17									
18	18-20	80%			2.3				
19									
								SP	10yr/6/2, loose, homogenous, medium poorly graded sand,dry. No odor or staining.
20	20-22	90%			2.3			SP	10yr/6/2, loose, homogenous, fine poorly graded sand,dry. No odor or staining.
21									
22	22-24	90%			2.3				
23									
24	24-26	90%			2.3				
25									
26	26-28	90%			3.8			SP	10yr/6/2, loose, homogenous, coarse poorly graded sand with occational gravel up to 0.75", moist. Becoming wet below 28 feet. No odor or staining.
27									
28									

Boring Number:	PES-MW-5	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	90%							
30									
31	30-32	90%			2.3				
32								SP	10yr/6/2, loose, homogenous, medium poorly graded sand, wet. No odor or staining.
33	32-34	40%			2.3				
34									
35	34-36	90%			NC				
36								SP	10yr/6/2, loose, homogenous, fine to medium poorly graded sand, wet. No odor or staining.
37	36-38	90%			2.3				
38								SP	10yr/6/2, loose, homogenous, medium to coarse poorly graded sand, wet. No odor or staining.
39	38-40	90%			2.3				
40									End of boring at 40 feet NC - Not collected - bulk density sample
41	40-42								
42									
43	42-44								
44									
45	44-46								

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-MW-6
Boring Depth:	60 feet	MW #:	PES-MW-6
GW Encountered	approximately 35 feet	Surface Elevation:	
Static GW Level:		Start time/date:	10/29/01 0736
Location:		End time/date:	10/29/01 1415

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0, 1	0-2	50%			5.8			ML	10yr/2/1, medium density, homogenous, silt with fine sand and organics, dry. No odor or staining.
2, 3	2-4	100%			2.9			SP	10yr/4/3, loose, homogenous, fine to medium poorly graded, subrounded sand, dry. No odor or staining.
4, 5	4-6	90%			1.4			SP	10yr/6/2, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
6, 7	6-8	80%			4.3				
8, 9	8-10	90%			4.3			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
10	10-12	90%			4.3			SP	10yr/4/3, loose, homogenous, medium to coarse poorly graded sand with occational gravel up to 1", dry. No odor or staining.
11								SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.

Boring Number:	PES-MW-6	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	95%			8.7			SP	10yr/6/2, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
13									
14	14-16	90%			5.8				
15									
16	16-18	90%			2.9				
17									
18	18-20	90%			1.4			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
19									
20	20-22	95%			7.2			SP	10yr/6/2, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
21									
22	22-24	90%			5.8				
23									
24	24-26	80%			5.8			SW	10yr/3/3, loose, homogenous, coarse, subrounded, well graded sand, moist. No odor or staining.
25									
26	26-28	50%			7.2			SP	10yr/3/3, loose, homogenous, very coarse poorly graded sand with gravel up to 1.5", moist. No odor or staining.
27									
28								CH	2.5yr/3/3, hard, mottled, homogenous, low plasticity, sandy fat clay, moist. No odor or staining.

Boring Number: PES-MW-6 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	60%			10.2				
30									
31	30-32	40%			7.2				
32								SP	10yr/3/3, loose, homogenous, fine to medium poorly graded sand, moist to wet (33'). No odor or staining.
33	32-34	100%			35.0				
34									
35	34-36	100%			70.0				
36									
37	36-38	75%			23.3				
38									
39	38-40	90%			74.4				
40								SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
41	40-42	75%			35.0				
42									
43	42-44	95%			27.2				
44									
45	44-46	95%			29.1				

Boring Number: PES-MW-6 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
46	46-48	80%						SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
47									
48	48-50	60%							
49									
50	50-52	80%						SP	10yr/3/3, loose, homogenous, very fine poorly graded sand with silt, wet. No odor or staining.
51									
52	52-54	60%						SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
53									
54	54-56	50%							
55									
56	56-58	80%							
57								ML	10yr/3/3, medium dense, homogenous, silt with sand, wet. 3" thick. No odor or staining.
								SP	10yr/3/3, loose, homogenous, fine poorly graded sand with silt, wet. No odor or staining.
58	58-60	80%							
59									
60	60-62								End of boring at 60 feet.
61									
62									

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-MW-7
Boring Depth:	70 feet	MW #:	PES-MW-7
GW Encountered	approximately 35 feet	Surface Elevation:	
Static GW Level:		Start time/date:	10/26/01 0815
Location:		End time/date:	10/26/01 1200

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0	0-2	95%			0.7			ML	10yr/2/1, firm, medium dense, homogenous, silt with clay and organics, dry. No odor or staining.
1									
								ML	10yr/6/4, loose, homogenous, silt with sand and peebles, dry. No odor or staining.
2	2-4	50%			0.7			SP	10yr/5/6, loose, homogenous, fine to medium poorly graded sand with occational peebles, dry. No odor or staining.
3									
4	4-6	70%			2.1			SP	10yr/6/2, loose, homogenous, medium poorly graded sand, dry, No odor or staining.
5									
6	6-8	90%			0.7			SP	10yr/6/2, loose, homogenous, medium poorly graded sand with rare peebles, dry, No odor or staining.
7									
8	8-10	95%			2.1				
9									
10	10-12	75%			2.1			SP	10yr/6/2, loose, homogenous, medium poorly graded sand with gravel up to 1.25", dry, No odor or staining.
								SP	10yr/7/1, loose, homogenous, very fine poorly graded sand with occational peebles, dry. No odor or staining.
11									

Boring Number:	PES-MW-7	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	0%			NC				No recovery - may have been pushing a rock
13									
14	14-16	75%			0.7			SP	10yr/5/2, loose, homogenous, fine to medium poorly graded sand with occational peebles, dry. No odor or staining.
15									
16	16-18	70%			2.1			SP	10yr/5/2, loose, homogenous, fine to medium poorly graded sand with occational gravel up to 0.75", dry. No odor or staining.
17									
18	18-20	90%			0.7			SP	10yr/5/2, loose, homogenous, fine to medium poorly graded sand with occational gravel up to 0.5", dry. No odor or gravel.
19									
20	20-22	90%			0.7			SP	10yr/5/2, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
21									
22	22-24	90%			2.1			SP	10yr/5/2, loose, homogenous, coarse poorly graded sand with gravel up to 0.25", dry. No odor or staining. Contains 2.5yr/6/1, lean clay in bottom 3" of sampler.
23								CL	2.5yr/6/1, lean clay in bottom 3" of sampler.
24	24-26	80%			2.1			SW	10yr/4/3, loose, homogenous, coarse well graded sand with occational gravel up to 0.5", moist. No odor or staining.
25									
26	26-28	90%			2.1			GP	10yr/4/3, loose, h omogenous, poorly graded gravel with coarse sand, moist. Gravel up to 1.5" and subangular. No odor or staining.
27								SP	10yr/5/2, loose, homogenous, poorly graded fine sand moist. No odor or staining.
28								CL	10yr/5/1, firm, medium density, silty clay with sand, medium plasticity, moist. No odor or staining.
								SP	10yr/4/3, loose, homogenous, very coarse poorly

Boring Number: PES-MW-7 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	80%			12.0				graded sand with occational gravel up to 1", wet. No odor or staining.
30								GP	10yr/3/3, loose, homogenous, coarse poorly graded gravel with minor sand, wet. No odor or staining.
31	30-32	15%			20.5				
32								CH	10yr/3/3, hard, homogenous, low plasticity, fat clay, moist. No odor or staining.
33	32-34	50%			10.6				
34									
35	34-36	100%			99.9			SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
36									
37	36-38	30%			91.4				
38									
39	38-40	50%			19.1				
40									
41	40-42	90%			7.8				
42									
43	42-44	75%			NC				No sample collected - bulk density sample
44									
45	44-46	40%			7.8				

Boring Number: PES-MW-7 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
46	46-48	90%			2.1			SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
47									
48	48-50	60%			2.1				
49									
50	50-52	95%			4.9				
51									
52	52-54	85%			4.9			SP	10yr/3/3, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
53									
54	54-56	50%			4.9				
55									
56	56-58	80%			6.3			SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
57									
58	58-60	60%			4.9				
59									
60	60-62	75%			3.5			SP	10yr/3/3, loose, homogenous, very fine poorly graded sand, wet. No odor or staining.
61									
62									

Boring Number:	PES-MW-7	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
63	62-64	70%			2.1				
64	64-66	NR			NC			SP	10yr/3/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining. Not collected - no recovery
65									
66	66-68								
67									
68	68-70								
69									
70									End of boring at 70 feet NC - headspace sample not collected.
71									
72									
73									
74									
75									
76									
77									
78									
79									

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-MW-8
Boring Depth:	40 feet	MW #:	PES-MW-8
GW Encountered	approximately 34 feet	Surface Elevation:	
Static GW Level:		Start time/date:	10/31/01 1000
Location:		End time/date:	10/31/01 1150

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0 1	0-2	50%			1.4			ML	10yr/3/2, firm to hard, homogenous, silt with fine sand, dry. No odor or staining.
2 3	2-4	90%			1.4			SP	10yr/4/4, loose, homogenous, fine, subrounded, poorly graded sand, dry. No odor or staining.
4 5	4-6	90%			1.4			SP	10yr/6/2, loose, homogenous, fine, subrounded, poorly graded sand, dry. No odor or staining.
6 7	6-8	90%			1.4			SP	10yr/5/4, loose, homogenous, fine to medium, poorly graded sand, dry. No odor or staining.
8 9	8-10	90%			1.4			SP	10yr/4/6, loose, homogenous, medium, poorly graded sand, dry. No odor or staining.
10 11	10-12	60%			1.4				10yr/4/4, loose, homogenous, medium to coarse poorly graded sand with occational peebles, moist. No odor or staining.

Boring Number:	PES-MW-8	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	80%			1.4				
13									
14	14-16	80%			1.4			SP	10yr/6/2, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
15									
16	16-18	90%			1.4			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
17									
18	18-20	80%			1.4				
19									
20	20-22	90%			1.4			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, moist. No odor or staining.
21									
22	22-24	90%			2.9				
23									
24	24-26	90%			2.9			SP	10yr/6/2, loose, homogenous, fine to medium poorly graded sand with gravel, moist. No odor or staining.
25									
26	26-28	90%			2.9			SP	10yr/6/2, loose, homogenous, medium poorly graded sand with gravel, wet. No odor or staining.
27								CL	10yr/4/3, firm, medium dense, homogenous, lean clay with sand, moist. No odor or staining.
28									

Boring Number:	PES-MW-8	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	90%			2.9			CL	10yr/4/3, firm, medium dense, homogenous, lean clay with occational gravel, moist.
30								CL	10yr/4/3, firm, medium dense, homogenous, lean clay with sand, moist to wet. No odor or staining.
31	30-32	95%			4.4				
32									
33	32-34	15%			1.4				
34									
35	34-36	90%			1.4			CL	10yr/4/3, firm, medium dense, homogenous, lean clay with significant sand, moist to wet. No odor or staining.
36								SP	10yr/4/3, loose, homogenous, fine to medium poorly graded sand, wet. No odor or staining.
37	36-38	90%			86.5				
38								SP	10yr/4/3, loose, homogenous, medium poorly graded sand, wet. No odor or staining.
39	38-40	90%			68.6				
40									End of Boring at 40 feet
41	40-42								
42									
43	42-44								
44									
45	44-46								

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-MW-9
Boring Depth:	40 feet	MW #:	PES-MW-9
GW Encountered	approximately 34 feet	Surface Elevation:	
Static GW Level:		Start time/date:	10/31/01 0749
Location:		End time/date:	10/31/01 0937

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0	0-2	20%			1.4			ML	10yr/2/1, loose, homogenous, silt with fine sand and organics, dry. No odor or staining.
1									
2	2-4	95%			1.4			ML	10yr/4/6, loose, homogenous, silt with fine sand, dry. No odor or staining.
3								SP	10yr/4/4, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
4	4-6	75%			1.4			SP	10yr/5/4, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
5									
6	6-8	90%			1.4			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
7									
8	8-10	90%			1.4				
9									
10	10-12	90%			1.4			SP	10yr/6/2, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
11									

Boring Number:	PES-MW-9	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	90%			2.9			SP	10yr/4/3, loose, homogenous, medium, subrounded poorly graded sand,dry. No odor or staining.
13									
14	14-16	90%			2.9				
15									
16	16-18	90%			1.4			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
17									
18	18-20	70%			1.4				
19									
20	20-22	80%			2.9				
21									
22	22-24	90%			4.4			SP	10yr/6/2, loose, homogenous, fine poorly graded sand with occational peebles, dry. No odor or staining.
23									
24	24-26	90%			4.4				
25									
26	26-28	90%			2.9			SW	10yr/4/3, loose, homogenous, medium to coarse well graded sand with peebles, moist. No odor or staining.
27									
28								ML	10yr/4/3, medium dense, homogenous, silt with sand,
								SP	wet. No odor or staining.
									10yr/4/3, loose, homogenous, medium to coarse,

Boring Number: PES-MW-9 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	15%			14.9				poorly graded sand, wet. No odor or staining.
30	30-32	40%			26.8			CL	10yr/4/3, medium dense, homogenous, sandy lean clay with sand, wet. No odor or staining.
31									
32	32-34	60%			53.7			ML	10yr/4/3, medium dense, homogenous, silt with sand, moist to wet. No odor or staining.
33									
34	34-36	80%			NC			CH	10yr/4/3, firm, homogenous, low plasticity, fat clay with sand, wet. No odor or staining.
35									
36	36-38	90%			35.8			SP	10yr/4/3, loose, homogenous, medium poorly graded sand, wet. No odor or staining.
37									
38	38-40	50%			10.4				
39									
40	40-42								End of boring at 40 feet NC - Not collected - bulk density sample
41									
42	42-44								
43									
44	44-46								
45									

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	8"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-CW-1
Boring Depth:	40 feet	MW #:	PES-CW-1
GW Encountered	approximately 28 feet	Surface Elevation:	
Static GW Level:		Start time/date:	11/5/01 1030
Location:		End time/date:	11/3/01 1150

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0	0-2	100%			1.6			SP	10yr/3/1, loose, homogenous, fine poorly graded sand with silt, dry. No odor or staining.
1								SP	10yr/4/6, loose, homogenous, fine poorly graded sand dry. No odor or staining.
2	2-4	80%			1.6				
3									
4	4-6	70%			1.6			SP	10yr/5/4, loose, homogenous, medium poorly graded sand with gravel up to 0.5", dry. No odor or staining.
5									
6	6-8	80%			1.6			SP	10yr/5/4, loose, homogenous, medium to coarse poorly graded sand with peebles, dry. No odor or staining.
7									
8	8-10	90%			1.6				
9									
10	10-12	80%			1.6			SP	10yr/6/2, loose, homogenous, fine to medium poorly graded sand, dry. No odor or staining.
11									

Boring Number: PES-CW-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	90%			0.0				
13									
14	14-16	90%			1.6				
15									
16	16-18	90%			1.6			SP	10yr/6/2, loose, homogenous, medium to coarse poorly graded sand with peebles, dry. No odor or staining.
17									
18	18-20	90%			1.6				
19									
20	20-22	90%			1.6			SP	10yr/6/2, loose, homogenous, medium poorly graded sand, moist. No odor or staining.
21									
22	22-24	85%			1.6				
23									
24	24-26	90%			1.6			SP	10yr/4/3, loose, homogenous, fine to medium poorly graded sand with occational peebles, moist. No odor or staining.
25									
26	26-28	80%			1.6			SP	10yr/4/3, loose, homogenous, fine to medium poorly graded sand, moist to wet. No odor or staining.
27									
28								SP	10yr/4/3, loose, homogenous, coarse poorly graded sand, wet. No odor or staining.

Boring Number: PES-CW-1 Project : NIROP Pilot-Scale Project Project #: 5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	15%			1.6				
30	30-32	25%			3.3				
31									
32	32-34	100%			1.6			SP	10yr/4/3, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
33									
34	34-36	60%			NC			SP	10yr/4/3, loose, homogenous, fine to medium poorly graded sand, wet. No odor or staining.
35									
36	36-38	90%			1.6				
37									
38	38-40	25%			1.6				10yr/4/3, loose, homogenous, coarse to very coarse sand with gravel up to 0.5", wet. No odor or staining.
39									
40	40-42								End of boring at 40 feet NC - Not collected - bulk density sample
41									
42	42-44								
43									
44	44-46								
45									

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	8"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-CW-2
Boring Depth:	40 feet	MW #:	PES-CW-2
GW Encountered	approximately 30 feet	Surface Elevation:	
Static GW Level:		Start time/date:	11/5/01 0730
Location:		End time/date:	11/5/01 0900

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0, 1	0-2	100%			0.0			SP	10yr/4/1, medium dense, homogenous, silt with fine sand and organics, dry. No odor or staining.
2	2-4	100%			0.0			SP	10yr/5/4, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
3								SP	10yr/2/3, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
4	4-6	90%			1.6			SP	10yr/6/2, loose, medium, fine to medium poorly graded sand, dry. No odor or staining
5								SP	10yr/3/3, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
6, 7	6-8	90%			0.0				10yr/4/3, loose, homogenous, coarse poorly graded sand with gravel up to 0.5", dry. No odor or staining.
8, 9	8-10	90%			0.0				
10, 11	10-12	90%			0.0				10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.

Boring Number:	PES-CW-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	80%			0.0				
13									
14	14-16	90%			0.0			SP	10yr/6/2, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
15									
16	16-18	90%			0.0			SP	10yr/6/2, loose, homogenous, medium poorly graded sand with gravel up to 0.75", dry. No odor or staining.
17									
18	18-20	90%			1.6				
19									
20	20-22	90%			1.6			SP	10yr/6/2, loose, homogenous, medium poorly graded sand with gravel up to 1.0", dry. No odor or staining.
21									
22	22-24	90%			0.0			SP	10yr/6/2, loose, homogenous, medium poorly graded sand with occational gravel up to 0.75", dry. No odor or staining.
23									
24	24-26	90%			0.0			SP	10yr/6/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining. Becoming moist below 26'.
25									
26	26-28	90%			1.6				
27									
28								SP	10yr/6/2, loose, homogenous, medium poorly graded sand, moist to wet (below 30 feet). No odor or staining.

Boring Number:	PES-CW-2	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	90%			1.6				
30									
31	30-32				3.3				
32								SP	10yr/6/2, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
33	32-34				1.6				
34									
35	34-36				NC				
36								SP	10yr/6/2, loose, homogenous, medium poorly graded sand, wet. No odor or staining.
37	36-38				3.3				
38								SP	10yr/6/2, loose, homogenous, fine poorly graded sand, wet. No odor or staining.
39	38-40				1.6				
40									End of boring at 40 feet NC - Not collected - bulk density sample
41	40-42								
42									
43	42-44								
44									
45	44-46								

VISUAL CLASSIFICATION OF SOILS

EMR INCORPORATED

EMR Project Name:
NIROP Pilot-Scale Project
EMR Project Number:
5427-001-01
Note:

Drilling Information

Drilling Contractor:	Bergerson-Caswell
Drilling Method:	Hollow Stem Auger
Drillers Name:	Glen Holman
Borehole Diameter:	10.25"
Sampler Type:	Split Spoon

Event Information

Logged by:	Mike Golan	Boring #:	PES-CW-3
Boring Depth:	40 feet	MW #:	PES-CW-3
GW Encountered	approximately 34 feet	Surface Elevation:	
Static GW Level:		Start time/date:	11/2/01 1200
Location:		End time/date:	11/2/01 1325

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Groundwater	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
0	0-2	80%						ML	10yr/4/1, medium density, homogenous, silt with sand, dry. No odor or staining.
1								SP	10yr/7/2, loose to hard, homogenous, fine poorly graded sand with fat clay lenses, dry. No odor or staining.
2	2-4	90%							10yr/6/5, hard, homogenous, low plasticity, fat clay with sand, dry. No odor or staining. Becoming sandier with depth.
3									
4	4-6	80%							
5									
6	6-8	90%						SP	10yr/6/5, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
7								SP	10yr/3/3, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
8	8-10	80%							
9									
								SP	10yr/3/3, loose, homogenous, fine poorly graded sand with peebles, dry. No odor or staining.
10	10-12	90%						SP	10yr/3/3, loose, homogenous, medium poorly graded sand with gravel, dry. No odor or staining.
11								SP	10yr/3/3, loose, homogenous, fine poorly graded sand dry. No odor or staining.

Boring Number:	PES-CW-3	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
12	12-14	90%			2.3			SP	10yr/4/4, loose, homogenous, medium poorly graded sand, dry. No odor or staining.
13									
14	14-16	90%			2.3			SP	10yr/5/2, loose, homogenous, fine to medium poorly graded sand, dry. No odor or staining.
15									
16	16-18	90%			2.3				
17									
18	18-20	95%			2.3				
19									
20	20-22	90%			0.7			SP	10yr/5/2, loose, homogenous, fine poorly graded sand, dry. No odor or staining.
21									
22	22-24	90%			0.7				10yr/4/3, loose, homogenous, medium to coarse poorly graded sand, dry. No odor or staining.
23									
24	24-26	90%			0.7				
25									
26	26-28	90%			2.3				10yr/4/3, loose, homogenous, medium to coarse poorly sand with minor lean clay, dry. No odor or staining.
27									
28									

Boring Number:	PES-CW-3	Project :	NIROP Pilot-Scale Project	Project #:	5427

Depth (ft)	Sample Interval	Sample Recovery	Evacuation Rate	Ground water	PID/FID Readings	GC Reading	Graphic Log	USCS Classification	Soil Classification/ Description
29	28-30	90%			0.7			SP	10yr/6/2, loose, homogenous, medium poorly graded sand, moist. No odor or staining.
30	30-32	95%			3.8			SP	10yr/6/2, loose, homogenous, medium poorly graded sand, wet. No odor or staining.
31									
32	32-34	70%			3.8				
33									
34	34-36	65%			NC			SP	10yr/6/2, loose, homogenous, coarse poorly graded sand with gravel up to 0.5", wet. No odor or staining.
35									
36	36-38	90%			6.9			CH	10yr/4/4, hard, homogenous, low plasticity, fat clay with sand, moist. No odor or staining.
37									
38	38-40	60%			2.3			SP	10yr/4/4, loose, homogenous, medium poorly graded sand with minor clay, wet. No odor or staining.
39									
40	40-42								End of boring at 40 feet NC - Not collected - bulk density sample
41									
42	42-44								
43									
44	44-46								
45									

PROJECT NO. 13453 BORING NO. PES-39-1 PROJECT NT Rop WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: Glenn Boring Started: 10-17-01
Helper: Jack Boring Completed: 10-18-01
Rig No: 81 Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet 1 of 3

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To: _____
	0	2		4	4	4	4	18		Sod + Black Sand Topsoil
	2	4		5	5	4	4	16	2½	Brown Sand
	4	6		4	2	2	2	14		Brown Sand
	6	8		2	2	4	4	12	7	Brown Tan Sand
	8	10		5	5	7	7	16	8.5	TAN Sand
	10	12		4	4	4	4	14		TAN Sand
	12	14		5	5	5	5	20		TAN Sand
	14	16		23	33	35	50/2			NR.
	16	18		3	6	9	9	16	16.5	Brown Sand
	18	20		6	7	7	8	14		Brown Sand
	20	22		4	6	9	9	10		Brown Sand
	22	24		13	15	16	16	12	23	Course Brown Sand.
	24	26		5	5	6	6	15		Course Brown Sand
	26	28		4	6	10	10	12	27.5	Brown Silt to Brown Sandy Silt Damp
	28	30		6	8	10	14	12		Brown Sandy Silt Damp
	30	32		10	10	5	5	16	30.5	Medium Brown Sand wet

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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NO. _____ BORING NO. PES-B4-1 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: Glenn Boring Started: 10-17-01
Helper: Jack Boring Completed: 10-18-01
Rig No: 81 Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet 2 of 3

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	32	34		2	2	4	4	12		Medium Brown Sand 3" Spoon wet
	34	36		4	4	4	4	10		Brown Sand 3" Spoon
	36	38		6	10	18	28	12	37	Fine Brown Sand 3" Spoon
	38	40		5	5	5	5	10		Fine Brown Sand 2½ Slotted Spoon
	40	42		8	12	13	18	12		Fine Brown Sand "
	42	44		7	7	7	7	12	43	Very Fine Brown Sand
	44	46		6	6	6	6	12	45	Fine Brown Sand
	46	48		4	4	4	4	8		Fine Brown Sand
	48	50		6	6	6	6	12		Fine Brown Sand
	50	52		4	6	6	8	12		Fine Brown Sand
	52	54		6	8	8	10	14	53.5	Fine Brown Sand to Very Fine Brown Sand 6"
	54	56		6	6	6	6	14		Very Fine Brown Sand
	56	58		4	4	4	4	15		" " "
	58	60		4	4	4	4	12	59.5	Very Fine Sand to Fine Brown Sand 6"
	60	62		3	3	4	4	14		Fine Brown Sand
	62	64		6	6	6	6	14		Fine Brown Sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): ____
Final Depth (drilled): ____
Backfill Type: ____
Was Well Set: ____
Depth of Well: ____
Well Number: ____
Auger Size: ____
Auger FTG: ____
Rotary Size: ____
Rotary FTG: ____
Fluid Used: ____
Fluid Loss: ____
Artesion Pressure: Depth: ____

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PROJECT NO. _____ BORING NO. PES-B4-1 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: Glenn Boring Started: 10-17-01
Helper: Jack Boring Completed: 10-18-01
Rig No: 81 Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet 3 of 3

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	64	66		4	4	4	4	12		Fine Brown Sand
	66	68		4	4	4	4	14		Fine Brown Sand
	68	70		4	4	4	4	12		Fine Brown Sand
	70	72		4	4	4	4	12		Fine Brown Sand
	72	74		5	5	5	5	12		Fine Brown Sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. ~~14 TW-2A~~ BG-27 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: Brown Boring Started: 10-15-01
Helper: Jack Boring Completed: 10-16-01
Rig No: 81 Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	0	2		5	5	5	5	20	1.5	Dark clayish top soil to Reddish Brown sand
	2	4		4	4	3	3	12	3.0'	Reddish Brown sand to tan sand
	4	6		3	3	3	3	12		Tan sand
	6	8		3	3	3	3	16		Tan sand
	8	10		3	4	6	10	12		Tan sand
	10	12		5	5	10	10	12		Tan sand
	12	14		7	7	5	6	12	13	Medium Brown sand
	14	16		17	20	22	10	3		Brown sand & Blue Rock
	16	18		4	4	6	6	12	17	Medium to fine tan sand
	18	20		6	10	12	12	6		Medium to fine tan sand
	20	22		6	6	7	8	12	21	Medium Brown to tan sand
	22	24		6	6	8	10	12	23	Rocky Brown sand
	24	26		10	10	20	28			Rock
	26	28		10	12	15	20	12	27	Fine gray sand (Damp)
	28	30		25	19	12	12	6		3" Sandstone to 4" gray sand
	30	32		4	4	6	6	6	31.5'	gray sandy clay

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. ~~VAFNS 2A~~ BG-2 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____
Driller: Glenn
Helper: Jack
Rig No: 81

Surface Elevation: _____
Boring Started: 10-15-01
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	32	34		3	3	3	3	20	32.4	Fine Gray Sand wet
	34	36		12	12	8	8	9		Fine Gray Sand wet Used 3" Spoon
	36	38		5	5	5	5	16		Fine Gray Sand wet 3" Spoon
	38	40		3	3	3	3	12		Fine Gray Sand wet 3" Spoon
	40	42	2" SS	5	5	5	5	15		Brown Sand
	42	44		5	5	6	6	15		" "
	44	46		3	3	3	3	12		Brown Sand
	46	48		3	3	4	6	14		Fine Brown Sand
	48	50		4	5	8	8	12		Fine Brown Sand
	50	52		5	5	10	10	8		Fine Brown Sand
	52	54		13	9	9	13	12		" Brown Sand
	54	56		6	6	6	6	10		" Brown Sand
	56	58		6	6	6	6	12		" Brown Sand
	58	60		10	7	7	8	12	59	" Brown Silty Sand
	60	62		4	4	7	8	12	61	" Brown Sand
	62	64								" Brown Sand

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. 13453 BORING NO. ~~V2 FN1-2-f~~ RW- PROJECT NIROP WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Scott
Rig No: 81

Surface Elevation: _____
Boring Started: 10-15-01
Boring Completed: 10-16-01
Off Set: _____

WATER LEVEL OBSERVATION

WL: 30 WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	64	66		4	4	4	4	10		Fine Brown Sand
	66	68		4	4	6	8	8		Fine Brown Sand
	68	70		4	4	6	6	12		Fine Brown Sand
	70	72		4	4	4	4	10		" Brown Sand
	72	74		2	2	2	2	10	B?	Medium to Fine Brown Sand
										Screen set 38' to 43'
										30' sump. Grouted in
										place - 3 bags
										sand pack 13 bags
										Mud 1 bag
										Neat 13 bags

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): 74
Final Depth (drilled): 75
Backfill Type: Neat
Was Well Set: Yes
Depth of Well: 43
Well Number: _____
Auger Size: 6 1/4
Auger FTG: 75
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. ~~VG-INS~~ - 1 B6 - 3 PROJECT _____

Technician: _____ Surface Elevation: _____

Driller: Glenn Boring Started: 10-16-01

Helper: Jack Boring Completed: 10-17-01

Rig No: 81 Off Set: _____

WEATHER _____

BORING LOG: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD

WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To:
	0	2		4	4	4	4	18		Sod to Black sand
	2	4		5	5	5	5	16	2.5	Brown Sand
	4	6		4	4	4	4	16		Brown TAN Sand
	6	8		2	3	3	4	12		Brown TAN Sand
	8	10		3	3	4	6	16		Brown TAN Sand
	10	12		5	5	5	5	10		Brown TAN Sand
	12	14		5	5	6	8	12	13	TAN Sand
	14	16		6	6	6	6	16		TAN Sand
	16	18		6	8	8	10	16		TAN Sand
	18	20		5	5	6	8	14		TAN Sand
	20	22		17	28	35	10/1	4	21.5	Brown Sand & Rock
	22	24		6	16	18	20	8		Rocky Brown Sand
	24	26		100/2						N.R.
	26	28		5	5	5	5	16	26.5	Gray Silty Sand
	28	30		20	20	15	12	16	29.5	Gray Silty Sand to ~~Brown~~ Gray TAN Sand wet
	30	32		4	4	4	4	14		Fine Gray Sand wet

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____

Final Depth (drilled): _____

Backfill Type: _____

Was Well Set: _____

Depth of Well: _____

Well Number: _____

Auger Size: _____

Auger FTG: _____

Rotary Size: _____

Rotary FTG: _____

Fluid Used: _____

Fluid Loss: _____

Artesion Pressure: Depth: _____

PROJECT NO. _____ BORING NO. ~~VATNS~~ 1 BG-3 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician:
Driller: Crew
Helper: Jack
Rig No: 81

Surface Elevation:
Boring Started: 10-16-01
Boring Completed: 10-17-01
Off Set:

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To:
	32	34		4	4	4	4	18		GRAY SAND wet
	34	36		6	10	6	6	18		GRAY SAND wet (Adding H2O
	36	38		20	25	29	30	16		Fine Gray Sand 3" Spoon
	38	40		6	8	12	12	12		Fine Gray Sand 3" Spoon
	40	42		15	22	25	30	8		Fine Gray Sand 3" Spoon
	42	44		15	17	17	18	16		Fine Gray Sand 3" Spoon
	44	46		5	6	10	10	12		Fine Brown Sand
	46	48		5	5	6	6	12		Fine Brown Sand
	48	50		5	5	5	5	8		Brown Sand
	50	52		10	10	8	8	10		Brown Sand
	52	54		5	5	5	5	14		Brown Sand
	54	56		5	5	6	6	10		Brown Sand
	56	58		5	6	6	7	12	57	Silty Brown Sand
	58	60		5	5	6	6	12		Silty Brown Sand
	60	62		10	14	16	16	12	61	Brown Sand
	62	64		5	5	5	5			Brown Sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. ~~[illegible]~~ B6-3 PROJECT _____

Technician: _____ Surface Elevation: _____

Driller: Glenn Boring Started: 10-22-01

Helper: J. Gill Boring Completed: 10-19-01

Rig No: 81 Off Set: _____

WEATHER _____

BORING LOG: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD

WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To: _____
	64	66		6	6	6	6	14		Brown Sand
	66	68		8	8	8	8	16		Brown Sand
	68	70		6	6	6	6	12		Brown Sand
	70	72		5	6	6	8	8		Brown Sand
	72	74		8	10	10	12	12	73	Very Fine Brown Sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____

Final Depth (drilled): _____

Backfill Type: _____

Was Well Set: _____

Depth of Well: _____

Well Number: _____

Auger Size: _____

Auger FTG: _____

Rotary Size: _____

Rotary FTG: _____

Fluid Used: _____

Fluid Loss: _____

Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. Inj 1 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Chad
Helper: Jack
Rig No: 81

Surface Elevation: _____
Boring Started: 10-23-01
Boring Completed: 10-24-01
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To: _____
	0	2		3	3	4	4	16	1	Soil to Brown Sand
	2	4		4	4	6	6	12		Fine Brown Sand
	4	6		8	8	8	8	17		Fine Brown Sand
	6	8		3	3	4	4	14	7.5	Medium Brown Sand to Fine Brown Sand
	8	10		6	6	8	8	12		Fine Brown Tan Sand
	10	12		4	4	6	6	12		Fine Brown Tan Sand
	12	14		3	3	4	4	16		Fine Brown Tan Sand
	14	16		4	4	7	7	14		Fine Brown Tan Sand
	16	18		4	4	4	4	12		Fine Brown Tan Sand
	18	20		3	3	4	4	12		Fine Brown Tan Sand
	20	22		4	4	6	6	4		Fine Brown Tan Sand
	22	24		10	10	12	12			Rock N.R.
	24	26		7	7	7	7			Rock N.R.
	26	28		4	4	6	6	18	26.5	Hard Brown clay
	28	30		6	6	8	8	14	29.5	Hard Brown clay to Brown sandy clay Damp
	30	32		6	6	8	8	12		Brown sandy clay Damp

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

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PROJECT NO. _____ BORING NO. VgTMW-1 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: Glenn Boring Started: 10-23-01
Helper: Sam Boring Completed: _____
Rig No: 81 Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	32	34		4	4	4	4	2	33.5	Fine Brown Sand wet
	34	36		4	4	4	4	16	35.5	Silty Brown Sand to Fine Brown Sand wet
	36	38		4	4	4	4	16		Fine Brown Sand wet
	38	40		6	6	8	8	16		Fine Brown Sand wet 2½" Spoon
	40	42		4	4	6	6	14		Fine Brown Sand 2½" Spoon
	42	44		4	4	4	4	8		Fine Brown Sand
	44	46		4	4	4	4	16		Fine Brown Sand
	46	48		5	5	5	5	12		Fine Brown Sand
	48	50		4	4	4	4	12	49.5	Fine Brown Sand Very Fine Brown Sand
	50	52		6	6	6	6	12		Very Fine Brown Sand
	52	54		4	4	4	4	14		Very Fine Brown Sand
	54	56		4	4	4	4	12		Very Fine Brown Sand
	56	58		4	4	4	4	12	57.5	Fine Brown Sand to Silty Brown Sand
	58	60		4	4	4	4	12	59	Very Fine Brown Sand
	60	62		4	4	6	6	12	61	Fine Brown Sand
	62	64		5	5	5	5	12		Fine Brown Sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. [illegible] PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: _____
Helper: _____ Boring Completed: 10-23-[illegible]
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To: _____
	64	66		4	4	4	4	14		Fine Brown Sand
	66	68		4	4	4	4	12	67.5	Fine Brown Sand to Silty Brown Sand
	68	70		4	4	4	4	12	69	Fine Brown Sand
	70	72								
	72	74								

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond Bit
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. V4-INJ-2-B PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____
Driller: Glenn
Helper: Jack
Rig No: 81

Surface Elevation: _____
Boring Started: 10-18-01
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet 1 of 2

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	0	2		4	4	4	4	15		Sod + Black Sand Topsoil
	2	4		4	4	4	4	16	2.5	Brown Sand
	4	6		4	4	4	4	12	4.5	Brown Tan Sand
	6	8		4	4	4	4	15		Brown Tan Sand
	8	10		4	4	6	6	16		Brown Tan Sand
	10	12		5	6	6	7	22	11	Brown Sand
	12	14		6	6	6	6	20		Brown Sand
	14	16		4	4	4	4	12		Brown Sand
	16	18		10	9	7	8	10		Brown Sand
	18	20		5	6	6	8	14		Brown Sand
	20	22		8	8	10	12	14		Brown Sand
	22	24		12	12	12	12	12	23	Course Brown Sand
	24	26		20	20	10	12	10		Course Brown Sand
	26	28		6	6	6	6	6	27.5	Fine Brown Sand
	28	30		10	10	10	10	12		Fine Brown Sand
	30	32		6	6	6	6	16		Fine Brown Sand. Damp

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. [illegible] BORING NO. B-TW3-2 PROJECT [illegible] WEATHER _____ BORING LOG: _____

Technician:
Driller: Gilbert
Helper: Smith
Rig No: 41

Surface Elevation:
Boring Started: 10-18-01
Boring Completed: 10-25-01
Off Set:

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet 2 of 2

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	32	34		10	10	10	10	16	32.5	Fine Brown Sand wet
	34	36		5	5	5	5	14		Fine Brown Sand wet
	36	38		6	6	6	6	10		Fine Brown Sand wet 3" Spoon
	38	40		6	6	6	6	14		Fine Brown Sand wet 3" Spoon
	40	42								Fine Brown Sand wet 3" Spoon
	42	44								
										Abandoned -
										8 Sacks

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): 46
Final Depth (drilled): 38
Backfill Type: Bentonite
Was Well Set: NO
Depth of Well: ~~[illegible]~~
Well Number: B-TW3-2
Auger Size: 6 1/4
Auger FTG: 38
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. [illegible] PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: [illegible]
Helper: _____ Boring Completed: [illegible]
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	0	2		4	4	4	4	18	1	Sod to Brown Sand
	2	4		5	5	5	5	16		Brown Sand
	4	6		5	5	5	5			Brown Sand
	6	8		4	5	5	6	16	6.5	Brown Tan Sand
	8	10		4	6	6	7	16		Brown Tan Sand
	10	12		6	6	6	6	12	11	Fine Brown Tan Sand
	12	14		4	10	10	10	16	13.5	Fine Brown Tan Sand to Coarse Brown Sand
	14	16		4	4	5	6	12	15.5	Coarse Brown Sand to Medium Brown Sand
	16	18		6	23	20	20			NR.
	18	20		6	7	10	12	12	19	Coarse Brown Sand
	20	22		5	5	6	8	12		Coarse Brown Sand
	22	24		8	8	8	8	16		Coarse Brown Sand
	24	26		7	7	9	9	12		Coarse Brown Sand
	26	28		6	8	8	10	16		Coarse Brown Sand
	28	30		8	8	10	10	16		Coarse Brown Sand Damp
	30	32		6	6	8	9	16	30.5	Brown Clay 10" to Sandy Brown Clay 6"

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond Bit
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Sample Description: Record Color & Texture

Sample Given To: _____

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. W4 TMS-2 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 10-22-01
Helper: _____ Boring Completed: 10-22-01
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	32	34		4	4	4	4	16	32.5	Fine Brown Sand wet
	34	36		4	4	4	4	18		Fine Brown Sand wet
	36	38		3	3	3	3	16	36.5	Medium Brown Sand wet
	38	40		3	3	3	3	16		Medium Brown Sand wet
	40	42		3	3	3	3	16	40.5	Fine Brown Sand
	42	44		5	5	5	5	14		Fine Brown Sand
	44	46		8	15	20	20	16		Fine Brown Sand
	46	48		4	4	4	4	16		Fine Brown Sand
	48	50		4	4	4	4	8		Fine Brown Sand
	50	52		5	5	5	5	12		" " "
	52	54		7	7	7	7	12		" " "
	54	56		5	5	5	5	12		Med Brown Sand
	56	58		4	5	5	6	8		Fine Brown Sand
	58	60		5	5	5	5	15		" " "
	60	62		5	5	6	6	2		" " "
	62	64		5	5	6	6			" " "

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): ____
Final Depth (drilled): ____
Backfill Type: ____
Was Well Set: ____
Depth of Well: ____
Well Number: ____
Auger Size: ____
Auger FTG: ____
Rotary Size: ____
Rotary FTG: ____
Fluid Used: ____
Fluid Loss: ____
Artesion Pressure: Depth: ____

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PROJECT NO. _____ BORING NO. VGIN3-2 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 10-27-01
Helper: _____ Boring Completed: 10-27-01
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	04	06		5	5	5	5	12		Fine Brown Sand
	06	08		5	5	5	5	12	06.5	Medium Brown Sand
	08	10		5	5	5	5	12	08.5	Medium Brown Sand to Fine Brown Sand

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. 13453 BORING NO. TAS-3 PROJECT NJRGP

Technician: Scott
Driller:
Helper:
Rig No: A1

Surface Elevation:
Boring Started: 10-19-01
Boring Completed: 10-22-01
Off Set:

WEATHER

BORING LOG:

WATER LEVEL OBSERVATION

WL: WS or WD
WL: HRS AB

Sheet of

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	0	2		4	4	4	4	18	3.5	Sod to Brown Sand
	2	4		3	3	4	4	16		Brown Sand
	4	6		3	3	3	3	14		Brown Sand
	6	8		4	4	4	4	16	6.5	Brown Tan Sand
	8	10		4	4	5	5	16		Brown Tan Sand
	10	12		4	4	4	4	14		Brown Tan Sand
	12	14		10	10	10	10	12	13	Coarse Brown Sand
	14	16		5	5	8	8	12	15	Medium Brown Sand
	16	18		12	12	8	8			N.R.
	18	20		6	6	6	6	12	19	Coarse Brown Sand
	20	22		5	5	5	5	12	21	Medium Brown Sand
	22	24		7	7	7	7	12		Medium Brown Sand
	24	26		6	6	6	6	12	25	Coarse Brown Sand
	26	28		10	8	15	22	4		Coarse Brown Sand & Rock
	28	30		4	4	4	4	6	29.5	Coarse Brown Sand wet
	30	32		7	7	7	7			Coarse Brown Sand wet

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled):
Final Depth (drilled):
Backfill Type:
Was Well Set:
Depth of Well:
Well Number:
Auger Size:
Auger FTG:
Rotary Size:
Rotary FTG:
Fluid Used:
Fluid Loss:
Artesion Pressure:
Depth:

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PROJECT NO. _____ BORING NO. V9-EN5-3 PROJECT _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 10-14-01
Helper: _____ Boring Completed: 10-22-01
Rig No: _____ Off Set: _____

WEATHER _____

BORING LOG: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To:
	32	34								
	34	36		8	8	10	10	12	33	Fine Brown Sandy clay 2½ spoon
	36	38		10	10	10	10	18	35	Fine Brown Sandy clay to Fine Brown Sand wet
	38	40		10	10	12	12	4		Fine Brown Sand 2½ spoon wet
	40	42		14	14	16	18	10		Fine Brown Sand 2½ spoon wet
	42	44		5	5	5	5	14		Fine Brown Sand 2½ spoon
	44	46		4	4	6	6	16		Fine Brown Sand
	46	48		10	10	10	10	14		Fine Brown Sand 2½ spoon
	48	50		5	5	5	5	12		Fine Brown Sand
	50	52		4	4	4	4	16		Fine Brown Sand
	52	54		6	6	6	6	16		Fine Brown Sand
	54	56		4	4	4	4	14		Fine Brown Sand
	56	58		6	6	8	8	14	56.8	Medium Brown Sand
	58	60		6	6	8	8	12		medium Brown Sand
	60	62		6	6	8	8	12	61	Fine Brown Sand
	62	64		4	4	5	5	16		Fine Brown Sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

PROJECT NO. _____ BORING NO. U9 TNS-3 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 10-18-01
Helper: _____ Boring Completed: 10-22-01
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	4.4	6.6		4	6	7	7	12		Fine Silty Brown Sand
	6.6	6.8		4	4	7	7	12	6.9'	Fine Brown Sand
	6.8	7.0		4	4	7	7	16		Fine Brown Sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond Bit
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. 285-MW-1 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: [illegible] Surface Elevation: _____
Driller: [illegible] Boring Started: 10-25-01
Helper: [illegible] Boring Completed: _____
Rig No: 41 Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	0	2		4	4	4	4	18	1	Sod To Brown Sand
	2	4		4	4	5	5	12		Brown Sand
	4	6		4	4	4	4	12	5.5'	Medium Brown Sand To Fine Brown Tan Sand
	6	8		4	5	5	6	12		Fine Brown Tan Sand
	8	10		4	4	4	4	14		Fine Brown Tan Sand
	10	12		4	4	6	6	14		Fine Brown Tan Sand
	12	14		4	4	4	4	6	13.5	Coarse Brown Sand
	14	16		4	4	4	4	12	15	Fine Brown Tan Sand
	16	18		4	4	6	6	12		Fine Brown Tan Sand
	18	20		5	6	6	10	14		Fine Brown Tan Sand
	20	22		4	4	5	5	12	21	Medium to Coarse Brown Sand
	22	24		5	5	5	5	12		Medium to Coarse Brown Sand
	24	26		4	5	5	4	14		Medium to Coarse Brown Sand
	26	28		10	15	24		12		Rock
	28	30		4	4	6	6	12	29	Hard Brown clay
	30	32		8	8	8	8			Hard Brown clay

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. PS-[illegible] PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: [illegible] Surface Elevation: _____
Driller: [illegible] Boring Started: 10-25-[illegible]
Helper: [illegible] Boring Completed: _____
Rig No: [illegible] Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	32	34		4	6	4	5	18	33	Hard Brown Clay to Fine Brown Sand. wet
	34	36		4	4	6	6	6		Fine Brown Sand wet
	36	38		6	7	7	9			N.R.
	38	40		3	3	4	4	12		Fine Brown Sand wet
	40	42		6	8	10	10	14		Fine Brown Sand 3½ spoonfuls
	42	44		6	8	8	10	14		Fine Brown Sand 3½ spoons
	44	46		4	4	4	4	12	45	Medium Brown Sand
	46	48		4	4	6	8	12		Medium Brown Sand
	48	50		6	10	10	12	18	48.5	Fine Brown Sand
	50	52		4	4	4	4	14		Fine Brown Sand
	52	54		4	4	4	4	14		Fine Brown Sand
	54	56		4	4	6	6	12	55	Silty Brown Sand
	56	58		5	5	5	5	6	57.5	Very Fine Brown Sand
	58	60		4	4	6	8	12		Very Fine Brown Sand
	60	62		4	4	6	6	14		Very Fine Brown Sand
	62	64		4	4	4	4	16	62.8	medium Brown Sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. PES-MW-1 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: _____
Helper: _____ Boring Completed: _____
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	64	66		4	4	4	4	12	65	Fine Brown Sand
	66	68		4	4	4	4	16		Fine Brown Sand
	68	70								

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. MW-2 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 06-30-01
Helper: _____ Boring Completed: _____
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To: _____
	0	2		6	6	6	6	12		Sod, Dark Brown Topsoil
	2	4		6	3	3	3	12	3	Medium Brown Sand
	4	6		3	3	3	3	14		Medium Brown Sand
	6	8		4	5	5	6	12	7	Medium Brown Tan Sand
	8	10		4	4	6	6	16		Medium Brown Tan Sand
	10	12		4	4	4	4	12	11	Medium to Coarse Brown Sand
	12	14		5	5	5	5	14		Medium to Coarse Brown Sand
	14	16		4	4	4	4			N.R.
	16	18		4	4	4	4	16	16.5	Medium to Fine Brown Tan Sand
	18	20		4	4	4	4	16	18.5	Fine Brown Tan Sand
	20	22		4	4	4	4	14		Fine Brown Tan Sand
	22	24		4	4	4	4	14	22.0	Medium Brown Sand
	24	26		4	5	5	7	8	24.5	Medium to Coarse Brown Sand
	26	28		10	12	14	14	8	27	Rocky Brown Sand
	28	30		11	11	11	11	10		Brown Sandy Clay
	30	32		7	7	9	9	10		Brown Sandy Clay

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): ____
Final Depth (drilled): ____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. _____ PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 20-30-01
Helper: _____ Boring Completed: _____
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To: _____
	32	34		11	17	20	24			N.R.
	34	36		4	3	3	3	14	34	Fine Brown Sand 2" Spoon
	36	38		5	3	3	3	12		Fine Brown Sand
	38	40		3	3	3	3	8		Fine Brown Sand
	40	42		5	5	5	5	14		Fine Brown Sand 2½" Spoon
	42	44		4	4	4	4	18	43.5	Very Fine Brown Sand
	44	46		3	3	3	3	16		Very Fine Brown Sand
	46	48		3	3	3	3	12	46	Fine Brown Sand
	48	50		3	3	4	4	18	49	Fine Brown Sand to Brown Silty Sand
	50	52		2	2	3	3	16	50	Very Fine Brown Sand
	52	54		2	2	2	2	10		Very Fine Brown Sand
	54	56		3	3	3	3	12	54	Silty Brown Sand
	56	58		2	2	3	3	18	56	Fine Brown Sand
	58	60		3	3	3	3	14		Fine Brown Sand
	60	62		2	2	2	2	12		Fine Brown Sand
	62	64		2	2	3	3	16	62	Very Fine Brown Sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. _____ PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 10-30-01
Helper: _____ Boring Completed: _____
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	64	66								
	66	68								
	68	70								

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. MW 3 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Blow
Helper: Smith
Rig No: 81

Surface Elevation: _____
Boring Started: 11-1-01
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	0	2		6	6	6	6	20		Sod Brown Sandy topsoil
	2	4		6	6	6	6	12	2	Fine Brown Sand
	4	6		4	4	4	4	16		Fine Brown Sand
	6	8		3	3	4	4	16	6	Medium Brown Fine Sand
	8	10		4	4	4	4	12		Medium Brown Fine Sand
	10	12		5	5	5	5	16	10	Medium to Coarse Brown Sand
	12	14		5	5	5	5	14		Medium to Coarse Brown Sand
	14	16		4	4	6	6	16	14	Medium Brown Sand
	16	18		4	4	4	4	14	16	Fine Brown Tan Sand
	18	20		4	4	6	8	12		Fine Brown Tan Sand
	20	22		4	4	4	4	14		Fine Brown Tan Sand
	22	24		4	6	10	10	18	23	Fine Brown Tan Sand to Medium Coarse Brown Sand
	24	26		10	10	12	12	16	24.5	Fine Brown Tan Sand
	26	28		10	10	12	10	16	26.5	Medium to Coarse Brown Sand
	28	30		12	12	14	10	6	28	Fine to Coarse Brown Silty Sand
	30	32		10	10	10	10	16		Fine Silty Brown Sand

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond Bit
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. MW 13 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: _____
Helper: _____ Boring Completed: _____
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	32	34		10	10	12	12	18		Fine Brown silty sand
	34	36		12	12	12	12	16		Fine Brown silty sand 2½ spoon.
	36	38		4	4	4	4	10		Fine Brown silty sand
	38	40		4	4	4	2	6	38.5	Fine Brown sand wet
	~~40~~	~~42~~								
	~~42~~	~~44~~								

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): ____
Final Depth (drilled): ____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. MW-4 (765) PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 11-1-01
Helper: _____ Boring Completed: _____
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	0	2		6	4	5	5	18		Sod Brown Sand Topsoil
	2	4		5	5	5	5	16	2	Fine Brown Sand
	4	6		5	5	5	5	16	4	Fine Brown Tan Sand
	6	8		3	3	4	4	14		Fine Brown Tan Sand
	8	10		3	3	4	4	14		Fine Brown Tan Sand
	10	12		4	4	5	6	15		Fine Tan Brown Tan Sand
	12	14		3	3	4	4	15	12	Medium Brown Sand
	14	16		5	5	5	5	12		Medium Brown Sand
	16	18		6	6	6	6	16	16	Fine Brown Tan Sand
	18	20		4	4	4	4	16		Fine Brown Tan Sand
	20	22		4	4	5	7	16		Fine Brown Tan Sand
	22	24		7	7	9	12	14		Fine Brown Tan Sand
	24	26		7	4	4	8	15		Fine Brown Tan Sand
	26	28		8	8	11	11	14	26	Fine Brown Sand
	28	30		10	10	5	6	6	28	Medium Brown Sand wet
	30	32		4	4	4	4	18	30	Coarse Sand (8") to Brown Silty Sand (10") wet

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. PB MW 1 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 11-1-01
Helper: _____ Boring Completed: _____
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	32	34		4	4	4	4	14		Medium Brown Silty Sand
	34	36		10	10	10	10	18		Medium Brown Silty Sand
	36	38		5	5	5	5	19		Brown Silty Sand
	38	40		5	5	5	5	2	38.5'	Medium Brown Sand

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. MW-5 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Jack
Rig No: 81

Surface Elevation: _____
Boring Started: 11-2-01
Boring Completed: 11-2-01
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	0	2		4	4	3	3	24		Soil to Fine Brown Sand
	2	4		4	4	4	4	18	3	Fine Brown Sand to Medium to Coarse Brown sand
	4	6		4	4	4	4	16		Medium to Coarse Brown Sand
	6	8		4	5	5	6	18		Medium to Coarse Brown Sand
	8	10		4	4	4	4	16		Medium to Coarse Brown Sand
	10	12		5	5	5	5	14	10	Medium Brown Sand
	12	14		4	4	4	4	14		Medium Brown Sand
	14	16		4	6	6	8	14	14	Fine Brown Tan Sand
	16	18		6	6	7	7	12		Fine Brown Tan Sand
	18	20		6	6	7	7	14		Fine Brown Tan Sand
	20	22		6	6	8	8	18	21	Medium Brown Tan Sand
	22	24		8	8	10	10	14		Medium Brown Tan Sand
	24	26		6	6	6	6	18	24	Medium Brown Sand
	26	28		9	12	12	14	17		Medium Brown Sand Damp
	28	30		10	8	5	5	18	28	Medium to Coarse Brown Sand wet
	30	32		4	4	4	4	16	30	Medium Brown Sand wet

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. MW-5 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Sonic
Rig No: 31

Surface Elevation: _____
Boring Started: 11-2-01
Boring Completed: 11-2-01
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	32	34		4	4	4	4	10		Medium Brown Sand wet
	34	36		4	8	10	12	12		Medium Brown Sand wet
	36	38		4	4	4	4	12	36	Fine Brown Sand wet
	38	40		3	3	3	3	12	38	Medium Brown Sand wet

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. PES MW-10 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Jorge
Rig No: 41

Surface Elevation: _____
Boring Started: 10-29-01
Boring Completed: 10-29-01
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To: _____
	0	2		5	5	5	5	12		Soil Blacktop soil
	2	4		5	4	3	3	18	2.5	Medium Brown Sand
	4	6		3	3	3	3	16		Medium Brown Sand
	6	8		2	2	4	4	16	6.8	Medium Brown Tan Sand
	8	10		4	6	6	8	16		Medium Brown Tan Sand
	10	12		4	4	4	4	16	10.5	Medium to Coarse Brown Sand to Fine Brown Tan Sand
	12	14		6	8	8	10	16		Fine Brown Tan Sand
	14	16		6	9	9	6	12	15	Medium Brown Sand
	16	18		5	5	5	5	15		Medium Brown Sand
	18	20		4	4	4	4	14	18.10	Fine Brown Sand
	20	22		4	4	4	4	16	21.4	Fine to Medium Brown Sand
	22	24		4	4	4	4	12		Medium Brown Sand
	24	26		4	5	5	6	12		Medium Brown Sand
	26	28		5	5	10	10	6	26	Coarse Brown Sand
	28	30		3	3	6	6	12	29	Brown Sandy clay
	30	32		6	6	10	100/.2	6		Brown sandy clay

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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BORING LOG: _____

ROJECT NO. _____ BORING NO. PES 11W-6 PROJECT _____ WEATHER _____

WATER LEVEL OBSERVATION

echnician:	Scott	Surface Elevation:	
riller:	Glenn	Boring Started:	10-29-01
lelper:	Nick	Boring Completed:	10-29-01
ig No:	81	Off Set:	

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture	Sample Given To:
	32	34		3	3	4	4	24	32	Fine Brown Sand	wet
	34	36		6	6	8	7	12		Fine Brown Sand	wet
	36	38		5	5	5	5	6		Fine Brown Sand	wet
	38	40		3	3	3	3	14		Fine Brown Sand	wet
	40	42		6	6	6	6	16		Fine Brown Sand	wet
	42	44		3	3	3	3	14		Fine Brown Sand	21" Sand
	44	46		3	3	3	3	12		Fine Brown Sand	
	46	48		3	3	3	3	10		Fine Brown Sand	
	48	50		4	4	4	4	10		Fine Brown Sand	
	50	52		4	4	4	4	12	51	Silty Brown Sand	
	52	54		3	3	3	3	12	53	Fine Brown Sand	
	54	56		3	3	3	3	10		Fine Brown Sand	
	56	58		3	3	3	3	16	56.5	Fine Brown Sand to Silty Brown Sand	6" Brown Sand 12"
	58	60		3	3	3	3	16	50	Silty Brown Sand to Fine Brown Sand	
	60	62		3	3	3	3	10		Fine Brown Sand	
	60	64		3	3	3	3	18	62.5	Very Fine Brown Sand	

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. PES MW-6 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Jack
Rig No: 81

Surface Elevation: _____
Boring Started: 10-29-01
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	64	66								
	66	68								
	68	70								

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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BORING LOG: _____

JECT NO. [illegible] BORING NO. PBS B6-7 PROJECT NE Rail WEATHER _____

hnician: Scott
ller: [illegible]
per: [illegible]
No: 51

Surface Elevation: _____
Boring Started: 10-26-01
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet 1 of 3

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To: _____
	0	2		4	3	3	3	22	1.5	Top Soil / Sand br
	2	4		3	3	3	3	14		Sand br
	4	6		3	3	4	4	14		Sand br
	6	8		4	5	5	7	16	6.5	Medium Brown Tan Sand
	8	10		3	3	4	4	16		Medium Brown Tan Sand
	10	12		6	4	7	10	12	11	Fine Brown Tan Sand
	12	14		17	16	16	18			N.R.
	14	16		3	3	4	4	16	14.5	Fine Brown Sand
	16	18		5	5	5	5	16	16.5	Fine Brown Tan Sand
	18	20		5	5	5	5	16	18.5	Fine to medium Brown Sand
	20	22		4	4	4	4	16	20.5	Medium Brown Sand
	22	24		5	5	5	5	16	22.5	Medium to Coarse Brown Sand
	24	26		5	5	5	5	16		Medium to Coarse Brown Sand
	26	28		20	18	14	15	12	27.5	Medium to Coarse Brown Sand 6" to Fine Brown Tan Sand 6"
	28	30		6	6	9	9	12	29	Brown Clay 3" to Medium to Coarse Brown Sand Damp
	30	32		5	5	6	6	4	30.5	Coarse Brown Sand wet

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond Bit
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. 13453 BORING NO. PB3 Dwell PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Jack
Rig No: 41

Surface Elevation: _____
Boring Started: 12-16-94
Boring Completed: 9
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	32	34		6	6	6	6	12	32	Brown clay
	34	36		8	8	8	8	20	35	Brown Clay to Fine Brown sand wet
	36	38		4	4	6	6	8		Fine Brown sand wet
	38	40		3	3	3	3	12		Fine Brown sand. wet
	40	42		4	5	5	6	14		Fine Brown sand
	43	44		10	10	8	8	14		Fine Brown sand 1/2" seam
	44	46		4	4	4	4	10		Fine Brown sand
	46	48		3	3	3	3	12		Fine Brown sand
	48	50		3	3	3	3	14		Fine Brown sand
	50	52		4	3	3	3	16		Fine Brown sand
	52	54		5	5	7	7	16		Very Fine Brown sand
	54	56		5	5	5	5	15		Very Fine Brown sand
	56	58		4	4	4	4	14		Fine Brown sand
	58	60		3	3	3	3	14		Fine Brown sand
	60	62		3	3	4	4	16		Fine Brown sand
	62	64		5	5	5	5	12		Fine Brown sand to Silty Brown sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond Bit
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. 13453 BORING NO. 76 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Smith
Rig No: 31

Surface Elevation: _____
Boring Started: 10-26-01
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	64	66		3	3	3	3	12		Fine Brown Sand
	66	68		6	10	10	12			NR
	68	70		6	6	6	6	12		Fine Brown Sand

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. MW-8 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 10-3-01
Helper: _____ Boring Completed: _____
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	0	2		4	4	6	6			Sod. Dark Brown Dry Soil
	2	4		4	5	5	4	16	2	Fine Brown Sand
	4	6		3	3	3	3	16		Fine Brown Sand
	6	8		4	4	5	5	16	6	Medium Brown Sand
	8	10		5	5	5	5	14		Medium Brown Sand
	10	12		6	6	6	6	16	10	Medium To Coarse Brown Sand
	12	14		6	6	10	10	16		Medium To Coarse Brown Sand
	14	16		5	5	5	5	14	14	Medium Brown Sand
	16	18		4	4	5	5	16	16	Medium To Fine Brown Tan Sand
	18	20		6	6	8	8	16	18.5	Fine Brown Tan Sand
	20	22		6	7	7	8	16		Fine Brown Tan Sand
	22	24		5	5	5	5	14	23.5	Medium Brown Sand
	24	26		7	7	7	7	16	24.5	Medium To Coarse Brown Sand
	26	28		7	7	10	14	16	26.5	Medium To Coarse Brown Sand To Sandy Silt
	28	30		10	14	14	23	18	28	Coarse Sandy ~~Silt~~ Silt
	30	32		6	6	8	10	14	30	Brown Sandy Silt

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): ____
Final Depth (drilled): ____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

PROJECT NO. _____ BORING NO. 265 MW-8 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Eldon
Helper: Joel
Rig No: 81

Surface Elevation: _____
Boring Started: 10-31-01
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	32	34		29	38	29	35	5	32	Soft Brown Silty Sand
	34	36		20	27	22	25	18	35	Silty Sand to Med Brown Sandy Clay
	36	38		4	4	4	4	20	36	Fine Brown Sand. 3½ spoon
	38	40		3	3	3	3	14		Fine Brown Sand.

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): ____
Final Depth (drilled): ____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure:
Depth: _____

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PROJECT NO. _____ BORING NO. PES mw-9 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: D Scott
Driller: Glenn
Helper: Jack
Rig No: 81

Surface Elevation: _____
Boring Started: 10-31-01
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	0	2		6	6	6	6	8		Sod & Brown Topsoil
	2	4		6	4	4	4	16	2	Fine Brown Sand
	4	6		4	4	4	4	16		Fine Brown Sand
	6	8		3	3	3	3	14	6	Medium Brown Tan Sand
	8	10		3	3	5	6	16	8	Medium to Fine Brown Tan Sand
	10	12		4	4	4	4	10		Fine Brown Tan Sand
	12	14		4	4	5	5	10	12	Medium Brown Sand
	14	16		4	4	4	4	12		Medium Brown Sand
	16	18		6	5	4	3	16	16	Medium to Fine Brown Tan Sand
	18	20		3	3	4	5	12	18	Fine Brown Tan Sand
	20	22		4	5	5	6	16		Fine Brown Tan Sand
	22	24		5	5	5	5	14		Fine Brown Tan Sand
	24	26		5	5	5	5	14		Fine Brown Tan Sand
	26	28		4	4	4	4	12	26	Medium to Coarse Brown Sand
	28	30		10	10	10	10	6	28	Sandstone & Medium to Coarse Sand
	30	32		10	10	10	10	8	30	Hard Sand Brown Clay

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. PBF MW-9 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Jack
Rig No: 81

Surface Elevation: _____
Boring Started: 10-31-01
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To: _____
	32	34		5	5	4	6	10		Brown Sandy clay
	34	36		8	8	8	8	12		Brown Sandy clay 3½ spoon.
	36	38		3	3	3	3	14	36	Fine Brown sand
	38	40		6	6	6	6	8	38	Medium Brown sand

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond Bit
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. 13453 BORING NO. 7ES CW-1 PROJECT NEROP WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Brown
Helper: Scott
Rig No: 81

Surface Elevation: _____
Boring Started: 11-3-94
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet 1 of 2

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To: _____
	0	2		5	5	5	5	24		Sod Brown Sand
	2	4		5	5	5	5	24	2	Fine Brown Sand
	4	6		5	5	5	5	20	4	Medium Coarse Brown Sand
	6	8		5	5	8	8	16		Medium Coarse Brown Sand
	8	10		6	6	6	6	15		Medium Coarse Brown Sand
	10	12		4	4	4	4	18	10	Medium Brown Sand
	12	14		4	4	4	4	16		Medium Brown Sand
	14	16		4	4	5	5	14		Medium Brown Sand
	16	18		4	4	4	4	17		Medium Brown Sand
	18	20		4	4	4	4	16		Medium Brown Sand
	20	22		6	6	8	8	16		Medium Brown Sand
	22	24		7	7	7	7	14		Medium Brown Sand
	24	26		7	7	7	7	12	24.5	Fine Brown Sand
	26	28		7	7	7	7	12	26.5	Fine Brown Sand wet
	28	30		4	8	8	10	6	28	Medium Coarse Brown Sand wet
	30	32		4	4	4	4	6		Medium Coarse Brown Sand wet

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): 46
Final Depth (drilled): 40
Backfill Type: Neat
Was Well Set: yes
Depth of Well: 40
Well Number: CW-1
Auger Size: 4 1/4
Auger FTG: 40
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. CW-1 (PES) PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Sacia
Rig No: 81

Surface Elevation: _____
Boring Started: 11-5-01
Boring Completed: _____
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet 2 of 2

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	32	34		4	4	4	4	20	32	Fine Silty Brown Sand wet
	34	36		6	6	6	6	12	34	Fine Brown Sand wet
	36	38		3	3	3	3	20	37.5	Fine Brown Sand to Medium Coarse Brown Sand wet
	38	40		3	3	3	3	8		Medium Coarse Brown Sand wet

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. PES CW-2 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Jack
Rig No: 81

Surface Elevation:
Boring Started: 11-5-01
Boring Completed: 11-5-01
Off Set:

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet 1 of 2

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES Sample Description: Record Color & Texture Sample Given To:
	0	2		6	6	6	6	24		Sod Dark Brown Fine Sand
	2	4		6	6	6	6	20	2	Fine Brown Sand
	4	6		5	5	5	5	16	4.5	Fine to Coarse Brown Sand
	6	8		3	6	5	6	16	6	medium Coarse Brown Sand
	8	10		5	5	5	5	18		medium Coarse Brown Sand
	10	12		4	4	4	4	12	10	Medium Brown Sand
	12	14		4	4	4	4	14	12	medium Brown Tan Sand
	14	16		4	4	4	4	18	15	medium to Fine Brown Tan Sand
	16	18		6	6	8	8	16	18	Medium Coarse Brown Sand
	18	20		7	7	7	7	18		medium Coarse Brown Sand
	20	22		6	6	6	6	17		Medium Coarse Brown Sand
	22	24		3	8	8	8	12		medium Coarse Brown Sand
	24	26		6	6	4	4	16	24	Medium Fine Brown Sand
	26	28		6	6	6	6	12	26	medium Brown Sand
	28	30		4	4	6	5	15	28	Medium Brown Sand. wet
	30	32		4	4	4	4	14		medium Brown Sand wet

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): 40
Final Depth (drilled): 40
Backfill Type: Nat
Was Well Set: Yes
Depth of Well: 40
Well Number: CW-2
Auger Size: 4 1/4
Auger FTG: 40
Rotary Size:
Rotary FTG:
Fluid Used:
Fluid Loss:
Artesion Pressure:
Depth:

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PROJECT NO. _____ BORING NO. GW-2 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Jack
Rig No: 81

Surface Elevation: _____
Boring Started: 11-5-01
Boring Completed: 11-5-01
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet 2 of 2

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES / Sample Description: Record Color & Texture / Sample Given To:
	32	34		3	3	7	5	20	32	Fine Brown Silty Sand wet
	34	36		3	3	3	3			N.R.
	36	38		8	8	10	10	12	36	Fine Brown Sand wet
	38	40		5	3	3	3	12		Fine Brown Sand wet

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W.S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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PROJECT NO. _____ BORING NO. CW-3 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: _____ Surface Elevation: _____
Driller: _____ Boring Started: 11-2-01
Helper: _____ Boring Completed: 11-2-01
Rig No: _____ Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	0	2		6	6	6	6	24	1	Soil, Brown sand to very fine tan sand
	2	4		6	12	20	100/2	14	2.4	Brown gray clay
	4	6		6	6	100/2		12	4	Very fine to medium Brown sand
	6	8		30	30	14	14	10	6	Coarse Brown sand + Rock
	8	10		4	4	8	8	16	9	medium Coarse Brown sand to fine Brown sand
	10	12		5	5	5	5	20	10	medium Coarse Brown sand
	12	14		4	4	6	6	14	12	Medium fine Brown sand
	14	16		4	4	6	8	14	14	Medium Brown sand
	16	18		7	7	7	7	16		Medium Brown sand
	18	20		8	8	8	8	14	18.5	Medium Brown tan sand
	20	22		6	6	6	6	16		Medium Brown tan sand
	22	24		8	8	8	8	18	22	Medium Coarse Brown sand
	24	26		6	6	6	6	18		Medium Coarse Brown sand
	26	28		5	5	5	5	14	26	Medium Brown sand
	28	30		6	6	6	6	16		Medium Brown sand
	30	32		5	5	5	5	18	30	Medium fine Brown sand wet

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

G:\PUBLIX\WRDPRF\MASTERS\BORLOG.FRM

PROJECT NO. _____ BORING NO. PES CW-3 PROJECT _____ WEATHER _____ BORING LOG: _____

Technician: Scott
Driller: Glenn
Helper: Sandy
Rig No: 81

Surface Elevation: _____
Boring Started: 11-2-01
Boring Completed: 11-2-01
Off Set: _____

WATER LEVEL OBSERVATION

WL: _____ WS or WD
WL: _____ HRS AB

Sheet _____ of _____

SAMPLE NO.	DEPTH OR ELEVATION FROM	TO	SAMPLING METHOD	PENETRATION RECORD Split Spoon Blows 6"	6"	6"	6"	REC. LENGTH	STRATA CHANGE	NOTES
	32	34		5	5	5	5	18	32	medium Brown Sand wet
	34	36		10	10	10	10	18	35.8	Medium Coarse Sand w/ Brown clay 2½ spoon
	36	38		4	4	4	4	16		Brown clay
	38	40		4	4	4	4	12	38	Fine Brown Silty sand

Sample Description: Record Color & Texture

Sample Given To: _____

A.S.: Auger Sample
S.T.: Shelby Tube
S.S.: Split Spoon
D.B.: Diamond But
S.A.: Solid Stem Auger
H.S.A.: Hollow Stem Auger
R.B.: Rock Bit
W. S.: While Sampling
W.D.: While Drilling
T.W.: Lined Split Spoon
G.S.: Grab Sample

Final Depth (sampled): _____
Final Depth (drilled): _____
Backfill Type: _____
Was Well Set: _____
Depth of Well: _____
Well Number: _____
Auger Size: _____
Auger FTG: _____
Rotary Size: _____
Rotary FTG: _____
Fluid Used: _____
Fluid Loss: _____
Artesion Pressure: Depth: _____

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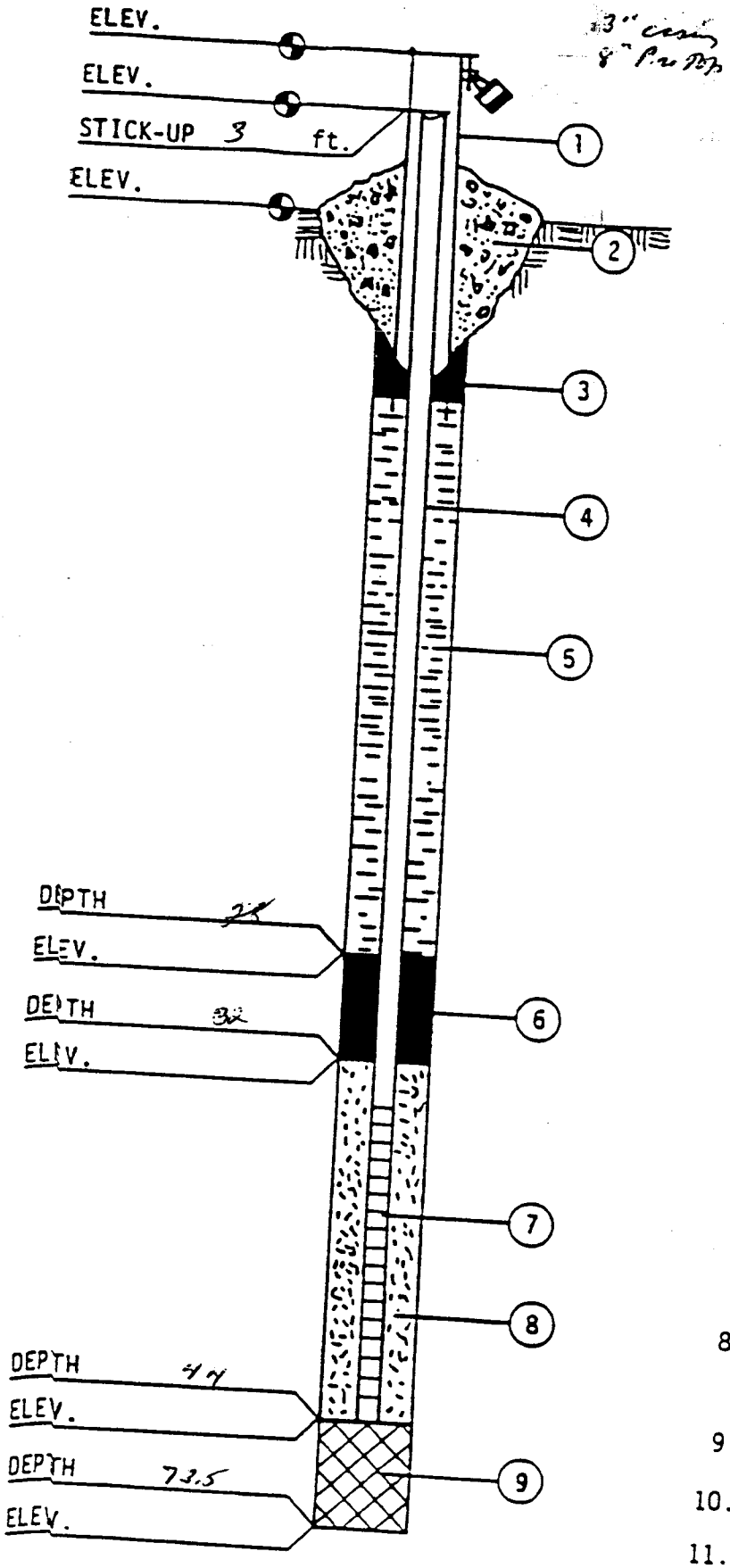
Appendix B3

Well Logs



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. BE3-BG-1

DATE 10-18-01

CHIEF/UNIT Glenn/81

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL (YES) NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH ~~28.5~~ 38.6 - 28 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Peat 20 bags

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ____ ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL Peat 2 bags

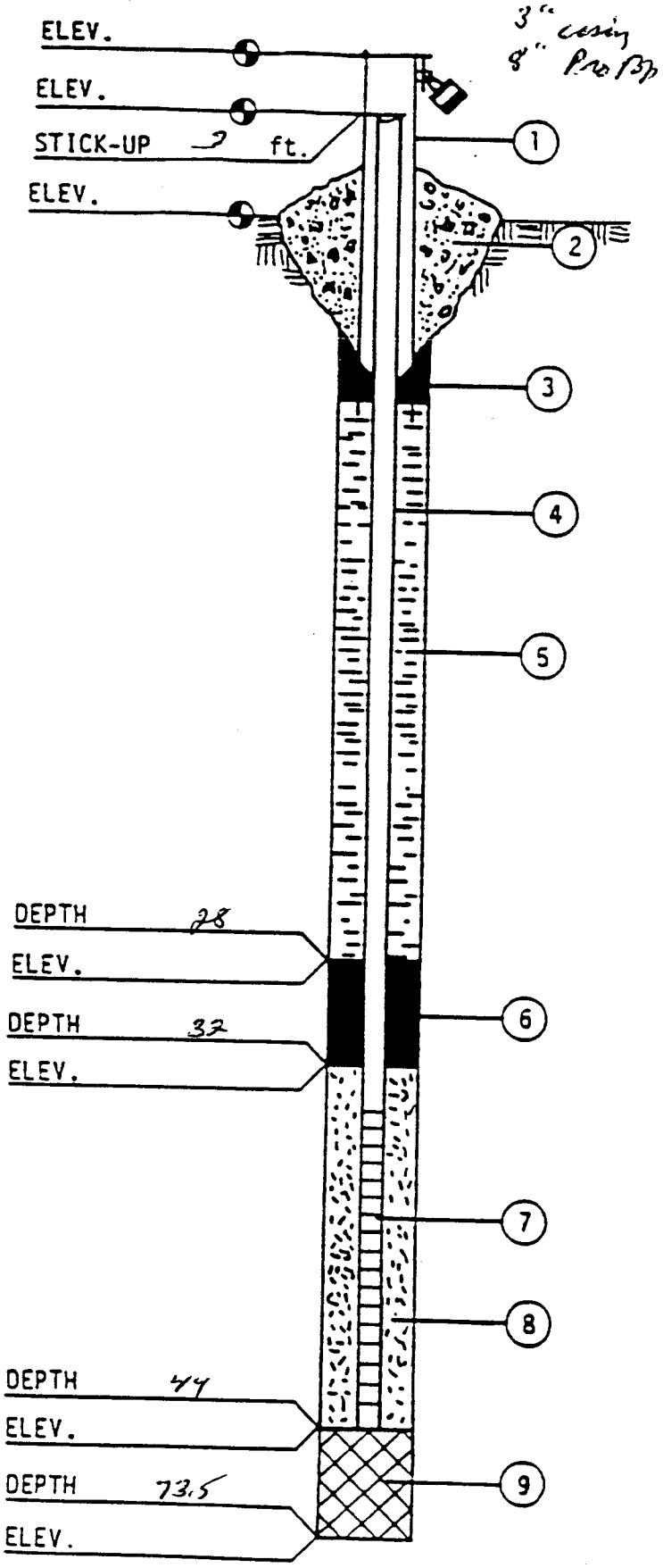
10. DRILLING METHOD 6 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL ____ DATE ____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13953

BORING/WELL NO. BG-2

DATE 10-16-91

CHIEF/UNIT Glenn / 81

1. PROTECTIVE CASING (YES) NO

   LOCKING ~~YES~~ NO

2. CONCRETE SEAL (YES) NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 37.5 30 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Pea - 17 bags

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE 020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL Pea - 2 bags

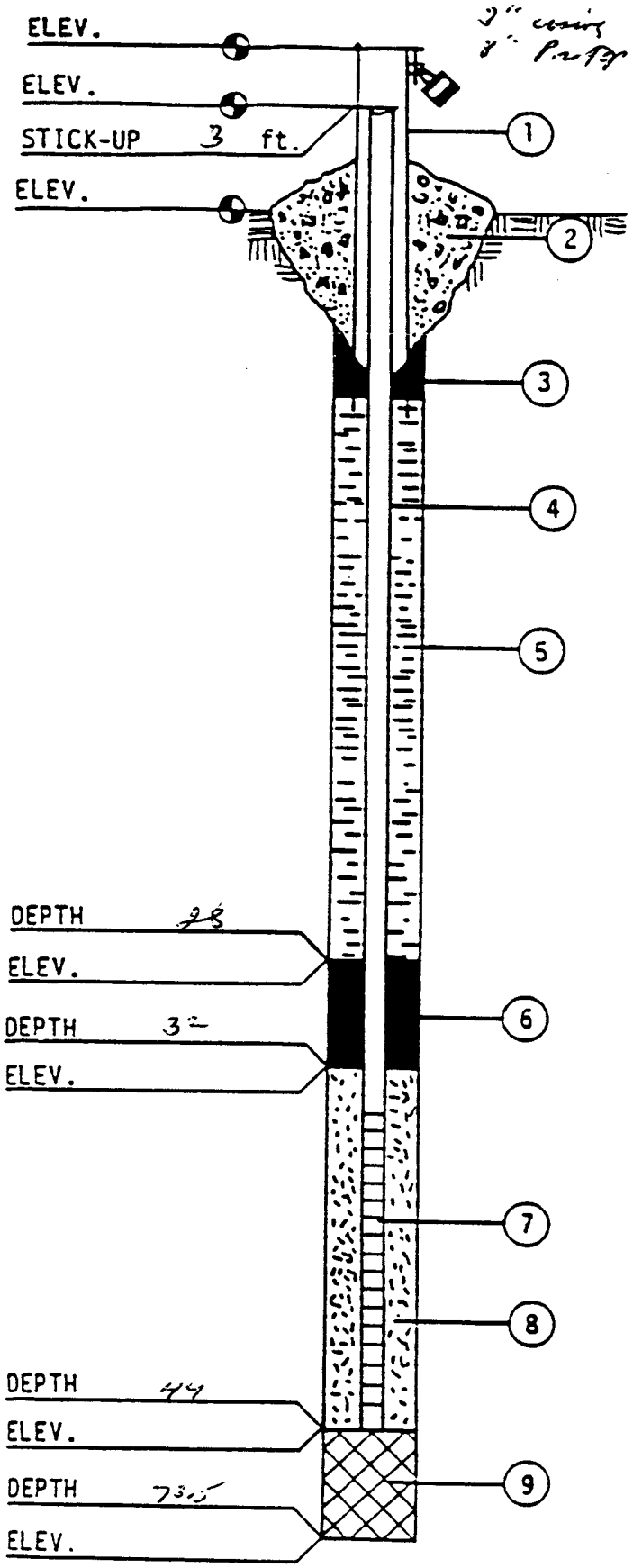
10. DRILLING METHOD 6 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13753

BORING/WELL NO. ~~PE~~ BG-3 ~~MW-1A~~ Relocation

DATE 10-17-01

CHIEF/UNIT Glenn/81

1. PROTECTIVE CASING (YES) NO

   LOCKING ~~YES~~ NO

2. CONCRETE SEAL YES NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 37 - 36 ft.

   JOINT TYPE SLIP/GLUED ~~THREADED~~

5. TYPE OF BACKFILL Neat 17 bags

   HOW INSTALLED - ~~TREMIE~~ FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ____ ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL Neat 2 bags

10. DRILLING METHOD 6¼ HSA

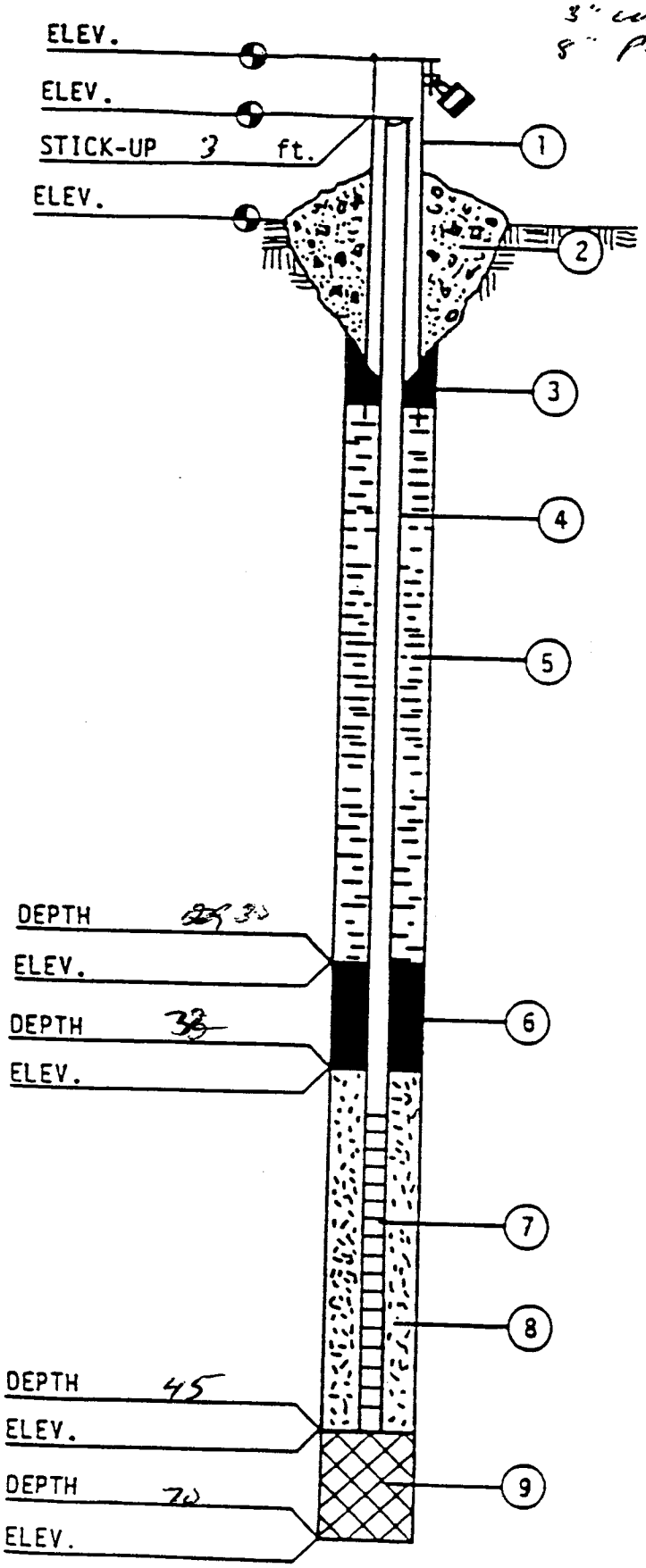
11. ADDITIVES USED (IF ANY)

WATER LEVEL ____ DATE ____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.

3" casing
8" PortaP



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13457

BORING/WELL NO. EP5-1

DATE 10-24-81

CHIEF/UNIT Clark / 81

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL YES NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 38 - 25 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Pent

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   4 30

9. TYPE OF BACKFILL Pent

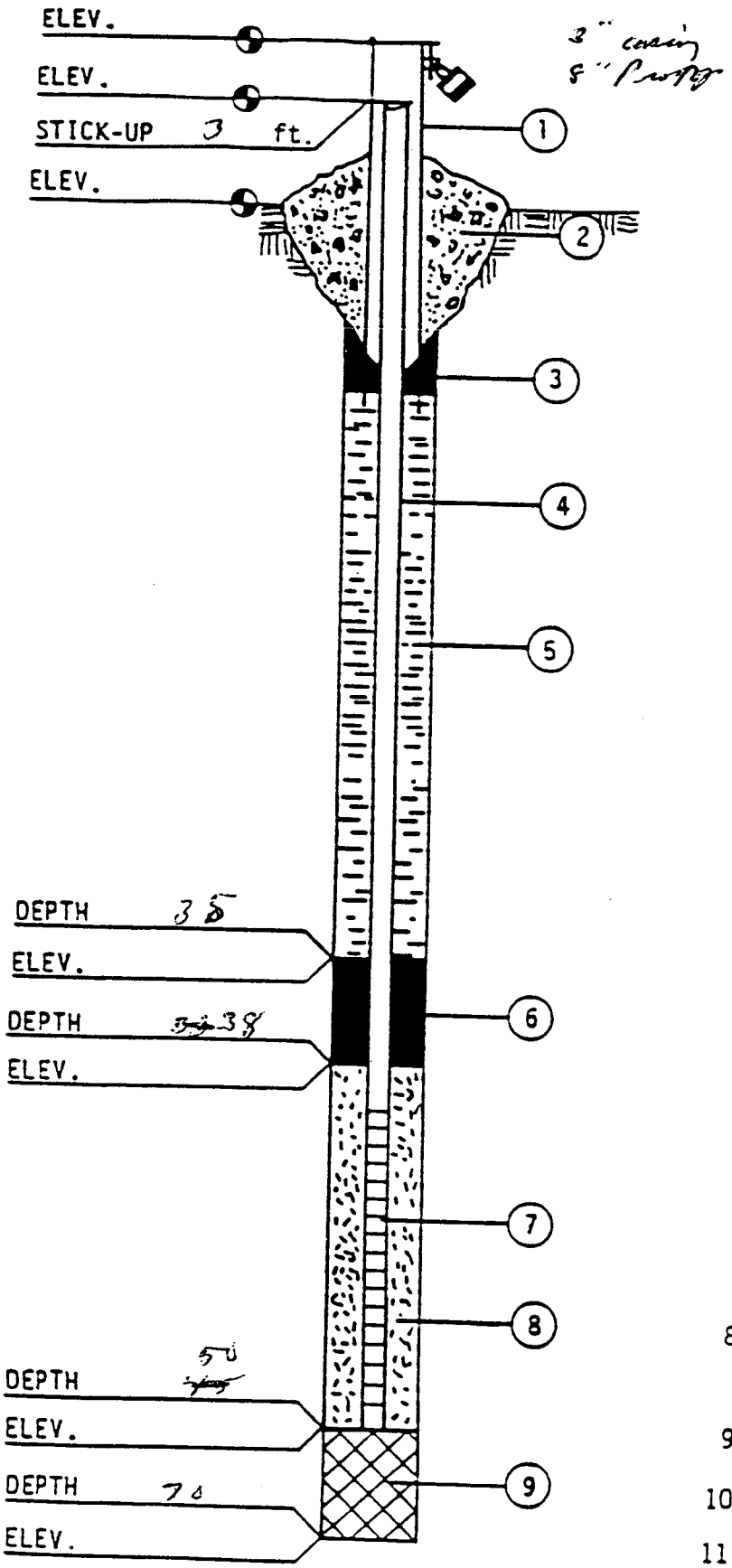
10. DRILLING METHOD 6 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. PBS TPS-2

DATE 10-24-01

CHIEF/UNIT Glenn 181

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL ~~YES~~ NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 43 -20 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Nat

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL Nat

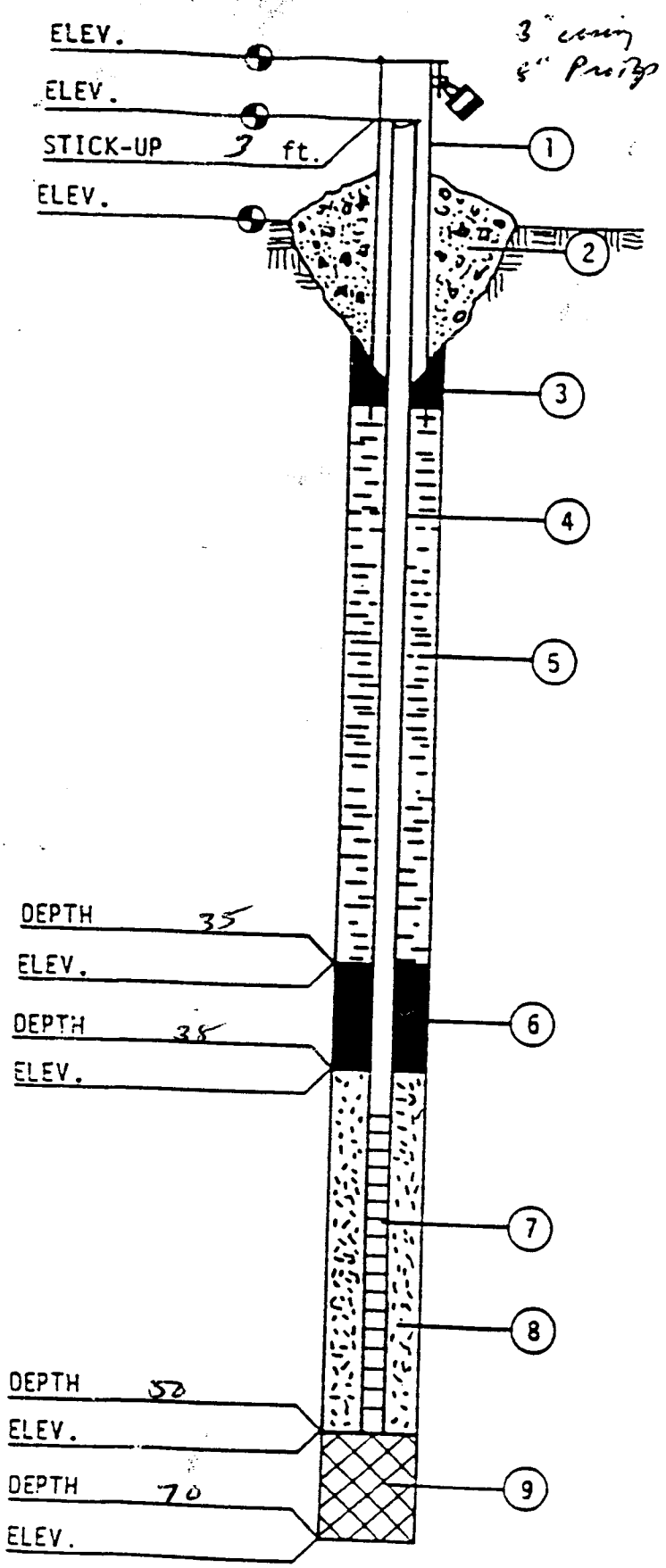
10. DRILLING METHOD 6¼ HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATI

JOB NO. 13453

BORING/WELL NO. PES-EWS-9

DATE 11-22-01

CHIEF/UNIT Gkpn / 81

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL (YES) NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 43 – 20 ft

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Neat – 27 bags

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ____ ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #3

9. TYPE OF BACKFILL Neat – 15 bags

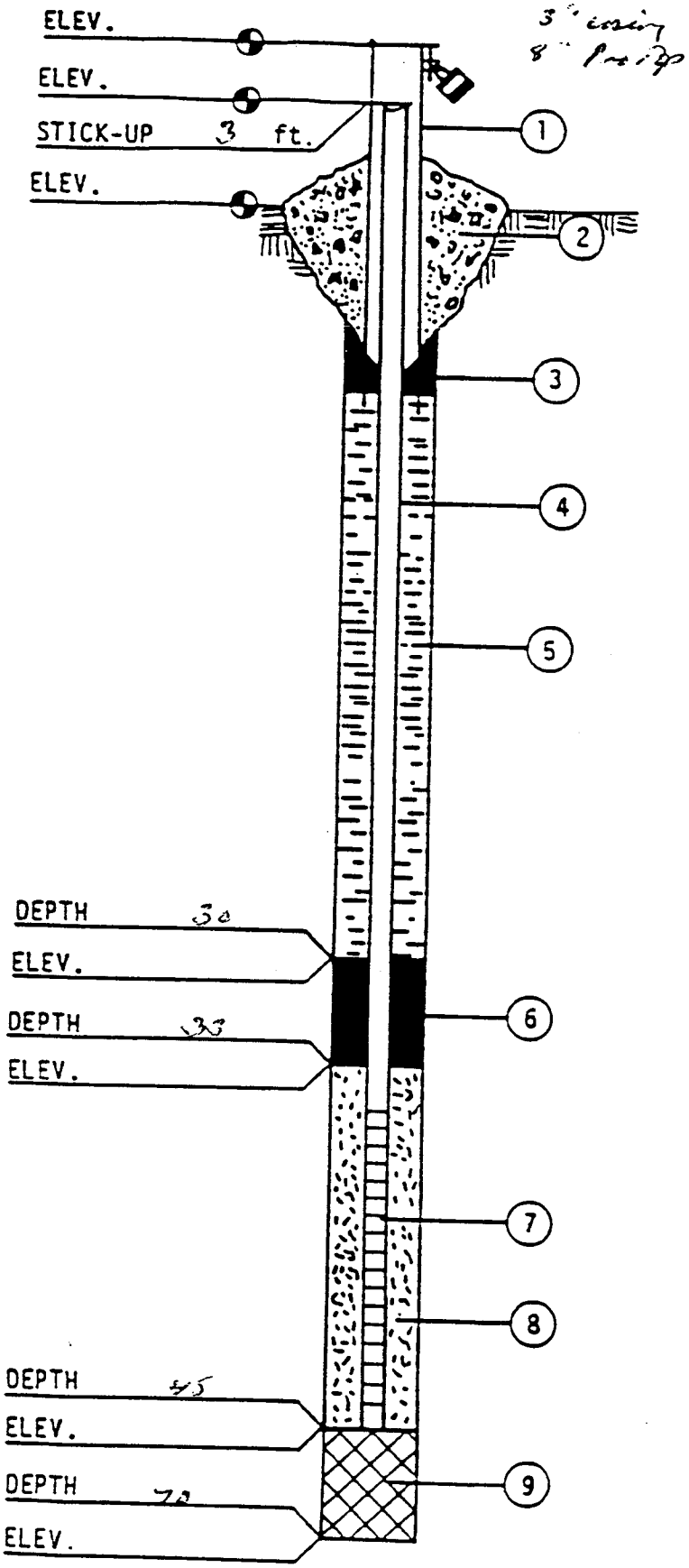
10. DRILLING METHOD 6¼ HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL ____ DATE ____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. PES MW-1

DATE 10-25-01

CHIEF/UNIT Glenn / 61

1. PROTECTIVE CASING YES NO

   LOCKING YES NO

2. CONCRETE SEAL YES NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 38 + 25 ft.

   JOINT TYPE SLIP/GLUED THREADED

5. TYPE OF BACKFILL Neat

   HOW INSTALLED - TREMIE FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #3

9. TYPE OF BACKFILL Neat

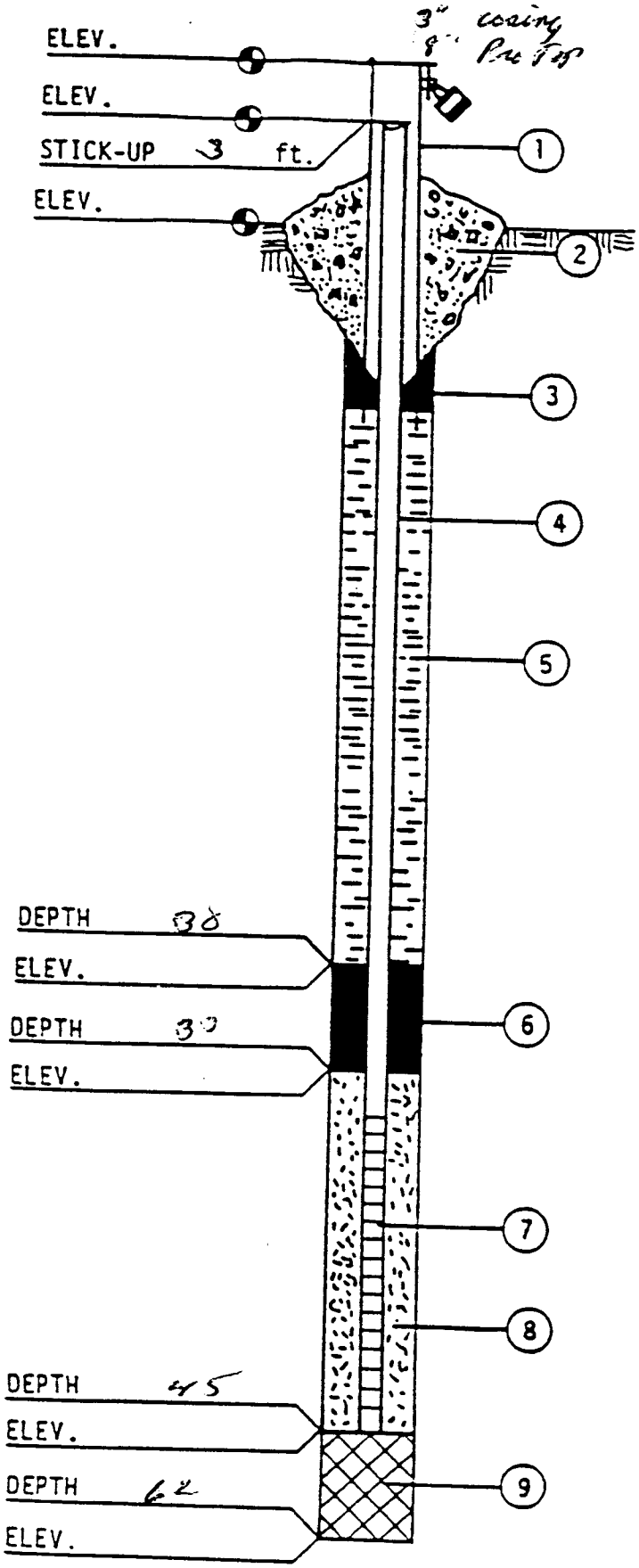
10. DRILLING METHOD 6¼ HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. MW-2

DATE 10-30-01

CHIEF/UNIT Glenn / 81

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL ~~YES~~ NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

   _____

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 38 - 17 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Neat

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE 020 LENGTH _____ ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL Neat

10. DRILLING METHOD 6 1/2 HSA

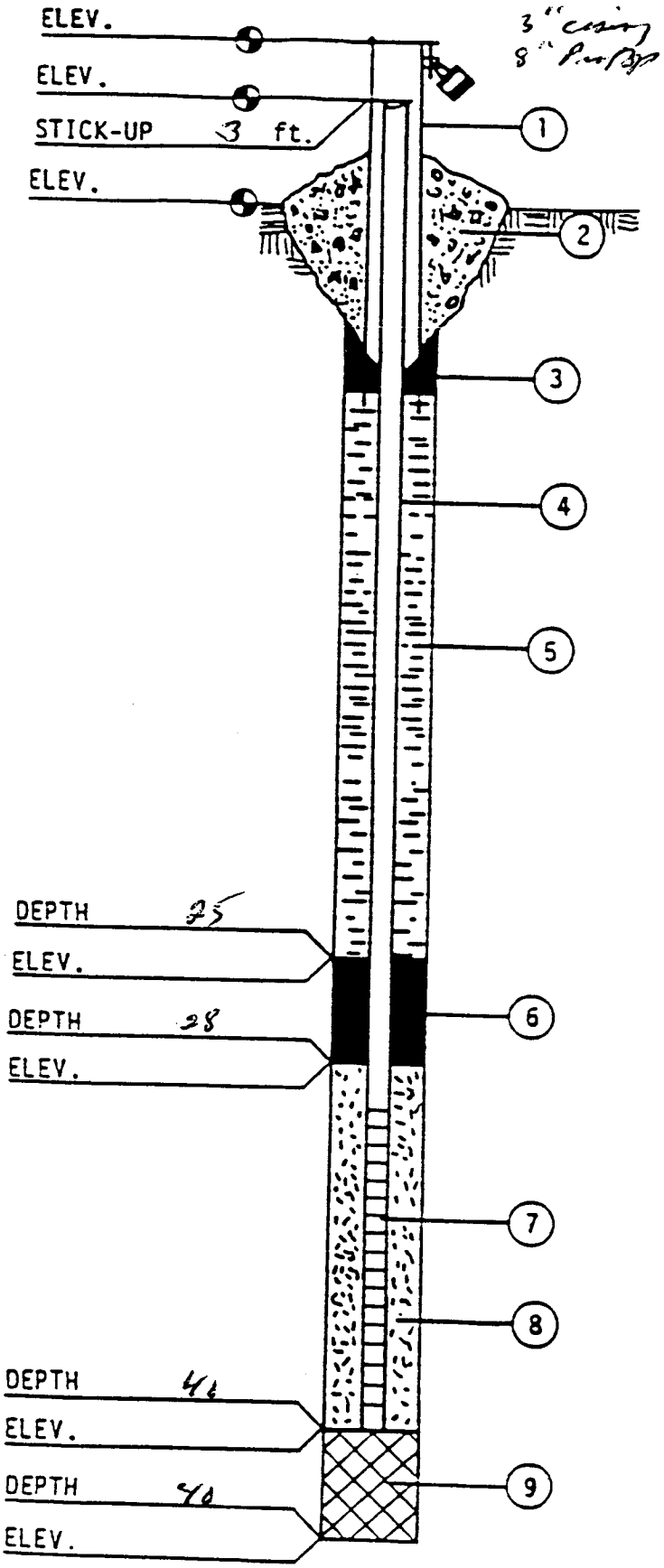
11. ADDITIVES USED (IF ANY)

    _____

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. MW-3

DATE 11-1-01

CHIEF/UNIT Elkins / 81

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL (YES) NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 33 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Pea

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL

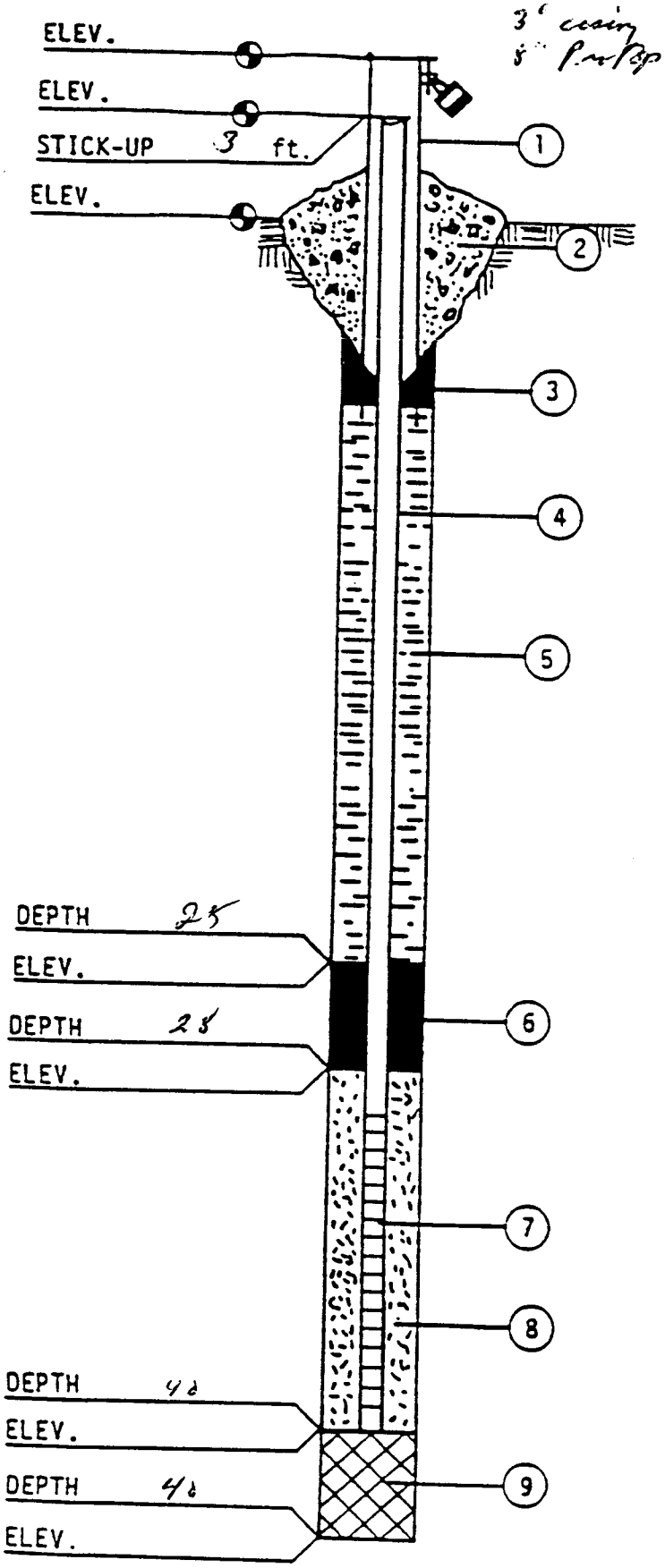
10. DRILLING METHOD 6 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. MW-7

DATE 11-2-01

CHIEF/UNIT Glend

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL (YES) NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 32 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Neat

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL

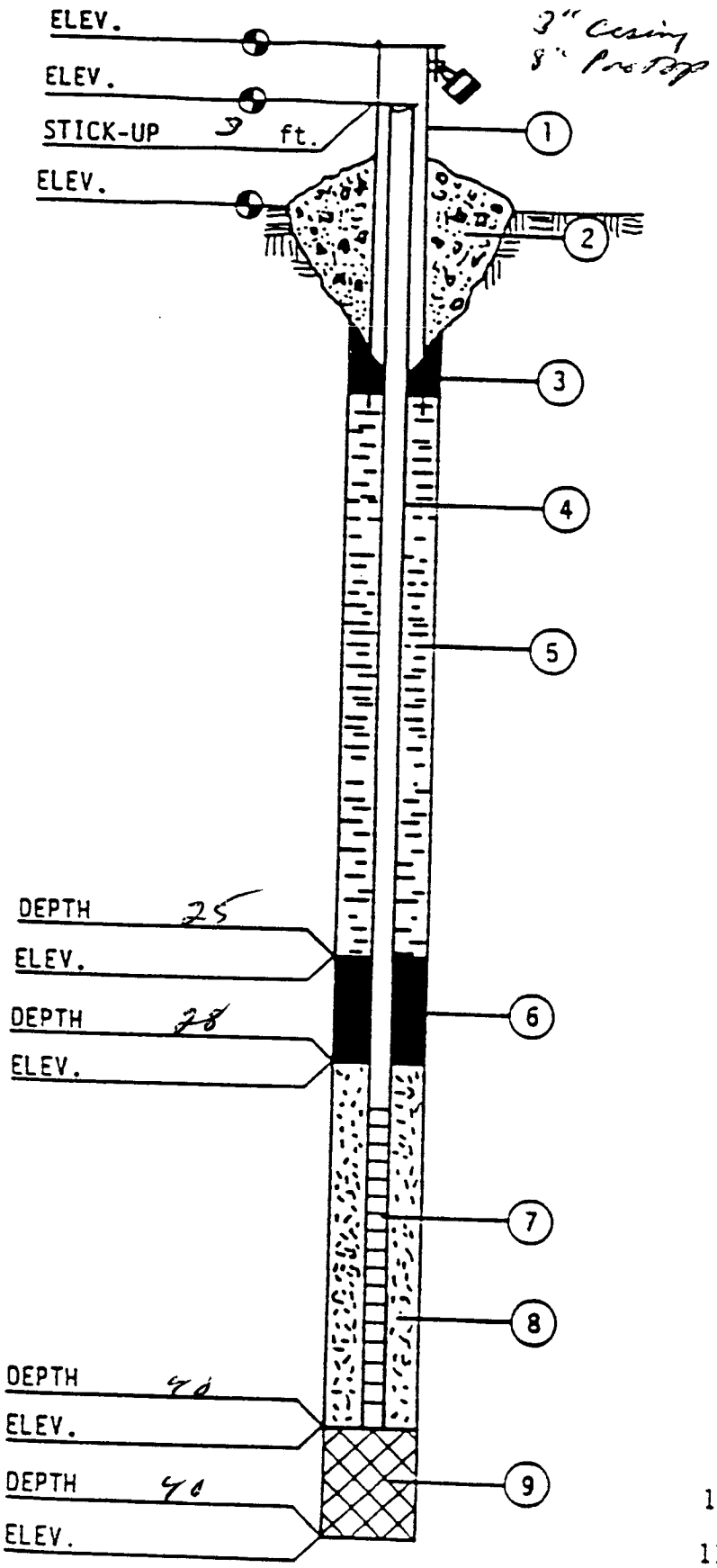
10. DRILLING METHOD 6 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. MW-5

DATE 11-2-01

CHIEF/UNIT Glenn / 81

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL (YES) NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 33 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Neat

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #3

9. TYPE OF BACKFILL

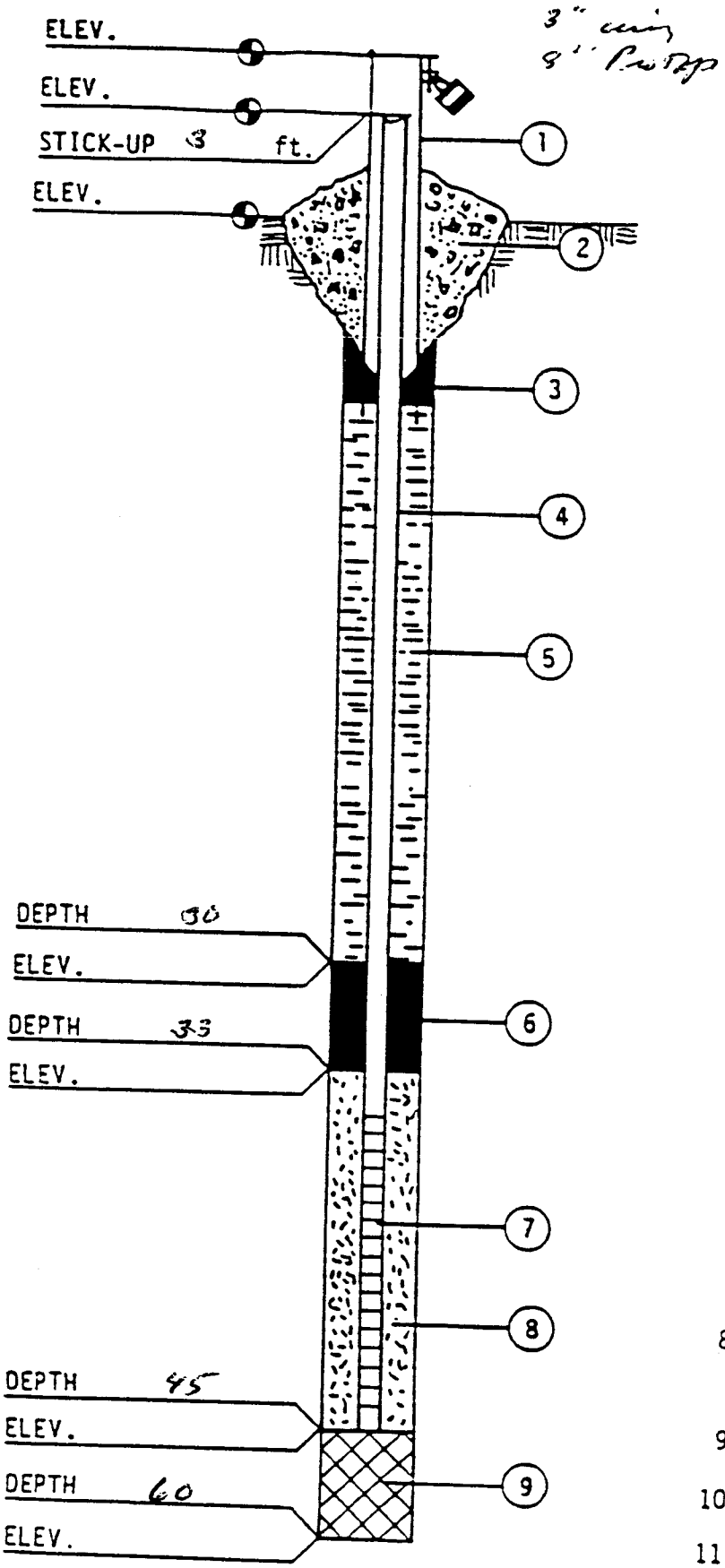
10. DRILLING METHOD 6 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. MW-6

DATE 10-29-01

CHIEF/UNIT Gkm/81

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL (YES) NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 38 - 15 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Neat

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL Neat

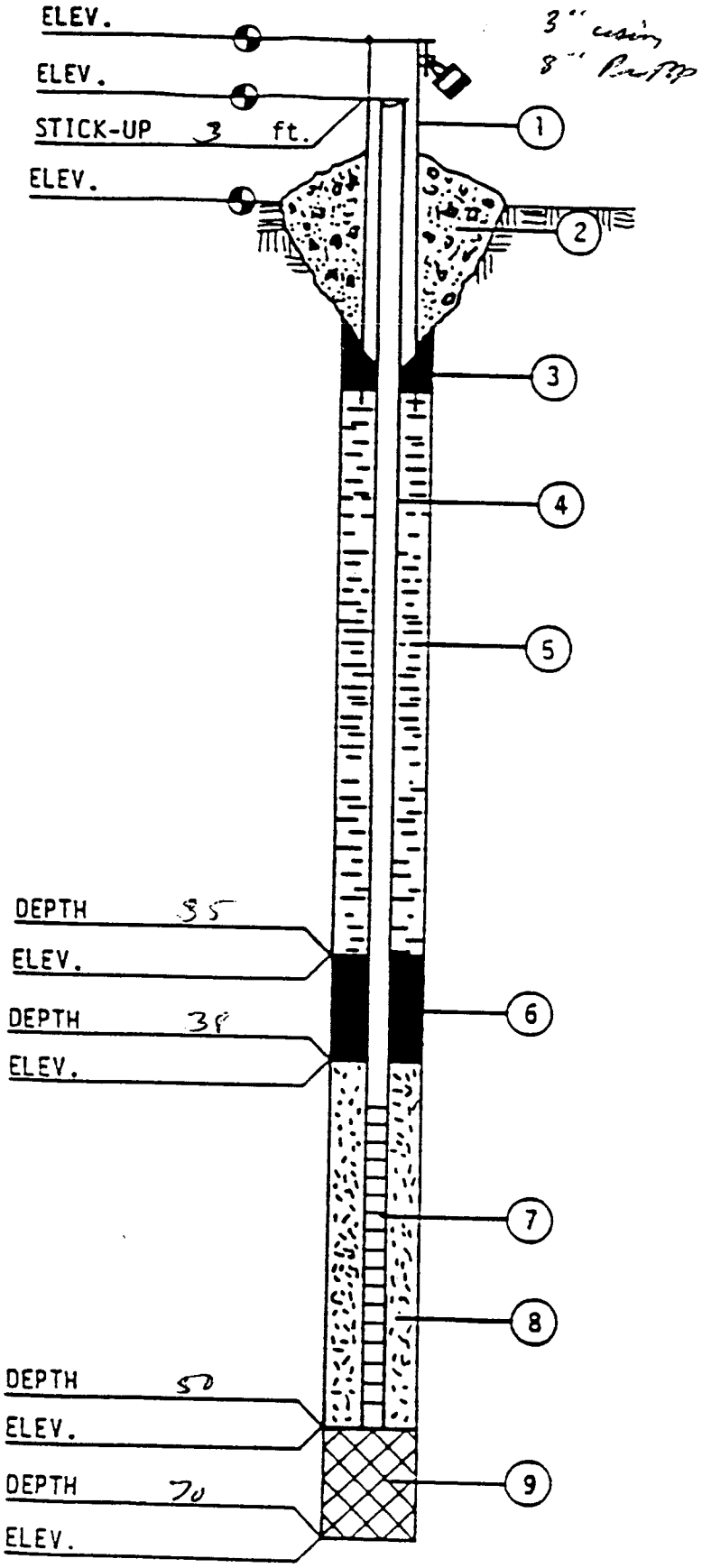
10. DRILLING METHOD 6 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. AES MW-7

DATE 10-25-01

CHIEF/UNIT Ebert / 81

1. PROTECTIVE CASING YES NO

   LOCKING YES NO

2. CONCRETE SEAL YES NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 43 - 28 ft.

   JOINT TYPE SLIP/GLUED THREADED

5. TYPE OF BACKFILL Sand

   HOW INSTALLED - ~~TREMIE~~ FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 16

   SLOT-SIZE .020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL Sand

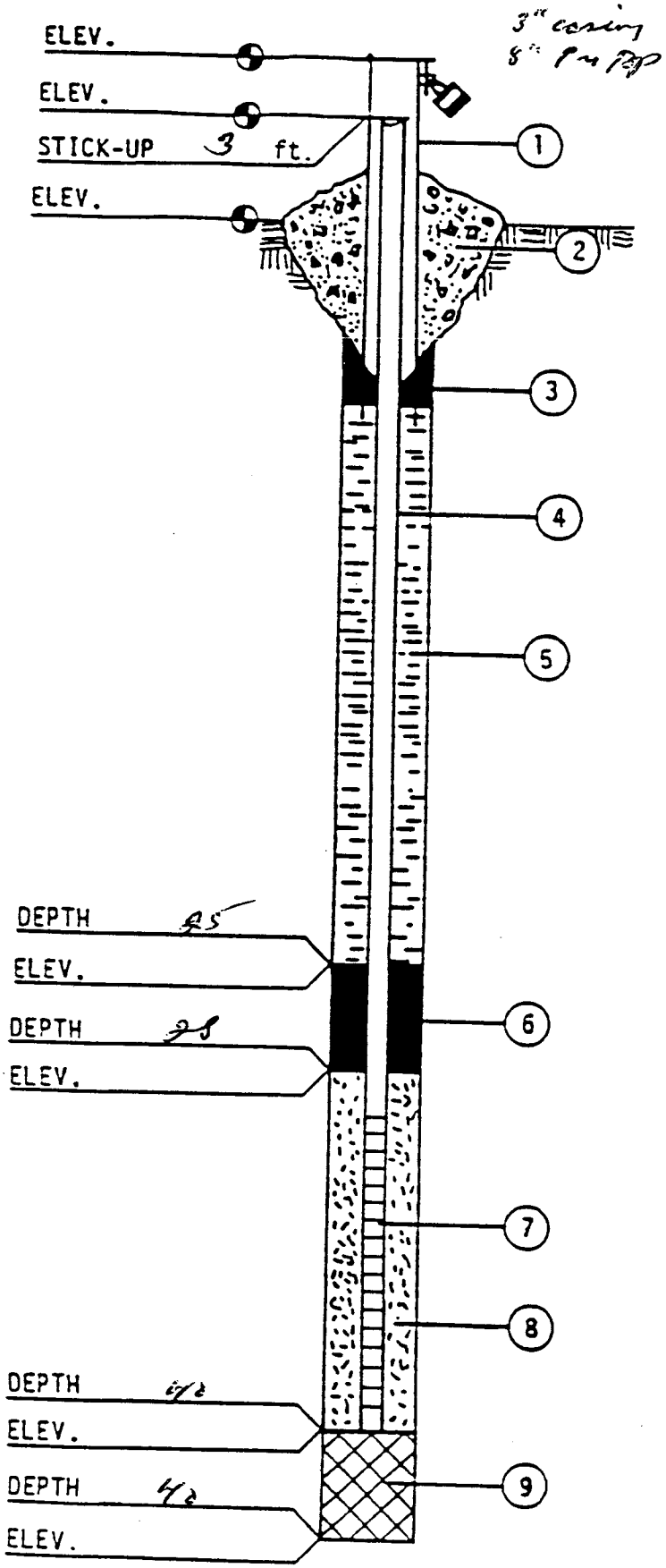
10. DRILLING METHOD 6 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. MW-8

DATE 10-31-91

CHIEF/UNIT Glen/Si

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL (YES) NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 33 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Neat

   HOW INSTALLED - ~~TREMIE~~ FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL

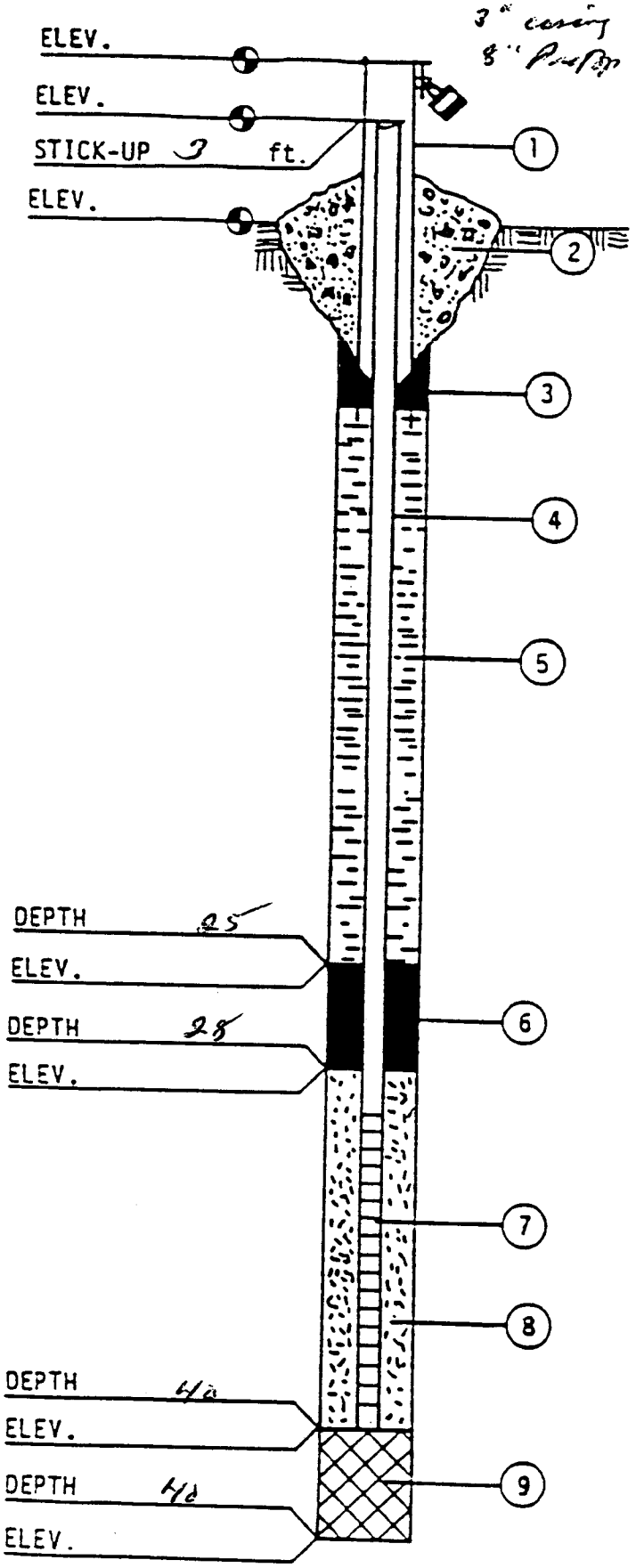
10. DRILLING METHOD 6 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. mw-9

DATE 10-31-01

CHIEF/UNIT [illegible] 81

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL (YES) NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 33 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Peat

   HOW INSTALLED - (TREMIE) FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .020 LENGTH ft.

   SCREEN DIAMETER 3 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL

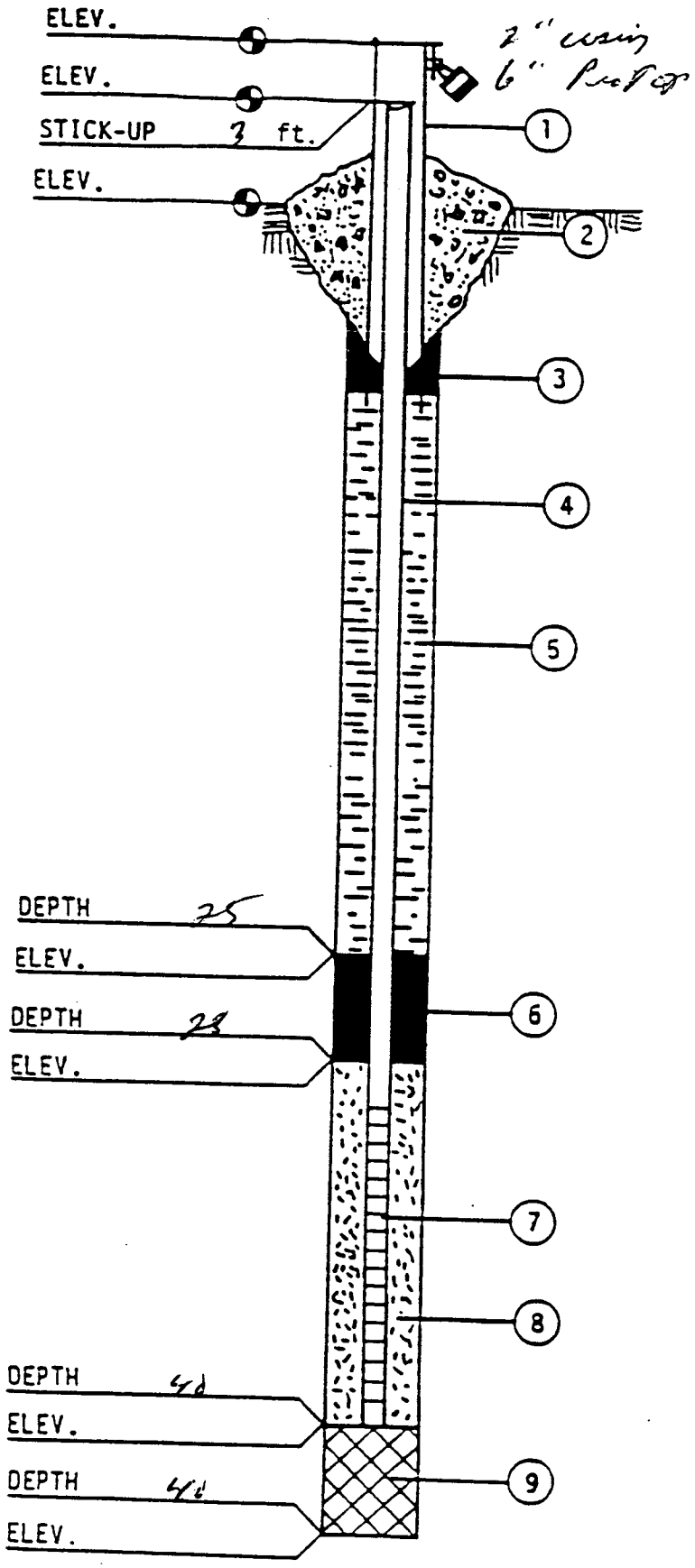
10. DRILLING METHOD 6 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. CW-1

DATE 11-5-81

CHIEF/UNIT Glenn/81

1. PROTECTIVE CASING YES NO

   LOCKING YES NO

2. CONCRETE SEAL YES NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 33 ft.

   JOINT TYPE SLIP/GLUED THREADED

5. TYPE OF BACKFILL Pea

   HOW INSTALLED - ~~TREMIE~~ FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE .010 LENGTH ft.

   SCREEN DIAMETER 2 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL

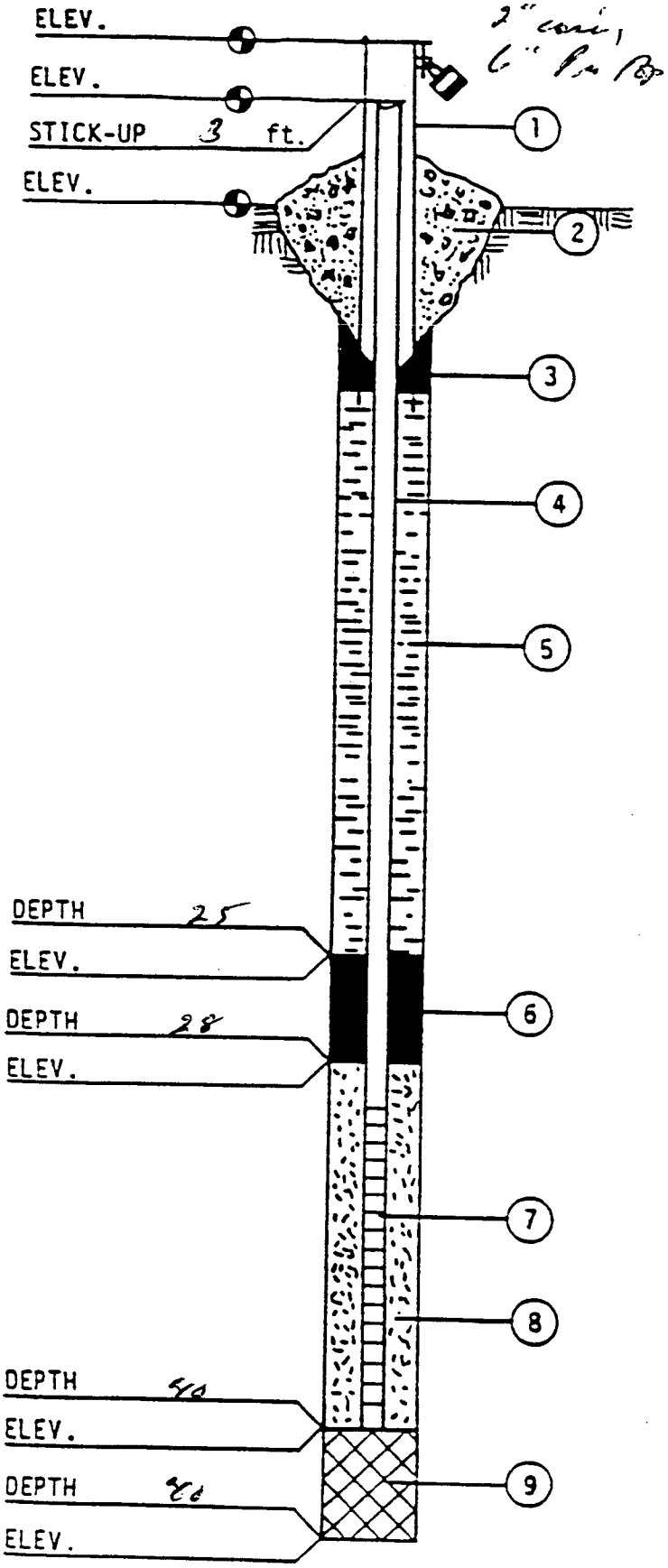
10. DRILLING METHOD 4¼ HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. CW-2

DATE 11-5-01

CHIEF/UNIT Glenn / 81

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL YES NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 33 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Pea

   HOW INSTALLED - ~~TREMIE~~ FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE 10/10 LENGTH ft.

   SCREEN DIAMETER 2 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL

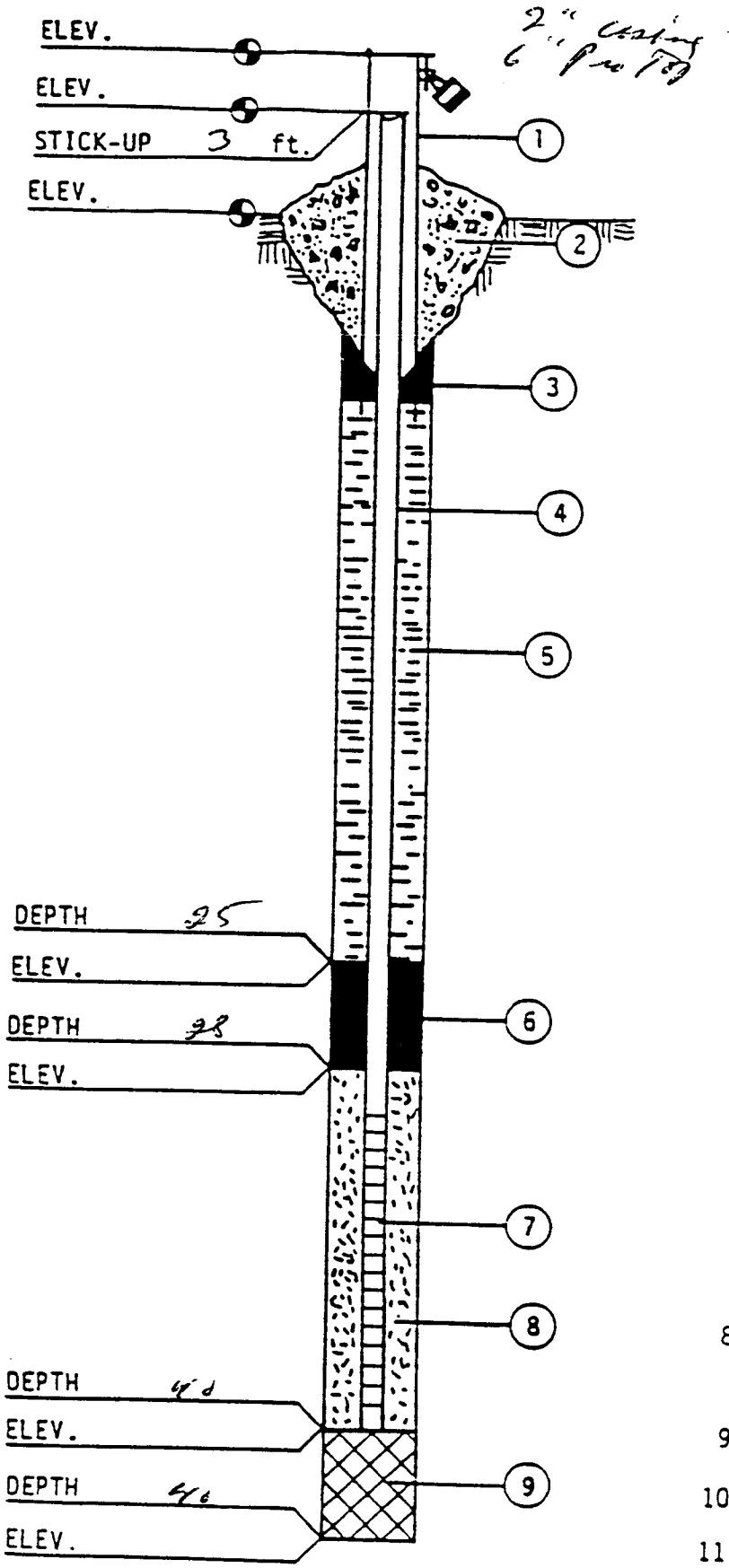
10. DRILLING METHOD 4 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13453

BORING/WELL NO. CW-3

DATE 11-2-91

CHIEF/UNIT Glenn/Bl

1. PROTECTIVE CASING (YES) NO

   LOCKING ~~YES~~ NO

2. CONCRETE SEAL ~~YES~~ NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 33 ft.

   JOINT TYPE SLIP/GLUED ~~THREADED~~

5. TYPE OF BACKFILL Neat

   HOW INSTALLED - ~~TREMIE~~ FROM SURFACE

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite

7. SCREEN TYPE PVC

   SCREEN LENGTH 10

   SLOT-SIZE 10/0 LENGTH ft.

   SCREEN DIAMETER 2 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #30

9. TYPE OF BACKFILL

10. DRILLING METHOD 4 1/4 HSA

11. ADDITIVES USED (IF ANY)

WATER LEVEL _____ DATE _____

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

BERGERSON-CASWELL, INC.

Appendix B4

Well Pump Test Data

Slug Test Report

EMR INCORPORATED

Date:	12/07/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-INJ1
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	35'	Total Well Depth (Installed):	70'
Screen Diameter:	3"	Depth to Bottom of Screen:	45'	Total Well Depth (Measured):	70'
TOC Elevation:	832.42	Static Water Level	804.05	Product Present (Y/N)	N
				Static Product Level:	

Test Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	9:35:58 F/ 9:50:20 R	End Static Water Level:	804.05
End Time:	9:38:45 F / 9:53:36 R	Max/Min Water Level:	807.49/801.251
Data File Name:	PES-INJ1.bin	Test Time - Max/Min:	
		Transducer Depth:	786.628F/786.619 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
8:00	30	Partly cloudy	Low	1 mph		Frost

Manual Testing

Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Drawdown
0	804.05	Falling	0	804.05	Rising			
158	804.05	Falling	188	804.05	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:57:47
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 093!
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-INJ1F

Test defined on: 12/07/01 09:32:51
Test started on: 12/07/01 09:35:58
Test stopped on: 12/07/01 09:38:45
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 78

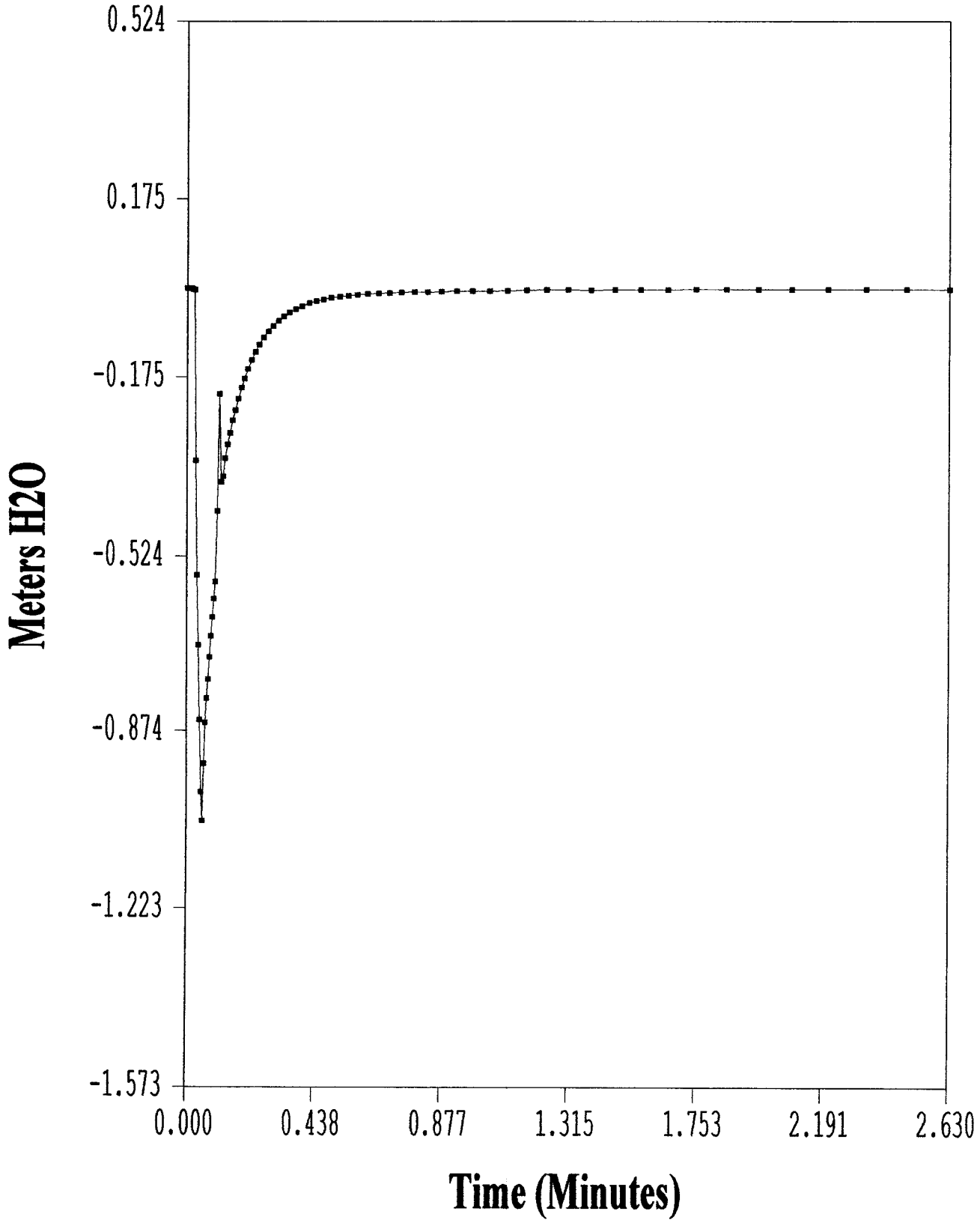
TOTAL DATA SAMPLES 78

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 5.310 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	09:35:58	0.0000	0.000
12/07/01	09:35:59	0.0050	0.000
12/07/01	09:35:59	0.0100	0.000
12/07/01	09:35:59	0.0150	0.000
12/07/01	09:35:59	0.0200	-0.002
12/07/01	09:36:00	0.0250	-0.003
12/07/01	09:36:00	0.0300	-0.337
12/07/01	09:36:00	0.0350	-0.561
12/07/01	09:36:01	0.0400	-0.702
12/07/01	09:36:01	0.0450	-0.851
12/07/01	09:36:01	0.0500	-0.992
12/07/01	09:36:02	0.0550	-1.049
12/07/01	09:36:02	0.0600	-0.937
12/07/01	09:36:02	0.0650	-0.856
12/07/01	09:36:02	0.0700	-0.807
12/07/01	09:36:03	0.0750	-0.770
12/07/01	09:36:03	0.0800	-0.726
12/07/01	09:36:03	0.0848	-0.684
12/07/01	09:36:04	0.0900	-0.646
12/07/01	09:36:04	0.0950	-0.609
12/07/01	09:36:04	0.1000	-0.575
12/07/01	09:36:05	0.1058	-0.435
12/07/01	09:36:05	0.1120	-0.207
12/07/01	09:36:05	0.1185	-0.379
12/07/01	09:36:06	0.1255	-0.368
12/07/01	09:36:06	0.1328	-0.332
12/07/01	09:36:07	0.1407	-0.305
12/07/01	09:36:07	0.1490	-0.283
12/07/01	09:36:08	0.1578	-0.259

12/07/01	09:36:08	0.1670	-0.239
12/07/01	09:36:09	0.1770	-0.216
12/07/01	09:36:09	0.1875	-0.195
12/07/01	09:36:10	0.1985	-0.176
12/07/01	09:36:11	0.2102	-0.158
12/07/01	09:36:12	0.2227	-0.140
12/07/01	09:36:12	0.2358	-0.124
12/07/01	09:36:13	0.2498	-0.110
12/07/01	09:36:14	0.2647	-0.096
12/07/01	09:36:15	0.2803	-0.084
12/07/01	09:36:16	0.2970	-0.073
12/07/01	09:36:17	0.3147	-0.063
12/07/01	09:36:18	0.3333	-0.054
12/07/01	09:36:19	0.3532	-0.047
12/07/01	09:36:21	0.3742	-0.040
12/07/01	09:36:22	0.3963	-0.034
12/07/01	09:36:23	0.4198	-0.029
12/07/01	09:36:25	0.4447	-0.025
12/07/01	09:36:26	0.4697	-0.022
12/07/01	09:36:28	0.4963	-0.018
12/07/01	09:36:30	0.5247	-0.016
12/07/01	09:36:31	0.5547	-0.015
12/07/01	09:36:33	0.5863	-0.012
12/07/01	09:36:35	0.6213	-0.011
12/07/01	09:36:38	0.6578	-0.009
12/07/01	09:36:40	0.6963	-0.009
12/07/01	09:36:42	0.7380	-0.007
12/07/01	09:36:45	0.7813	-0.007
12/07/01	09:36:48	0.8280	-0.006
12/07/01	09:36:51	0.8763	-0.006
12/07/01	09:36:54	0.9280	-0.005
12/07/01	09:36:57	0.9830	-0.004
12/07/01	09:37:01	1.0413	-0.004
12/07/01	09:37:04	1.1030	-0.004
12/07/01	09:37:08	1.1680	-0.003
12/07/01	09:37:12	1.2380	-0.002
12/07/01	09:37:17	1.3113	-0.002
12/07/01	09:37:22	1.3897	-0.002
12/07/01	09:37:27	1.4730	-0.002
12/07/01	09:37:32	1.5613	-0.002
12/07/01	09:37:37	1.6547	-0.002
12/07/01	09:37:43	1.7530	-0.001
12/07/01	09:37:50	1.8580	-0.001
12/07/01	09:37:56	1.9680	-0.001
12/07/01	09:38:03	2.0847	-0.001
12/07/01	09:38:11	2.2097	-0.001
12/07/01	09:38:19	2.3412	-0.001
12/07/01	09:38:27	2.4813	-0.001
12/07/01	09:38:36	2.6297	-0.001

PES-INJ1F



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:58:41
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 095
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-INJ1R

Test defined on: 12/07/01 09:49:39
Test started on: 12/07/01 09:50:20
Test stopped on: 12/07/01 09:53:36
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 81

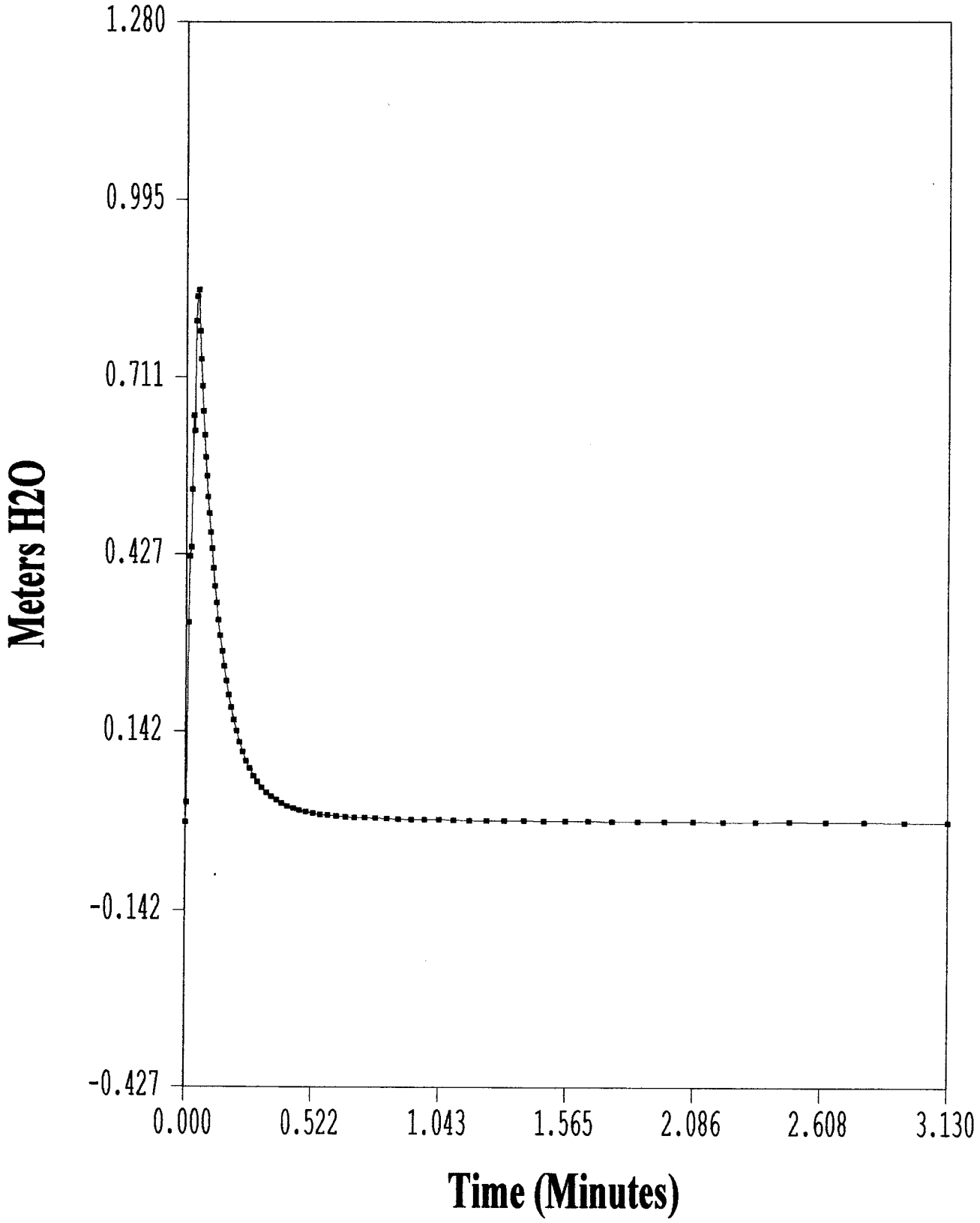
TOTAL DATA SAMPLES 81

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 5.313 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	09:50:20	0.0000	0.000
12/07/01	09:50:20	0.0050	0.031
12/07/01	09:50:21	0.0100	0.317
12/07/01	09:50:21	0.0150	0.424
12/07/01	09:50:21	0.0200	0.438
12/07/01	09:50:21	0.0250	0.531
12/07/01	09:50:22	0.0300	0.649
12/07/01	09:50:22	0.0350	0.625
12/07/01	09:50:22	0.0400	0.803
12/07/01	09:50:23	0.0450	0.842
12/07/01	09:50:23	0.0500	0.853
12/07/01	09:50:23	0.0550	0.786
12/07/01	09:50:24	0.0600	0.741
12/07/01	09:50:24	0.0650	0.697
12/07/01	09:50:24	0.0700	0.656
12/07/01	09:50:24	0.0750	0.618
12/07/01	09:50:25	0.0800	0.582
12/07/01	09:50:25	0.0848	0.552
12/07/01	09:50:25	0.0900	0.519
12/07/01	09:50:26	0.0950	0.492
12/07/01	09:50:26	0.1000	0.462
12/07/01	09:50:26	0.1058	0.436
12/07/01	09:50:27	0.1120	0.405
12/07/01	09:50:27	0.1185	0.375
12/07/01	09:50:27	0.1255	0.349
12/07/01	09:50:28	0.1328	0.321
12/07/01	09:50:28	0.1407	0.296
12/07/01	09:50:29	0.1490	0.271
12/07/01	09:50:29	0.1578	0.247

12/07/01	09:50:30	0.1670	0.224
12/07/01	09:50:31	0.1770	0.202
12/07/01	09:50:31	0.1875	0.181
12/07/01	09:50:32	0.1985	0.162
12/07/01	09:50:33	0.2102	0.144
12/07/01	09:50:33	0.2227	0.126
12/07/01	09:50:34	0.2358	0.111
12/07/01	09:50:35	0.2498	0.097
12/07/01	09:50:36	0.2647	0.085
12/07/01	09:50:37	0.2803	0.073
12/07/01	09:50:38	0.2970	0.063
12/07/01	09:50:39	0.3147	0.054
12/07/01	09:50:40	0.3333	0.047
12/07/01	09:50:41	0.3532	0.040
12/07/01	09:50:42	0.3742	0.035
12/07/01	09:50:44	0.3963	0.030
12/07/01	09:50:45	0.4198	0.025
12/07/01	09:50:47	0.4447	0.022
12/07/01	09:50:48	0.4697	0.019
12/07/01	09:50:50	0.4963	0.017
12/07/01	09:50:51	0.5247	0.014
12/07/01	09:50:53	0.5547	0.013
12/07/01	09:50:55	0.5863	0.011
12/07/01	09:50:57	0.6213	0.010
12/07/01	09:50:59	0.6578	0.009
12/07/01	09:51:02	0.6963	0.008
12/07/01	09:51:04	0.7380	0.007
12/07/01	09:51:07	0.7813	0.007
12/07/01	09:51:10	0.8280	0.006
12/07/01	09:51:13	0.8763	0.005
12/07/01	09:51:16	0.9280	0.005
12/07/01	09:51:19	0.9830	0.005
12/07/01	09:51:22	1.0413	0.005
12/07/01	09:51:26	1.1030	0.004
12/07/01	09:51:30	1.1680	0.003
12/07/01	09:51:34	1.2380	0.003
12/07/01	09:51:39	1.3113	0.003
12/07/01	09:51:43	1.3897	0.003
12/07/01	09:51:48	1.4730	0.002
12/07/01	09:51:54	1.5613	0.002
12/07/01	09:51:59	1.6547	0.002
12/07/01	09:52:05	1.7530	0.002
12/07/01	09:52:11	1.8580	0.002
12/07/01	09:52:18	1.9680	0.002
12/07/01	09:52:25	2.0847	0.002
12/07/01	09:52:33	2.2097	0.001
12/07/01	09:52:40	2.3412	0.001
12/07/01	09:52:49	2.4813	0.002
12/07/01	09:52:58	2.6297	0.001
12/07/01	09:53:07	2.7863	0.001
12/07/01	09:53:17	2.9530	0.000
12/07/01	09:53:28	3.1297	0.000

PES-INJ1R



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/07/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-INJ2
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	40'	Total Well Depth (Installed):	70'
Screen Diameter:	3"	Depth to Bottom of Screen:	50'	Total Well Depth (Measured):	70'
TOC Elevation:	832.87	Static Water Level	804.03	Product Present (Y/N)	N
				Static Product Level:	

Test Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" Diameter/ 6' long

Testing Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	10:11:15 F/ 10:24:17 R	End Static Water Level:	804.03
End Time:	10:14:10 F / 10:27:43 R	Max/Min Water Level:	807.554/800.823
Data File Name:	PES-INJ2.bin	Test Time - Max/Min:	
		Transducer Depth:	783.257 F/ 783.258 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
8:00	30	Partly cloudy	Low	1 mph		Frost

Manual Testing

Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Drawdown
0	804.03	Falling	0	804.03	Rising			
167	804.03	Falling	198	804.03	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:59:42
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 101:
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-INJ2F

Test defined on: 12/07/01 10:06:48
Test started on: 12/07/01 10:11:16
Test stopped on: 12/07/01 10:14:10
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 79

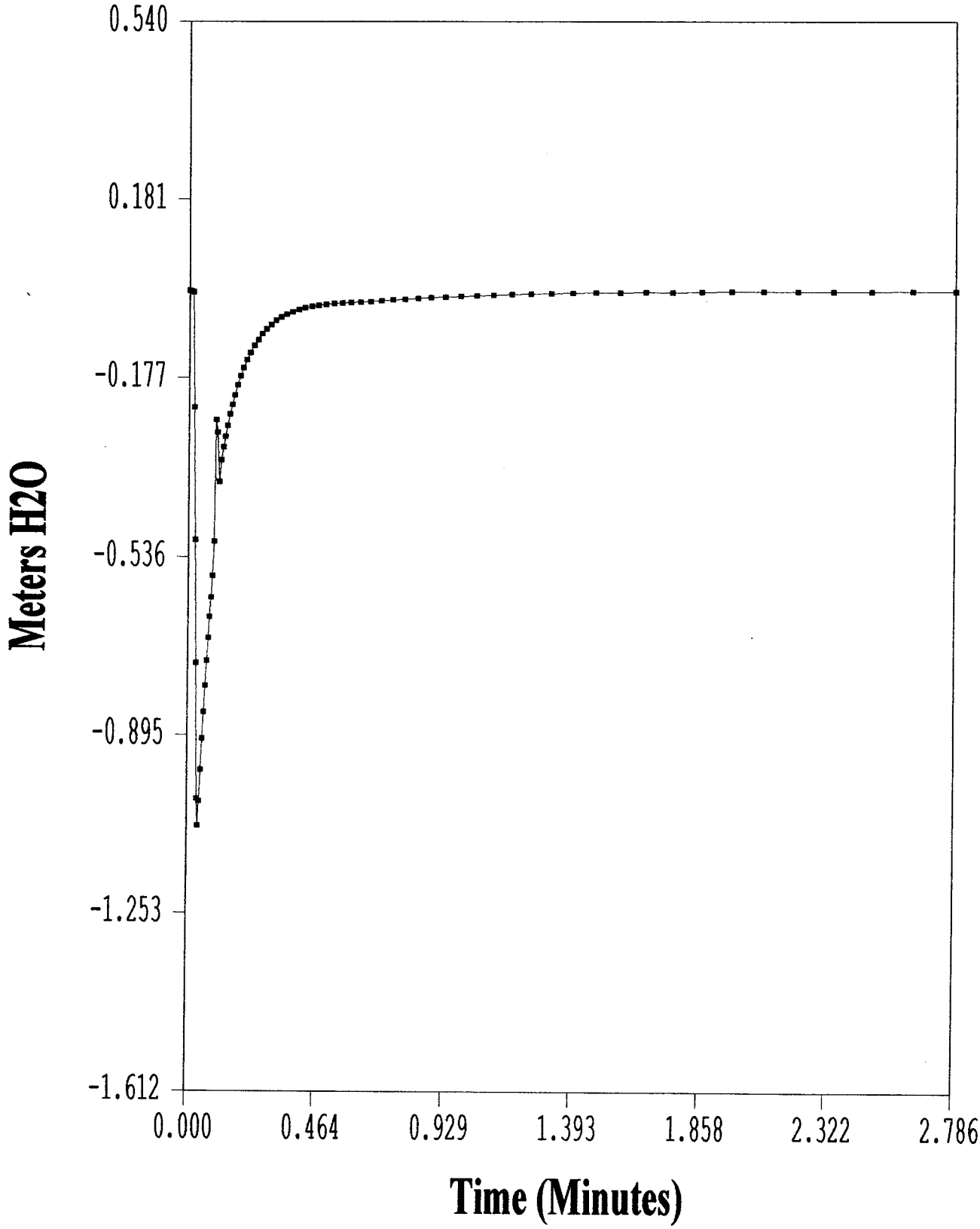
TOTAL DATA SAMPLES 79

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 6.332 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	10:11:16	0.0000	0.000
12/07/01	10:11:16	0.0050	0.000
12/07/01	10:11:16	0.0100	-0.002
12/07/01	10:11:16	0.0150	-0.003
12/07/01	10:11:17	0.0200	-0.236
12/07/01	10:11:17	0.0250	-0.500
12/07/01	10:11:17	0.0300	-0.750
12/07/01	10:11:18	0.0350	-1.020
12/07/01	10:11:18	0.0400	-1.074
12/07/01	10:11:18	0.0450	-1.025
12/07/01	10:11:19	0.0500	-0.962
12/07/01	10:11:19	0.0550	-0.901
12/07/01	10:11:19	0.0600	-0.848
12/07/01	10:11:19	0.0650	-0.795
12/07/01	10:11:20	0.0700	-0.745
12/07/01	10:11:20	0.0750	-0.698
12/07/01	10:11:20	0.0800	-0.656
12/07/01	10:11:21	0.0848	-0.617
12/07/01	10:11:21	0.0900	-0.573
12/07/01	10:11:21	0.0950	-0.503
12/07/01	10:11:22	0.1000	-0.262
12/07/01	10:11:22	0.1058	-0.286
12/07/01	10:11:22	0.1120	-0.386
12/07/01	10:11:23	0.1185	-0.343
12/07/01	10:11:23	0.1255	-0.316
12/07/01	10:11:24	0.1328	-0.295
12/07/01	10:11:24	0.1407	-0.273
12/07/01	10:11:25	0.1490	-0.250
12/07/01	10:11:25	0.1578	-0.231

12/07/01	10:11:26	0.1670	-0.211
12/07/01	10:11:26	0.1770	-0.191
12/07/01	10:11:27	0.1875	-0.173
12/07/01	10:11:28	0.1985	-0.156
12/07/01	10:11:28	0.2102	-0.140
12/07/01	10:11:29	0.2227	-0.125
12/07/01	10:11:30	0.2358	-0.111
12/07/01	10:11:31	0.2498	-0.099
12/07/01	10:11:31	0.2647	-0.087
12/07/01	10:11:32	0.2803	-0.077
12/07/01	10:11:33	0.2970	-0.068
12/07/01	10:11:34	0.3147	-0.060
12/07/01	10:11:36	0.3333	-0.053
12/07/01	10:11:37	0.3532	-0.047
12/07/01	10:11:38	0.3742	-0.042
12/07/01	10:11:39	0.3963	-0.038
12/07/01	10:11:41	0.4198	-0.034
12/07/01	10:11:42	0.4447	-0.031
12/07/01	10:11:44	0.4697	-0.029
12/07/01	10:11:45	0.4963	-0.027
12/07/01	10:11:47	0.5247	-0.025
12/07/01	10:11:49	0.5547	-0.024
12/07/01	10:11:51	0.5863	-0.023
12/07/01	10:11:53	0.6213	-0.022
12/07/01	10:11:55	0.6578	-0.021
12/07/01	10:11:57	0.6963	-0.019
12/07/01	10:12:00	0.7380	-0.018
12/07/01	10:12:02	0.7813	-0.016
12/07/01	10:12:05	0.8280	-0.014
12/07/01	10:12:08	0.8763	-0.012
12/07/01	10:12:11	0.9280	-0.011
12/07/01	10:12:15	0.9830	-0.009
12/07/01	10:12:18	1.0413	-0.008
12/07/01	10:12:22	1.1030	-0.007
12/07/01	10:12:26	1.1680	-0.006
12/07/01	10:12:30	1.2380	-0.005
12/07/01	10:12:34	1.3113	-0.004
12/07/01	10:12:39	1.3897	-0.003
12/07/01	10:12:44	1.4730	-0.002
12/07/01	10:12:49	1.5613	-0.001
12/07/01	10:12:55	1.6547	-0.001
12/07/01	10:13:01	1.7530	-0.001
12/07/01	10:13:07	1.8580	0.000
12/07/01	10:13:14	1.9680	0.001
12/07/01	10:13:21	2.0847	0.001
12/07/01	10:13:28	2.2097	0.001
12/07/01	10:13:36	2.3412	0.001
12/07/01	10:13:44	2.4813	0.001
12/07/01	10:13:53	2.6297	0.002
12/07/01	10:14:03	2.7863	0.002

PES-INJ2F



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:00:32
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 102
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-INJ2R

Test defined on: 12/07/01 10:22:44
Test started on: 12/07/01 10:24:17
Test stopped on: 12/07/01 10:27:43
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 82

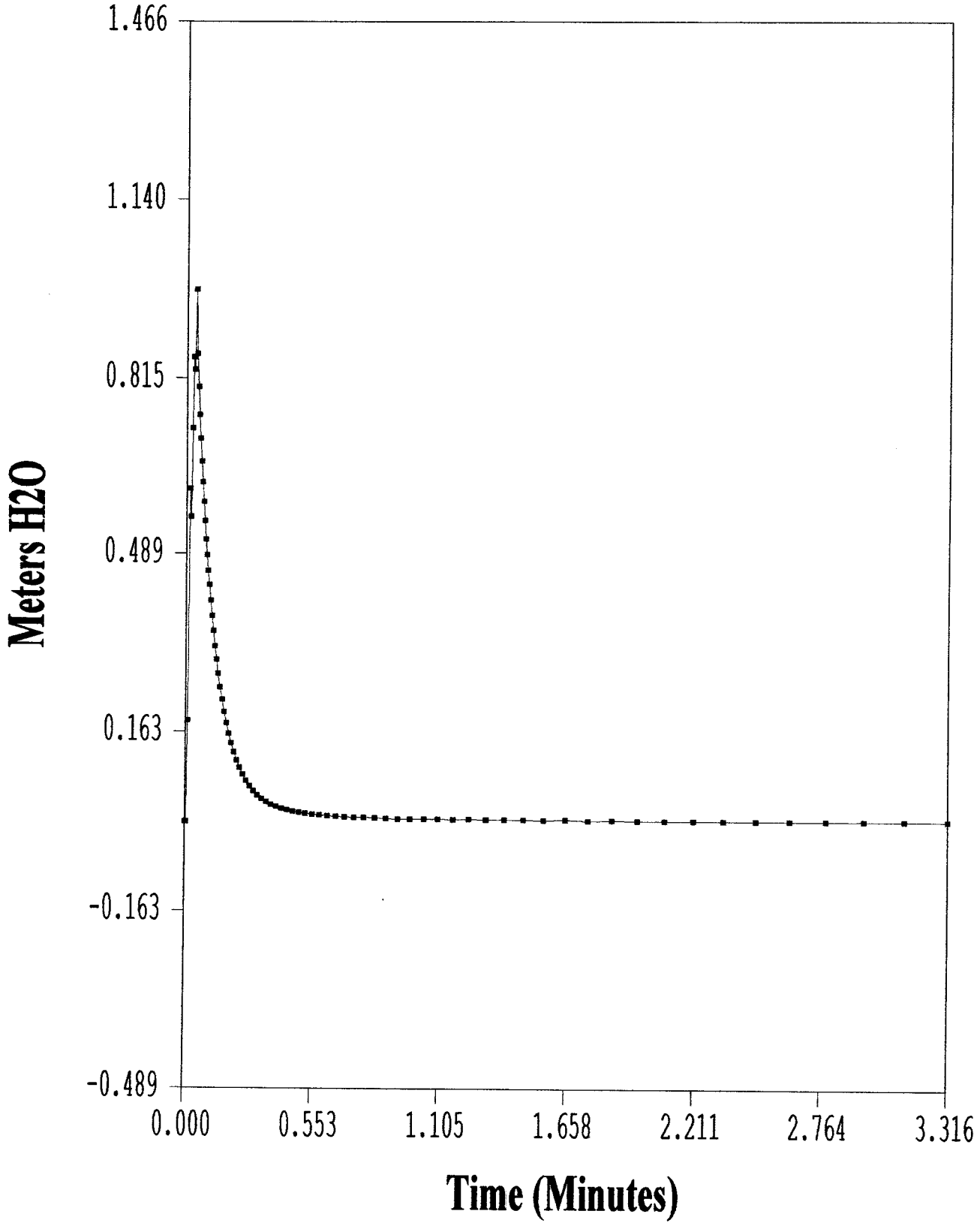
TOTAL DATA SAMPLES 82

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 6.331 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	10:24:17	0.0000	0.000
12/07/01	10:24:17	0.0050	0.000
12/07/01	10:24:17	0.0100	0.184
12/07/01	10:24:17	0.0150	0.610
12/07/01	10:24:18	0.0200	0.558
12/07/01	10:24:18	0.0250	0.723
12/07/01	10:24:18	0.0300	0.854
12/07/01	10:24:19	0.0350	0.831
12/07/01	10:24:19	0.0400	0.978
12/07/01	10:24:19	0.0450	0.860
12/07/01	10:24:20	0.0500	0.799
12/07/01	10:24:20	0.0550	0.748
12/07/01	10:24:20	0.0600	0.704
12/07/01	10:24:20	0.0650	0.661
12/07/01	10:24:21	0.0700	0.622
12/07/01	10:24:21	0.0750	0.585
12/07/01	10:24:21	0.0800	0.549
12/07/01	10:24:22	0.0848	0.515
12/07/01	10:24:22	0.0900	0.486
12/07/01	10:24:22	0.0950	0.458
12/07/01	10:24:23	0.1000	0.432
12/07/01	10:24:23	0.1058	0.403
12/07/01	10:24:23	0.1120	0.375
12/07/01	10:24:24	0.1185	0.348
12/07/01	10:24:24	0.1255	0.320
12/07/01	10:24:25	0.1328	0.295
12/07/01	10:24:25	0.1407	0.270
12/07/01	10:24:26	0.1490	0.245
12/07/01	10:24:26	0.1578	0.222

12/07/01	10:24:27	0.1670	0.200
12/07/01	10:24:27	0.1770	0.180
12/07/01	10:24:28	0.1875	0.160
12/07/01	10:24:28	0.1985	0.142
12/07/01	10:24:29	0.2102	0.126
12/07/01	10:24:30	0.2227	0.111
12/07/01	10:24:31	0.2358	0.097
12/07/01	10:24:32	0.2498	0.085
12/07/01	10:24:32	0.2647	0.074
12/07/01	10:24:33	0.2803	0.064
12/07/01	10:24:34	0.2970	0.056
12/07/01	10:24:35	0.3147	0.048
12/07/01	10:24:37	0.3333	0.042
12/07/01	10:24:38	0.3532	0.036
12/07/01	10:24:39	0.3742	0.031
12/07/01	10:24:40	0.3963	0.027
12/07/01	10:24:42	0.4198	0.024
12/07/01	10:24:43	0.4447	0.021
12/07/01	10:24:45	0.4697	0.019
12/07/01	10:24:46	0.4963	0.017
12/07/01	10:24:48	0.5247	0.015
12/07/01	10:24:50	0.5547	0.014
12/07/01	10:24:52	0.5863	0.012
12/07/01	10:24:54	0.6213	0.011
12/07/01	10:24:56	0.6578	0.011
12/07/01	10:24:58	0.6963	0.009
12/07/01	10:25:01	0.7380	0.009
12/07/01	10:25:03	0.7813	0.008
12/07/01	10:25:06	0.8280	0.007
12/07/01	10:25:09	0.8763	0.007
12/07/01	10:25:12	0.9280	0.006
12/07/01	10:25:16	0.9830	0.006
12/07/01	10:25:19	1.0413	0.005
12/07/01	10:25:23	1.1030	0.005
12/07/01	10:25:27	1.1680	0.005
12/07/01	10:25:31	1.2380	0.005
12/07/01	10:25:35	1.3113	0.005
12/07/01	10:25:40	1.3897	0.005
12/07/01	10:25:45	1.4730	0.005
12/07/01	10:25:50	1.5613	0.004
12/07/01	10:25:56	1.6547	0.005
12/07/01	10:26:02	1.7530	0.003
12/07/01	10:26:08	1.8580	0.004
12/07/01	10:26:15	1.9680	0.003
12/07/01	10:26:22	2.0847	0.003
12/07/01	10:26:29	2.2097	0.003
12/07/01	10:26:37	2.3412	0.003
12/07/01	10:26:45	2.4813	0.003
12/07/01	10:26:54	2.6297	0.003
12/07/01	10:27:04	2.7863	0.003
12/07/01	10:27:14	2.9530	0.003
12/07/01	10:27:24	3.1297	0.003
12/07/01	10:27:36	3.3163	0.003

PES-INJ2R



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/07/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-INJ3
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	40'	Total Well Depth (Installed):	70'
Screen Diameter:	3"	Depth to Bottom of Screen:	50'	Total Well Depth (Measured):	70'
TOC Elevation:	832.71	Static Water Level	803.98	Product Present (Y/N)	N
				Static Product Level:	

Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	10:54:04 F/ 11:01:17 R	End Static Water Level:	803.98
End Time:	10:55:11 F / 11:03:29 R	Max/Min Water Level:	807.394/800.917
Data File Name:	PES-INJ3.bin	Test Time - Max/Min:	
		Transducer Depth:	783.085 F/ 783.083 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind Velocity	Wind Direction	Ground/Surface Conditions
8:00	30	Partly cloudy	Low	1 mph		Frost

Manual Testing

Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Drawdown
0	803.98	Falling	0	803.98	Rising			
66	803.98	Falling	125	803.98	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:01:29
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 105.
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-INJ3F

Test defined on: 12/07/01 10:50:32
Test started on: 12/07/01 10:54:04
Test stopped on: 12/07/01 10:55:11
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 63

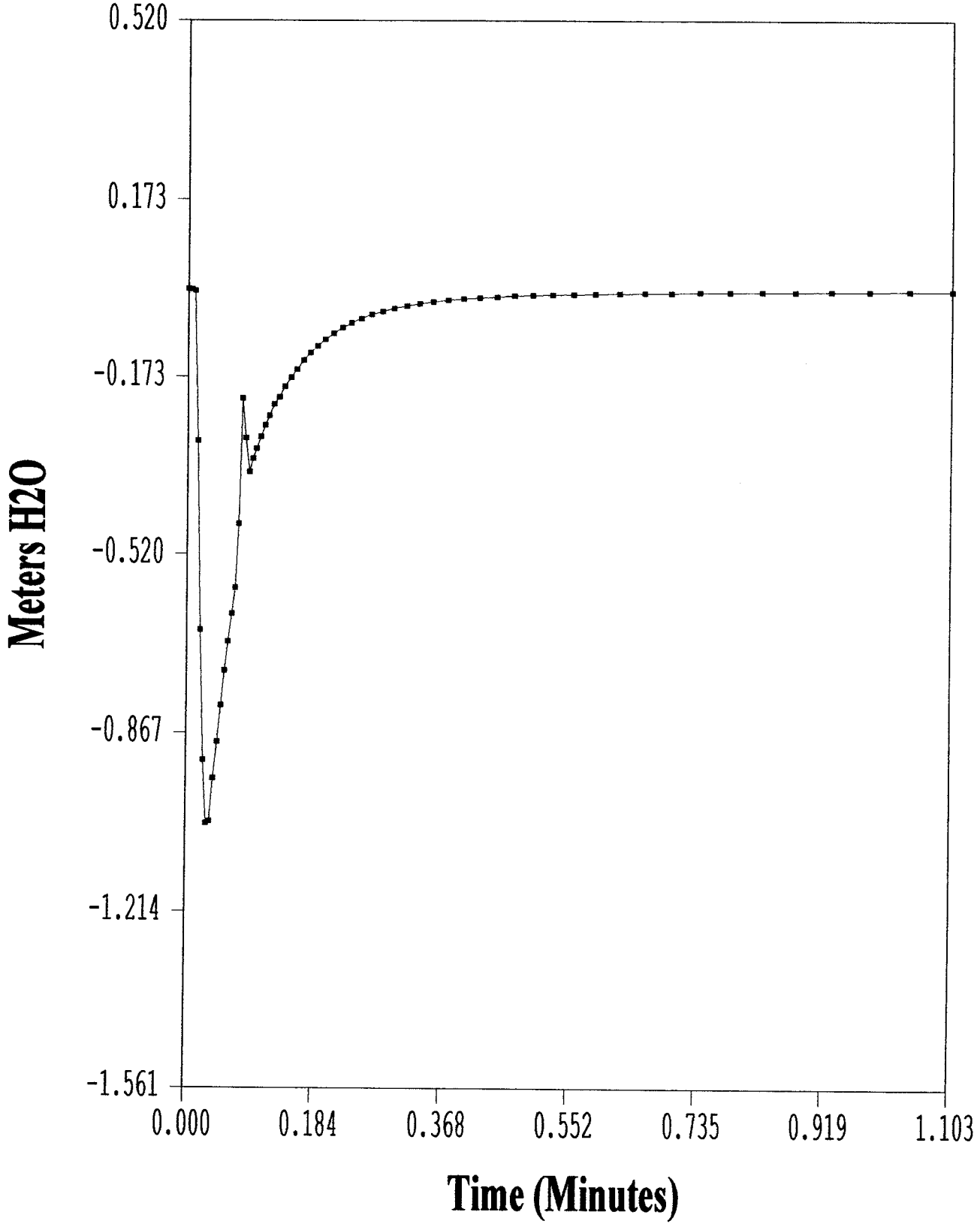
TOTAL DATA SAMPLES 63

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 6.369 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	10:54:04	0.0000	0.000
12/07/01	10:54:05	0.0050	-0.001
12/07/01	10:54:05	0.0100	-0.003
12/07/01	10:54:05	0.0150	-0.298
12/07/01	10:54:06	0.0200	-0.667
12/07/01	10:54:06	0.0250	-0.918
12/07/01	10:54:06	0.0300	-1.040
12/07/01	10:54:06	0.0350	-1.037
12/07/01	10:54:07	0.0400	-0.954
12/07/01	10:54:07	0.0450	-0.883
12/07/01	10:54:07	0.0500	-0.812
12/07/01	10:54:08	0.0550	-0.745
12/07/01	10:54:08	0.0600	-0.688
12/07/01	10:54:08	0.0650	-0.635
12/07/01	10:54:09	0.0700	-0.585
12/07/01	10:54:09	0.0750	-0.460
12/07/01	10:54:09	0.0800	-0.215
12/07/01	10:54:09	0.0848	-0.292
12/07/01	10:54:10	0.0900	-0.358
12/07/01	10:54:10	0.0950	-0.332
12/07/01	10:54:10	0.1000	-0.312
12/07/01	10:54:11	0.1058	-0.289
12/07/01	10:54:11	0.1120	-0.267
12/07/01	10:54:11	0.1185	-0.248
12/07/01	10:54:12	0.1255	-0.226
12/07/01	10:54:12	0.1328	-0.212
12/07/01	10:54:13	0.1407	-0.191
12/07/01	10:54:13	0.1490	-0.173
12/07/01	10:54:14	0.1578	-0.157

12/07/01	10:54:14	0.1670	-0.140
12/07/01	10:54:15	0.1770	-0.125
12/07/01	10:54:16	0.1875	-0.112
12/07/01	10:54:16	0.1985	-0.099
12/07/01	10:54:17	0.2102	-0.087
12/07/01	10:54:18	0.2227	-0.076
12/07/01	10:54:18	0.2358	-0.066
12/07/01	10:54:19	0.2498	-0.058
12/07/01	10:54:20	0.2647	-0.050
12/07/01	10:54:21	0.2803	-0.044
12/07/01	10:54:22	0.2970	-0.037
12/07/01	10:54:23	0.3147	-0.032
12/07/01	10:54:24	0.3333	-0.028
12/07/01	10:54:25	0.3532	-0.024
12/07/01	10:54:27	0.3742	-0.020
12/07/01	10:54:28	0.3963	-0.018
12/07/01	10:54:29	0.4198	-0.016
12/07/01	10:54:31	0.4447	-0.014
12/07/01	10:54:32	0.4697	-0.012
12/07/01	10:54:34	0.4963	-0.010
12/07/01	10:54:36	0.5247	-0.009
12/07/01	10:54:38	0.5547	-0.008
12/07/01	10:54:39	0.5863	-0.007
12/07/01	10:54:42	0.6213	-0.006
12/07/01	10:54:44	0.6578	-0.006
12/07/01	10:54:46	0.6963	-0.005
12/07/01	10:54:49	0.7380	-0.004
12/07/01	10:54:51	0.7813	-0.004
12/07/01	10:54:54	0.8280	-0.003
12/07/01	10:54:57	0.8763	-0.003
12/07/01	10:55:00	0.9280	-0.002
12/07/01	10:55:03	0.9830	-0.002
12/07/01	10:55:07	1.0413	-0.001
12/07/01	10:55:10	1.1030	-0.001

PES-INJ3F



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:02:15
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 110:
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-INJ3R

Test defined on: 12/07/01 11:00:37
Test started on: 12/07/01 11:01:17
Test stopped on: 12/07/01 11:03:29
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 74

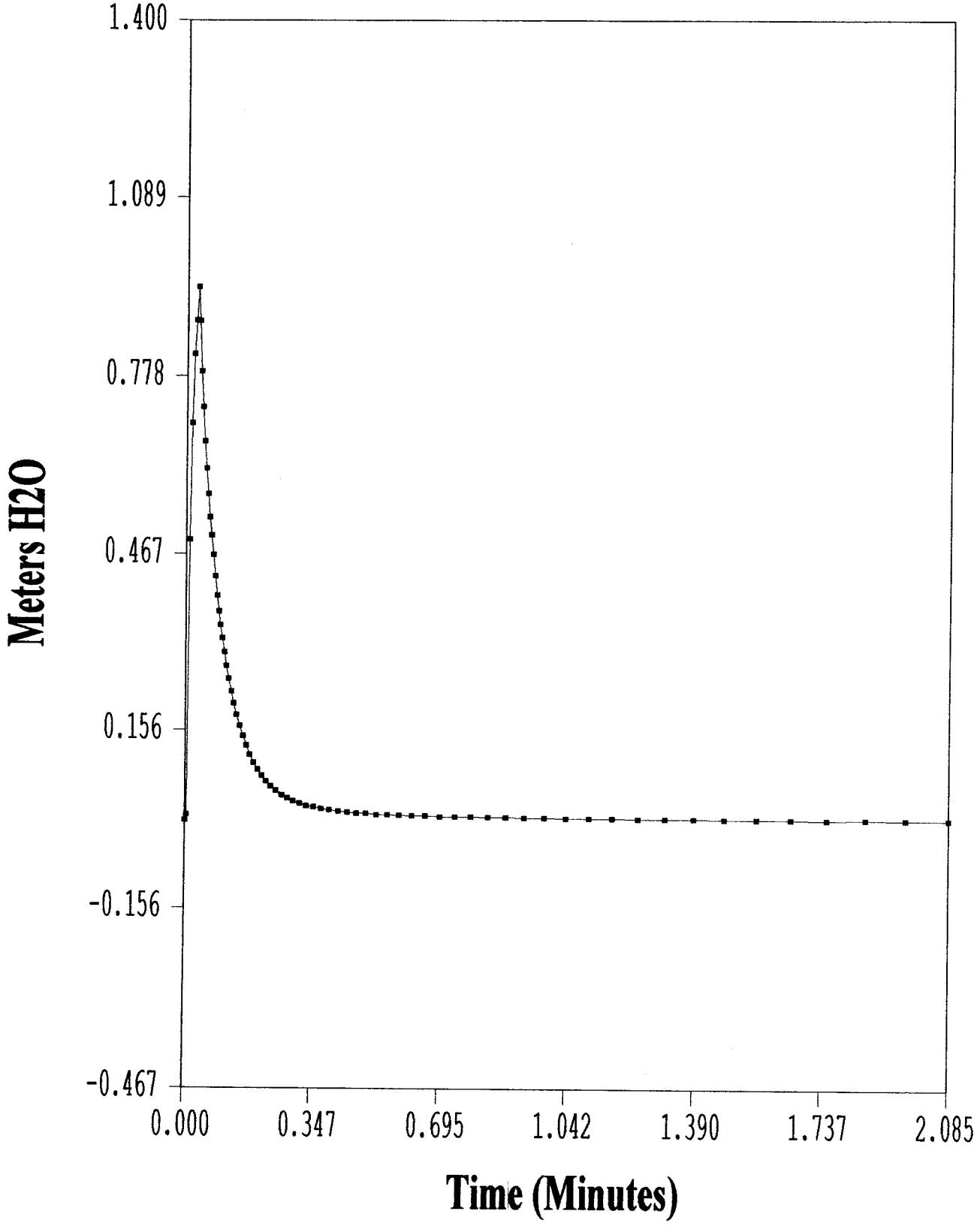
TOTAL DATA SAMPLES 74

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 6.369 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	11:01:17	0.0000	0.000
12/07/01	11:01:17	0.0050	0.010
12/07/01	11:01:17	0.0100	0.492
12/07/01	11:01:18	0.0150	0.697
12/07/01	11:01:18	0.0200	0.817
12/07/01	11:01:18	0.0250	0.876
12/07/01	11:01:19	0.0300	0.934
12/07/01	11:01:19	0.0350	0.875
12/07/01	11:01:19	0.0400	0.787
12/07/01	11:01:20	0.0450	0.724
12/07/01	11:01:20	0.0500	0.665
12/07/01	11:01:20	0.0550	0.618
12/07/01	11:01:20	0.0600	0.572
12/07/01	11:01:21	0.0650	0.532
12/07/01	11:01:21	0.0700	0.500
12/07/01	11:01:21	0.0750	0.465
12/07/01	11:01:22	0.0800	0.428
12/07/01	11:01:22	0.0848	0.393
12/07/01	11:01:22	0.0900	0.366
12/07/01	11:01:23	0.0950	0.342
12/07/01	11:01:23	0.1000	0.319
12/07/01	11:01:23	0.1058	0.294
12/07/01	11:01:24	0.1120	0.270
12/07/01	11:01:24	0.1185	0.247
12/07/01	11:01:24	0.1255	0.224
12/07/01	11:01:25	0.1328	0.204
12/07/01	11:01:25	0.1407	0.183
12/07/01	11:01:26	0.1490	0.164
12/07/01	11:01:26	0.1578	0.146

12/07/01	11:01:27	0.1670	0.130
12/07/01	11:01:27	0.1770	0.114
12/07/01	11:01:28	0.1875	0.101
12/07/01	11:01:29	0.1985	0.088
12/07/01	11:01:29	0.2102	0.077
12/07/01	11:01:30	0.2227	0.068
12/07/01	11:01:31	0.2358	0.059
12/07/01	11:01:32	0.2498	0.052
12/07/01	11:01:33	0.2647	0.045
12/07/01	11:01:34	0.2803	0.039
12/07/01	11:01:35	0.2970	0.034
12/07/01	11:01:36	0.3147	0.030
12/07/01	11:01:37	0.3333	0.026
12/07/01	11:01:38	0.3532	0.024
12/07/01	11:01:39	0.3742	0.021
12/07/01	11:01:41	0.3963	0.019
12/07/01	11:01:42	0.4198	0.017
12/07/01	11:01:44	0.4447	0.015
12/07/01	11:01:45	0.4697	0.014
12/07/01	11:01:47	0.4963	0.013
12/07/01	11:01:48	0.5247	0.011
12/07/01	11:01:50	0.5547	0.011
12/07/01	11:01:52	0.5863	0.010
12/07/01	11:01:54	0.6213	0.009
12/07/01	11:01:56	0.6578	0.009
12/07/01	11:01:59	0.6963	0.008
12/07/01	11:02:01	0.7380	0.007
12/07/01	11:02:04	0.7813	0.007
12/07/01	11:02:07	0.8280	0.007
12/07/01	11:02:09	0.8763	0.007
12/07/01	11:02:13	0.9280	0.006
12/07/01	11:02:16	0.9830	0.006
12/07/01	11:02:19	1.0413	0.005
12/07/01	11:02:23	1.1030	0.005
12/07/01	11:02:27	1.1680	0.005
12/07/01	11:02:31	1.2380	0.004
12/07/01	11:02:36	1.3113	0.004
12/07/01	11:02:40	1.3897	0.004
12/07/01	11:02:45	1.4730	0.003
12/07/01	11:02:51	1.5613	0.003
12/07/01	11:02:56	1.6547	0.003
12/07/01	11:03:02	1.7530	0.003
12/07/01	11:03:08	1.8580	0.003
12/07/01	11:03:15	1.9680	0.003
12/07/01	11:03:22	2.0847	0.003

PES-INJ3R



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/07/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-MW1
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	35'	Total Well Depth (Installed):	70'
Screen Diameter:	3"	Depth to Bottom of Screen:	45'	Total Well Depth (Measured):	70'
TOC Elevation:	832.49	Static Water Level	803.94	Product Present (Y/N)	N
				Static Product Level:	

Test Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	9:07:10 F / 9:14:28 R	End Static Water Level:	803.94
End Time:	9:10:56 F / 9:18:24 R	Max/Min Water Level:	807.732/800.54
Data File Name:	PES-MW1.bin	Test Time - Max/Min:	
		Transducer Depth:	786.689F/786.692 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
8:00	30	Partly cloudy	Low	1 mph		Frost

Manual Testing

Time (Sec)	Depth to Water (ft)	Depth to Type	Time (Sec)	Depth to Water (ft)	Depth to Type	Time (Sec)	Depth to Water (ft)	Depth to Drawdown
0	803.94	Falling	0	803.94	Rising			
223	803.94	Falling	223	803.94	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:55:43
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 090
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-MW1F

Test defined on: 12/07/01 09:01:57
Test started on: 12/07/01 09:07:10
Test stopped on: 12/07/01 09:10:56
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 84

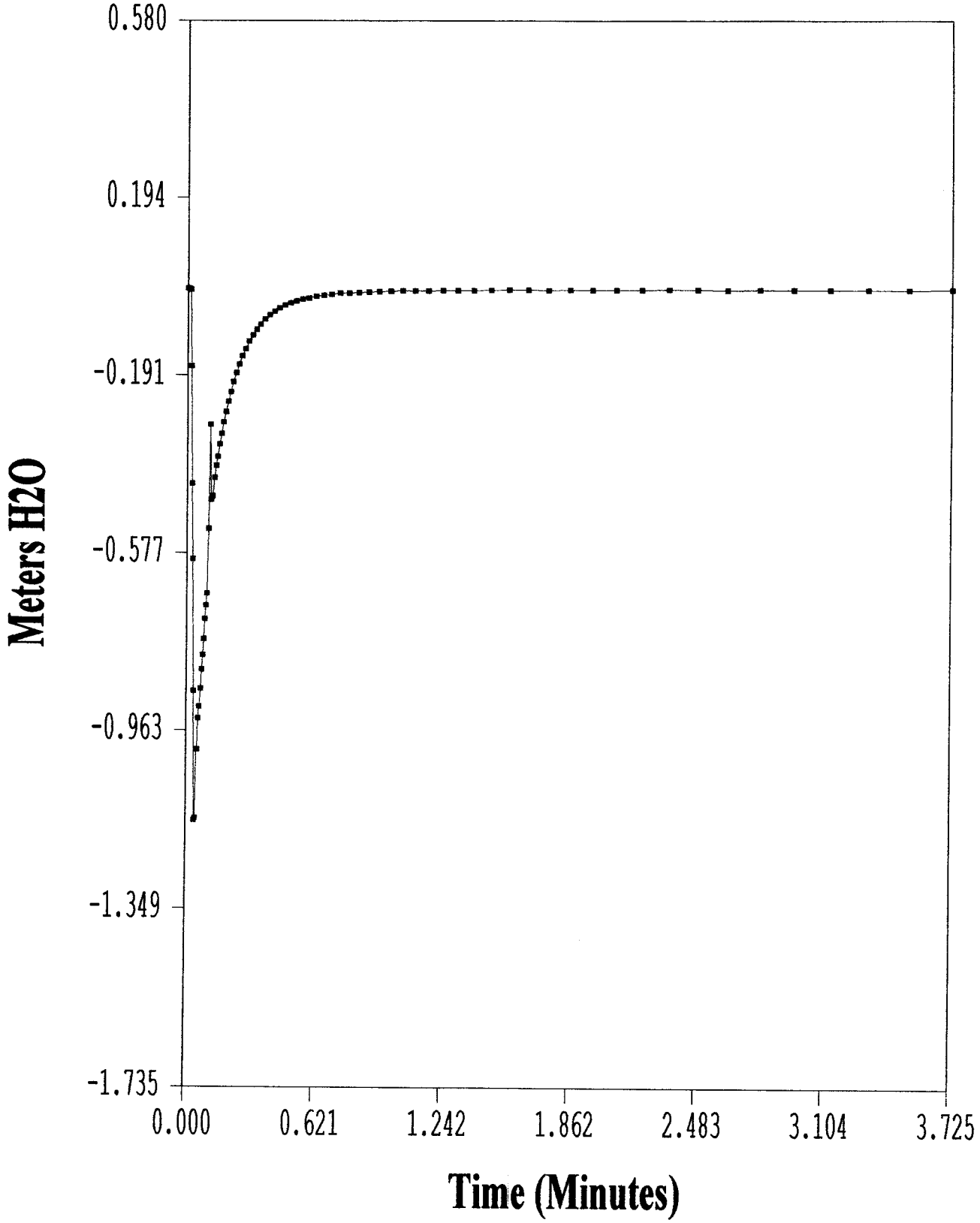
TOTAL DATA SAMPLES 84

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 5.276 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	09:07:10	0.0000	0.000
12/07/01	09:07:11	0.0050	0.000
12/07/01	09:07:11	0.0100	-0.002
12/07/01	09:07:11	0.0150	-0.003
12/07/01	09:07:12	0.0200	-0.171
12/07/01	09:07:12	0.0250	-0.426
12/07/01	09:07:12	0.0300	-0.590
12/07/01	09:07:13	0.0350	-0.876
12/07/01	09:07:13	0.0400	-1.156
12/07/01	09:07:13	0.0450	-1.152
12/07/01	09:07:13	0.0500	-1.003
12/07/01	09:07:14	0.0550	-1.003
12/07/01	09:07:14	0.0600	-0.935
12/07/01	09:07:14	0.0650	-0.911
12/07/01	09:07:15	0.0700	-0.871
12/07/01	09:07:15	0.0750	-0.830
12/07/01	09:07:15	0.0800	-0.799
12/07/01	09:07:16	0.0848	-0.764
12/07/01	09:07:16	0.0900	-0.721
12/07/01	09:07:16	0.0950	-0.691
12/07/01	09:07:16	0.1000	-0.665
12/07/01	09:07:17	0.1058	-0.523
12/07/01	09:07:17	0.1120	-0.298
12/07/01	09:07:18	0.1185	-0.462
12/07/01	09:07:18	0.1255	-0.453
12/07/01	09:07:18	0.1328	-0.414
12/07/01	09:07:19	0.1407	-0.388
12/07/01	09:07:19	0.1490	-0.368
12/07/01	09:07:20	0.1578	-0.341

12/07/01	09:07:20	0.1670	-0.318
12/07/01	09:07:21	0.1770	-0.293
12/07/01	09:07:22	0.1875	-0.270
12/07/01	09:07:22	0.1985	-0.247
12/07/01	09:07:23	0.2102	-0.227
12/07/01	09:07:24	0.2227	-0.205
12/07/01	09:07:25	0.2358	-0.185
12/07/01	09:07:25	0.2498	-0.166
12/07/01	09:07:26	0.2647	-0.148
12/07/01	09:07:27	0.2803	-0.132
12/07/01	09:07:28	0.2970	-0.116
12/07/01	09:07:29	0.3147	-0.102
12/07/01	09:07:30	0.3333	-0.090
12/07/01	09:07:32	0.3532	-0.078
12/07/01	09:07:33	0.3742	-0.067
12/07/01	09:07:34	0.3963	-0.058
12/07/01	09:07:36	0.4198	-0.049
12/07/01	09:07:37	0.4447	-0.042
12/07/01	09:07:39	0.4697	-0.036
12/07/01	09:07:40	0.4963	-0.031
12/07/01	09:07:42	0.5247	-0.027
12/07/01	09:07:44	0.5547	-0.023
12/07/01	09:07:46	0.5863	-0.020
12/07/01	09:07:48	0.6213	-0.016
12/07/01	09:07:50	0.6578	-0.014
12/07/01	09:07:52	0.6963	-0.012
12/07/01	09:07:55	0.7380	-0.009
12/07/01	09:07:57	0.7813	-0.009
12/07/01	09:08:00	0.8280	-0.007
12/07/01	09:08:03	0.8763	-0.007
12/07/01	09:08:06	0.9280	-0.006
12/07/01	09:08:09	0.9830	-0.005
12/07/01	09:08:13	1.0413	-0.004
12/07/01	09:08:17	1.1030	-0.004
12/07/01	09:08:21	1.1680	-0.004
12/07/01	09:08:25	1.2380	-0.003
12/07/01	09:08:29	1.3113	-0.003
12/07/01	09:08:34	1.3897	-0.002
12/07/01	09:08:39	1.4730	-0.002
12/07/01	09:08:44	1.5613	-0.001
12/07/01	09:08:50	1.6547	-0.001
12/07/01	09:08:56	1.7530	-0.002
12/07/01	09:09:02	1.8580	0.000
12/07/01	09:09:09	1.9680	0.000
12/07/01	09:09:16	2.0847	0.000
12/07/01	09:09:23	2.2097	-0.001
12/07/01	09:09:31	2.3412	0.001
12/07/01	09:09:39	2.4813	0.000
12/07/01	09:09:48	2.6297	-0.001
12/07/01	09:09:58	2.7863	0.001
12/07/01	09:10:08	2.9530	0.000
12/07/01	09:10:18	3.1297	0.001
12/07/01	09:10:29	3.3163	0.001
12/07/01	09:10:41	3.5147	0.000
12/07/01	09:10:54	3.7247	0.002

PES-MW1F



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:56:40
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 091·
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-MW1R

Test defined on: 12/07/01 09:13:53
Test started on: 12/07/01 09:14:29
Test stopped on: 12/07/01 09:18:24
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 84

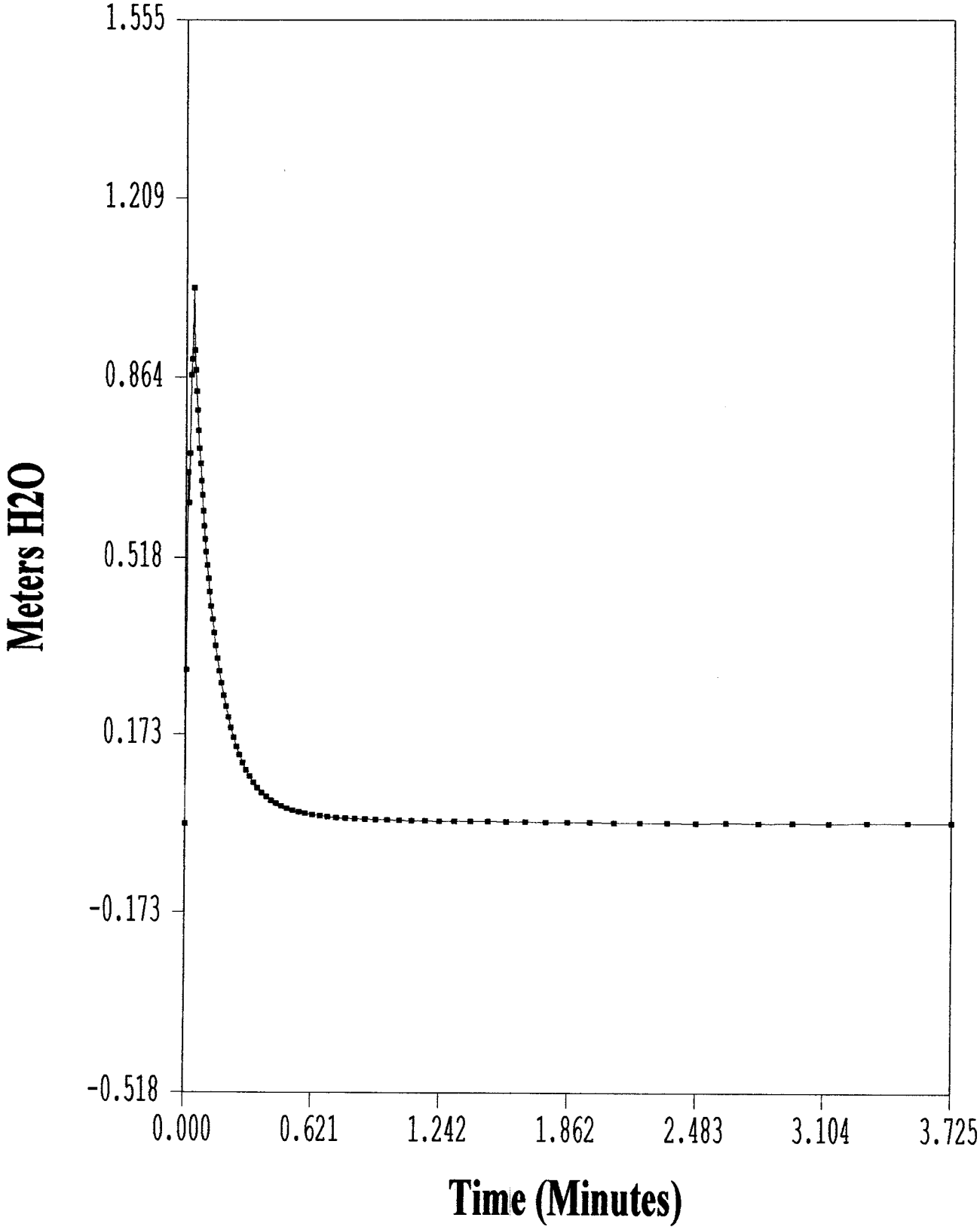
TOTAL DATA SAMPLES 84

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 5.276 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	09:14:29	0.0000	0.000
12/07/01	09:14:29	0.0050	0.299
12/07/01	09:14:29	0.0100	0.682
12/07/01	09:14:29	0.0150	0.623
12/07/01	09:14:30	0.0200	0.719
12/07/01	09:14:30	0.0250	0.869
12/07/01	09:14:30	0.0300	0.900
12/07/01	09:14:31	0.0350	1.036
12/07/01	09:14:31	0.0400	0.916
12/07/01	09:14:31	0.0450	0.878
12/07/01	09:14:32	0.0500	0.838
12/07/01	09:14:32	0.0550	0.801
12/07/01	09:14:32	0.0600	0.762
12/07/01	09:14:32	0.0650	0.728
12/07/01	09:14:33	0.0700	0.699
12/07/01	09:14:33	0.0750	0.665
12/07/01	09:14:33	0.0800	0.639
12/07/01	09:14:34	0.0848	0.608
12/07/01	09:14:34	0.0900	0.579
12/07/01	09:14:34	0.0950	0.554
12/07/01	09:14:35	0.1000	0.530
12/07/01	09:14:35	0.1058	0.503
12/07/01	09:14:35	0.1120	0.478
12/07/01	09:14:36	0.1185	0.451
12/07/01	09:14:36	0.1255	0.424
12/07/01	09:14:36	0.1328	0.398
12/07/01	09:14:37	0.1407	0.372
12/07/01	09:14:37	0.1490	0.346
12/07/01	09:14:38	0.1578	0.321

12/07/01	09:14:39	0.1670	0.296
12/07/01	09:14:39	0.1770	0.273
12/07/01	09:14:40	0.1875	0.249
12/07/01	09:14:40	0.1985	0.228
12/07/01	09:14:41	0.2102	0.206
12/07/01	09:14:42	0.2227	0.186
12/07/01	09:14:43	0.2358	0.167
12/07/01	09:14:43	0.2498	0.149
12/07/01	09:14:44	0.2647	0.133
12/07/01	09:14:45	0.2803	0.118
12/07/01	09:14:46	0.2970	0.104
12/07/01	09:14:47	0.3147	0.092
12/07/01	09:14:49	0.3333	0.080
12/07/01	09:14:50	0.3532	0.070
12/07/01	09:14:51	0.3742	0.061
12/07/01	09:14:52	0.3963	0.053
12/07/01	09:14:54	0.4198	0.046
12/07/01	09:14:55	0.4447	0.040
12/07/01	09:14:57	0.4697	0.034
12/07/01	09:14:58	0.4963	0.030
12/07/01	09:15:00	0.5247	0.026
12/07/01	09:15:02	0.5547	0.023
12/07/01	09:15:04	0.5863	0.020
12/07/01	09:15:06	0.6213	0.018
12/07/01	09:15:08	0.6578	0.016
12/07/01	09:15:10	0.6963	0.014
12/07/01	09:15:13	0.7380	0.012
12/07/01	09:15:15	0.7813	0.011
12/07/01	09:15:18	0.8280	0.010
12/07/01	09:15:21	0.8763	0.009
12/07/01	09:15:24	0.9280	0.009
12/07/01	09:15:27	0.9830	0.008
12/07/01	09:15:31	1.0413	0.007
12/07/01	09:15:35	1.1030	0.007
12/07/01	09:15:39	1.1680	0.007
12/07/01	09:15:43	1.2380	0.006
12/07/01	09:15:47	1.3113	0.006
12/07/01	09:15:52	1.3897	0.005
12/07/01	09:15:57	1.4730	0.005
12/07/01	09:16:02	1.5613	0.005
12/07/01	09:16:08	1.6547	0.005
12/07/01	09:16:14	1.7530	0.004
12/07/01	09:16:20	1.8580	0.003
12/07/01	09:16:27	1.9680	0.003
12/07/01	09:16:34	2.0847	0.003
12/07/01	09:16:41	2.2097	0.003
12/07/01	09:16:49	2.3412	0.003
12/07/01	09:16:57	2.4813	0.002
12/07/01	09:17:06	2.6297	0.003
12/07/01	09:17:16	2.7863	0.002
12/07/01	09:17:26	2.9530	0.003
12/07/01	09:17:36	3.1297	0.002
12/07/01	09:17:47	3.3163	0.003
12/07/01	09:17:59	3.5147	0.003
12/07/01	09:18:12	3.7247	0.003

PES-MW1R



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/06/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-MW3
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Boring Diameter:		Depth to Top of Screen:	30'	Total Well Depth (Installed):	40'
Screen Diameter:	3"	Depth to Bottom of Screen:	40'	Total Well Depth (Measured):	40'
TOC Elevation:	832.80	Static Water Level	803.14	Product Present (Y/N)	N
				Static Product Level:	

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" Diameter/ 6' long

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	15:21:13 F / 15:39:01 R	End Static Water Level:	803.14
End Time:	15:35:34 F / 15:52:15 R	Max/Min Water Level:	806.943/798.996
Data File Name:	PES-MW3.bin	Test Time - Max/Min:	
		Transducer Depth:	791.082F/791.071R

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
10:55	40	Sunny	Low	1 mph		Muddy

Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Drawdown
0	803.14	Falling	0	803.27	Rising			
844	803.27	Falling	752	803.14	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:51:12
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-06 152:
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-MW3F

Test defined on: 12/06/01 15:09:58
Test started on: 12/06/01 15:21:13
Test stopped on: 12/06/01 15:35:34
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 107

TOTAL DATA SAMPLES 107

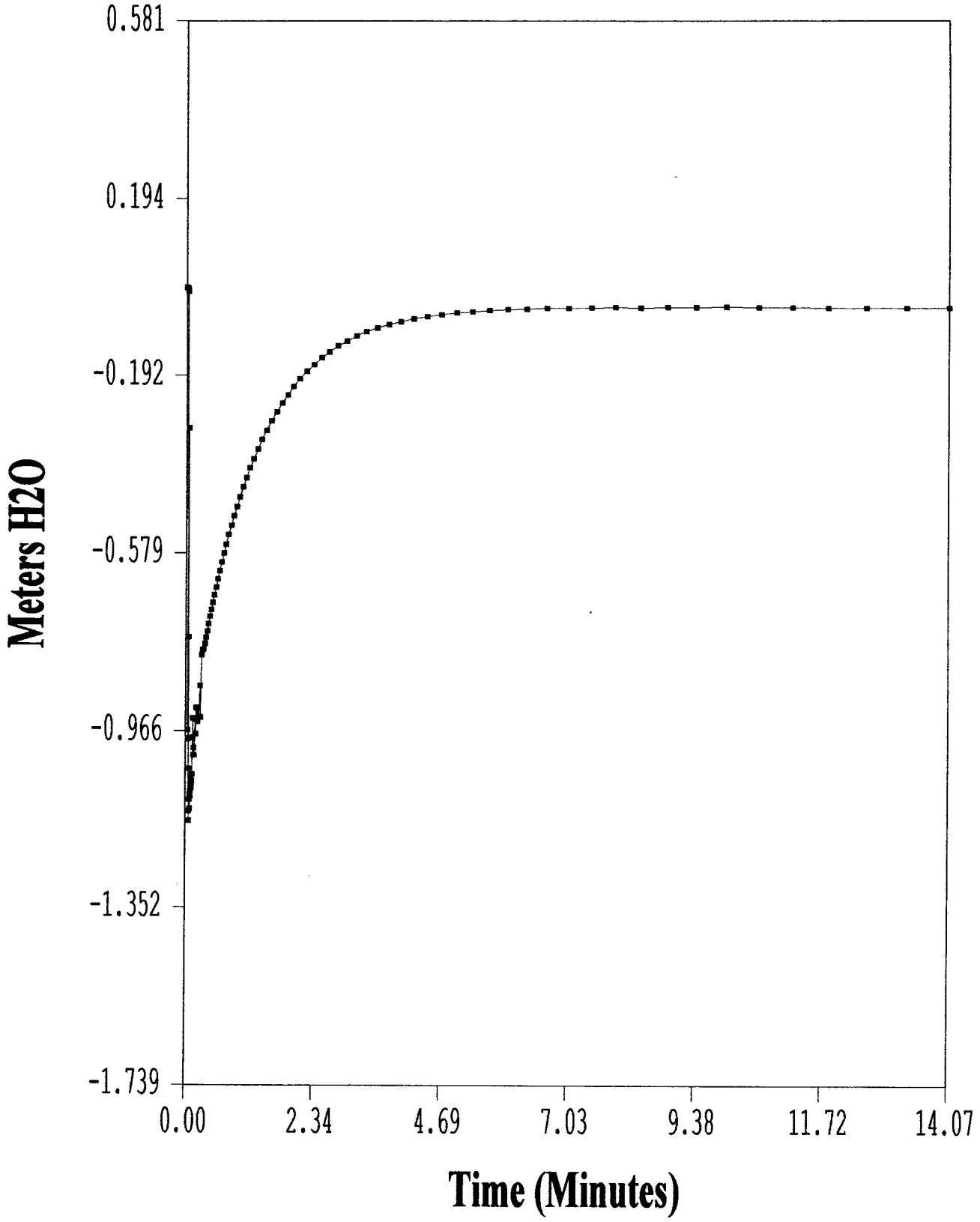
Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 3.675 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/06/01	15:21:13	0.0000	0.000
12/06/01	15:21:14	0.0050	0.001
12/06/01	15:21:14	0.0100	0.000
12/06/01	15:21:14	0.0150	0.000
12/06/01	15:21:15	0.0200	0.000
12/06/01	15:21:15	0.0250	0.000
12/06/01	15:21:15	0.0300	-0.004
12/06/01	15:21:16	0.0350	-0.007
12/06/01	15:21:16	0.0400	-0.962
12/06/01	15:21:16	0.0450	-0.307
12/06/01	15:21:16	0.0500	-0.982
12/06/01	15:21:17	0.0550	-0.760
12/06/01	15:21:17	0.0600	-1.045
12/06/01	15:21:17	0.0650	-1.138
12/06/01	15:21:18	0.0700	-1.159
12/06/01	15:21:18	0.0750	-1.113
12/06/01	15:21:18	0.0800	-1.133
12/06/01	15:21:19	0.0848	-1.102
12/06/01	15:21:19	0.0900	-1.105
12/06/01	15:21:19	0.0950	-1.095
12/06/01	15:21:19	0.1000	-1.070
12/06/01	15:21:20	0.1058	-1.088
12/06/01	15:21:20	0.1120	-1.081
12/06/01	15:21:21	0.1185	-1.073
12/06/01	15:21:21	0.1255	-1.059
12/06/01	15:21:21	0.1328	-0.980
12/06/01	15:21:22	0.1407	-0.938
12/06/01	15:21:22	0.1490	-1.017
12/06/01	15:21:23	0.1578	-1.001

12/06/01	15:21:23	0.1670	-1.016
12/06/01	15:21:24	0.1770	-0.939
12/06/01	15:21:25	0.1875	-0.972
12/06/01	15:21:25	0.1985	-0.914
12/06/01	15:21:26	0.2102	-0.916
12/06/01	15:21:27	0.2227	-0.945
12/06/01	15:21:28	0.2358	-0.914
12/06/01	15:21:28	0.2498	-0.935
12/06/01	15:21:29	0.2647	-0.867
12/06/01	15:21:30	0.2803	-0.935
12/06/01	15:21:31	0.2970	-0.800
12/06/01	15:21:32	0.3147	-0.789
12/06/01	15:21:33	0.3333	-0.788
12/06/01	15:21:35	0.3532	-0.775
12/06/01	15:21:36	0.3742	-0.762
12/06/01	15:21:37	0.3963	-0.748
12/06/01	15:21:39	0.4198	-0.732
12/06/01	15:21:40	0.4447	-0.716
12/06/01	15:21:42	0.4697	-0.701
12/06/01	15:21:43	0.4963	-0.685
12/06/01	15:21:45	0.5247	-0.669
12/06/01	15:21:47	0.5547	-0.653
12/06/01	15:21:49	0.5863	-0.635
12/06/01	15:21:51	0.6213	-0.617
12/06/01	15:21:53	0.6578	-0.599
12/06/01	15:21:55	0.6963	-0.579
12/06/01	15:21:58	0.7380	-0.559
12/06/01	15:22:00	0.7813	-0.539
12/06/01	15:22:03	0.8280	-0.519
12/06/01	15:22:06	0.8763	-0.499
12/06/01	15:22:09	0.9280	-0.478
12/06/01	15:22:12	0.9830	-0.458
12/06/01	15:22:16	1.0413	-0.437
12/06/01	15:22:20	1.1030	-0.416
12/06/01	15:22:24	1.1680	-0.395
12/06/01	15:22:28	1.2380	-0.374
12/06/01	15:22:32	1.3113	-0.353
12/06/01	15:22:37	1.3897	-0.332
12/06/01	15:22:42	1.4730	-0.312
12/06/01	15:22:47	1.5613	-0.291
12/06/01	15:22:53	1.6547	-0.271
12/06/01	15:22:59	1.7530	-0.252
12/06/01	15:23:05	1.8580	-0.234
12/06/01	15:23:12	1.9680	-0.216
12/06/01	15:23:19	2.0847	-0.199
12/06/01	15:23:26	2.2097	-0.182
12/06/01	15:23:34	2.3412	-0.167
12/06/01	15:23:42	2.4813	-0.152
12/06/01	15:23:51	2.6297	-0.140
12/06/01	15:24:01	2.7863	-0.126
12/06/01	15:24:11	2.9530	-0.115
12/06/01	15:24:21	3.1297	-0.104
12/06/01	15:24:32	3.3163	-0.095
12/06/01	15:24:44	3.5147	-0.087
12/06/01	15:24:57	3.7247	-0.079
12/06/01	15:25:10	3.9463	-0.073
12/06/01	15:25:24	4.1813	-0.067
12/06/01	15:25:39	4.4295	-0.062
12/06/01	15:25:55	4.6930	-0.058
12/06/01	15:26:12	4.9730	-0.053
12/06/01	15:26:30	5.2697	-0.051
12/06/01	15:26:48	5.5830	-0.048
12/06/01	15;27:08	5.9147	-0.046
12/06/01	15:27:29	6.2663	-0.045
12/06/01	15:27:52	6.6397	-0.043
12/06/01	15:28:16	7.0347	-0.043
12/06/01	15:28:41	7.4530	-0.042

12/06/01	15:29:07	7.8963	-0.041
12/06/01	15:29:35	8.3663	-0.041
12/06/01	15:30:05	8.8647	-0.041
12/06/01	15:30:37	9.3913	-0.041
12/06/01	15:31:10	9.9497	-0.040
12/06/01	15:31:46	10.5413	-0.041
12/06/01	15:32:24	11.1680	-0.041
12/06/01	15:33:03	11.8313	-0.041
12/06/01	15:33:46	12.5347	-0.041
12/06/01	15:34:30	13.2797	-0.041
12/06/01	15:35:18	14.0697	-0.041

PES-MW3F



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:52:19
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-06 153:
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-MW3R

Test defined on: 12/06/01 15:37:23
Test started on: 12/06/01 15:39:01
Test stopped on: 12/06/01 15:52:15
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 105

TOTAL DATA SAMPLES 105

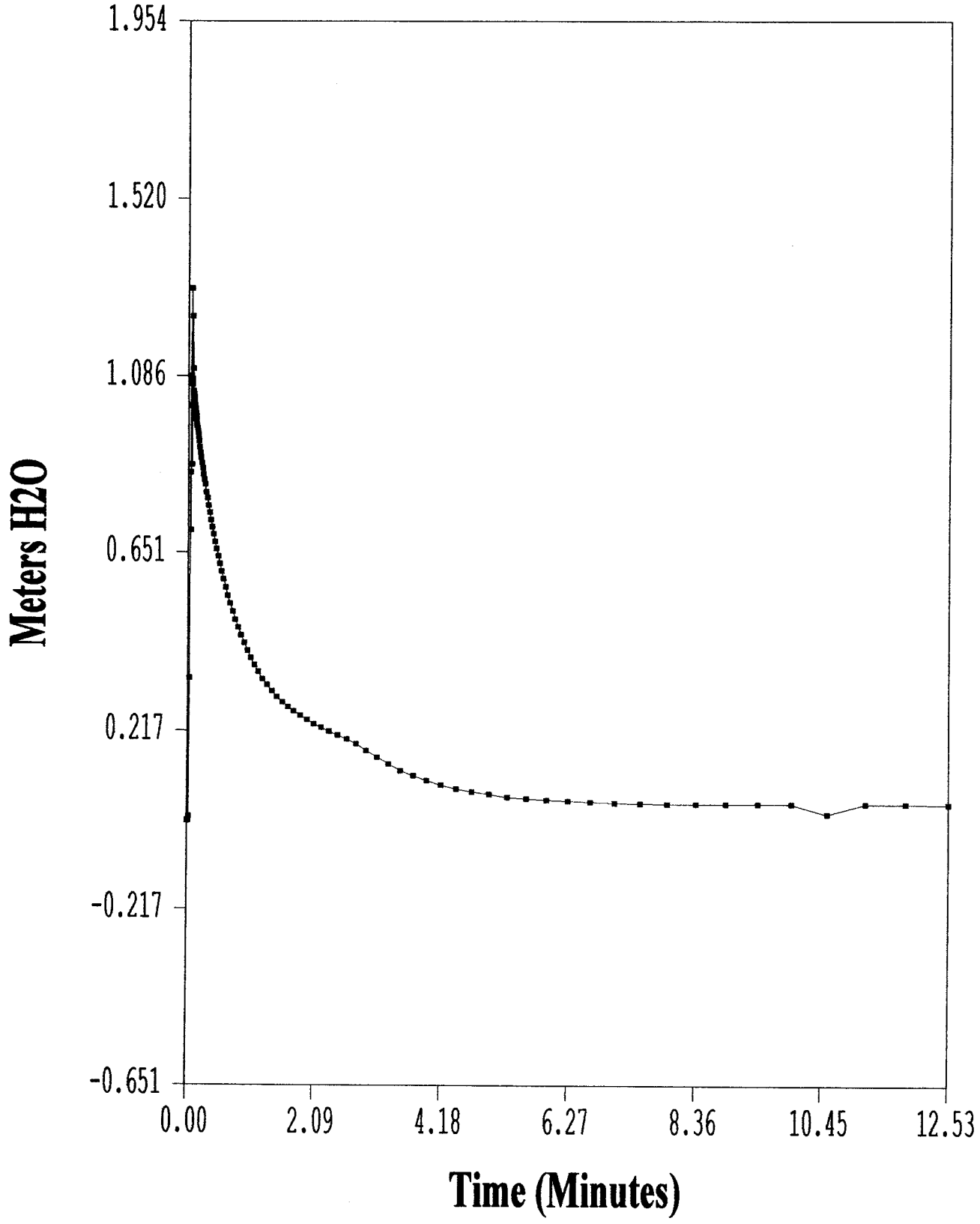
Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 3.718 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/06/01	15:39:01	0.0000	0.000
12/06/01	15:39:01	0.0050	0.002
12/06/01	15:39:02	0.0100	0.002
12/06/01	15:39:02	0.0150	0.001
12/06/01	15:39:02	0.0200	0.002
12/06/01	15:39:03	0.0250	0.010
12/06/01	15:39:03	0.0300	0.346
12/06/01	15:39:03	0.0350	0.850
12/06/01	15:39:04	0.0400	0.707
12/06/01	15:39:04	0.0450	1.014
12/06/01	15:39:04	0.0500	1.086
12/06/01	15:39:04	0.0550	1.303
12/06/01	15:39:05	0.0600	0.870
12/06/01	15:39:05	0.0650	1.079
12/06/01	15:39:05	0.0700	1.067
12/06/01	15:39:06	0.0750	1.234
12/06/01	15:39:06	0.0800	1.105
12/06/01	15:39:06	0.0848	1.050
12/06/01	15:39:07	0.0900	1.042
12/06/01	15:39:07	0.0950	1.036
12/06/01	15:39:07	0.1000	1.025
12/06/01	15:39:08	0.1058	1.015
12/06/01	15:39:08	0.1120	1.009
12/06/01	15:39:08	0.1185	0.996
12/06/01	15:39:09	0.1255	0.989
12/06/01	15:39:09	0.1328	0.979
12/06/01	15:39:10	0.1407	0.966
12/06/01	15:39:10	0.1490	0.958
12/06/01	15:39:11	0.1578	0.947

12/06/01	15:39:11	0.1670	0.936
12/06/01	15:39:12	0.1770	0.927
12/06/01	15:39:12	0.1875	0.911
12/06/01	15:39:13	0.1985	0.898
12/06/01	15:39:14	0.2102	0.886
12/06/01	15:39:15	0.2227	0.873
12/06/01	15:39:15	0.2358	0.860
12/06/01	15:39:16	0.2498	0.845
12/06/01	15:39:17	0.2647	0.831
12/06/01	15:39:18	0.2803	0.820
12/06/01	15:39:19	0.2970	0.800
12/06/01	15:39:20	0.3147	0.786
12/06/01	15:39:21	0.3333	0.768
12/06/01	15:39:22	0.3532	0.750
12/06/01	15:39:24	0.3742	0.732
12/06/01	15:39:25	0.3963	0.714
12/06/01	15:39:26	0.4198	0.696
12/06/01	15:39:28	0.4447	0.678
12/06/01	15:39:29	0.4697	0.660
12/06/01	15:39:31	0.4963	0.642
12/06/01	15:39:33	0.5247	0.624
12/06/01	15:39:34	0.5547	0.606
12/06/01	15:39:36	0.5863	0.586
12/06/01	15:39:38	0.6213	0.566
12/06/01	15:39:41	0.6578	0.547
12/06/01	15:39:43	0.6963	0.528
12/06/01	15:39:45	0.7380	0.508
12/06/01	15:39:48	0.7813	0.488
12/06/01	15:39:51	0.8280	0.469
12/06/01	15:39:54	0.8763	0.450
12/06/01	15:39:57	0.9280	0.433
12/06/01	15:40:00	0.9830	0.414
12/06/01	15:40:04	1.0413	0.396
12/06/01	15:40:07	1.1030	0.379
12/06/01	15:40:11	1.1680	0.362
12/06/01	15:40:15	1.2380	0.345
12/06/01	15:40:20	1.3113	0.330
12/06/01	15:40:25	1.3897	0.315
12/06/01	15:40:30	1.4730	0.302
12/06/01	15:40:35	1.5613	0.289
12/06/01	15:40:40	1.6547	0.277
12/06/01	15:40:46	1.7530	0.266
12/06/01	15:40:53	1.8580	0.255
12/06/01	15:40:59	1.9680	0.245
12/06/01	15:41:06	2.0847	0.235
12/06/01	15:41:14	2.2097	0.226
12/06/01	15:41:22	2.3412	0.217
12/06/01	15:41:30	2.4813	0.208
12/06/01	15:41:39	2.6297	0.198
12/06/01	15:41:48	2.7863	0.187
12/06/01	15:41:58	2.9530	0.170
12/06/01	15:42:09	3.1297	0.154
12/06/01	15:42:20	3.3163	0.138
12/06/01	15:42:32	3.5147	0.122
12/06/01	15:42:45	3.7247	0.109
12/06/01	15:42:58	3.9463	0.098
12/06/01	15:43:12	4.1813	0.087
12/06/01	15:43:27	4.4295	0.078
12/06/01	15:43:43	4.6930	0.071
12/06/01	15:44:00	4.9730	0.065
12/06/01	15:44:17	5.2697	0.059
12/06/01	15:44:36	5.5830	0.055
12/06/01	15:44:56	5.9147	0.051
12/06/01	15:45:17	6.2663	0.049
12/06/01	15:45:40	6.6397	0.047
12/06/01	15:46:03	7.0347	0.045
12/06/01	15:46:28	7.4530	0.044

12/06/01	15:46:55	7.8963	0.042
12/06/01	15:47:23	8.3663	0.042
12/06/01	15:47:53	8.8647	0.042
12/06/01	15:48:25	9.3913	0.042
12/06/01	15:48:58	9.9497	0.042
12/06/01	15:49:34	10.5413	0.017
12/06/01	15:50:11	11.1680	0.042
12/06/01	15:50:51	11.8313	0.042
12/06/01	15:51:33	12.5347	0.041

PES-MW3R



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/06/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-MW4
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well

Boring Diameter:		Depth to Top of Screen:	30'	Total Well Depth (Installed):	40'
Screen Diameter:	3"	Depth to Bottom of Screen:	40'	Total Well Depth (Measured):	40'
TOC Elevation:	832.57	Static Water Level	801.37	Product Present (Y/N)	N
				Static Product Level:	

Test Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	13:00:30 F / 13:38:22 R	End Static Water Level:	801.37
End Time:	13:32:37 F /13:57:46 R	Max/Min Water Level:	804.872/798.255
Data File Name:	PES-MW4.bin	Test Time - Max/Min:	
		Transducer Depth:	790.867 F/ 790.821 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
10:55	40	Sunny	Low	1 mph		Muddy

Manual Testing

Time (Sec)	Depth to Water (ft)	Depth to Type	Time (Sec)	Depth to Water (ft)	Depth to Type	Time (Sec)	Depth to Water (ft)	Depth to Drawdown
0	801.37	Falling	0	801.37	Rising			
1906	801.37	Falling	250	801.37	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:48:41
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-06 130
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-MW4F

Test defined on: 12/06/01 12:54:30
Test started on: 12/06/01 13:00:31
Test stopped on: 12/06/01 13:32:37
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 125

TOTAL DATA SAMPLES 125

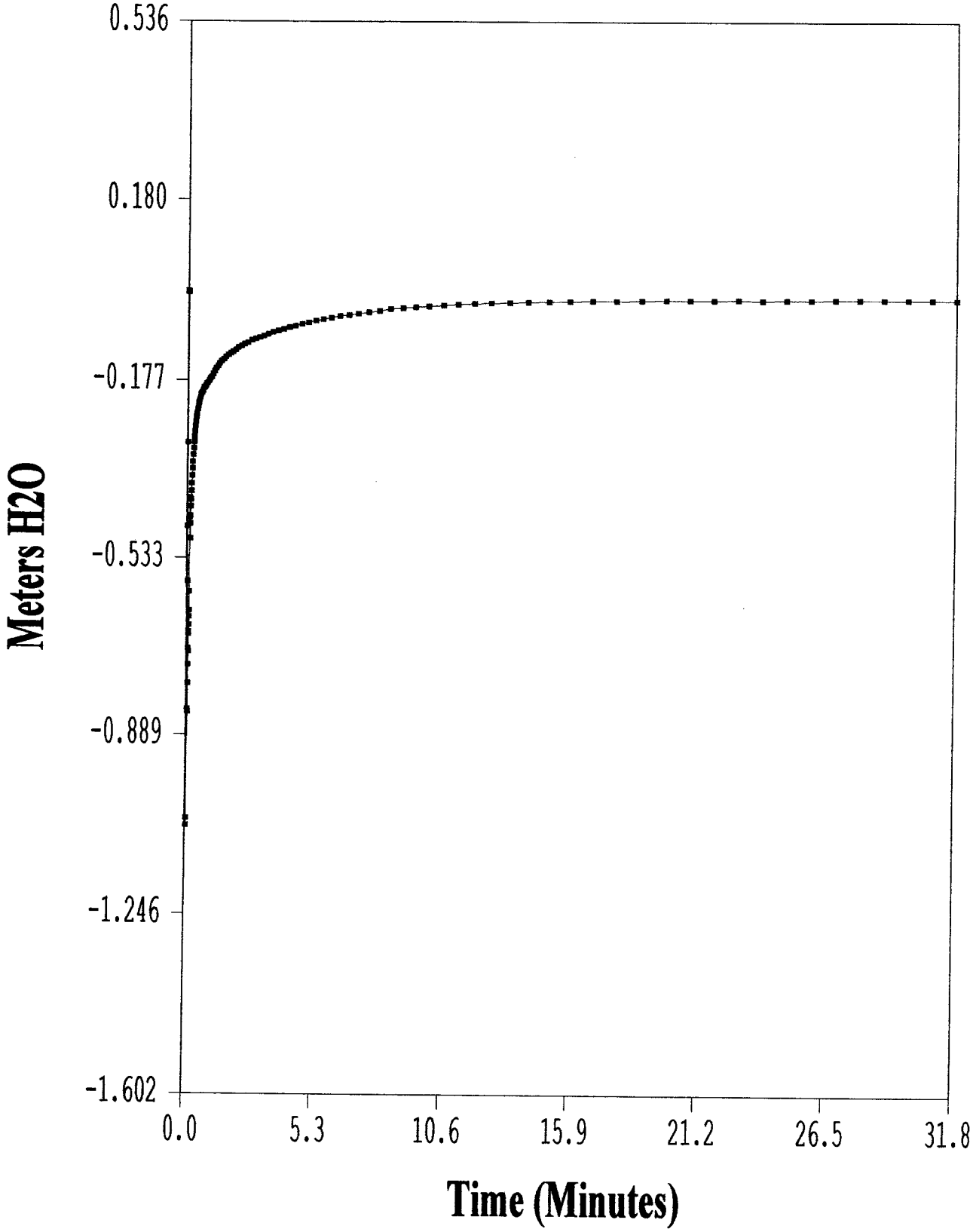
Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 3.204 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/06/01	13:00:31	0.0000	0.000
12/06/01	13:00:31	0.0050	0.001
12/06/01	13:00:31	0.0100	0.001
12/06/01	13:00:32	0.0150	0.002
12/06/01	13:00:32	0.0200	0.001
12/06/01	13:00:32	0.0250	0.000
12/06/01	13:00:32	0.0300	-0.301
12/06/01	13:00:33	0.0350	-0.469
12/06/01	13:00:33	0.0400	-0.581
12/06/01	13:00:33	0.0450	-0.837
12/06/01	13:00:34	0.0500	-1.053
12/06/01	13:00:34	0.0550	-1.067
12/06/01	13:00:34	0.0600	-0.716
12/06/01	13:00:35	0.0650	-0.844
12/06/01	13:00:35	0.0700	-0.787
12/06/01	13:00:35	0.0750	-0.750
12/06/01	13:00:35	0.0800	-0.722
12/06/01	13:00:36	0.0848	-0.688
12/06/01	13:00:36	0.0900	-0.683
12/06/01	13:00:36	0.0950	-0.683
12/06/01	13:00:37	0.1000	-0.670
12/06/01	13:00:37	0.1058	-0.652
12/06/01	13:00:37	0.1120	-0.640
12/06/01	13:00:38	0.1185	-0.601
12/06/01	13:00:38	0.1255	-0.451
12/06/01	13:00:39	0.1328	-0.412
12/06/01	13:00:39	0.1407	-0.494
12/06/01	13:00:40	0.1490	-0.463
12/06/01	13:00:40	0.1578	-0.447

12/06/01	13:00:41	0.1670	-0.429
12/06/01	13:00:41	0.1770	-0.415
12/06/01	13:00:42	0.1875	-0.399
12/06/01	13:00:43	0.1985	-0.383
12/06/01	13:00:43	0.2102	-0.368
12/06/01	13:00:44	0.2227	-0.353
12/06/01	13:00:45	0.2358	-0.339
12/06/01	13:00:46	0.2498	-0.326
12/06/01	13:00:47	0.2647	-0.313
12/06/01	13:00:47	0.2803	-0.301
12/06/01	13:00:48	0.2970	-0.289
12/06/01	13:00:50	0.3147	-0.279
12/06/01	13:00:51	0.3333	-0.268
12/06/01	13:00:52	0.3532	-0.258
12/06/01	13:00:53	0.3742	-0.249
12/06/01	13:00:54	0.3963	-0.242
12/06/01	13:00:56	0.4198	-0.234
12/06/01	13:00:57	0.4447	-0.227
12/06/01	13:00:59	0.4697	-0.220
12/06/01	13:01:00	0.4963	-0.215
12/06/01	13:01:02	0.5247	-0.210
12/06/01	13:01:04	0.5547	-0.205
12/06/01	13:01:06	0.5863	-0.201
12/06/01	13:01:08	0.6213	-0.197
12/06/01	13:01:10	0.6578	-0.190
12/06/01	13:01:12	0.6963	-0.190
12/06/01	13:01:15	0.7380	-0.186
12/06/01	13:01:18	0.7813	-0.183
12/06/01	13:01:20	0.8280	-0.180
12/06/01	13:01:23	0.8763	-0.177
12/06/01	13:01:26	0.9280	-0.172
12/06/01	13:01:30	0.9830	-0.169
12/06/01	13:01:33	1.0413	-0.163
12/06/01	13:01:37	1.1030	-0.158
12/06/01	13:01:41	1.1680	-0.152
12/06/01	13:01:45	1.2380	-0.147
12/06/01	13:01:49	1.3113	-0.142
12/06/01	13:01:54	1.3897	-0.137
12/06/01	13:01:59	1.4730	-0.133
12/06/01	13:02:04	1.5613	-0.129
12/06/01	13:02:10	1.6547	-0.125
12/06/01	13:02:16	1.7530	-0.121
12/06/01	13:02:22	1.8580	-0.118
12/06/01	13:02:29	1.9680	-0.114
12/06/01	13:02:36	2.0847	-0.110
12/06/01	13:02:43	2.2097	-0.107
12/06/01	13:02:51	2.3412	-0.103
12/06/01	13:03:00	2.4813	-0.100
12/06/01	13:03:08	2.6297	-0.096
12/06/01	13:03:18	2.7863	-0.092
12/06/01	13:03:28	2.9530	-0.089
12/06/01	13:03:38	3.1297	-0.087
12/06/01	13:03:50	3.3163	-0.083
12/06/01	13:04:02	3.5147	-0.079
12/06/01	13:04:14	3.7247	-0.076
12/06/01	13:04:27	3.9463	-0.073
12/06/01	13:04:42	4.1813	-0.070
12/06/01	13:04:56	4.4295	-0.067
12/06/01	13:05:12	4.6930	-0.063
12/06/01	13:05:29	4.9730	-0.060
12/06/01	13:05:47	5.2697	-0.056
12/06/01	13:06:06	5.5830	-0.053
12/06/01	13:06:26	5.9147	-0.050
12/06/01	13:06:47	6.2663	-0.047
12/06/01	13:07:09	6.6397	-0.044
12/06/01	13:07:33	7.0347	-0.041
12/06/01	13:07:58	7.4530	-0.039

12/06/01	13:08:24	7.8963	-0.036
12/06/01	13:08:53	8.3663	-0.032
12/06/01	13:09:23	8.8647	-0.031
12/06/01	13:09:54	9.3913	-0.028
12/06/01	13:10:28	9.9497	-0.026
12/06/01	13:11:03	10.5413	-0.024
12/06/01	13:11:41	11.1680	-0.023
12/06/01	13:12:21	11.8313	-0.020
12/06/01	13:13:03	12.5347	-0.020
12/06/01	13:13:47	13.2797	-0.018
12/06/01	13:14:35	14.0697	-0.018
12/06/01	13:15:25	14.9063	-0.017
12/06/01	13:16:18	15.7913	-0.016
12/06/01	13:17:14	16.7297	-0.015
12/06/01	13:18:14	17.7230	-0.015
12/06/01	13:19:17	18.7763	-0.014
12/06/01	13:20:17	19.7763	-0.013
12/06/01	13:21:17	20.7763	-0.013
12/06/01	13:22:17	21.7763	-0.013
12/06/01	13:23:17	22.7763	-0.012
12/06/01	13:24:17	23.7763	-0.013
12/06/01	13:25:17	24.7763	-0.012
12/06/01	13:26:17	25.7763	-0.012
12/06/01	13:27:17	26.7763	-0.011
12/06/01	13:28:17	27.7763	-0.011
12/06/01	13:29:17	28.7763	-0.011
12/06/01	13:30:17	29.7763	-0.011
12/06/01	13:31:17	30.7763	-0.011
12/06/01	13:32:17	31.7763	-0.011

PES-MW4F



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:50:04
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-06 133
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-MW4R

Test defined on: 12/06/01 13:37:14
Test started on: 12/06/01 13:38:22
Test stopped on: 12/06/01 13:57:46
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 112

TOTAL DATA SAMPLES 112

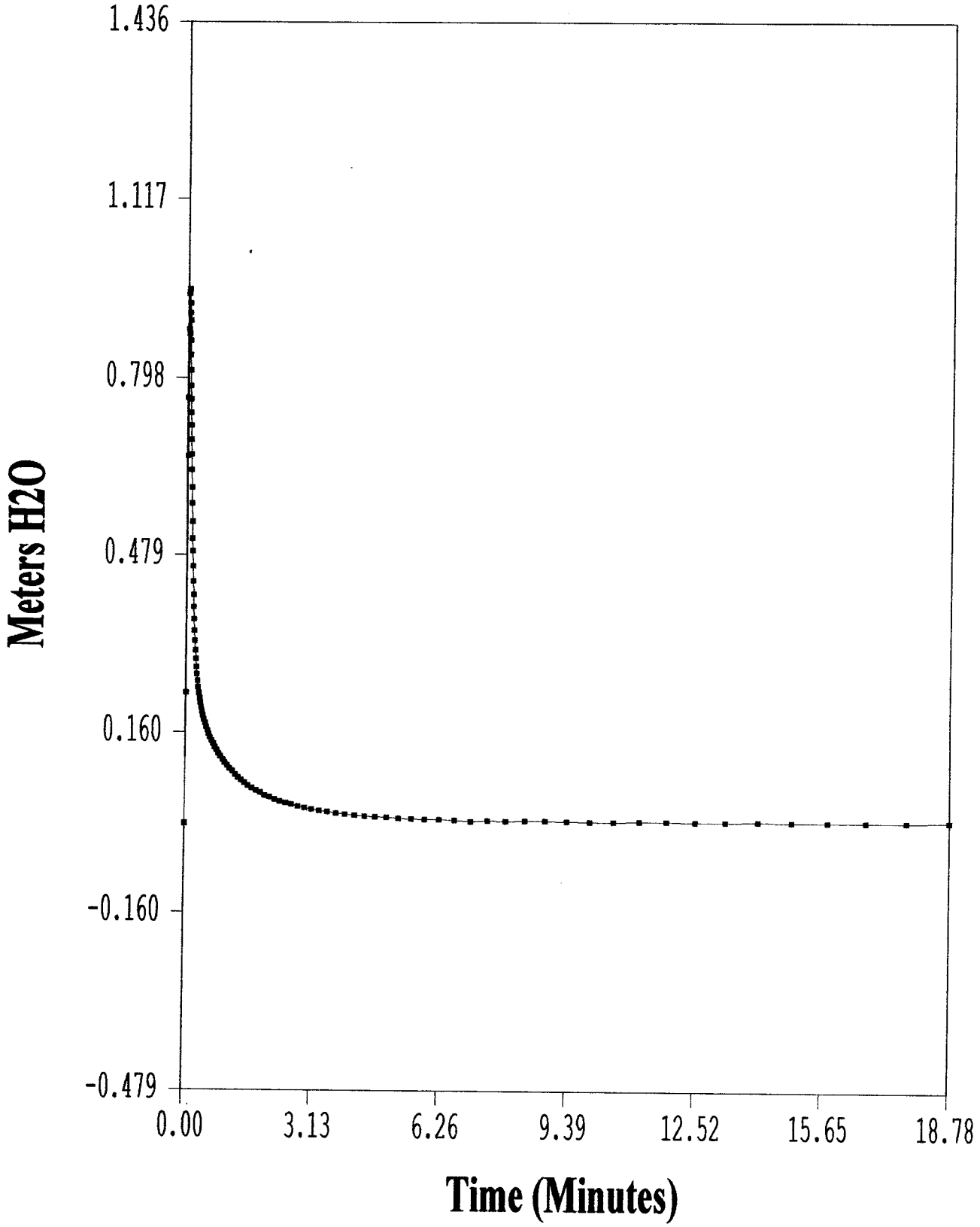
Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 3.215 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/06/01	13:38:22	0.0000	0.000
12/06/01	13:38:22	0.0050	0.001
12/06/01	13:38:22	0.0100	0.001
12/06/01	13:38:23	0.0150	0.231
12/06/01	13:38:23	0.0200	0.762
12/06/01	13:38:23	0.0250	0.657
12/06/01	13:38:24	0.0300	0.949
12/06/01	13:38:24	0.0350	0.886
12/06/01	13:38:24	0.0400	0.879
12/06/01	13:38:24	0.0450	0.957
12/06/01	13:38:25	0.0500	0.915
12/06/01	13:38:25	0.0550	0.932
12/06/01	13:38:25	0.0600	0.901
12/06/01	13:38:26	0.0650	0.866
12/06/01	13:38:26	0.0700	0.841
12/06/01	13:38:26	0.0750	0.813
12/06/01	13:38:27	0.0800	0.784
12/06/01	13:38:27	0.0848	0.760
12/06/01	13:38:27	0.0900	0.735
12/06/01	13:38:27	0.0950	0.711
12/06/01	13:38:28	0.1000	0.686
12/06/01	13:38:28	0.1058	0.659
12/06/01	13:38:29	0.1120	0.631
12/06/01	13:38:29	0.1185	0.599
12/06/01	13:38:29	0.1255	0.571
12/06/01	13:38:30	0.1328	0.538
12/06/01	13:38:30	0.1407	0.508
12/06/01	13:38:31	0.1490	0.486
12/06/01	13:38:31	0.1578	0.459

12/06/01	13:38:32	0.1670	0.431
12/06/01	13:38:32	0.1770	0.407
12/06/01	13:38:33	0.1875	0.384
12/06/01	13:38:34	0.1985	0.363
12/06/01	13:38:34	0.2102	0.342
12/06/01	13:38:35	0.2227	0.324
12/06/01	13:38:36	0.2358	0.307
12/06/01	13:38:37	0.2498	0.291
12/06/01	13:38:38	0.2647	0.276
12/06/01	13:38:39	0.2803	0.263
12/06/01	13:38:40	0.2970	0.252
12/06/01	13:38:41	0.3147	0.240
12/06/01	13:38:42	0.3333	0.230
12/06/01	13:38:43	0.3532	0.221
12/06/01	13:38:44	0.3742	0.213
12/06/01	13:38:46	0.3963	0.205
12/06/01	13:38:47	0.4198	0.197
12/06/01	13:38:48	0.4447	0.189
12/06/01	13:38:50	0.4697	0.183
12/06/01	13:38:52	0.4963	0.177
12/06/01	13:38:53	0.5247	0.170
12/06/01	13:38:55	0.5547	0.164
12/06/01	13:38:57	0.5863	0.158
12/06/01	13:38:59	0.6213	0.152
12/06/01	13:39:01	0.6578	0.146
12/06/01	13:39:04	0.6963	0.140
12/06/01	13:39:06	0.7380	0.135
12/06/01	13:39:09	0.7813	0.130
12/06/01	13:39:11	0.8280	0.124
12/06/01	13:39:14	0.8763	0.119
12/06/01	13:39:17	0.9280	0.112
12/06/01	13:39:21	0.9830	0.107
12/06/01	13:39:24	1.0413	0.103
12/06/01	13:39:28	1.1030	0.097
12/06/01	13:39:32	1.1680	0.093
12/06/01	13:39:36	1.2380	0.086
12/06/01	13:39:40	1.3113	0.082
12/06/01	13:39:45	1.3897	0.077
12/06/01	13:39:50	1.4730	0.073
12/06/01	13:39:55	1.5613	0.068
12/06/01	13:40:01	1.6547	0.063
12/06/01	13:40:07	1.7530	0.059
12/06/01	13:40:13	1.8580	0.055
12/06/01	13:40:20	1.9680	0.051
12/06/01	13:40:27	2.0847	0.048
12/06/01	13:40:34	2.2097	0.044
12/06/01	13:40:42	2.3412	0.041
12/06/01	13:40:51	2.4813	0.038
12/06/01	13:41:00	2.6297	0.035
12/06/01	13:41:09	2.7863	0.032
12/06/01	13:41:19	2.9530	0.029
12/06/01	13:41:30	3.1297	0.026
12/06/01	13:41:41	3.3163	0.024
12/06/01	13:41:53	3.5147	0.022
12/06/01	13:42:05	3.7247	0.019
12/06/01	13:42:19	3.9463	0.018
12/06/01	13:42:33	4.1813	0.016
12/06/01	13:42:48	4.4295	0.015
12/06/01	13:43:03	4.6930	0.014
12/06/01	13:43:20	4.9730	0.013
12/06/01	13:43:38	5.2697	0.011
12/06/01	13:43:57	5.5830	0.010
12/06/01	13:44:17	5.9147	0.010
12/06/01	13:44:38	6.2663	0.010
12/06/01	13:45:00	6.6397	0.008
12/06/01	13:45:24	7.0347	0.006
12/06/01	13:45:49	7.4530	0.008

12/06/01	13:46:16	7.8963	0.007
12/06/01	13:46:44	8.3663	0.008
12/06/01	13:47:14	8.8647	0.008
12/06/01	13:47:45	9.3913	0.007
12/06/01	13:48:19	9.9497	0.006
12/06/01	13:48:54	10.5413	0.006
12/06/01	13:49:32	11.1680	0.007
12/06/01	13:50:12	11.8313	0.007
12/06/01	13:50:54	12.5347	0.006
12/06/01	13:51:39	13.2797	0.006
12/06/01	13:52:26	14.0697	0.007
12/06/01	13:53:16	14.9063	0.006
12/06/01	13:54:09	15.7913	0.006
12/06/01	13:55:06	16.7297	0.006
12/06/01	13:56:05	17.7230	0.006
12/06/01	13:57:08	18.7763	0.007

PES-MW4R



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/06/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-MW5
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	30'	Total Well Depth (Installed):	40'
Screen Diameter:	3"	Depth to Bottom of Screen:	40'	Total Well Depth (Measured):	40'
TOC Elevation:	832.60	Static Water Level	801.37	Product Present (Y/N)	N
				Static Product Level:	

Test Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	12:08:04 F / 12:22:38 R	End Static Water Level:	801.37
End Time:	12:12:28 F / 12:27:27 R	Max/Min Water Level:	802.871/799.902
Data File Name:	PES-MW5.bin	Test Time - Max/Min:	
		Transducer Depth:	790.897 F / 790.854 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
10:55	40	Sunny	Low	1 mph		Muddy

Manual Testing

Time (Sec)	Depth to Water (ft)	Depth to Type
0	801.37	Falling
251	801.37	Falling

Time (Sec)	Depth to Water (ft)	Depth to Type
0	801.37	Rising
289	801.37	Rising

Time (Sec)	Depth to Water (ft)	Depth to Drawdown

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:46:50
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-06 120
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-MW5F

Test defined on: 12/06/01 12:06:25
Test started on: 12/06/01 12:08:04
Test stopped on: 12/06/01 12:12:28
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 86

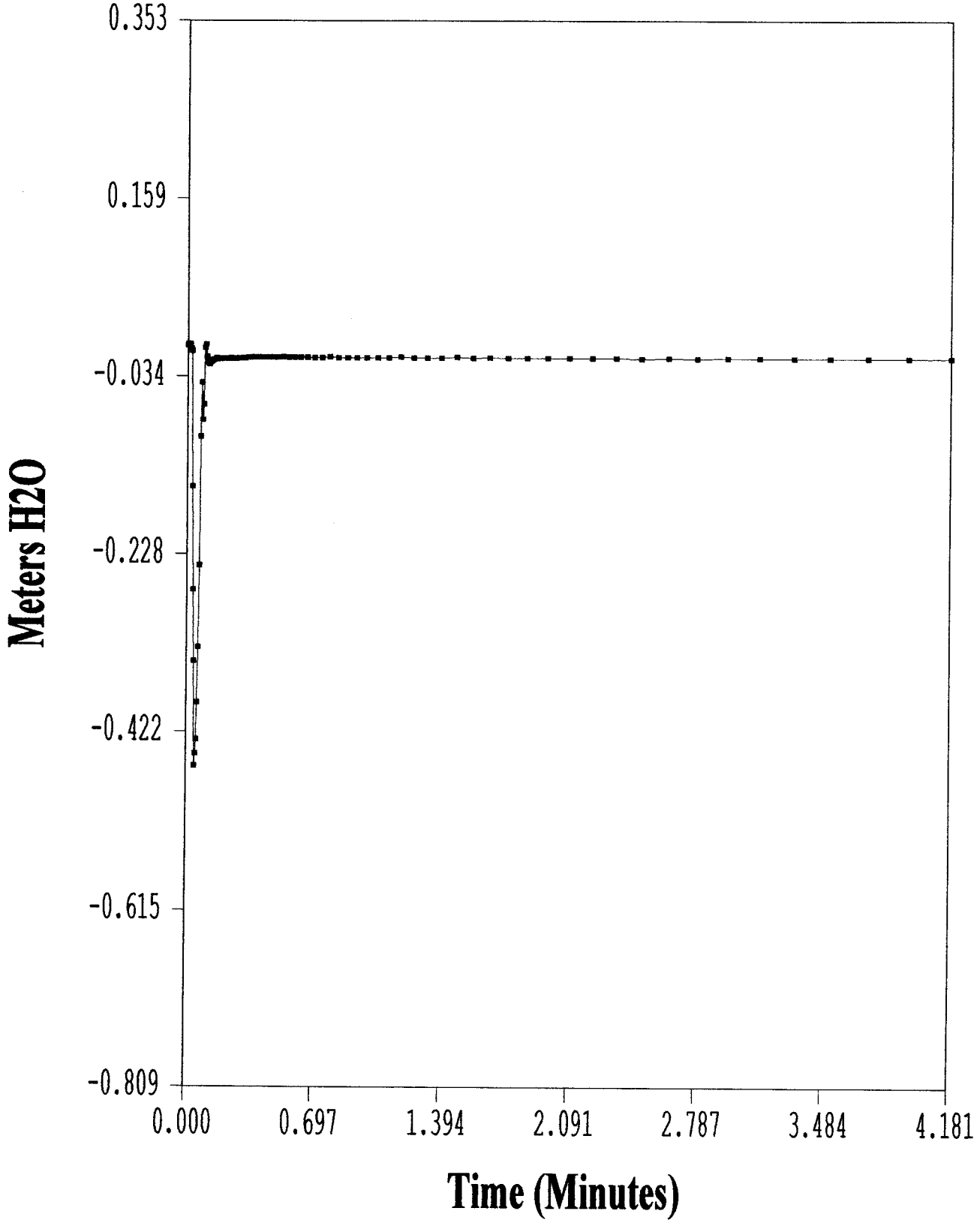
TOTAL DATA SAMPLES 86

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 3.192 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/06/01	12:08:04	0.0000	0.000
12/06/01	12:08:04	0.0050	0.002
12/06/01	12:08:05	0.0100	0.002
12/06/01	12:08:05	0.0150	0.002
12/06/01	12:08:05	0.0200	-0.004
12/06/01	12:08:06	0.0250	-0.006
12/06/01	12:08:06	0.0300	-0.154
12/06/01	12:08:06	0.0350	-0.267
12/06/01	12:08:06	0.0400	-0.344
12/06/01	12:08:07	0.0450	-0.458
12/06/01	12:08:07	0.0500	-0.445
12/06/01	12:08:07	0.0550	-0.429
12/06/01	12:08:08	0.0600	-0.390
12/06/01	12:08:08	0.0650	-0.330
12/06/01	12:08:08	0.0700	-0.240
12/06/01	12:08:09	0.0750	-0.100
12/06/01	12:08:09	0.0800	-0.041
12/06/01	12:08:09	0.0848	-0.082
12/06/01	12:08:09	0.0900	-0.065
12/06/01	12:08:10	0.0950	-0.003
12/06/01	12:08:10	0.1000	0.001
12/06/01	12:08:10	0.1058	-0.012
12/06/01	12:08:11	0.1120	-0.019
12/06/01	12:08:11	0.1185	-0.021
12/06/01	12:08:12	0.1255	-0.019
12/06/01	12:08:12	0.1328	-0.018
12/06/01	12:08:13	0.1407	-0.016
12/06/01	12:08:13	0.1490	-0.016
12/06/01	12:08:14	0.1578	-0.014

12/06/01	12:08:14	0.1670	-0.015
12/06/01	12:08:15	0.1770	-0.015
12/06/01	12:08:15	0.1875	-0.014
12/06/01	12:08:16	0.1985	-0.014
12/06/01	12:08:17	0.2102	-0.014
12/06/01	12:08:17	0.2227	-0.014
12/06/01	12:08:18	0.2358	-0.014
12/06/01	12:08:19	0.2498	-0.014
12/06/01	12:08:20	0.2647	-0.014
12/06/01	12:08:21	0.2803	-0.014
12/06/01	12:08:22	0.2970	-0.014
12/06/01	12:08:23	0.3147	-0.014
12/06/01	12:08:24	0.3333	-0.013
12/06/01	12:08:25	0.3532	-0.013
12/06/01	12:08:27	0.3742	-0.013
12/06/01	12:08:28	0.3963	-0.013
12/06/01	12:08:29	0.4198	-0.013
12/06/01	12:08:31	0.4447	-0.013
12/06/01	12:08:32	0.4697	-0.013
12/06/01	12:08:34	0.4963	-0.013
12/06/01	12:08:36	0.5247	-0.013
12/06/01	12:08:37	0.5547	-0.013
12/06/01	12:08:39	0.5863	-0.013
12/06/01	12:08:41	0.6213	-0.013
12/06/01	12:08:44	0.6578	-0.013
12/06/01	12:08:46	0.6963	-0.013
12/06/01	12:08:48	0.7380	-0.013
12/06/01	12:08:51	0.7813	-0.013
12/06/01	12:08:54	0.8280	-0.013
12/06/01	12:08:57	0.8763	-0.013
12/06/01	12:09:00	0.9280	-0.013
12/06/01	12:09:03	0.9830	-0.013
12/06/01	12:09:07	1.0413	-0.013
12/06/01	12:09:10	1.1030	-0.013
12/06/01	12:09:14	1.1680	-0.013
12/06/01	12:09:18	1.2380	-0.013
12/06/01	12:09:23	1.3113	-0.013
12/06/01	12:09:27	1.3897	-0.013
12/06/01	12:09:32	1.4730	-0.013
12/06/01	12:09:38	1.5613	-0.013
12/06/01	12:09:43	1.6547	-0.013
12/06/01	12:09:49	1.7530	-0.013
12/06/01	12:09:56	1.8580	-0.013
12/06/01	12:10:02	1.9680	-0.013
12/06/01	12:10:09	2.0847	-0.013
12/06/01	12:10:17	2.2097	-0.013
12/06/01	12:10:25	2.3412	-0.013
12/06/01	12:10:33	2.4813	-0.014
12/06/01	12:10:42	2.6297	-0.013
12/06/01	12:10:51	2.7863	-0.014
12/06/01	12:11:01	2.9530	-0.013
12/06/01	12:11:12	3.1297	-0.013
12/06/01	12:11:23	3.3163	-0.014
12/06/01	12:11:35	3.5147	-0.014
12/06/01	12:11:48	3.7247	-0.014
12/06/01	12:12:01	3.9463	-0.014
12/06/01	12:12:15	4.1813	-0.014

PES-MW5F



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:47:43
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-06 122:
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-MW5R

Test defined on: 12/06/01 12:20:35
Test started on: 12/06/01 12:22:38
Test stopped on: 12/06/01 12:27:27
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 88

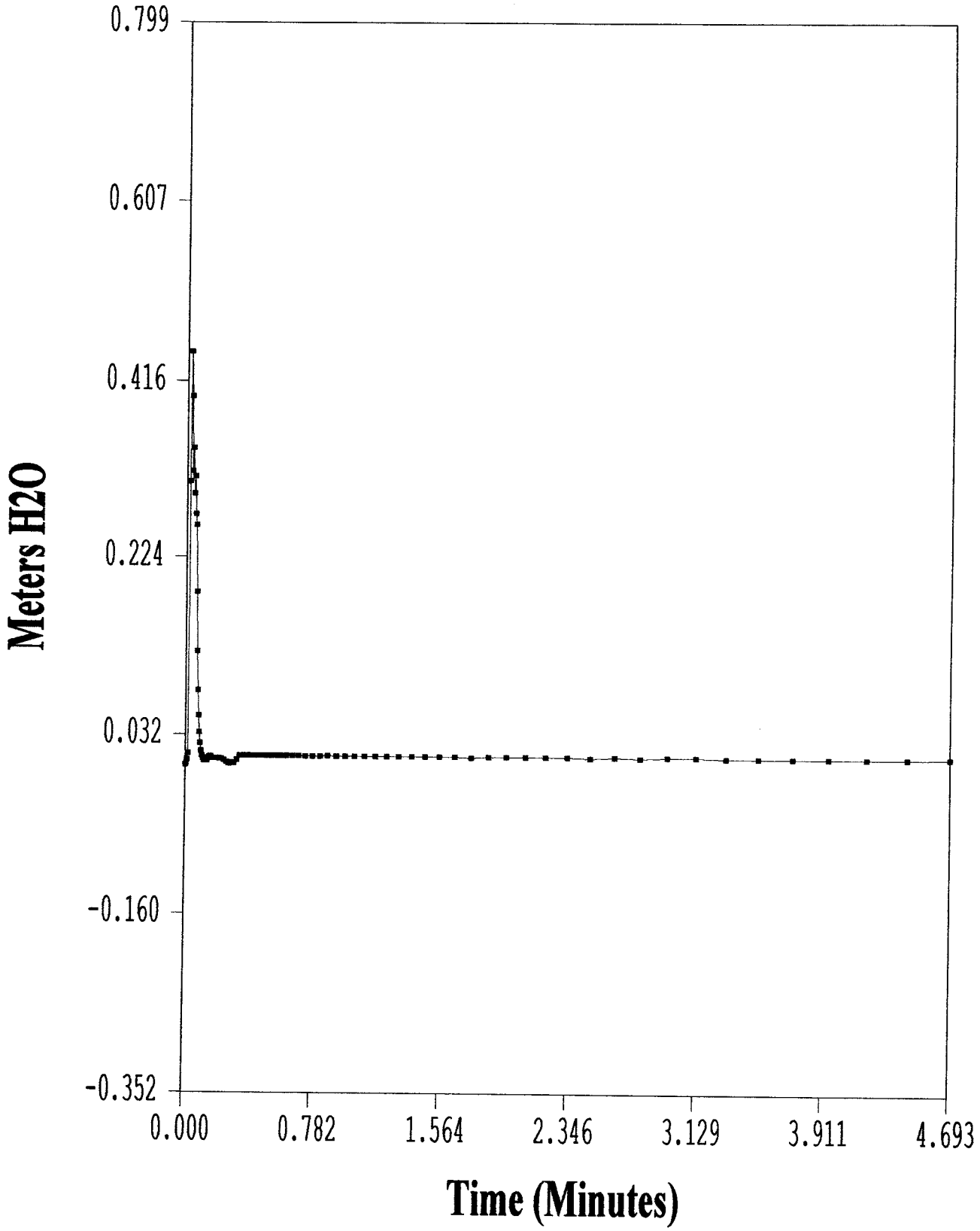
TOTAL DATA SAMPLES 88

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 3.205 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/06/01	12:22:38	0.0000	0.000
12/06/01	12:22:39	0.0050	0.001
12/06/01	12:22:39	0.0100	0.006
12/06/01	12:22:39	0.0150	0.012
12/06/01	12:22:40	0.0200	0.306
12/06/01	12:22:40	0.0250	0.448
12/06/01	12:22:40	0.0300	0.399
12/06/01	12:22:40	0.0350	0.318
12/06/01	12:22:41	0.0400	0.343
12/06/01	12:22:41	0.0450	0.292
12/06/01	12:22:41	0.0500	0.312
12/06/01	12:22:42	0.0550	0.271
12/06/01	12:22:42	0.0600	0.258
12/06/01	12:22:42	0.0650	0.186
12/06/01	12:22:43	0.0700	0.123
12/06/01	12:22:43	0.0750	0.081
12/06/01	12:22:43	0.0800	0.053
12/06/01	12:22:43	0.0848	0.035
12/06/01	12:22:44	0.0900	0.023
12/06/01	12:22:44	0.0950	0.015
12/06/01	12:22:44	0.1000	0.010
12/06/01	12:22:45	0.1058	0.008
12/06/01	12:22:45	0.1120	0.005
12/06/01	12:22:45	0.1185	0.005
12/06/01	12:22:46	0.1255	0.005
12/06/01	12:22:46	0.1328	0.005
12/06/01	12:22:47	0.1407	0.008
12/06/01	12:22:47	0.1490	0.009
12/06/01	12:22:48	0.1578	0.009

12/06/01	12:22:48	0.1670	0.007
12/06/01	12:22:49	0.1770	0.007
12/06/01	12:22:50	0.1875	0.007
12/06/01	12:22:50	0.1985	0.007
12/06/01	12:22:51	0.2102	0.007
12/06/01	12:22:52	0.2227	0.007
12/06/01	12:22:53	0.2358	0.005
12/06/01	12:22:53	0.2498	0.003
12/06/01	12:22:54	0.2647	0.002
12/06/01	12:22:55	0.2803	0.003
12/06/01	12:22:56	0.2970	0.002
12/06/01	12:22:57	0.3147	0.006
12/06/01	12:22:58	0.3333	0.011
12/06/01	12:23:00	0.3532	0.011
12/06/01	12:23:01	0.3742	0.011
12/06/01	12:23:02	0.3963	0.011
12/06/01	12:23:04	0.4198	0.011
12/06/01	12:23:05	0.4447	0.011
12/06/01	12:23:07	0.4697	0.011
12/06/01	12:23:08	0.4963	0.011
12/06/01	12:23:10	0.5247	0.011
12/06/01	12:23:12	0.5547	0.011
12/06/01	12:23:14	0.5863	0.011
12/06/01	12:23:16	0.6213	0.011
12/06/01	12:23:18	0.6578	0.011
12/06/01	12:23:20	0.6963	0.011
12/06/01	12:23:23	0.7380	0.010
12/06/01	12:23:25	0.7813	0.010
12/06/01	12:23:28	0.8280	0.010
12/06/01	12:23:31	0.8763	0.011
12/06/01	12:23:34	0.9280	0.010
12/06/01	12:23:37	0.9830	0.010
12/06/01	12:23:41	1.0413	0.010
12/06/01	12:23:45	1.1030	0.010
12/06/01	12:23:48	1.1680	0.010
12/06/01	12:23:53	1.2380	0.010
12/06/01	12:23:57	1.3113	0.010
12/06/01	12:24:02	1.3897	0.010
12/06/01	12:24:07	1.4730	0.010
12/06/01	12:24:12	1.5613	0.010
12/06/01	12:24:18	1.6547	0.010
12/06/01	12:24:24	1.7530	0.009
12/06/01	12:24:30	1.8580	0.010
12/06/01	12:24:36	1.9680	0.010
12/06/01	12:24:43	2.0847	0.010
12/06/01	12:24:51	2.2097	0.010
12/06/01	12:24:59	2.3412	0.010
12/06/01	12:25:07	2.4813	0.009
12/06/01	12:25:16	2.6297	0.010
12/06/01	12:25:26	2.7863	0.009
12/06/01	12:25:36	2.9530	0.010
12/06/01	12:25:46	3.1297	0.010
12/06/01	12:25:57	3.3163	0.009
12/06/01	12:26:09	3.5147	0.009
12/06/01	12:26:22	3.7247	0.009
12/06/01	12:26:35	3.9463	0.009
12/06/01	12:26:49	4.1813	0.009
12/06/01	12:27:04	4.4295	0.009
12/06/01	12:27:20	4.6930	0.010

PES-MW5R



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/07/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-MW8
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	30'	Total Well Depth (Installed):	40'
Screen Diameter:	3"	Depth to Bottom of Screen:	40'	Total Well Depth (Measured):	40'
TOC Elevation:	832.64	Static Water Level	803.94	Product Present (Y/N)	N
				Static Product Level:	

Test Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	8:24:32 F / 8:35:11 R	End Static Water Level:	803.94
End Time:	8:31:02 F / 8:43:00 R	Max/Min Water Level:	807.599/800.677
Data File Name:	PES-MW8.bin	Test Time - Max/Min:	
		Transducer Depth:	790.901F/790.895R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
8:00	30	Partly cloudy	Low	1 mph		Frost

Manual Testing

Time (Sec)	Depth to Water (ft)	Depth to Type	Time (Sec)	Depth to Water (ft)	Depth to Type	Time (Sec)	Depth to Water (ft)	Depth to Drawdown
0	803.94	Falling	0	803.94	Rising			
376	803.94	Falling	447	803.94	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:53:29
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 082.
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-MW8F

Test defined on: 12/07/01 08:20:46
Test started on: 12/07/01 08:24:33
Test stopped on: 12/07/01 08:31:02
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 93

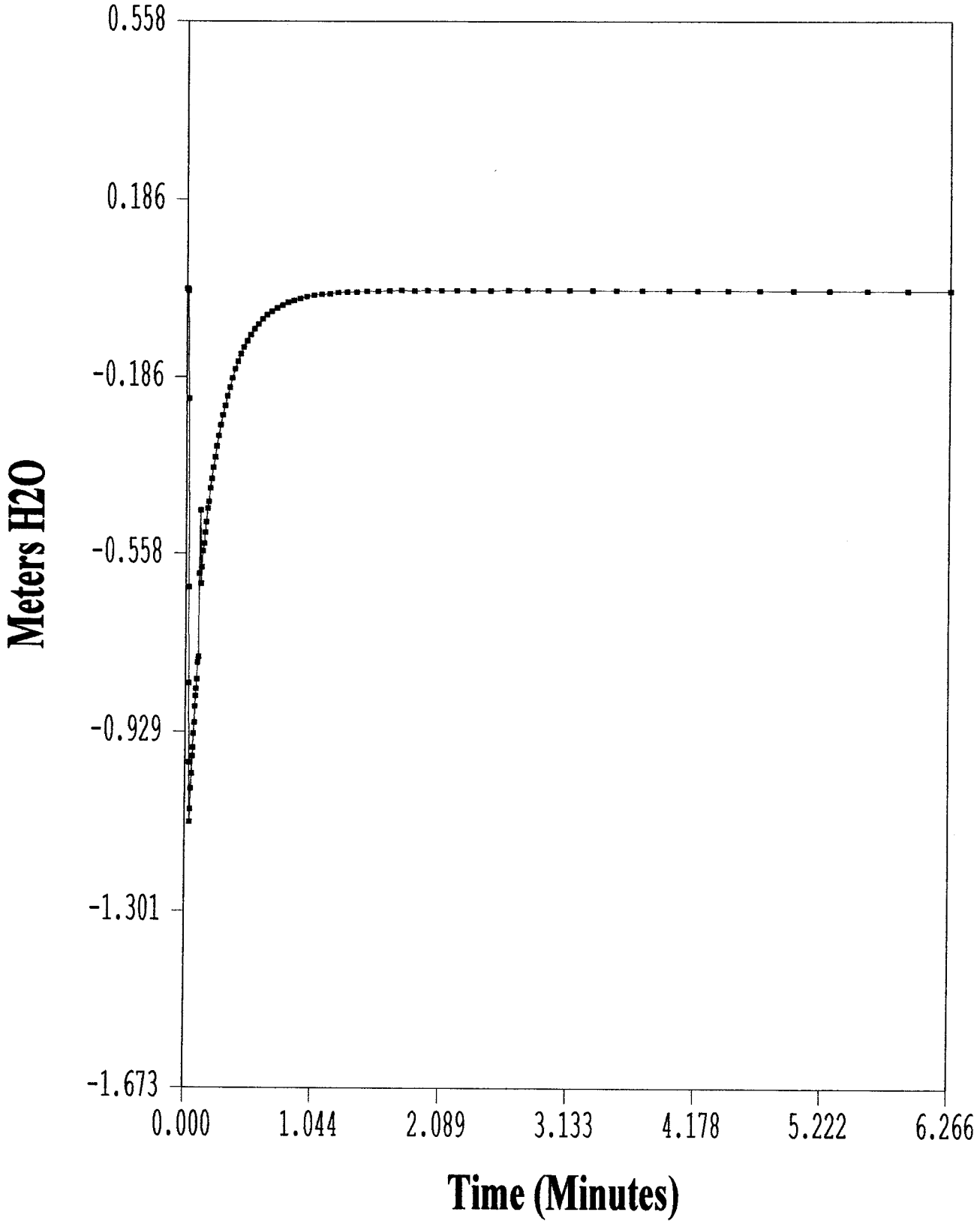
TOTAL DATA SAMPLES 93

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 3.974 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	08:24:33	0.0000	0.000
12/07/01	08:24:33	0.0050	0.000
12/07/01	08:24:33	0.0100	-0.001
12/07/01	08:24:34	0.0150	-0.004
12/07/01	08:24:34	0.0200	-0.230
12/07/01	08:24:34	0.0250	-0.627
12/07/01	08:24:35	0.0300	-0.826
12/07/01	08:24:35	0.0350	-0.992
12/07/01	08:24:35	0.0400	-1.115
12/07/01	08:24:36	0.0450	-1.089
12/07/01	08:24:36	0.0500	-1.046
12/07/01	08:24:36	0.0550	-1.016
12/07/01	08:24:36	0.0600	-0.979
12/07/01	08:24:37	0.0650	-0.961
12/07/01	08:24:37	0.0700	-0.932
12/07/01	08:24:37	0.0750	-0.909
12/07/01	08:24:38	0.0800	-0.875
12/07/01	08:24:38	0.0848	-0.853
12/07/01	08:24:38	0.0900	-0.838
12/07/01	08:24:39	0.0950	-0.818
12/07/01	08:24:39	0.1000	-0.783
12/07/01	08:24:39	0.1058	-0.771
12/07/01	08:24:40	0.1120	-0.599
12/07/01	08:24:40	0.1185	-0.466
12/07/01	08:24:40	0.1255	-0.620
12/07/01	08:24:41	0.1328	-0.587
12/07/01	08:24:41	0.1407	-0.553
12/07/01	08:24:42	0.1490	-0.536
12/07/01	08:24:42	0.1578	-0.513

12/07/01	08:24:43	0.1670	-0.491
12/07/01	08:24:43	0.1770	-0.462
12/07/01	08:24:44	0.1875	-0.448
12/07/01	08:24:45	0.1985	-0.420
12/07/01	08:24:45	0.2102	-0.400
12/07/01	08:24:46	0.2227	-0.377
12/07/01	08:24:47	0.2358	-0.354
12/07/01	08:24:48	0.2498	-0.331
12/07/01	08:24:49	0.2647	-0.309
12/07/01	08:24:50	0.2803	-0.287
12/07/01	08:24:51	0.2970	-0.265
12/07/01	08:24:52	0.3147	-0.245
12/07/01	08:24:53	0.3333	-0.225
12/07/01	08:24:54	0.3532	-0.207
12/07/01	08:24:55	0.3742	-0.187
12/07/01	08:24:57	0.3963	-0.168
12/07/01	08:24:58	0.4198	-0.152
12/07/01	08:25:00	0.4447	-0.136
12/07/01	08:25:01	0.4697	-0.122
12/07/01	08:25:03	0.4963	-0.109
12/07/01	08:25:04	0.5247	-0.096
12/07/01	08:25:06	0.5547	-0.084
12/07/01	08:25:08	0.5863	-0.074
12/07/01	08:25:10	0.6213	-0.063
12/07/01	08:25:12	0.6578	-0.054
12/07/01	08:25:15	0.6963	-0.047
12/07/01	08:25:17	0.7380	-0.040
12/07/01	08:25:20	0.7813	-0.034
12/07/01	08:25:23	0.8280	-0.028
12/07/01	08:25:25	0.8763	-0.024
12/07/01	08:25:29	0.9280	-0.020
12/07/01	08:25:32	0.9830	-0.016
12/07/01	08:25:35	1.0413	-0.013
12/07/01	08:25:39	1.1030	-0.011
12/07/01	08:25:43	1.1680	-0.010
12/07/01	08:25:47	1.2380	-0.007
12/07/01	08:25:52	1.3113	-0.006
12/07/01	08:25:56	1.3897	-0.006
12/07/01	08:26:01	1.4730	-0.004
12/07/01	08:26:07	1.5613	-0.004
12/07/01	08:26:12	1.6547	-0.003
12/07/01	08:26:18	1.7530	-0.002
12/07/01	08:26:24	1.8580	-0.003
12/07/01	08:26:31	1.9680	-0.002
12/07/01	08:26:38	2.0847	-0.002
12/07/01	08:26:45	2.2097	-0.002
12/07/01	08:26:53	2.3412	-0.002
12/07/01	08:27:02	2.4813	-0.002
12/07/01	08:27:11	2.6297	-0.001
12/07/01	08:27:20	2.7863	-0.001
12/07/01	08:27:30	2.9530	-0.001
12/07/01	08:27:41	3.1297	-0.001
12/07/01	08:27:52	3.3163	-0.001
12/07/01	08:28:04	3.5147	-0.001
12/07/01	08:28:16	3.7247	-0.001
12/07/01	08:28:30	3.9463	-0.001
12/07/01	08:28:44	4.1813	-0.001
12/07/01	08:28:59	4.4295	-0.001
12/07/01	08:29:14	4.6930	-0.001
12/07/01	08:29:31	4.9730	-0.001
12/07/01	08:29:49	5.2697	-0.001
12/07/01	08:30:08	5.5830	-0.001
12/07/01	08:30:28	5.9147	-0.001
12/07/01	08:30:49	6.2663	-0.001

PES-MW8F



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:54:26
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 083!
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-MW8R

Test defined on: 12/07/01 08:34:28
Test started on: 12/07/01 08:35:11
Test stopped on: 12/07/01 08:43:00
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 96

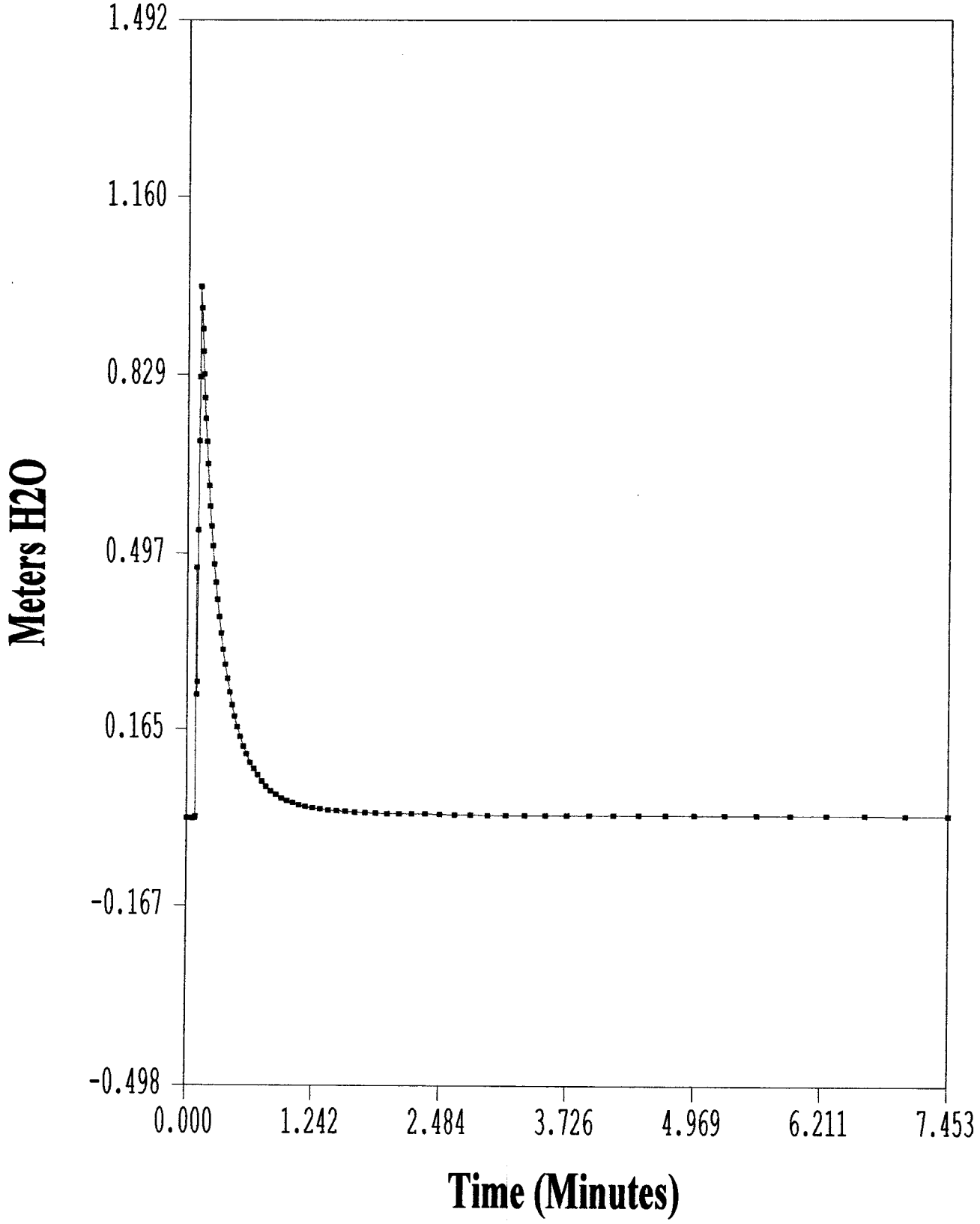
TOTAL DATA SAMPLES 96

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 3.976 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	08:35:11	0.0000	0.000
12/07/01	08:35:12	0.0050	0.000
12/07/01	08:35:12	0.0100	0.000
12/07/01	08:35:12	0.0150	0.000
12/07/01	08:35:13	0.0200	0.000
12/07/01	08:35:13	0.0250	0.000
12/07/01	08:35:13	0.0300	0.000
12/07/01	08:35:14	0.0350	0.000
12/07/01	08:35:14	0.0400	0.000
12/07/01	08:35:14	0.0450	0.000
12/07/01	08:35:14	0.0500	0.000
12/07/01	08:35:15	0.0550	0.000
12/07/01	08:35:15	0.0600	-0.001
12/07/01	08:35:15	0.0650	0.000
12/07/01	08:35:16	0.0700	0.000
12/07/01	08:35:16	0.0750	0.000
12/07/01	08:35:16	0.0800	0.000
12/07/01	08:35:17	0.0848	0.002
12/07/01	08:35:17	0.0900	0.470
12/07/01	08:35:17	0.0950	0.230
12/07/01	08:35:17	0.1000	0.254
12/07/01	08:35:18	0.1058	0.541
12/07/01	08:35:18	0.1120	0.705
12/07/01	08:35:19	0.1185	0.825
12/07/01	08:35:19	0.1255	0.994
12/07/01	08:35:19	0.1328	0.954
12/07/01	08:35:20	0.1407	0.915
12/07/01	08:35:20	0.1490	0.873
12/07/01	08:35:21	0.1578	0.830

12/07/01	08:35:21	0.1670	0.785
12/07/01	08:35:22	0.1770	0.747
12/07/01	08:35:23	0.1875	0.705
12/07/01	08:35:23	0.1985	0.664
12/07/01	08:35:24	0.2102	0.623
12/07/01	08:35:25	0.2227	0.586
12/07/01	08:35:26	0.2358	0.548
12/07/01	08:35:26	0.2498	0.512
12/07/01	08:35:27	0.2647	0.476
12/07/01	08:35:28	0.2803	0.442
12/07/01	08:35:29	0.2970	0.409
12/07/01	08:35:30	0.3147	0.377
12/07/01	08:35:31	0.3333	0.346
12/07/01	08:35:33	0.3532	0.316
12/07/01	08:35:34	0.3742	0.287
12/07/01	08:35:35	0.3963	0.260
12/07/01	08:35:37	0.4198	0.235
12/07/01	08:35:38	0.4447	0.211
12/07/01	08:35:40	0.4697	0.189
12/07/01	08:35:41	0.4963	0.169
12/07/01	08:35:43	0.5247	0.151
12/07/01	08:35:45	0.5547	0.134
12/07/01	08:35:47	0.5863	0.119
12/07/01	08:35:49	0.6213	0.104
12/07/01	08:35:51	0.6578	0.092
12/07/01	08:35:53	0.6963	0.080
12/07/01	08:35:56	0.7380	0.069
12/07/01	08:35:58	0.7813	0.059
12/07/01	08:36:01	0.8280	0.051
12/07/01	08:36:04	0.8763	0.045
12/07/01	08:36:07	0.9280	0.038
12/07/01	08:36:10	0.9830	0.033
12/07/01	08:36:14	1.0413	0.029
12/07/01	08:36:18	1.1030	0.025
12/07/01	08:36:22	1.1680	0.022
12/07/01	08:36:26	1.2380	0.020
12/07/01	08:36:30	1.3113	0.018
12/07/01	08:36:35	1.3897	0.016
12/07/01	08:36:40	1.4730	0.014
12/07/01	08:36:45	1.5613	0.013
12/07/01	08:36:51	1.6547	0.012
12/07/01	08:36:57	1.7530	0.011
12/07/01	08:37:03	1.8580	0.010
12/07/01	08:37:10	1.9680	0.009
12/07/01	08:37:17	2.0847	0.009
12/07/01	08:37:24	2.2097	0.009
12/07/01	08:37:32	2.3412	0.009
12/07/01	08:37:40	2.4813	0.008
12/07/01	08:37:49	2.6297	0.007
12/07/01	08:37:59	2.7863	0.007
12/07/01	08:38:09	2.9530	0.007
12/07/01	08:38:19	3.1297	0.007
12/07/01	08:38:30	3.3163	0.007
12/07/01	08:38:42	3.5147	0.006
12/07/01	08:38:55	3.7247	0.006
12/07/01	08:39:08	3.9463	0.006
12/07/01	08:39:22	4.1813	0.006
12/07/01	08:39:37	4.4295	0.006
12/07/01	08:39:53	4.6930	0.006
12/07/01	08:40:10	4.9730	0.006
12/07/01	08:40:28	5.2697	0.006
12/07/01	08:40:46	5.5830	0.006
12/07/01	08:41:06	5.9147	0.006
12/07/01	08:41:27	6.2663	0.006
12/07/01	08:41:50	6.6397	0.006
12/07/01	08:42:14	7.0347	0.005
12/07/01	08:42:39	7.4530	0.005

PES-MW8R



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/06/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-CW2
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	30'	Total Well Depth (Installed):	40'
Screen Diameter:	2"	Depth to Bottom of Screen:	40'	Total Well Depth (Measured):	40'
TOC Elevation:	833.02	Static Water Level	801.64	Product Present (Y/N)	N
				Static Product Level:	

Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	1" Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	11:18:25 F / 11:26:50 R	End Static Water Level:	801.64
End Time:	11:21:04 F / 11:31:00 R	Max/Min Water Level:	803.918/799.629
Data File Name:	PES-CW2.bin	Test Time - Max/Min:	
		Transducer Depth:	792.22 F / 792.222 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind Velocity	Wind Direction	Ground/Surface Conditions
10:55	40	Sunny	Low	1 mph		Muddy

Manual Testing

Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Drawdown
0	801.64	Falling	0	801.64	Rising			
159	801.64	Falling	250	801.64	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:41:08
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-06 111
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-CW2F

Test defined on: 12/06/01 11:13:18
Test started on: 12/06/01 11:18:25
Test stopped on: 12/06/01 11:21:04
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 78

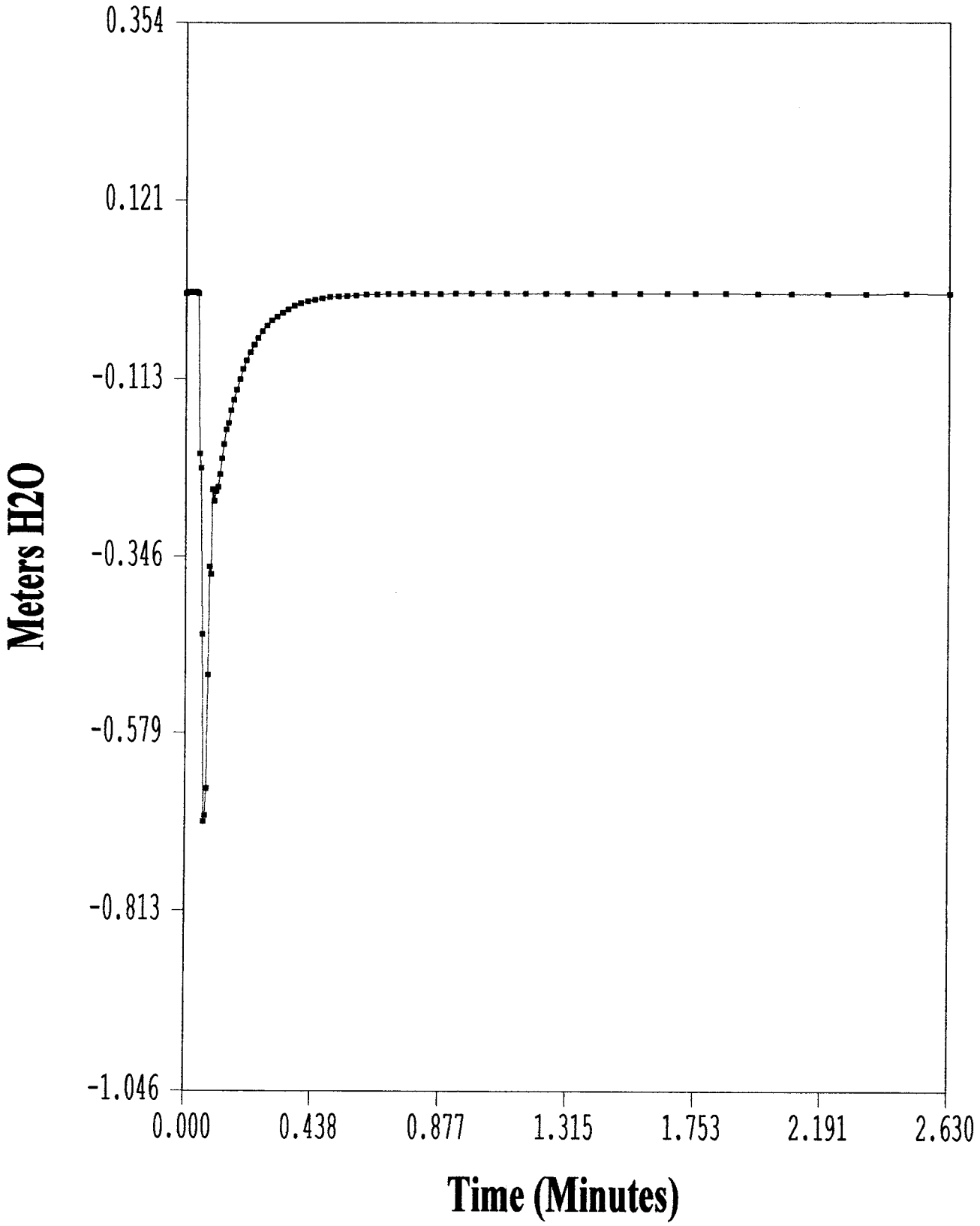
TOTAL DATA SAMPLES 78

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 2.870 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/06/01	11:18:25	0.0000	0.000
12/06/01	11:18:26	0.0050	0.002
12/06/01	11:18:26	0.0100	0.002
12/06/01	11:18:26	0.0150	0.002
12/06/01	11:18:27	0.0200	0.002
12/06/01	11:18:27	0.0250	0.002
12/06/01	11:18:27	0.0300	0.002
12/06/01	11:18:27	0.0350	0.002
12/06/01	11:18:28	0.0400	0.002
12/06/01	11:18:28	0.0450	0.000
12/06/01	11:18:28	0.0500	-0.211
12/06/01	11:18:29	0.0550	-0.230
12/06/01	11:18:29	0.0600	-0.449
12/06/01	11:18:29	0.0650	-0.694
12/06/01	11:18:30	0.0700	-0.686
12/06/01	11:18:30	0.0750	-0.651
12/06/01	11:18:30	0.0800	-0.503
12/06/01	11:18:30	0.0848	-0.359
12/06/01	11:18:31	0.0900	-0.369
12/06/01	11:18:31	0.0950	-0.258
12/06/01	11:18:31	0.1000	-0.273
12/06/01	11:18:32	0.1058	-0.260
12/06/01	11:18:32	0.1120	-0.255
12/06/01	11:18:32	0.1185	-0.238
12/06/01	11:18:33	0.1255	-0.217
12/06/01	11:18:33	0.1328	-0.198
12/06/01	11:18:34	0.1407	-0.179
12/06/01	11:18:34	0.1490	-0.170
12/06/01	11:18:35	0.1578	-0.153

12/06/01	11:18:35	0.1670	-0.139
12/06/01	11:18:36	0.1770	-0.126
12/06/01	11:18:37	0.1875	-0.112
12/06/01	11:18:37	0.1985	-0.099
12/06/01	11:18:38	0.2102	-0.087
12/06/01	11:18:39	0.2227	-0.076
12/06/01	11:18:39	0.2358	-0.067
12/06/01	11:18:40	0.2498	-0.058
12/06/01	11:18:41	0.2647	-0.049
12/06/01	11:18:42	0.2803	-0.041
12/06/01	11:18:43	0.2970	-0.035
12/06/01	11:18:44	0.3147	-0.029
12/06/01	11:18:45	0.3333	-0.024
12/06/01	11:18:47	0.3532	-0.020
12/06/01	11:18:48	0.3742	-0.015
12/06/01	11:18:49	0.3963	-0.012
12/06/01	11:18:51	0.4198	-0.009
12/06/01	11:18:52	0.4447	-0.007
12/06/01	11:18:54	0.4697	-0.005
12/06/01	11:18:55	0.4963	-0.004
12/06/01	11:18:57	0.5247	-0.003
12/06/01	11:18:59	0.5547	-0.002
12/06/01	11:19:01	0.5863	-0.002
12/06/01	11:19:03	0.6213	0.000
12/06/01	11:19:05	0.6578	0.000
12/06/01	11:19:07	0.6963	0.000
12/06/01	11:19:10	0.7380	0.000
12/06/01	11:19:12	0.7813	0.001
12/06/01	11:19:15	0.8280	0.000
12/06/01	11:19:18	0.8763	0.000
12/06/01	11:19:21	0.9280	0.001
12/06/01	11:19:24	0.9830	0.001
12/06/01	11:19:28	1.0413	0.001
12/06/01	11:19:32	1.1030	0.001
12/06/01	11:19:35	1.1680	0.001
12/06/01	11:19:40	1.2380	0.001
12/06/01	11:19:44	1.3113	0.001
12/06/01	11:19:49	1.3897	0.001
12/06/01	11:19:54	1.4730	0.001
12/06/01	11:19:59	1.5613	0.001
12/06/01	11:20:05	1.6547	0.001
12/06/01	11:20:11	1.7530	0.001
12/06/01	11:20:17	1.8580	0.001
12/06/01	11:20:23	1.9680	0.000
12/06/01	11:20:30	2.0847	0.000
12/06/01	11:20:38	2.2097	0.000
12/06/01	11:20:46	2.3412	0.000
12/06/01	11:20:54	2.4813	0.001
12/06/01	11:21:03	2.6297	0.000

PES-CW2F



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 09:44:40
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-06 112
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: PES-CW2R

Test defined on: 12/06/01 11:26:23
Test started on: 12/06/01 11:26:50
Test stopped on: 12/06/01 11:31:00
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 85

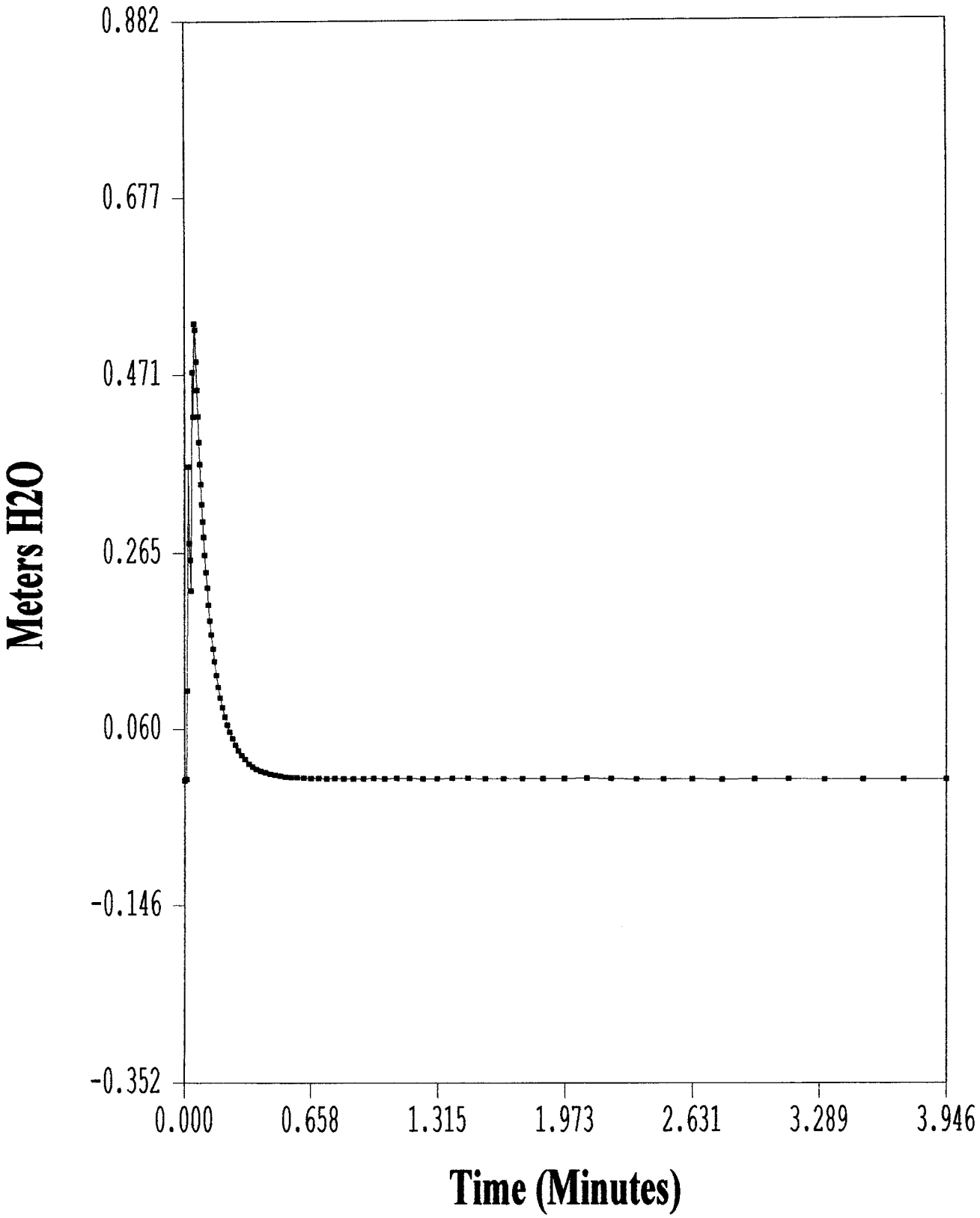
TOTAL DATA SAMPLES 85

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 2.870 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/06/01	11:26:50	0.0000	0.000
12/06/01	11:26:50	0.0050	0.002
12/06/01	11:26:51	0.0100	0.002
12/06/01	11:26:51	0.0150	0.106
12/06/01	11:26:51	0.0200	0.366
12/06/01	11:26:52	0.0250	0.277
12/06/01	11:26:52	0.0300	0.258
12/06/01	11:26:52	0.0350	0.222
12/06/01	11:26:52	0.0400	0.475
12/06/01	11:26:53	0.0450	0.423
12/06/01	11:26:53	0.0500	0.531
12/06/01	11:26:53	0.0550	0.524
12/06/01	11:26:54	0.0600	0.487
12/06/01	11:26:54	0.0650	0.454
12/06/01	11:26:54	0.0700	0.424
12/06/01	11:26:55	0.0750	0.394
12/06/01	11:26:55	0.0800	0.368
12/06/01	11:26:55	0.0848	0.345
12/06/01	11:26:55	0.0900	0.322
12/06/01	11:26:56	0.0950	0.302
12/06/01	11:26:56	0.1000	0.284
12/06/01	11:26:56	0.1058	0.264
12/06/01	11:26:57	0.1120	0.244
12/06/01	11:26:57	0.1185	0.226
12/06/01	11:26:58	0.1255	0.206
12/06/01	11:26:58	0.1328	0.188
12/06/01	11:26:58	0.1407	0.172
12/06/01	11:26:59	0.1490	0.155
12/06/01	11:26:59	0.1578	0.140

12/06/01	11:27:00	0.1670	0.124
12/06/01	11:27:01	0.1770	0.110
12/06/01	11:27:01	0.1875	0.097
12/06/01	11:27:02	0.1985	0.086
12/06/01	11:27:03	0.2102	0.075
12/06/01	11:27:03	0.2227	0.065
12/06/01	11:27:04	0.2358	0.057
12/06/01	11:27:05	0.2498	0.049
12/06/01	11:27:06	0.2647	0.041
12/06/01	11:27:07	0.2803	0.035
12/06/01	11:27:08	0.2970	0.029
12/06/01	11:27:09	0.3147	0.025
12/06/01	11:27:10	0.3333	0.020
12/06/01	11:27:11	0.3532	0.016
12/06/01	11:27:12	0.3742	0.013
12/06/01	11:27:14	0.3963	0.011
12/06/01	11:27:15	0.4198	0.009
12/06/01	11:27:17	0.4447	0.008
12/06/01	11:27:18	0.4697	0.007
12/06/01	11:27:20	0.4963	0.005
12/06/01	11:27:22	0.5247	0.005
12/06/01	11:27:23	0.5547	0.004
12/06/01	11:27:25	0.5863	0.004
12/06/01	11:27:27	0.6213	0.003
12/06/01	11:27:30	0.6578	0.003
12/06/01	11:27:32	0.6963	0.003
12/06/01	11:27:34	0.7380	0.002
12/06/01	11:27:37	0.7813	0.003
12/06/01	11:27:40	0.8280	0.002
12/06/01	11:27:43	0.8763	0.002
12/06/01	11:27:46	0.9280	0.002
12/06/01	11:27:49	0.9830	0.003
12/06/01	11:27:53	1.0413	0.002
12/06/01	11:27:56	1.1030	0.003
12/06/01	11:28:00	1.1680	0.003
12/06/01	11:28:04	1.2380	0.002
12/06/01	11:28:09	1.3113	0.002
12/06/01	11:28:13	1.3897	0.003
12/06/01	11:28:18	1.4730	0.003
12/06/01	11:28:24	1.5613	0.002
12/06/01	11:28:29	1.6547	0.002
12/06/01	11:28:35	1.7530	0.002
12/06/01	11:28:42	1.8580	0.002
12/06/01	11:28:48	1.9680	0.002
12/06/01	11:28:55	2.0847	0.003
12/06/01	11:29:03	2.2097	0.002
12/06/01	11:29:11	2.3412	0.002
12/06/01	11:29:19	2.4813	0.002
12/06/01	11:29:28	2.6297	0.002
12/06/01	11:29:37	2.7863	0.001
12/06/01	11:29:47	2.9530	0.002
12/06/01	11:29:58	3.1297	0.002
12/06/01	11:30:09	3.3163	0.001
12/06/01	11:30:21	3.5147	0.001
12/06/01	11:30:34	3.7247	0.001
12/06/01	11:30:47	3.9463	0.001

PES-CW2R



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/07/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	MS-46S
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	25.74	Total Well Depth (Installed):	35
Screen Diameter:	2"	Depth to Bottom of Screen:	35.74'	Total Well Depth (Measured):	35.74
TOC Elevation:		Static Water Level	27.6	Product Present (Y/N)	N
				Static Product Level:	

Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	1" Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	11:33:31 F / 11:39:48 R	End Static Water Level:	27.58
End Time:	11:36:59 F / 11:43:20 R	Max/Min Water Level:	29.199/25.937
Data File Name:	MS-46S.bin	Test Time - Max/Min:	
		Transducer Depth:	35.231 F/ 35.234 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
8:00	30	Partly cloudy	Low	1 mph		Frost

Manual Reading

Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Drawdown
0	27.60	Falling	0	27.60	Rising			
199	27.60	Falling	210	27.58	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:03:58
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 112
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: MS-46SF

Test defined on: 12/07/01 11:17:01
Test started on: 12/07/01 11:28:14
Test stopped on: N/A N/A
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 62

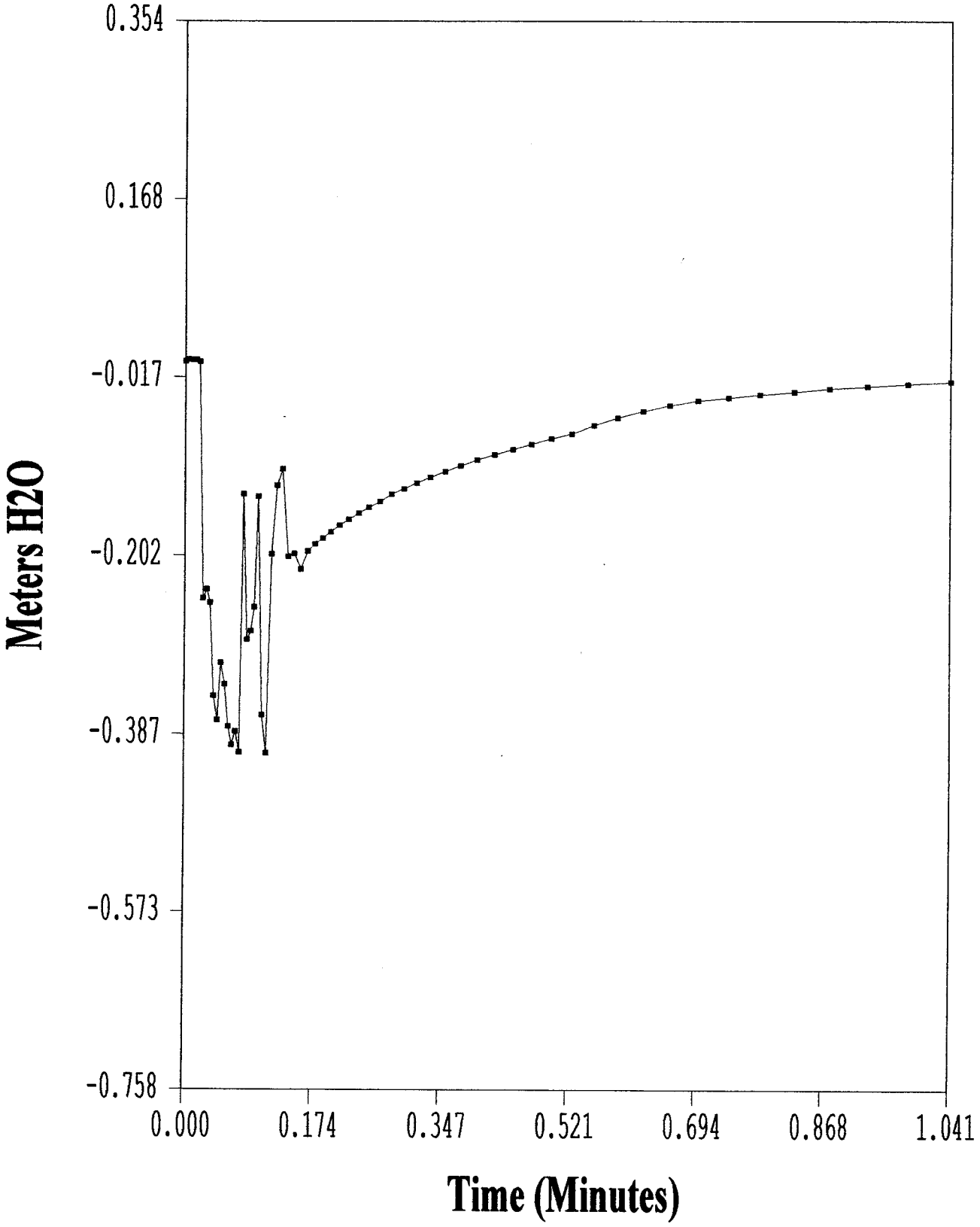
TOTAL DATA SAMPLES 62

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 2.325 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	11:28:14	0.0000	0.000
12/07/01	11:28:15	0.0050	0.002
12/07/01	11:28:15	0.0100	0.002
12/07/01	11:28:15	0.0150	0.002
12/07/01	11:28:16	0.0200	0.000
12/07/01	11:28:16	0.0250	-0.246
12/07/01	11:28:16	0.0300	-0.237
12/07/01	11:28:17	0.0350	-0.251
12/07/01	11:28:17	0.0400	-0.347
12/07/01	11:28:17	0.0450	-0.372
12/07/01	11:28:17	0.0500	-0.313
12/07/01	11:28:18	0.0550	-0.335
12/07/01	11:28:18	0.0600	-0.379
12/07/01	11:28:18	0.0650	-0.398
12/07/01	11:28:19	0.0700	-0.384
12/07/01	11:28:19	0.0750	-0.405
12/07/01	11:28:19	0.0800	-0.139
12/07/01	11:28:20	0.0848	-0.289
12/07/01	11:28:20	0.0900	-0.280
12/07/01	11:28:20	0.0950	-0.255
12/07/01	11:28:20	0.1000	-0.141
12/07/01	11:28:21	0.1058	-0.367
12/07/01	11:28:21	0.1120	-0.406
12/07/01	11:28:22	0.1185	-0.200
12/07/01	11:28:22	0.1255	-0.130
12/07/01	11:28:22	0.1328	-0.113
12/07/01	11:28:23	0.1407	-0.203
12/07/01	11:28:23	0.1490	-0.200
12/07/01	11:28:24	0.1578	-0.216

12/07/01	11:28:24	0.1670	-0.197
12/07/01	11:28:25	0.1770	-0.190
12/07/01	11:28:26	0.1875	-0.184
12/07/01	11:28:26	0.1985	-0.177
12/07/01	11:28:27	0.2102	-0.170
12/07/01	11:28:28	0.2227	-0.164
12/07/01	11:28:29	0.2358	-0.158
12/07/01	11:28:29	0.2498	-0.152
12/07/01	11:28:30	0.2647	-0.146
12/07/01	11:28:31	0.2803	-0.139
12/07/01	11:28:32	0.2970	-0.133
12/07/01	11:28:33	0.3147	-0.127
12/07/01	11:28:34	0.3333	-0.121
12/07/01	11:28:36	0.3532	-0.115
12/07/01	11:28:37	0.3742	-0.109
12/07/01	11:28:38	0.3963	-0.103
12/07/01	11:28:40	0.4198	-0.097
12/07/01	11:28:41	0.4447	-0.092
12/07/01	11:28:43	0.4697	-0.087
12/07/01	11:28:44	0.4963	-0.081
12/07/01	11:28:46	0.5247	-0.076
12/07/01	11:28:48	0.5547	-0.067
12/07/01	11:28:50	0.5863	-0.059
12/07/01	11:28:52	0.6213	-0.052
12/07/01	11:28:54	0.6578	-0.046
12/07/01	11:28:56	0.6963	-0.041
12/07/01	11:28:59	0.7380	-0.038
12/07/01	11:29:01	0.7813	-0.034
12/07/01	11:29:04	0.8280	-0.031
12/07/01	11:29:07	0.8763	-0.028
12/07/01	11:29:10	0.9280	-0.025
12/07/01	11:29:13	0.9830	-0.023
12/07/01	11:29:17	1.0413	-0.020

MS-46SF



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:05:07
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 113:
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: MS-46SF

Test defined on: 12/07/01 11:32:53
Test started on: 12/07/01 11:33:31
Test stopped on: 12/07/01 11:36:59
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 82

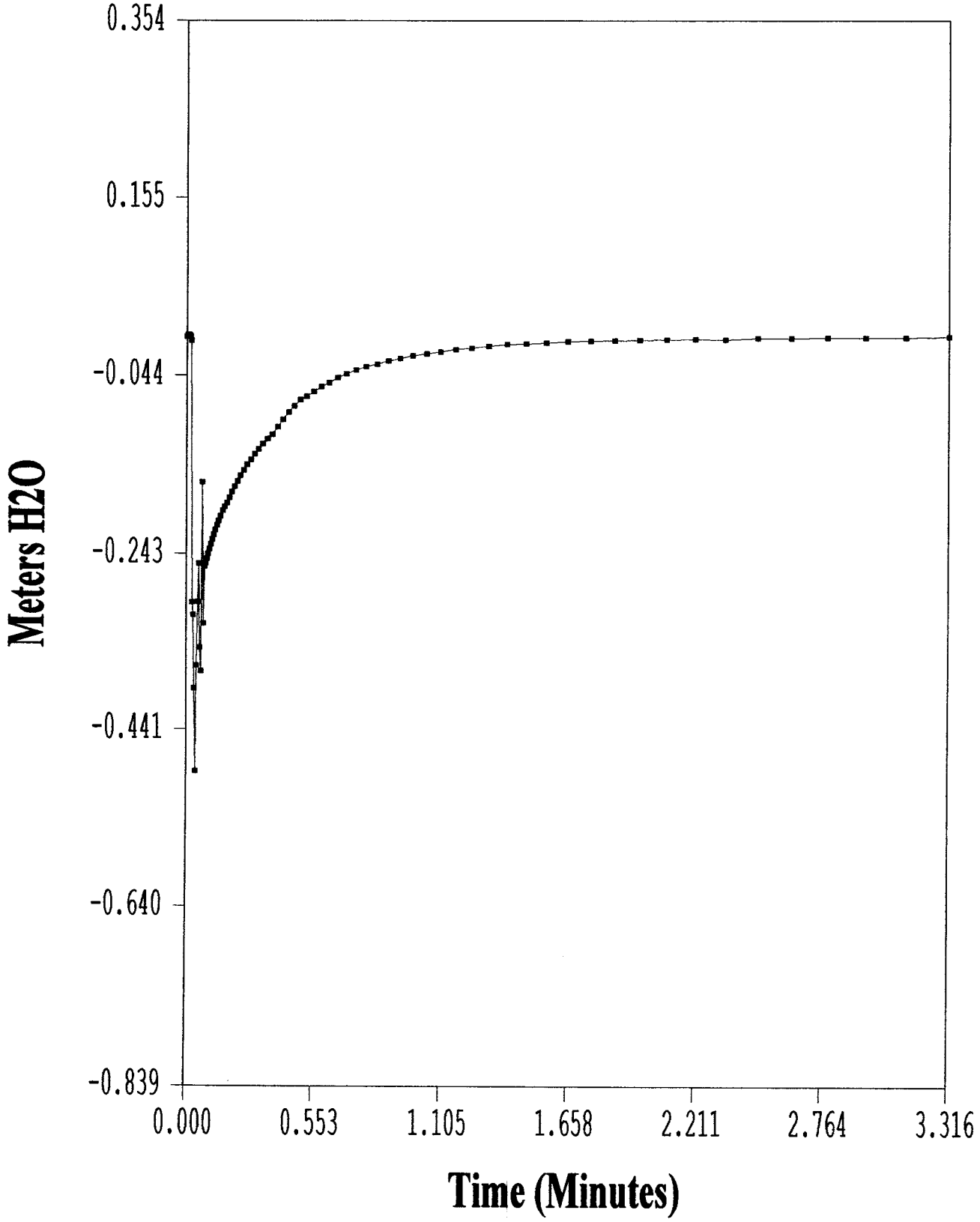
TOTAL DATA SAMPLES 82

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 2.326 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	11:33:31	0.0000	0.000
12/07/01	11:33:32	0.0050	0.002
12/07/01	11:33:32	0.0100	0.002
12/07/01	11:33:32	0.0150	0.001
12/07/01	11:33:33	0.0200	-0.004
12/07/01	11:33:33	0.0250	-0.298
12/07/01	11:33:33	0.0300	-0.312
12/07/01	11:33:34	0.0350	-0.395
12/07/01	11:33:34	0.0400	-0.487
12/07/01	11:33:34	0.0450	-0.369
12/07/01	11:33:34	0.0500	-0.297
12/07/01	11:33:35	0.0550	-0.254
12/07/01	11:33:35	0.0600	-0.349
12/07/01	11:33:35	0.0650	-0.375
12/07/01	11:33:36	0.0700	-0.162
12/07/01	11:33:36	0.0750	-0.321
12/07/01	11:33:36	0.0800	-0.257
12/07/01	11:33:37	0.0848	-0.253
12/07/01	11:33:37	0.0900	-0.248
12/07/01	11:33:37	0.0950	-0.242
12/07/01	11:33:37	0.1000	-0.237
12/07/01	11:33:38	0.1058	-0.232
12/07/01	11:33:38	0.1120	-0.226
12/07/01	11:33:39	0.1185	-0.221
12/07/01	11:33:39	0.1255	-0.216
12/07/01	11:33:39	0.1328	-0.210
12/07/01	11:33:40	0.1407	-0.206
12/07/01	11:33:40	0.1490	-0.200
12/07/01	11:33:41	0.1578	-0.194

12/07/01	11:33:42	0.1670	-0.189
12/07/01	11:33:42	0.1770	-0.185
12/07/01	11:33:43	0.1875	-0.179
12/07/01	11:33:43	0.1985	-0.173
12/07/01	11:33:44	0.2102	-0.167
12/07/01	11:33:45	0.2227	-0.161
12/07/01	11:33:46	0.2358	-0.155
12/07/01	11:33:46	0.2498	-0.149
12/07/01	11:33:47	0.2647	-0.143
12/07/01	11:33:48	0.2803	-0.137
12/07/01	11:33:49	0.2970	-0.130
12/07/01	11:33:50	0.3147	-0.125
12/07/01	11:33:51	0.3333	-0.119
12/07/01	11:33:53	0.3532	-0.114
12/07/01	11:33:54	0.3742	-0.109
12/07/01	11:33:55	0.3963	-0.101
12/07/01	11:33:57	0.4198	-0.092
12/07/01	11:33:58	0.4447	-0.085
12/07/01	11:34:00	0.4697	-0.078
12/07/01	11:34:01	0.4963	-0.071
12/07/01	11:34:03	0.5247	-0.067
12/07/01	11:34:05	0.5547	-0.062
12/07/01	11:34:07	0.5863	-0.056
12/07/01	11:34:09	0.6213	-0.052
12/07/01	11:34:11	0.6578	-0.046
12/07/01	11:34:13	0.6963	-0.042
12/07/01	11:34:16	0.7380	-0.038
12/07/01	11:34:18	0.7813	-0.034
12/07/01	11:34:21	0.8280	-0.031
12/07/01	11:34:24	0.8763	-0.027
12/07/01	11:34:27	0.9280	-0.025
12/07/01	11:34:30	0.9830	-0.022
12/07/01	11:34:34	1.0413	-0.019
12/07/01	11:34:38	1.1030	-0.017
12/07/01	11:34:42	1.1680	-0.015
12/07/01	11:34:46	1.2380	-0.013
12/07/01	11:34:50	1.3113	-0.011
12/07/01	11:34:55	1.3897	-0.009
12/07/01	11:35:00	1.4730	-0.008
12/07/01	11:35:05	1.5613	-0.007
12/07/01	11:35:11	1.6547	-0.006
12/07/01	11:35:17	1.7530	-0.005
12/07/01	11:35:23	1.8580	-0.004
12/07/01	11:35:30	1.9680	-0.004
12/07/01	11:35:37	2.0847	-0.003
12/07/01	11:35:44	2.2097	-0.003
12/07/01	11:35:52	2.3412	-0.003
12/07/01	11:36:00	2.4813	-0.002
12/07/01	11:36:09	2.6297	-0.002
12/07/01	11:36:19	2.7863	-0.001
12/07/01	11:36:29	2.9530	-0.001
12/07/01	11:36:39	3.1297	-0.001
12/07/01	11:36:50	3.3163	0.000

MS-46SF



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:06:07
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-07 113
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.01
Unit name: MiniTROLL

Test name: MS-46SR

Test defined on: 12/07/01 11:39:20
Test started on: 12/07/01 11:39:48
Test stopped on: 12/07/01 11:43:20
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 83

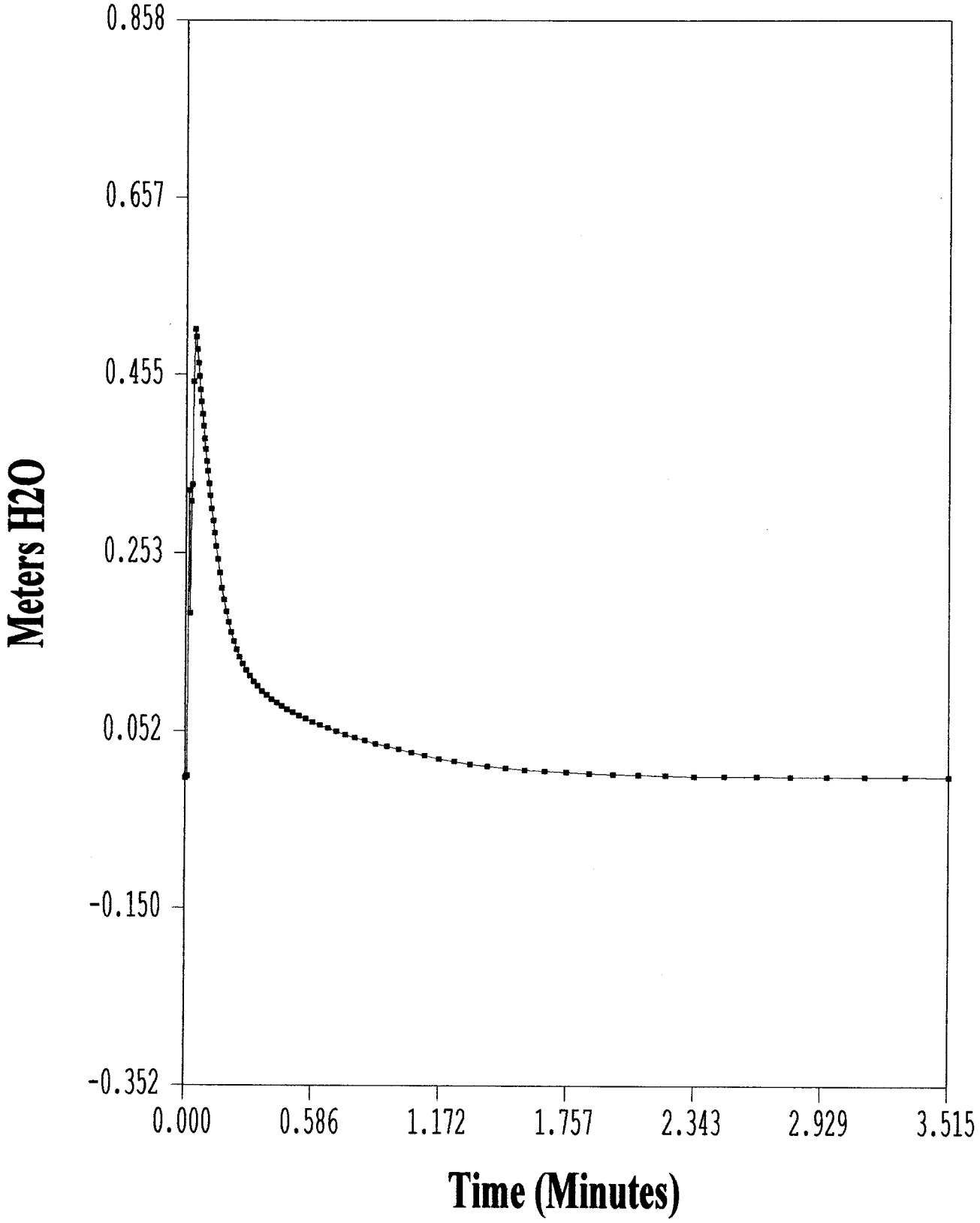
TOTAL DATA SAMPLES 83

Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 2.327 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/07/01	11:39:48	0.0000	0.000
12/07/01	11:39:48	0.0050	0.001
12/07/01	11:39:48	0.0100	0.002
12/07/01	11:39:49	0.0150	0.325
12/07/01	11:39:49	0.0200	0.186
12/07/01	11:39:49	0.0250	0.312
12/07/01	11:39:49	0.0300	0.331
12/07/01	11:39:50	0.0350	0.448
12/07/01	11:39:50	0.0400	0.507
12/07/01	11:39:50	0.0450	0.498
12/07/01	11:39:51	0.0500	0.484
12/07/01	11:39:51	0.0550	0.468
12/07/01	11:39:51	0.0600	0.453
12/07/01	11:39:52	0.0650	0.438
12/07/01	11:39:52	0.0700	0.425
12/07/01	11:39:52	0.0750	0.410
12/07/01	11:39:52	0.0800	0.397
12/07/01	11:39:53	0.0848	0.383
12/07/01	11:39:53	0.0900	0.371
12/07/01	11:39:53	0.0950	0.358
12/07/01	11:39:54	0.1000	0.347
12/07/01	11:39:54	0.1058	0.332
12/07/01	11:39:54	0.1120	0.319
12/07/01	11:39:55	0.1185	0.303
12/07/01	11:39:55	0.1255	0.290
12/07/01	11:39:56	0.1328	0.276
12/07/01	11:39:56	0.1407	0.261
12/07/01	11:39:57	0.1490	0.247
12/07/01	11:39:57	0.1578	0.232

12/07/01	11:39:58	0.1670	0.214
12/07/01	11:39:58	0.1770	0.201
12/07/01	11:39:59	0.1875	0.188
12/07/01	11:40:00	0.1985	0.175
12/07/01	11:40:00	0.2102	0.164
12/07/01	11:40:01	0.2227	0.154
12/07/01	11:40:02	0.2358	0.144
12/07/01	11:40:03	0.2498	0.136
12/07/01	11:40:03	0.2647	0.128
12/07/01	11:40:04	0.2803	0.121
12/07/01	11:40:05	0.2970	0.115
12/07/01	11:40:06	0.3147	0.108
12/07/01	11:40:08	0.3333	0.103
12/07/01	11:40:09	0.3532	0.097
12/07/01	11:40:10	0.3742	0.093
12/07/01	11:40:11	0.3963	0.088
12/07/01	11:40:13	0.4198	0.085
12/07/01	11:40:14	0.4447	0.081
12/07/01	11:40:16	0.4697	0.077
12/07/01	11:40:17	0.4963	0.074
12/07/01	11:40:19	0.5247	0.070
12/07/01	11:40:21	0.5547	0.067
12/07/01	11:40:23	0.5863	0.063
12/07/01	11:40:25	0.6213	0.059
12/07/01	11:40:27	0.6578	0.056
12/07/01	11:40:29	0.6963	0.052
12/07/01	11:40:32	0.7380	0.048
12/07/01	11:40:34	0.7813	0.045
12/07/01	11:40:37	0.8280	0.042
12/07/01	11:40:40	0.8763	0.038
12/07/01	11:40:43	0.9280	0.036
12/07/01	11:40:47	0.9830	0.032
12/07/01	11:40:50	1.0413	0.029
12/07/01	11:40:54	1.1030	0.025
12/07/01	11:40:58	1.1680	0.021
12/07/01	11:41:02	1.2380	0.019
12/07/01	11:41:06	1.3113	0.016
12/07/01	11:41:11	1.3897	0.013
12/07/01	11:41:16	1.4730	0.011
12/07/01	11:41:21	1.5613	0.009
12/07/01	11:41:27	1.6547	0.008
12/07/01	11:41:33	1.7530	0.007
12/07/01	11:41:39	1.8580	0.005
12/07/01	11:41:46	1.9680	0.004
12/07/01	11:41:53	2.0847	0.003
12/07/01	11:42:00	2.2097	0.003
12/07/01	11:42:08	2.3412	0.002
12/07/01	11:42:16	2.4813	0.002
12/07/01	11:42:25	2.6297	0.002
12/07/01	11:42:35	2.7863	0.002
12/07/01	11:42:45	2.9530	0.002
12/07/01	11:42:55	3.1297	0.002
12/07/01	11:43:07	3.3163	0.002
12/07/01	11:43:18	3.5147	0.001

MS-46SR



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/14/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-INJ1
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	35'	Total Well Depth (Installed):	70'
Screen Diameter:	3"	Depth to Bottom of Screen:	45'	Total Well Depth (Measured):	70'
TOC Elevation:	832.42	Static Water Level	804.10	Product Present (Y/N)	N
				Static Product Level:	

Test Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" I Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	1:00:03 F/ 1:22:46 R	End Static Water Level:	804.10
End Time:	1:18:28 F / 1:34:02 R	Max/Min Water Level:	
Data File Name:	PES-INJ1.bin	Test Time - Max/Min:	
		Transducer Depth:	782.513F/785.634 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
9:00	20	Partly cloudy	Low	5 mph		Frost

Manual Testing

Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Drawdown
0	804.10	Falling	0	804.10	Rising			
1004	804.10	Falling	670	804.10	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:07:19
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-14 120:
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.02
Unit name: MiniTROLL

Test name: INJ-1 post inj

Test defined on: 12/14/01 11:51:19
Test started on: 12/14/01 12:01:03
Test stopped on: 12/14/01 12:18:28
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 110

TOTAL DATA SAMPLES 110

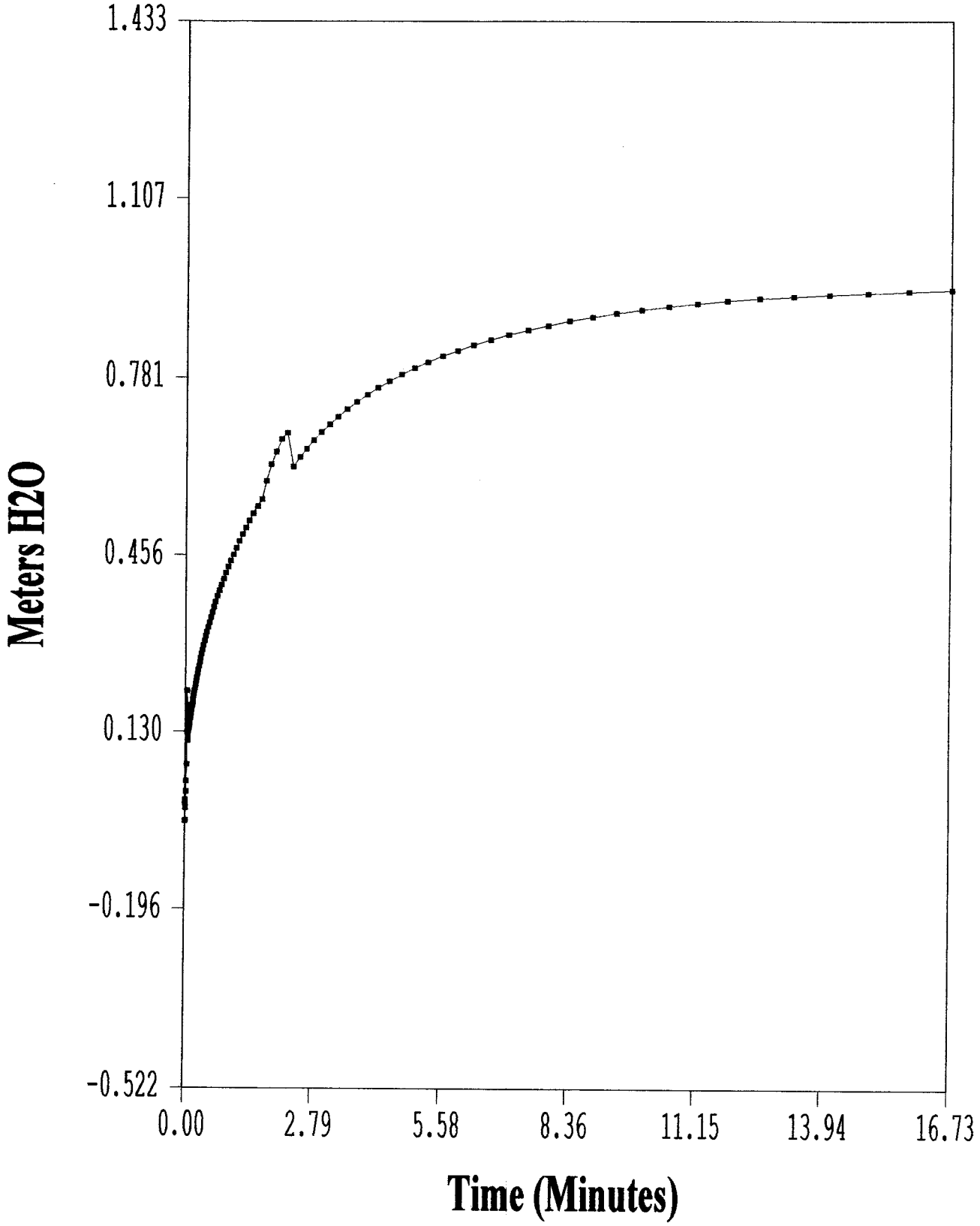
Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 6.580 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/14/01	12:01:03	0.0000	0.000
12/14/01	12:01:04	0.0050	0.006
12/14/01	12:01:04	0.0100	-0.033
12/14/01	12:01:04	0.0150	-0.032
12/14/01	12:01:05	0.0200	-0.009
12/14/01	12:01:05	0.0250	0.022
12/14/01	12:01:05	0.0300	0.040
12/14/01	12:01:05	0.0350	0.071
12/14/01	12:01:06	0.0400	0.205
12/14/01	12:01:06	0.0450	0.178
12/14/01	12:01:06	0.0500	0.129
12/14/01	12:01:07	0.0550	0.114
12/14/01	12:01:07	0.0600	0.121
12/14/01	12:01:07	0.0650	0.132
12/14/01	12:01:08	0.0700	0.136
12/14/01	12:01:08	0.0750	0.138
12/14/01	12:01:08	0.0800	0.140
12/14/01	12:01:08	0.0848	0.143
12/14/01	12:01:09	0.0900	0.146
12/14/01	12:01:09	0.0950	0.150
12/14/01	12:01:09	0.1000	0.152
12/14/01	12:01:10	0.1058	0.155
12/14/01	12:01:10	0.1120	0.159
12/14/01	12:01:10	0.1185	0.162
12/14/01	12:01:11	0.1255	0.167
12/14/01	12:01:11	0.1328	0.170
12/14/01	12:01:12	0.1407	0.175
12/14/01	12:01:12	0.1490	0.179
12/14/01	12:01:13	0.1578	0.183

12/14/01	12:01:13	0.1670	0.188
12/14/01	12:01:14	0.1770	0.194
12/14/01	12:01:15	0.1875	0.199
12/14/01	12:01:15	0.1985	0.204
12/14/01	12:01:16	0.2102	0.210
12/14/01	12:01:17	0.2227	0.216
12/14/01	12:01:18	0.2358	0.222
12/14/01	12:01:18	0.2498	0.228
12/14/01	12:01:19	0.2647	0.235
12/14/01	12:01:20	0.2803	0.242
12/14/01	12:01:21	0.2970	0.249
12/14/01	12:01:22	0.3147	0.256
12/14/01	12:01:23	0.3333	0.264
12/14/01	12:01:25	0.3532	0.272
12/14/01	12:01:26	0.3742	0.279
12/14/01	12:01:27	0.3963	0.288
12/14/01	12:01:29	0.4198	0.296
12/14/01	12:01:30	0.4447	0.304
12/14/01	12:01:32	0.4697	0.313
12/14/01	12:01:33	0.4963	0.321
12/14/01	12:01:35	0.5247	0.330
12/14/01	12:01:37	0.5547	0.339
12/14/01	12:01:39	0.5863	0.349
12/14/01	12:01:41	0.6213	0.358
12/14/01	12:01:43	0.6578	0.368
12/14/01	12:01:45	0.6963	0.379
12/14/01	12:01:48	0.7380	0.389
12/14/01	12:01:50	0.7813	0.400
12/14/01	12:01:53	0.8280	0.411
12/14/01	12:01:56	0.8763	0.422
12/14/01	12:01:59	0.9280	0.434
12/14/01	12:02:02	0.9830	0.446
12/14/01	12:02:06	1.0413	0.457
12/14/01	12:02:10	1.1030	0.469
12/14/01	12:02:13	1.1680	0.482
12/14/01	12:02:18	1.2380	0.495
12/14/01	12:02:22	1.3113	0.508
12/14/01	12:02:27	1.3897	0.521
12/14/01	12:02:32	1.4730	0.534
12/14/01	12:02:37	1.5613	0.547
12/14/01	12:02:43	1.6547	0.561
12/14/01	12:02:49	1.7530	0.593
12/14/01	12:02:55	1.8580	0.624
12/14/01	12:03:01	1.9680	0.647
12/14/01	12:03:08	2.0847	0.670
12/14/01	12:03:16	2.2097	0.681
12/14/01	12:03:24	2.3412	0.620
12/14/01	12:03:32	2.4813	0.637
12/14/01	12:03:41	2.6297	0.652
12/14/01	12:03:51	2.7863	0.668
12/14/01	12:04:01	2.9530	0.683
12/14/01	12:04:11	3.1297	0.697
12/14/01	12:04:22	3.3163	0.711
12/14/01	12:04:34	3.5147	0.725
12/14/01	12:04:47	3.7247	0.739
12/14/01	12:05:00	3.9463	0.751
12/14/01	12:05:14	4.1813	0.764
12/14/01	12:05:29	4.4295	0.776
12/14/01	12:05:45	4.6930	0.789
12/14/01	12:06:02	4.9730	0.800
12/14/01	12:06:20	5.2697	0.811
12/14/01	12:06:38	5.5830	0.822
12/14/01	12:06:58	5.9147	0.832
12/14/01	12:07:19	6.2663	0.843
12/14/01	12:07:42	6.6397	0.852
12/14/01	12:08:05	7.0347	0.862
12/14/01	12:08:31	7.4530	0.870

12/14/01	12:08:57	7.8963	0.879
12/14/01	12:09:25	8.3663	0.887
12/14/01	12:09:55	8.8647	0.894
12/14/01	12:10:27	9.3913	0.901
12/14/01	12:11:00	9.9497	0.907
12/14/01	12:11:36	10.5413	0.913
12/14/01	12:12:13	11.1680	0.918
12/14/01	12:12:53	11.8313	0.924
12/14/01	12:13:35	12.5347	0.928
12/14/01	12:14:20	13.2797	0.932
12/14/01	12:15:08	14.0697	0.936
12/14/01	12:15:58	14.9063	0.938
12/14/01	12:16:51	15.7913	0.942
12/14/01	12:17:47	16.7297	0.944

INJ-1 post inj



- [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:08:23
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-14 122:
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.02
Unit name: MiniTROLL

Test name: INJ-1R POST INJ

Test defined on: 12/14/01 12:20:09
Test started on: 12/14/01 12:22:46
Test stopped on: 12/14/01 12:34:02
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 103

TOTAL DATA SAMPLES 103

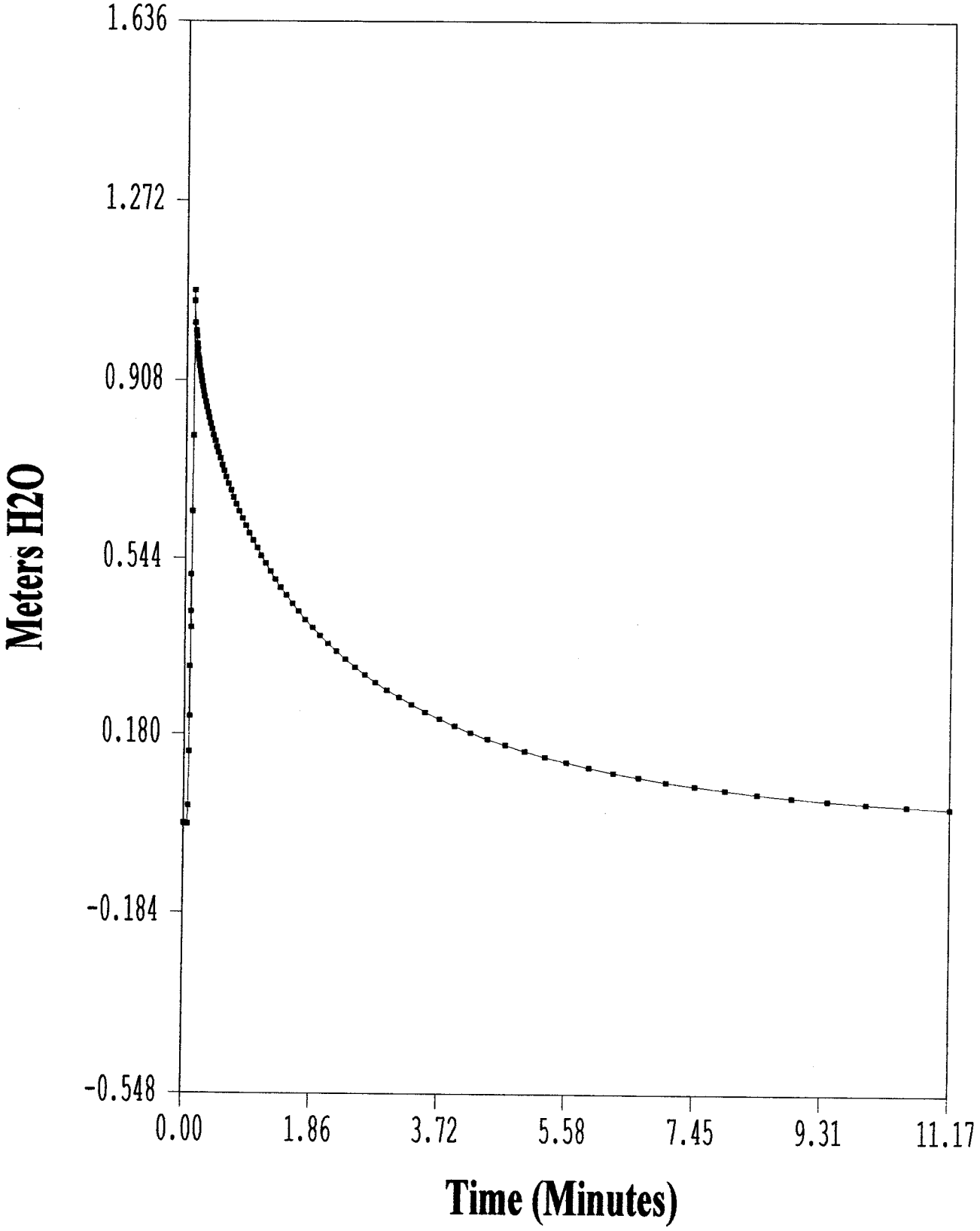
Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 5.628 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/14/01	12:22:46	0.0000	0.000
12/14/01	12:22:47	0.0050	0.000
12/14/01	12:22:47	0.0100	-0.001
12/14/01	12:22:47	0.0150	-0.002
12/14/01	12:22:47	0.0200	-0.002
12/14/01	12:22:48	0.0250	-0.001
12/14/01	12:22:48	0.0300	-0.002
12/14/01	12:22:48	0.0350	-0.002
12/14/01	12:22:49	0.0400	-0.002
12/14/01	12:22:49	0.0450	-0.002
12/14/01	12:22:49	0.0500	-0.002
12/14/01	12:22:50	0.0550	-0.002
12/14/01	12:22:50	0.0600	-0.002
12/14/01	12:22:50	0.0650	0.035
12/14/01	12:22:50	0.0700	0.145
12/14/01	12:22:51	0.0750	0.320
12/14/01	12:22:51	0.0800	0.217
12/14/01	12:22:51	0.0848	0.434
12/14/01	12:22:52	0.0900	0.511
12/14/01	12:22:52	0.0950	0.402
12/14/01	12:22:52	0.1000	0.641
12/14/01	12:22:53	0.1058	0.796
12/14/01	12:22:53	0.1120	1.090
12/14/01	12:22:53	0.1185	1.069
12/14/01	12:22:54	0.1255	1.025
12/14/01	12:22:54	0.1328	1.009
12/14/01	12:22:55	0.1407	0.998
12/14/01	12:22:55	0.1490	0.982
12/14/01	12:22:56	0.1578	0.972

12/14/01	12:22:56	0.1670	0.959
12/14/01	12:22:57	0.1770	0.950
12/14/01	12:22:57	0.1875	0.938
12/14/01	12:22:58	0.1985	0.927
12/14/01	12:22:59	0.2102	0.917
12/14/01	12:23:00	0.2227	0.907
12/14/01	12:23:00	0.2358	0.896
12/14/01	12:23:01	0.2498	0.886
12/14/01	12:23:02	0.2647	0.875
12/14/01	12:23:03	0.2803	0.865
12/14/01	12:23:04	0.2970	0.854
12/14/01	12:23:05	0.3147	0.843
12/14/01	12:23:06	0.3333	0.832
12/14/01	12:23:07	0.3532	0.821
12/14/01	12:23:09	0.3742	0.810
12/14/01	12:23:10	0.3963	0.797
12/14/01	12:23:11	0.4198	0.785
12/14/01	12:23:13	0.4447	0.773
12/14/01	12:23:14	0.4697	0.761
12/14/01	12:23:16	0.4963	0.750
12/14/01	12:23:18	0.5247	0.737
12/14/01	12:23:20	0.5547	0.725
12/14/01	12:23:21	0.5863	0.712
12/14/01	12:23:24	0.6213	0.698
12/14/01	12:23:26	0.6578	0.684
12/14/01	12:23:28	0.6963	0.670
12/14/01	12:23:31	0.7380	0.656
12/14/01	12:23:33	0.7813	0.641
12/14/01	12:23:36	0.8280	0.626
12/14/01	12:23:39	0.8763	0.612
12/14/01	12:23:42	0.9280	0.596
12/14/01	12:23:45	0.9830	0.581
12/14/01	12:23:49	1.0413	0.566
12/14/01	12:23:52	1.1030	0.550
12/14/01	12:23:56	1.1680	0.534
12/14/01	12:24:01	1.2380	0.518
12/14/01	12:24:05	1.3113	0.502
12/14/01	12:24:10	1.3897	0.485
12/14/01	12:24:15	1.4730	0.469
12/14/01	12:24:20	1.5613	0.451
12/14/01	12:24:26	1.6547	0.435
12/14/01	12:24:31	1.7530	0.418
12/14/01	12:24:38	1.8580	0.402
12/14/01	12:24:44	1.9680	0.385
12/14/01	12:24:51	2.0847	0.368
12/14/01	12:24:59	2.2097	0.352
12/14/01	12:25:07	2.3412	0.336
12/14/01	12:25:15	2.4813	0.319
12/14/01	12:25:24	2.6297	0.303
12/14/01	12:25:33	2.7863	0.288
12/14/01	12:25:43	2.9530	0.273
12/14/01	12:25:54	3.1297	0.257
12/14/01	12:26:05	3.3163	0.242
12/14/01	12:26:17	3.5147	0.227
12/14/01	12:26:30	3.7247	0.213
12/14/01	12:26:43	3.9463	0.199
12/14/01	12:26:57	4.1813	0.185
12/14/01	12:27:12	4.4295	0.172
12/14/01	12:27:28	4.6930	0.160
12/14/01	12:27:45	4.9730	0.148
12/14/01	12:28:02	5.2697	0.136
12/14/01	12:28:21	5.5830	0.125
12/14/01	12:28:41	5.9147	0.114
12/14/01	12:29:02	6.2663	0.104
12/14/01	12:29:25	6.6397	0.095
12/14/01	12:29:48	7.0347	0.085
12/14/01	12:30:13	7.4530	0.077

12/14/01	12:30:40	7.8963	0.069
12/14/01	12:31:08	8.3663	0.062
12/14/01	12:31:38	8.8647	0.055
12/14/01	12:32:10	9.3913	0.049
12/14/01	12:32:43	9.9497	0.043
12/14/01	12:33:19	10.5413	0.038
12/14/01	12:33:56	11.1680	0.033

INJ-1R POST INJ



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/14/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-INJ2
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	40'	Total Well Depth (Installed):	70'
Screen Diameter:	3"	Depth to Bottom of Screen:	50'	Total Well Depth (Measured):	70'
TOC Elevation:	832.87	Static Water Level	804.05	Product Present (Y/N)	N
				Static Product Level:	

Test Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	1:45:47 F/ 1:57:40 R	End Static Water Level:	804.05
End Time:	1:54:38 F / 2:06:43 R	Max/Min Water Level:	
Data File Name:	PES-INJ2.bin	Test Time - Max/Min:	
		Transducer Depth:	783.226 F/ 783.226 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
8:00	30	Partly cloudy	Low	1 mph		Frost

Manual Testing

Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Drawdown
0	804.05	Falling	0	804.05	Rising			
531	804.05	Falling	531	804.05	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:09:30
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-14 124!
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.02
Unit name: MiniTROLL

Test name: INJ-2F POST INJ

Test defined on: 12/14/01 12:41:09
Test started on: 12/14/01 12:45:47
Test stopped on: N/A N/A
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 99

TOTAL DATA SAMPLES 99

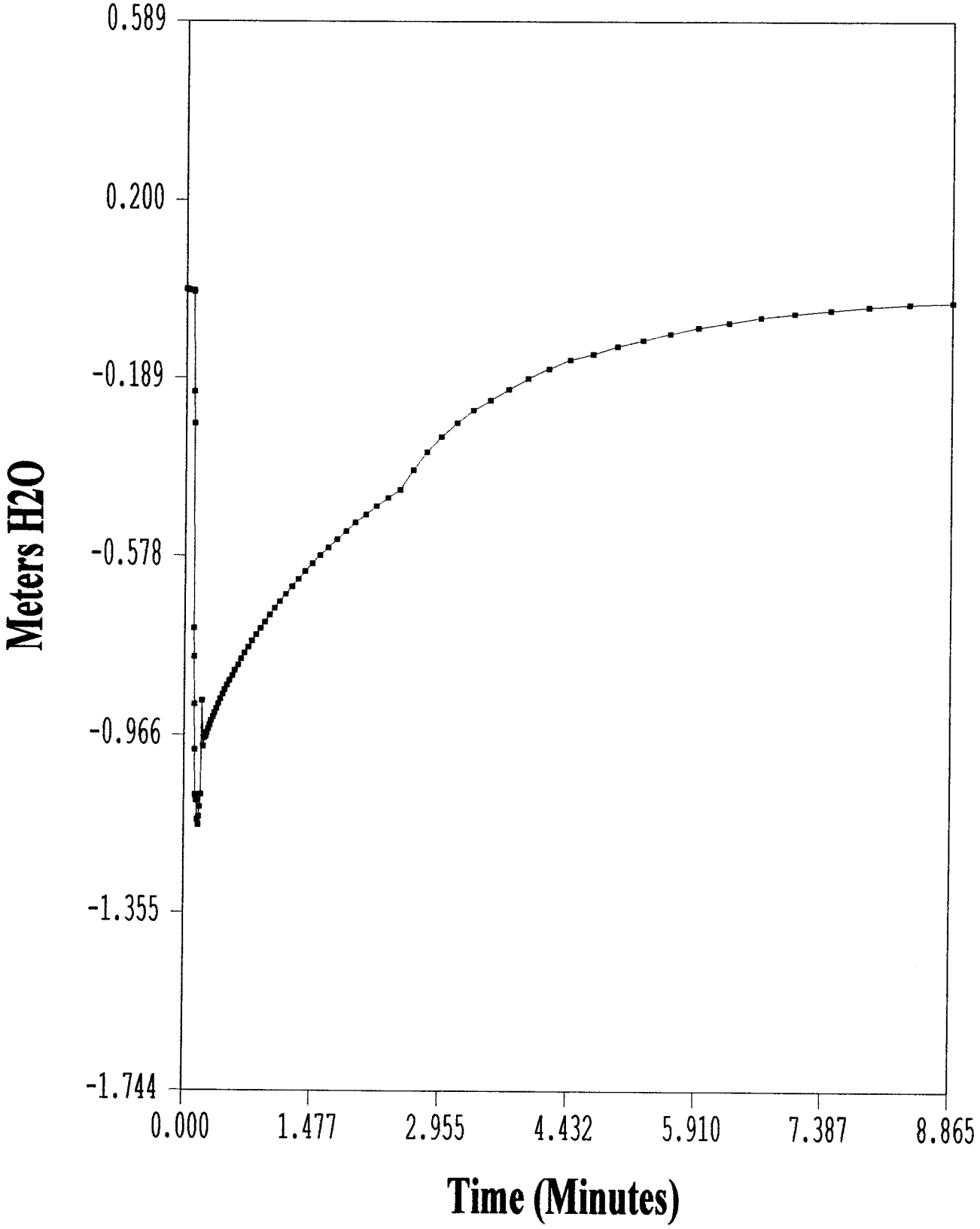
Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: channel definition.
Pressure head at reference: 6.347 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/14/01	12:45:47	0.0000	0.006
12/14/01	12:45:47	0.0050	0.005
12/14/01	12:45:48	0.0100	0.004
12/14/01	12:45:48	0.0150	0.004
12/14/01	12:45:48	0.0200	0.003
12/14/01	12:45:49	0.0250	0.003
12/14/01	12:45:49	0.0300	0.003
12/14/01	12:45:49	0.0350	0.003
12/14/01	12:45:49	0.0400	0.003
12/14/01	12:45:50	0.0450	0.003
12/14/01	12:45:50	0.0500	0.003
12/14/01	12:45:50	0.0550	0.003
12/14/01	12:45:51	0.0600	0.003
12/14/01	12:45:51	0.0650	0.003
12/14/01	12:45:51	0.0700	0.003
12/14/01	12:45:52	0.0750	0.002
12/14/01	12:45:52	0.0800	0.002
12/14/01	12:45:52	0.0848	0.003
12/14/01	12:45:52	0.0900	0.000
12/14/01	12:45:53	0.0950	-0.218
12/14/01	12:45:53	0.1000	-0.288
12/14/01	12:45:53	0.1058	-0.733
12/14/01	12:45:54	0.1120	-0.795
12/14/01	12:45:54	0.1185	-0.899
12/14/01	12:45:55	0.1255	-0.998
12/14/01	12:45:55	0.1328	-1.096
12/14/01	12:45:56	0.1407	-1.106
12/14/01	12:45:56	0.1490	-1.109
12/14/01	12:45:57	0.1578	-1.150

12/14/01	12:45:57	0.1670	-1.161
12/14/01	12:45:58	0.1770	-1.143
12/14/01	12:45:58	0.1875	-1.122
12/14/01	12:45:59	0.1985	-1.095
12/14/01	12:46:00	0.2102	-0.890
12/14/01	12:46:00	0.2227	-0.991
12/14/01	12:46:01	0.2358	-0.971
12/14/01	12:46:02	0.2498	-0.968
12/14/01	12:46:03	0.2647	-0.960
12/14/01	12:46:04	0.2803	-0.951
12/14/01	12:46:05	0.2970	-0.943
12/14/01	12:46:06	0.3147	-0.934
12/14/01	12:46:07	0.3333	-0.925
12/14/01	12:46:08	0.3532	-0.917
12/14/01	12:46:10	0.3742	-0.907
12/14/01	12:46:11	0.3963	-0.897
12/14/01	12:46:12	0.4198	-0.887
12/14/01	12:46:14	0.4447	-0.876
12/14/01	12:46:15	0.4697	-0.867
12/14/01	12:46:17	0.4963	-0.856
12/14/01	12:46:19	0.5247	-0.846
12/14/01	12:46:20	0.5547	-0.835
12/14/01	12:46:22	0.5863	-0.824
12/14/01	12:46:24	0.6213	-0.812
12/14/01	12:46:27	0.6578	-0.799
12/14/01	12:46:29	0.6963	-0.786
12/14/01	12:46:31	0.7380	-0.774
12/14/01	12:46:34	0.7813	-0.760
12/14/01	12:46:37	0.8280	-0.747
12/14/01	12:46:40	0.8763	-0.733
12/14/01	12:46:43	0.9280	-0.719
12/14/01	12:46:46	0.9830	-0.704
12/14/01	12:46:50	1.0413	-0.689
12/14/01	12:46:53	1.1030	-0.674
12/14/01	12:46:57	1.1680	-0.659
12/14/01	12:47:01	1.2380	-0.642
12/14/01	12:47:06	1.3113	-0.626
12/14/01	12:47:10	1.3897	-0.610
12/14/01	12:47:15	1.4730	-0.593
12/14/01	12:47:21	1.5613	-0.575
12/14/01	12:47:26	1.6547	-0.558
12/14/01	12:47:32	1.7530	-0.541
12/14/01	12:47:39	1.8580	-0.523
12/14/01	12:47:45	1.9680	-0.504
12/14/01	12:47:52	2.0847	-0.487
12/14/01	12:48:00	2.2097	-0.468
12/14/01	12:48:08	2.3412	-0.450
12/14/01	12:48:16	2.4813	-0.433
12/14/01	12:48:25	2.6297	-0.390
12/14/01	12:48:34	2.7863	-0.350
12/14/01	12:48:44	2.9530	-0.317
12/14/01	12:48:55	3.1297	-0.286
12/14/01	12:49:06	3.3163	-0.258
12/14/01	12:49:18	3.5147	-0.236
12/14/01	12:49:31	3.7247	-0.212
12/14/01	12:49:44	3.9463	-0.188
12/14/01	12:49:58	4.1813	-0.167
12/14/01	12:50:13	4.4295	-0.148
12/14/01	12:50:29	4.6930	-0.134
12/14/01	12:50:45	4.9730	-0.118
12/14/01	12:51:03	5.2697	-0.104
12/14/01	12:51:22	5.5830	-0.090
12/14/01	12:51:42	5.9147	-0.077
12/14/01	12:52:03	6.2663	-0.067
12/14/01	12:52:25	6.6397	-0.056
12/14/01	12:52:49	7.0347	-0.047
12/14/01	12:53:14	7.4530	-0.039

12/14/01	12:53:41	7.8963	-0.032
12/14/01	12:54:09	8.3663	-0.026
12/14/01	12:54:39	8.8647	-0.023

INJ-2F POST INJ



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:10:39
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-14 125'
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.02
Unit name: MiniTROLL

Test name: INJ-2R POST INJ

Test defined on: 12/14/01 12:56:18
Test started on: 12/14/01 12:57:40
Test stopped on: 12/14/01 13:06:43
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 99

TOTAL DATA SAMPLES 99

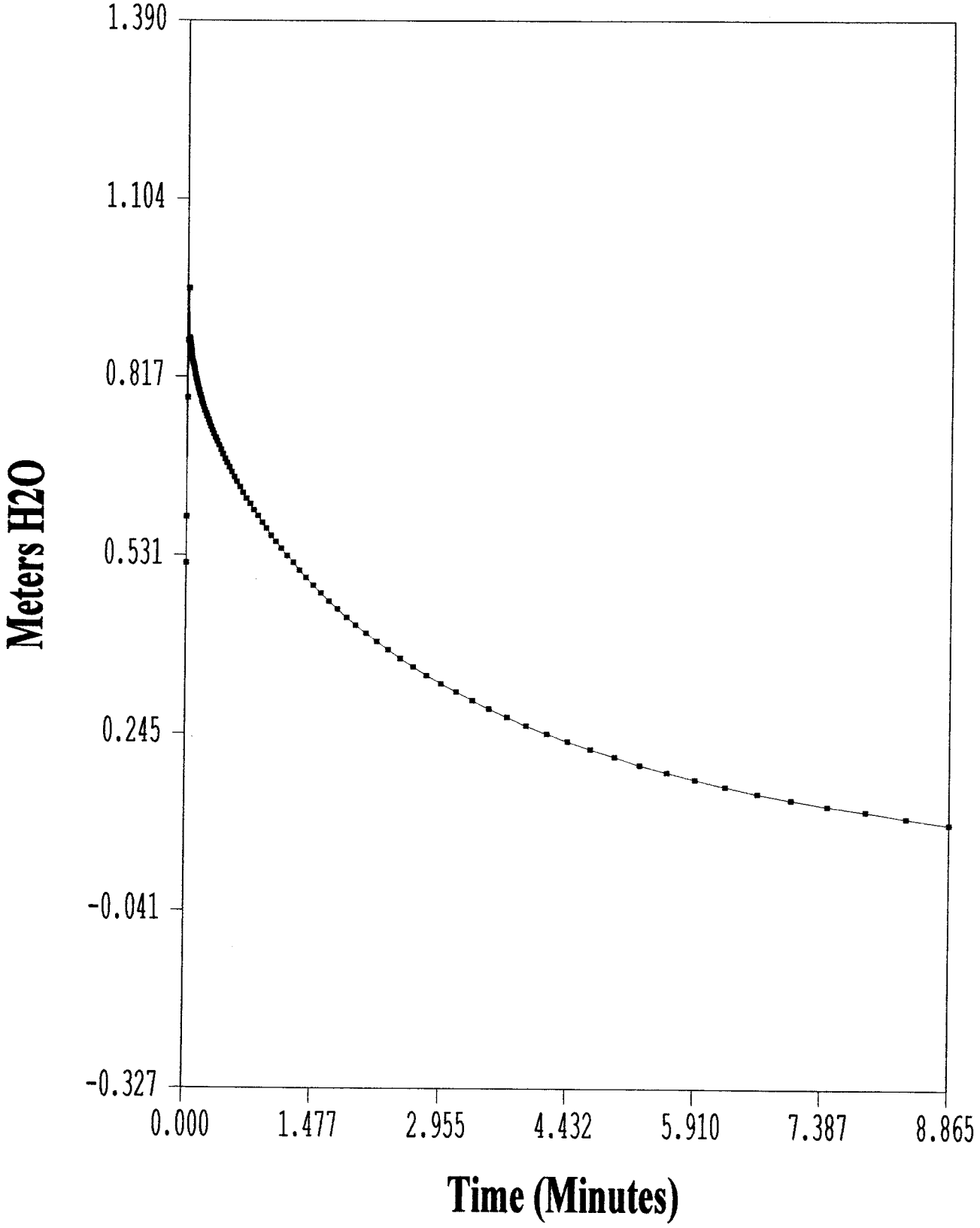
Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: channel definition.
Pressure head at reference: 6.347 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/14/01	12:57:40	0.0000	0.520
12/14/01	12:57:40	0.0050	0.593
12/14/01	12:57:40	0.0100	0.784
12/14/01	12:57:41	0.0150	0.876
12/14/01	12:57:41	0.0200	0.960
12/14/01	12:57:41	0.0250	0.881
12/14/01	12:57:41	0.0300	0.878
12/14/01	12:57:42	0.0350	0.872
12/14/01	12:57:42	0.0400	0.866
12/14/01	12:57:42	0.0450	0.861
12/14/01	12:57:43	0.0500	0.856
12/14/01	12:57:43	0.0550	0.851
12/14/01	12:57:43	0.0600	0.846
12/14/01	12:57:44	0.0650	0.841
12/14/01	12:57:44	0.0700	0.840
12/14/01	12:57:44	0.0750	0.838
12/14/01	12:57:44	0.0800	0.833
12/14/01	12:57:45	0.0848	0.829
12/14/01	12:57:45	0.0900	0.822
12/14/01	12:57:45	0.0950	0.821
12/14/01	12:57:46	0.1000	0.817
12/14/01	12:57:46	0.1058	0.813
12/14/01	12:57:46	0.1120	0.810
12/14/01	12:57:47	0.1185	0.806
12/14/01	12:57:47	0.1255	0.803
12/14/01	12:57:48	0.1328	0.799
12/14/01	12:57:48	0.1407	0.795
12/14/01	12:57:49	0.1490	0.791
12/14/01	12:57:49	0.1578	0.787

12/14/01	12:57:50	0.1670	0.782
12/14/01	12:57:50	0.1770	0.777
12/14/01	12:57:51	0.1875	0.773
12/14/01	12:57:52	0.1985	0.769
12/14/01	12:57:52	0.2102	0.764
12/14/01	12:57:53	0.2227	0.759
12/14/01	12:57:54	0.2358	0.754
12/14/01	12:57:55	0.2498	0.749
12/14/01	12:57:55	0.2647	0.744
12/14/01	12:57:56	0.2803	0.738
12/14/01	12:57:57	0.2970	0.732
12/14/01	12:57:58	0.3147	0.726
12/14/01	12:58:00	0.3333	0.720
12/14/01	12:58:01	0.3532	0.714
12/14/01	12:58:02	0.3742	0.708
12/14/01	12:58:03	0.3963	0.701
12/14/01	12:58:05	0.4198	0.694
12/14/01	12:58:06	0.4447	0.686
12/14/01	12:58:08	0.4697	0.679
12/14/01	12:58:09	0.4963	0.672
12/14/01	12:58:11	0.5247	0.665
12/14/01	12:58:13	0.5547	0.657
12/14/01	12:58:15	0.5863	0.649
12/14/01	12:58:17	0.6213	0.641
12/14/01	12:58:19	0.6578	0.632
12/14/01	12:58:21	0.6963	0.623
12/14/01	12:58:24	0.7380	0.614
12/14/01	12:58:26	0.7813	0.604
12/14/01	12:58:29	0.8280	0.594
12/14/01	12:58:32	0.8763	0.584
12/14/01	12:58:35	0.9280	0.575
12/14/01	12:58:39	0.9830	0.564
12/14/01	12:58:42	1.0413	0.553
12/14/01	12:58:46	1.1030	0.542
12/14/01	12:58:50	1.1680	0.531
12/14/01	12:58:54	1.2380	0.520
12/14/01	12:58:58	1.3113	0.508
12/14/01	12:59:03	1.3897	0.496
12/14/01	12:59:08	1.4730	0.484
12/14/01	12:59:13	1.5613	0.472
12/14/01	12:59:19	1.6547	0.459
12/14/01	12:59:25	1.7530	0.446
12/14/01	12:59:31	1.8580	0.433
12/14/01	12:59:38	1.9680	0.421
12/14/01	12:59:45	2.0847	0.408
12/14/01	12:59:52	2.2097	0.395
12/14/01	13:00:00	2.3412	0.381
12/14/01	13:00:08	2.4813	0.368
12/14/01	13:00:17	2.6297	0.355
12/14/01	13:00:27	2.7863	0.341
12/14/01	13:00:37	2.9530	0.328
12/14/01	13:00:47	3.1297	0.315
12/14/01	13:00:59	3.3163	0.301
12/14/01	13:01:10	3.5147	0.287
12/14/01	13:01:23	3.7247	0.275
12/14/01	13:01:36	3.9463	0.261
12/14/01	13:01:50	4.1813	0.248
12/14/01	13:02:05	4.4295	0.235
12/14/01	13:02:21	4.6930	0.223
12/14/01	13:02:38	4.9730	0.211
12/14/01	13:02:56	5.2697	0.198
12/14/01	13:03:15	5.5830	0.186
12/14/01	13:03:34	5.9147	0.174
12/14/01	13:03:56	6.2663	0.163
12/14/01	13:04:18	6.6397	0.152
12/14/01	13:04:42	7.0347	0.142
12/14/01	13:05:07	7.4530	0.131

12/14/01	13:05:33	7.8963	0.123
12/14/01	13:06:02	8.3663	0.112
12/14/01	13:06:31	8.8647	0.102

INJ-2R POST INJ



▪ [2] - H2O Elevation

Slug Test Report

EMR INCORPORATED

Date:	12/14/2001	Tester Name(s):	Mike Goalen/Tracey Turner
Project:	NIROP	Well ID:	PES-INJ3
Project Number:		Installation Date:	
Drilling Method:	Hollow Stem Auger	Development Date:	

Well Information

Boring Diameter:		Depth to Top of Screen:	40'	Total Well Depth (Installed):	70'
Screen Diameter:	3"	Depth to Bottom of Screen:	50'	Total Well Depth (Measured):	70'
TOC Elevation:	832.71	Static Water Level	803.98	Product Present (Y/N)	N
				Static Product Level:	

Test Equipment

Data Recording Method:	Winsitu 2000	Transducer Rating:	30 PSI
Instrument Brand/Model:	In-Situ miniTroll	Slug/Bailer Dimensions:	2" Diameter/ 6' long

Test Information

Type:	Falling Head/Rising Head	Time Interval:	Logarithmic
Start Time:	1:18:46 F/ 3:02:19 R	End Static Water Level:	803.98
End Time:	1:50:48 F / 3:27:05 R	Max/Min Water Level:	
Data File Name:	PES-INJ3.bin	Test Time - Max/Min:	
		Transducer Depth:	783.085 F/ 783.083 R

Weather Conditions

Time	Temp (Approx)	Weather	Humidity (General)	Wind		Ground/Surface Conditions
				Velocity	Direction	
8:00	30	Partly cloudy	Low	1 mph		Frost

Manual Testing

Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Type	Time (Sec)	Depth to Water (ft)	Drawdown
0	804.4	Falling	0	805	Rising			
1906	805	Falling	1486	803.98	Rising			

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:11:47
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-14 131
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.02
Unit name: MiniTROLL

Test name: INJ-3F POST INJ

Test defined on: 12/14/01 13:16:32
Test started on: 12/14/01 13:18:46
Test stopped on: 12/14/01 13:50:48
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 125

TOTAL DATA SAMPLES 125

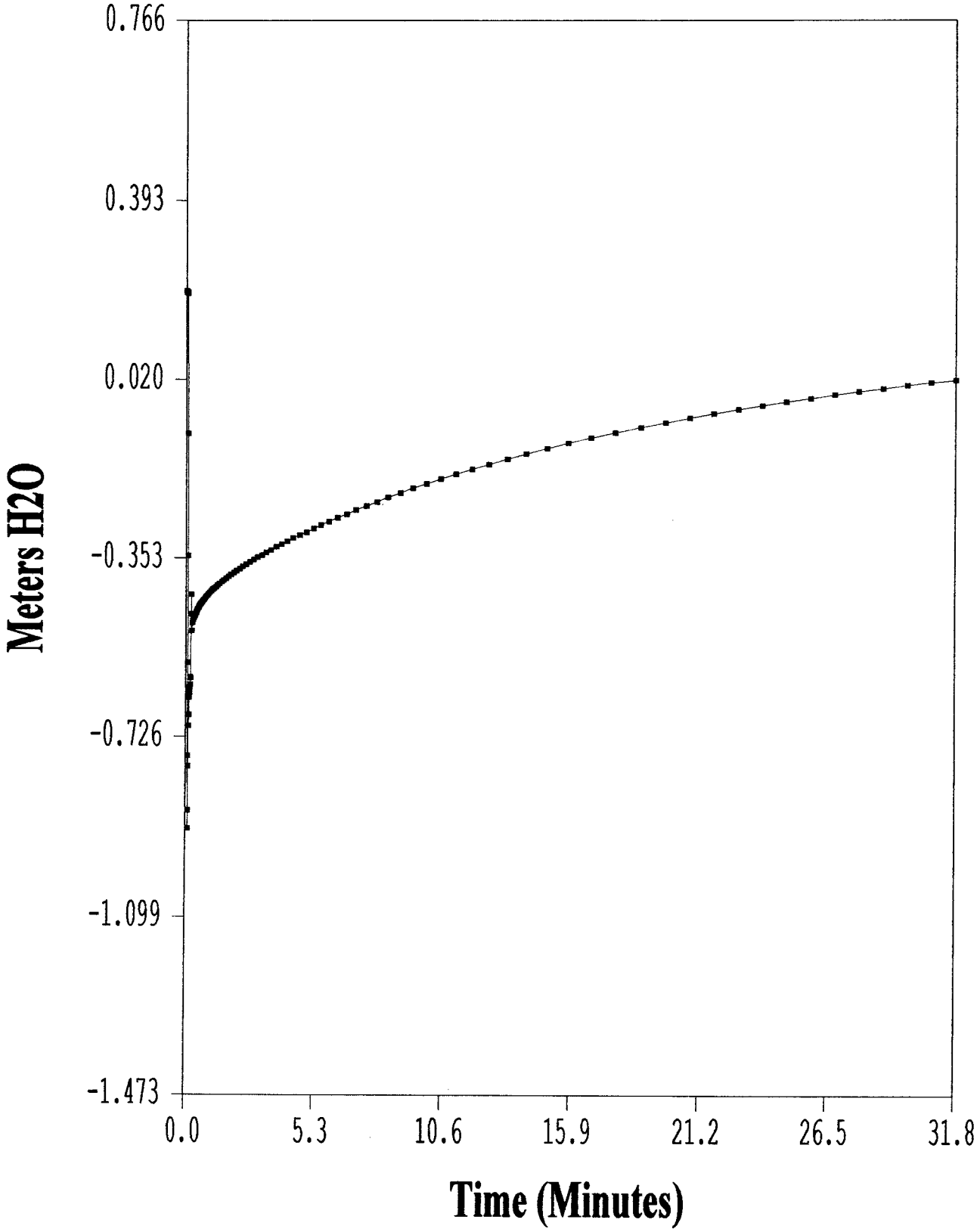
Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: channel definition.
Pressure head at reference: 6.347 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/14/01	13:18:46	0.0000	0.207
12/14/01	13:18:46	0.0050	0.206
12/14/01	13:18:46	0.0100	0.206
12/14/01	13:18:47	0.0150	0.205
12/14/01	13:18:47	0.0200	0.205
12/14/01	13:18:47	0.0250	0.204
12/14/01	13:18:47	0.0300	0.204
12/14/01	13:18:48	0.0350	0.204
12/14/01	13:18:48	0.0400	0.204
12/14/01	13:18:48	0.0450	0.204
12/14/01	13:18:49	0.0500	0.204
12/14/01	13:18:49	0.0550	0.204
12/14/01	13:18:49	0.0600	0.204
12/14/01	13:18:50	0.0650	0.204
12/14/01	13:18:50	0.0700	0.204
12/14/01	13:18:50	0.0750	0.202
12/14/01	13:18:50	0.0800	-0.093
12/14/01	13:18:51	0.0848	-0.347
12/14/01	13:18:51	0.0900	-0.572
12/14/01	13:18:51	0.0950	-0.764
12/14/01	13:18:52	0.1000	-0.876
12/14/01	13:18:52	0.1058	-0.913
12/14/01	13:18:52	0.1120	-0.785
12/14/01	13:18:53	0.1185	-0.626
12/14/01	13:18:53	0.1255	-0.624
12/14/01	13:18:54	0.1328	-0.703
12/14/01	13:18:54	0.1407	-0.680
12/14/01	13:18:55	0.1490	-0.635
12/14/01	13:18:55	0.1578	-0.645

12/14/01	13:18:56	0.1670	-0.635
12/14/01	13:18:56	0.1770	-0.625
12/14/01	13:18:57	0.1875	-0.618
12/14/01	13:18:58	0.1985	-0.602
12/14/01	13:18:58	0.2102	-0.603
12/14/01	13:18:59	0.2227	-0.429
12/14/01	13:19:00	0.2358	-0.470
12/14/01	13:19:01	0.2498	-0.506
12/14/01	13:19:02	0.2647	-0.488
12/14/01	13:19:02	0.2803	-0.486
12/14/01	13:19:03	0.2970	-0.485
12/14/01	13:19:05	0.3147	-0.481
12/14/01	13:19:06	0.3333	-0.478
12/14/01	13:19:07	0.3532	-0.476
12/14/01	13:19:08	0.3742	-0.473
12/14/01	13:19:09	0.3963	-0.470
12/14/01	13:19:11	0.4198	-0.467
12/14/01	13:19:12	0.4447	-0.465
12/14/01	13:19:14	0.4697	-0.461
12/14/01	13:19:15	0.4963	-0.459
12/14/01	13:19:17	0.5247	-0.456
12/14/01	13:19:19	0.5547	-0.453
12/14/01	13:19:21	0.5863	-0.451
12/14/01	13:19:23	0.6213	-0.448
12/14/01	13:19:25	0.6578	-0.445
12/14/01	13:19:27	0.6963	-0.442
12/14/01	13:19:30	0.7380	-0.440
12/14/01	13:19:33	0.7813	-0.437
12/14/01	13:19:35	0.8280	-0.434
12/14/01	13:19:38	0.8763	-0.431
12/14/01	13:19:41	0.9280	-0.428
12/14/01	13:19:45	0.9830	-0.425
12/14/01	13:19:48	1.0413	-0.422
12/14/01	13:19:52	1.1030	-0.418
12/14/01	13:19:56	1.1680	-0.416
12/14/01	13:20:00	1.2380	-0.413
12/14/01	13:20:04	1.3113	-0.409
12/14/01	13:20:09	1.3897	-0.406
12/14/01	13:20:14	1.4730	-0.402
12/14/01	13:20:19	1.5613	-0.398
12/14/01	13:20:25	1.6547	-0.395
12/14/01	13:20:31	1.7530	-0.391
12/14/01	13:20:37	1.8580	-0.387
12/14/01	13:20:44	1.9680	-0.383
12/14/01	13:20:51	2.0847	-0.379
12/14/01	13:20:58	2.2097	-0.375
12/14/01	13:21:06	2.3412	-0.370
12/14/01	13:21:15	2.4813	-0.366
12/14/01	13:21:23	2.6297	-0.361
12/14/01	13:21:33	2.7863	-0.356
12/14/01	13:21:43	2.9530	-0.351
12/14/01	13:21:53	3.1297	-0.346
12/14/01	13:22:05	3.3163	-0.341
12/14/01	13:22:17	3.5147	-0.335
12/14/01	13:22:29	3.7247	-0.329
12/14/01	13:22:42	3.9463	-0.323
12/14/01	13:22:57	4.1813	-0.317
12/14/01	13:23:11	4.4295	-0.311
12/14/01	13:23:27	4.6930	-0.305
12/14/01	13:23:44	4.9730	-0.298
12/14/01	13:24:02	5.2697	-0.290
12/14/01	13:24:21	5.5830	-0.283
12/14/01	13:24:41	5.9147	-0.276
12/14/01	13:25:02	6.2663	-0.269
12/14/01	13:25:24	6.6397	-0.261
12/14/01	13:25:48	7.0347	-0.252
12/14/01	13:26:13	7.4530	-0.244

12/14/01	13:26:39	7.8963	-0.236
12/14/01	13:27:08	8.3663	-0.226
12/14/01	13:27:38	8.8647	-0.217
12/14/01	13:28:09	9.3913	-0.208
12/14/01	13:28:43	9.9497	-0.199
12/14/01	13:29:18	10.5413	-0.188
12/14/01	13:29:56	11.1680	-0.178
12/14/01	13:30:36	11.8313	-0.168
12/14/01	13:31:18	12.5347	-0.157
12/14/01	13:32:02	13.2797	-0.147
12/14/01	13:32:50	14.0697	-0.136
12/14/01	13:33:40	14.9063	-0.125
12/14/01	13:34:33	15.7913	-0.113
12/14/01	13:35:29	16.7297	-0.102
12/14/01	13:36:29	17.7230	-0.091
12/14/01	13:37:32	18.7763	-0.080
12/14/01	13:38:32	19.7763	-0.069
12/14/01	13:39:32	20.7763	-0.060
12/14/01	13:40:32	21.7763	-0.051
12/14/01	13:41:32	22.7763	-0.042
12/14/01	13:42:32	23.7763	-0.033
12/14/01	13:43:32	24.7763	-0.026
12/14/01	13:44:32	25.7763	-0.018
12/14/01	13:45:32	26.7763	-0.010
12/14/01	13:46:32	27.7763	-0.003
12/14/01	13:47:32	28.7763	0.003
12/14/01	13:48:32	29.7763	0.010
12/14/01	13:49:32	30.7763	0.016
12/14/01	13:50:32	31.7763	0.021

INJ-3F POST INJ



▪ [2] - H2O Elevation

In-Situ Inc. MiniTroll Pro

Report generated: 01/10/02 10:12:47
Report from file: C:\Documents\Documents\Fridley Veg Oil\Analytical\SN05782 2001-12-14 140:
DataMgr Version 3.70

Serial number: 00005782
Firmware Version 3.02
Unit name: MiniTROLL

Test name: INJ-3R POST INJ

Test defined on: 12/14/01 14:00:51
Test started on: 12/14/01 14:02:19
Test stopped on: N/A N/A
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1.0000 Minutes.
Number of data samples: 118

TOTAL DATA SAMPLES 118

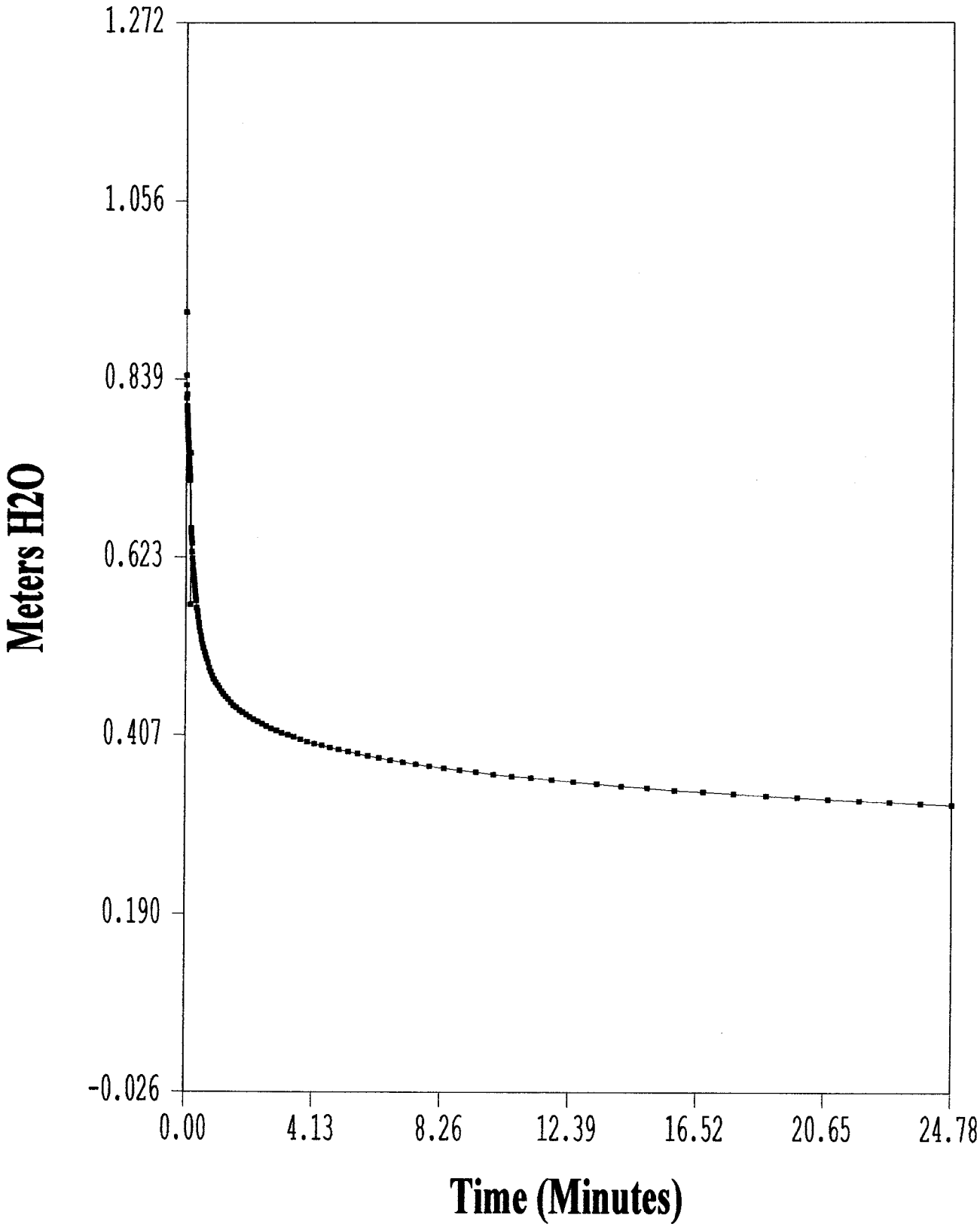
Channel number [2]
Measurement type: Pressure
Channel name: H2O Elevation
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: channel definition.
Pressure head at reference: 6.347 Meters H2O

Date	Time	ET (min)	Chan[2] Meters H2O
12/14/01	14:02:19	0.0000	0.921
12/14/01	14:02:19	0.0050	0.833
12/14/01	14:02:19	0.0100	0.817
12/14/01	14:02:20	0.0150	0.844
12/14/01	14:02:20	0.0200	0.821
12/14/01	14:02:20	0.0250	0.806
12/14/01	14:02:21	0.0300	0.801
12/14/01	14:02:21	0.0350	0.795
12/14/01	14:02:21	0.0400	0.789
12/14/01	14:02:21	0.0450	0.784
12/14/01	14:02:22	0.0500	0.777
12/14/01	14:02:22	0.0550	0.771
12/14/01	14:02:22	0.0600	0.765
12/14/01	14:02:23	0.0650	0.762
12/14/01	14:02:23	0.0700	0.759
12/14/01	14:02:23	0.0750	0.756
12/14/01	14:02:24	0.0800	0.752
12/14/01	14:02:24	0.0848	0.747
12/14/01	14:02:24	0.0900	0.745
12/14/01	14:02:24	0.0950	0.740
12/14/01	14:02:25	0.1000	0.736
12/14/01	14:02:25	0.1058	0.733
12/14/01	14:02:25	0.1120	0.730
12/14/01	14:02:26	0.1185	0.726
12/14/01	14:02:26	0.1255	0.721
12/14/01	14:02:27	0.1328	0.717
12/14/01	14:02:27	0.1407	0.566
12/14/01	14:02:28	0.1490	0.749
12/14/01	14:02:28	0.1578	0.658

12/14/01	14:02:29	0.1670	0.653
12/14/01	14:02:29	0.1770	0.646
12/14/01	14:02:30	0.1875	0.640
12/14/01	14:02:31	0.1985	0.630
12/14/01	14:02:31	0.2102	0.621
12/14/01	14:02:32	0.2227	0.615
12/14/01	14:02:33	0.2358	0.608
12/14/01	14:02:34	0.2498	0.601
12/14/01	14:02:35	0.2647	0.596
12/14/01	14:02:36	0.2803	0.589
12/14/01	14:02:37	0.2970	0.583
12/14/01	14:02:38	0.3147	0.576
12/14/01	14:02:39	0.3333	0.571
12/14/01	14:02:40	0.3532	0.562
12/14/01	14:02:41	0.3742	0.558
12/14/01	14:02:42	0.3963	0.551
12/14/01	14:02:44	0.4198	0.544
12/14/01	14:02:45	0.4447	0.538
12/14/01	14:02:47	0.4697	0.533
12/14/01	14:02:48	0.4963	0.528
12/14/01	14:02:50	0.5247	0.523
12/14/01	14:02:52	0.5547	0.518
12/14/01	14:02:54	0.5863	0.513
12/14/01	14:02:56	0.6213	0.509
12/14/01	14:02:58	0.6578	0.504
12/14/01	14:03:00	0.6963	0.500
12/14/01	14:03:03	0.7380	0.496
12/14/01	14:03:06	0.7813	0.489
12/14/01	14:03:08	0.8280	0.485
12/14/01	14:03:11	0.8763	0.480
12/14/01	14:03:14	0.9280	0.475
12/14/01	14:03:18	0.9830	0.471
12/14/01	14:03:21	1.0413	0.468
12/14/01	14:03:25	1.1030	0.464
12/14/01	14:03:29	1.1680	0.460
12/14/01	14:03:33	1.2380	0.457
12/14/01	14:03:37	1.3113	0.454
12/14/01	14:03:42	1.3897	0.451
12/14/01	14:03:47	1.4730	0.447
12/14/01	14:03:52	1.5613	0.444
12/14/01	14:03:58	1.6547	0.441
12/14/01	14:04:04	1.7530	0.438
12/14/01	14:04:10	1.8580	0.435
12/14/01	14:04:17	1.9680	0.433
12/14/01	14:04:24	2.0847	0.429
12/14/01	14:04:31	2.2097	0.427
12/14/01	14:04:39	2.3412	0.424
12/14/01	14:04:48	2.4813	0.422
12/14/01	14:04:56	2.6297	0.418
12/14/01	14:05:06	2.7863	0.416
12/14/01	14:05:16	2.9530	0.413
12/14/01	14:05:26	3.1297	0.410
12/14/01	14:05:38	3.3163	0.408
12/14/01	14:05:50	3.5147	0.406
12/14/01	14:06:02	3.7247	0.403
12/14/01	14:06:15	3.9463	0.400
12/14/01	14:06:30	4.1813	0.397
12/14/01	14:06:44	4.4295	0.395
12/14/01	14:07:00	4.6930	0.393
12/14/01	14:07:17	4.9730	0.390
12/14/01	14:07:35	5.2697	0.388
12/14/01	14:07:54	5.5830	0.386
12/14/01	14:08:14	5.9147	0.383
12/14/01	14:08:35	6.2663	0.380
12/14/01	14:08:57	6.6397	0.378
12/14/01	14:09:21	7.0347	0.375
12/14/01	14:09:46	7.4530	0.373

12/14/01	14:10:12	7.8963	0.371
12/14/01	14:10:41	8.3663	0.368
12/14/01	14:11:11	8.8647	0.366
12/14/01	14:11:42	9.3913	0.364
12/14/01	14:12:16	9.9497	0.361
12/14/01	14:12:51	10.5413	0.358
12/14/01	14:13:29	11.1680	0.356
12/14/01	14:14:09	11.8313	0.355
12/14/01	14:14:51	12.5347	0.352
12/14/01	14:15:35	13.2797	0.349
12/14/01	14:16:23	14.0697	0.347
12/14/01	14:17:13	14.9063	0.345
12/14/01	14:18:06	15.7913	0.342
12/14/01	14:19:02	16.7297	0.340
12/14/01	14:20:02	17.7230	0.338
12/14/01	14:21:05	18.7763	0.336
12/14/01	14:22:05	19.7763	0.334
12/14/01	14:23:05	20.7763	0.332
12/14/01	14:24:05	21.7763	0.330
12/14/01	14:25:05	22.7763	0.329
12/14/01	14:26:05	23.7763	0.327
12/14/01	14:27:05	24.7763	0.325

INJ-3R POST INJ



▪ [2] - H2O Elevation

Appendix B5

Well Development Forms

COPY

MINNESOTA MDH DEPARTMENT OF HEALTH

Protecting, maintaining and improving the health of all Minnesotans

October 26, 2001

Refer to: TN2408a

Mr. Joel Sanders, P.E.
Department of the Navy – Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
2155 Eagle Drive
North Charleston, South Carolina 29419-9010

Dear Mr. Sanders:

Subject: Request for a Variance from Minnesota Rules, Chapter 4725, to Inject Soybean Oil, Lecithin, and Magnetite/Ferrous Iron to Enhance In-Situ Bioremediation in the NE ¼ of the NE ¼ of the NW ¼ of Section 27, Township 30 North, Range 24 West, Anoka County, Minnesota.

This letter is in response to your request for a variance from Minnesota Rules, Chapter 4725, to inject a vegetable oil solution into three wells in Anoka County Riverfront Park, located in Fridley, Anoka County The park is located immediately west of the Naval Industrial Ordnance Plant (NIROP). The purpose of the variance is to allow a pilot-scale investigation to assess the effectiveness of adding vegetable oil to enhance in-situ bioremediation of groundwater contaminated with chlorinated solvents. A plume of contaminated groundwater has been identified in the park.

Details of the injection proposal, bioremediation mechanisms, and groundwater monitoring are included in the "Final Work Plan for Field Application to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection", dated September 19, 2001, and prepared by Parson's Engineering Science, Inc. (hereinafter referred to as Final Work Plan). A one-time injection of a total of approximately 3600 gallons of food-grade soybean oil, 300 pounds of food-grade lecithin, and 30 pounds of magnetite/ferrous iron particles mixed with a fatty acid dispersant will be injected in three wells (PES-INJ-1, PES-INJ-2, and PES-INJ-3). Approximately 7000 gallons of native ground water will also be injected. Details of the soybean oil, lecithin, and magnetite materials are included in a September 21, 2001, submittal from Mr. Venky Venkatesh of CH2M Hill Constructors, Inc. This submittal is an attachment to the variance request application. This submittal was further amended, based on a communication via electronic mail on October 22, 2001, from Mr. Venky Venkatesh to Mr. Michael Convery of my staff, to eliminate the use of mineral oil as a dispersant for the magnetite. The dispersion of the vegetable oil solution and effectiveness of bioremediation will be monitored for at least one year after injection using 13 monitoring wells, sampled at roughly 2, 5, 8, and 12 months after injection.

Minnesota Rules, part 4725.2050, prohibits the use of wells or borings for disposal of surface water, groundwater, or any other liquid, gas, or chemical. The purpose of this rule provision is to protect groundwater quality.

In accordance with Minnesota Rules, Chapter 4725, and based on the information provided in your variance request application and attachments, **your request for a variance is granted.** The variance is granted because of the need for remediation of ground water contamination at the site. Enhanced bioremediation is being investigated because hydraulic controls have not been fully effective in reducing contaminant levels, especially in the park. The area of highest ground water contamination within the park appears to be a stagnation point in the ground water flow regime at the site and is not greatly influenced by the ground water extraction occurring at the NIROP facility, upgradient of the park. The variance is granted with the following conditions:

1. You must contact Mr. Steve Bennett of the MDH at (651) 643-2113 at least 24 hours prior to the start of injection.
2. The ground water monitoring plan, as detailed in Sections 4 and 5 of the Final Work Plan, must be followed.
3. The contingency plan, as detailed in Section 6 and in Attachment 2 of Appendix D shall be followed to mitigate generation and migration of vinyl chloride.
4. The Field Application Results Report, top be prepared by Parsons Engineering Science, Inc., shall be submitted to the MDH within 30 days of completion of the report and approval by the U.S. Navy.

All other requirements of Minnesota Rules, Chapter 4725, are in effect.

Alternative measures or conditions attached to the variance have the force of law and effect of applicable rule. If a party violates the alternative measures or conditions attached to the variance, the party is subject to enforcement actions and penalties provided in the applicable law or rule.

The variance is conditioned upon the applicable acceptance of and compliance with the conditions of the variance. Failure of the applicant to comply with the conditions of the variance will result in the immediate expiration of the variance.

If you have any questions, please contact Mr. Ed Schneider at (651) 215-0827 or Mr. Steve Bennett at (651) 643-2113.

Sincerely:

Kathy Svanda

for Daniel A. Wilson, Manager
Well Management Section
Division of Environmental Health
P.O. Box 64975
St. Paul, Minnesota 55164-0975

DAW:MPC:dg
cc: Jeff Perry, Anoka County Parks and Recreation
David Douglas, Minnesota Pollution Control Agency
Tom Bloom, U.S. Environmental Protection Agency
Venky Venkatesh, CH2M Hill Constructors, Inc.
Daniel Griffiths, Parsons Engineering Science, Inc.

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME: NIROP Pilot Scale Study	PROJECT #: 5427
	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-BG-1

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/1/01	END DATE: 11/1/01

WELL DEPTH: 73 feet		CASING DIAMETER: 3 inch	
DEPTH TO WATER:	28.77	DATE: 11/1/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	40 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	cloudy with suspended sediment	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1343	11.58	1450	14.3	2.2	89.2	75	
1353	11.75	1400	12.7	1.8	185.4	115	
1408	11.61	1107	12.3	0.2	51.8	150	
1422	11.36	918	12.4	0.7	71.6	180	
1436	11.45	993	12.6	0.0	50.6	220	
1457	11.41	959	13.2	0.6	24.7	250	
1518	11.37	956	14.8	0.2	14.1	270	
1535	11.43	989	14.7	0.4	19.4	290	
1550	11.41	971	13.7	0.5	11.2	310	
1600	11.36	966	14.7	1.0	10	320	
1615	11.34	978	14.6	0.6	9.2	340	

PUMPING START TIME:	11/1/01 1304	WATER LEVEL:	28.77
PUMPING STOP TIME:	11/1/01 1615	WATER LEVEL:	28.80

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME: NIROP Pilot Scale Study	PROJECT #: 5427
	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-CW-1

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/7/01	END DATE: 11/7/01
WELL DEPTH:	40	CASING DIAMETER:	3 inch
DEPTH TO WATER:	30.43	DATE: 11/7/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	38 feet	FT. BELOW MP	
SAMPLE APPEARANCE:		ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1514	7.21	964	11.6	5.1	31	5	
1519	7.21	960	11.3	4.2	180	10	
1524	7.22	967	11.3	3.7	126	15	
1529	7.2	972	11.2	3.2	113	20	
1532	7.19	976	11.2	2.7	185	25	
1537	7.2	970	11.3	2.9	50	30	
1539	7.22	968	11.3	2.4	41	35	
1541	7.19	972	11.2	2.2	40	40	

PUMPING START TIME:	11/7/01 1510	WATER LEVEL:	30.43
PUMPING STOP TIME:	11/7/01 1541	WATER LEVEL:	30.48

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME:	PROJECT #: 5427
NIROP Pilot Scale Study	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-CW-2

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/7/01	END DATE: 11/7/01
WELL DEPTH:	40	CASING DIAMETER:	3 inch
DEPTH TO WATER:	31.61	DATE: 11/7/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	38 feet	FT. BELOW MP	
SAMPLE APPEARANCE:		ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1200	6.81	1042	11.5	9.8	272	5	
1206	6.99	1024	11.3	6.8	239	10	
1211	6.96	1018	11.2	6.6	475	15	
1215	6.99	1016	11.2	5.7	329	20	
1219	6.94	1009	11.2	4.0	196	25	
1223	6.89	1026	11.2	3.3	115	30	
1227	6.89	1020	11.2	2.7	78	35	
1230	6.91	1016	11.2	2.5	69	40	
1233	6.97	1028	11.2	2.7	66	45	

PUMPING START TIME:	11/7/01 1152	WATER LEVEL:	31.61
PUMPING STOP TIME:	11/7/01 1233	WATER LEVEL:	31.64

COMMENTS: Ending water level estimated since the well was recovering very quickly.

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME: NIROP Pilot Scale Study	PROJECT #: 5427
	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-CW-2

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/7/01	END DATE: 11/7/01
WELL DEPTH:	40	CASING DIAMETER:	3 inch
DEPTH TO WATER:	31.61	DATE: 11/7/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	38 feet	FT. BELOW MP	
SAMPLE APPEARANCE:		ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1200	6.81	1042	11.5	9.8	272	5	
1206	6.99	1024	11.3	6.8	239	10	
1211	6.96	1018	11.2	6.6	475	15	
1215	6.99	1016	11.2	5.7	329	20	
1219	6.94	1009	11.2	4.0	196	25	
1223	6.89	1026	11.2	3.3	115	30	
1227	6.89	1020	11.2	2.7	78	35	
1230	6.91	1016	11.2	2.5	69	40	
1233	6.97	1028	11.2	2.7	66	45	

PUMPING START TIME:	11/7/01 1152	WATER LEVEL:	31.61
PUMPING STOP TIME:	11/7/01 1233	WATER LEVEL:	31.64

COMMENTS: Ending water level estimated since the well was recovering very quickly.

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME:	PROJECT #: 5427
NIROP Pilot Scale Study	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-CW-3

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/7/01	END DATE: 11/7/01
WELL DEPTH:	40	CASING DIAMETER:	3 inch
DEPTH TO WATER:	34.32	DATE: 11/6/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	38 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	cloudy with grey sediments	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
926	8.1			7.4	75	10	
930	5.63	1053	11.2	5.1	158	15	
938	6.26	1085	11.1	4.5	70	20	
942	6.47	872	11.3	3.3	89.2	25	
947	6.63	1076	11.1	2.1	198	30	
950	6.66	1071	11.1	3.4	125	35	
955	6.77	1068	11.1	2.0	178	40	
959	6.48	1088	11.2	2.7	164	45	
1003	6.82	1090	11.2	2.5	115	50	
1007	6.69	1087	11.1	2.1	111	55	
1011	6.74	1102	11.1	2.8	111	60	

PUMPING START TIME:	11/7/01 0814	WATER LEVEL:	34.32
PUMPING STOP TIME:	11/7/01 1011	WATER LEVEL:	34.39

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME: NIROP Pilot Scale Study	PROJECT #: 5427
	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-INJ-1

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/1/01	END DATE: 11/1/01
WELL DEPTH: 70 feet		CASING DIAMETER: 3 inch	
DEPTH TO WATER:	28.5	DATE: 11/1/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	40 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	cloudy with suspended sediment	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1007	7.98	827	12.5	1.1	19.5	85	
1020	9.10	844	12.1	0.5	25.4	110	
1055	8.78	890	12.1	0.7	21.2	175	
1110	8.74	896	11.9	0.5	20.5	215	
1118	8.65	904	12.0	0.4	20.5	235	
1127	8.56	899	12.1	0.5	20.6	255	
1148	8.43	890	12.1	0.5	15.3	300	
1158	8.36	907	12.1	0.4	19.8	325	
1209	8.29	920	12.1	0.3	21.5	355	

PUMPING START TIME:	11/1/01 0915	WATER LEVEL:	28.50
PUMPING STOP TIME:	11/1/01 1214	WATER LEVEL:	28.52

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME: NIROP Pilot Scale Study	PROJECT #: 5427
	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-INJ-2

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW Glen Holman	
WELL INSTALLATION DATE		START DATE: 10/31/2001	END DATE: 11/1/2001
WELL DEPTH:	70 feet	CASING DIAMETER:	3 inch
DEPTH TO WATER:	28.9	DATE: 11/1/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	45 feet	FT. BELOW MP	
SAMPLE APPEARANCE:		ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Culumative Volume (gallons)	PUMPING RATE (gpm)
1405	10.64	716	13.1	4.1	122.8	10	
1412	10.81	722	12.4	3.4	62.8	20	
1423	10.77	690	12.3	1.3	71.9	40	
1434	9.68	767	12.3	1.0	79.9	65	
1445	9.38	787	12.2	0.0	71.1	85	
1457	9.03	813	12.1	0.9	37.1	105	
1517	9.03	806	12.0	0.6	17.5	135	
1530	8.73	830	12.1	5.1	18.4	165	
1545	8.8	812	12.1	0.7	10.6	195	
1600	8.65	852	11.9	0.2	7.5	225	
1615	8.45	875	12.0	0.4	7.5	245	
1623	8.46	891	12.0	0.8	5.2	270	
1635	8.44	897	12.0	0.6	3.2	300	
1644	8.33	897	12.0	0.3	3.3	330	
825	8.42	845	12.0	1.4	3.5	360	
835	8.45	831	12.0	0.8	5.7	380	

PUMPING START TIME:	1355 10/31/01	WATER LEVEL:	28.90
PUMPING STOP TIME:	0840 11/1/01	WATER LEVEL:	28.97

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME: NIROP Pilot Scale Study	PROJECT #: 5427
LOCATION: Anoka Riverfront Park	SAMPLING POINT:
	SAMPLE ID: PES-INJ-3

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/1/01	END DATE: 11/6/01
WELL DEPTH:	70	CASING DIAMETER:	3 inch
DEPTH TO WATER:	28.92	DATE:	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	45 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	cloudy with suspended sediment	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
846	9.43	657	13.3	2.5	51.4	100	
Pump shorted out - end pumping						130	
835	9.43	771	11.0	2.7	16.5	150	
845	9.52	777	11.0	1.9	11.3	160	
855	9.58	788	11.0	0.5	16.6	180	
921	9.48	818	11.0	0.8	19.8	220	
928	9.40	789	11.0	0.8	19.0	230	
937	9.35	767	11.0	0.7	19.8	250	

PUMPING START TIME:	11/1/01 0745	WATER LEVEL:	28.92
PUMPING STOP TIME:	11/6/01 0941	WATER LEVEL:	28.98

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME:	PROJECT #: 5427
NIROP Pilot Scale Study	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-MW-1

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/6/01	END DATE: 11/6/01
WELL DEPTH:	70	CASING DIAMETER:	3 inch
DEPTH TO WATER:	28.74	DATE: 11/6/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	40 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	cloudy with suspended sediment	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
849	10.42	795	10.9	2.2	19.1	15	
858	10.04	803	10.9	1.3	24.4	30	
906	10.16	814	10.9	0.9	21.1	40	
914	10.03	820	10.9	0.7	28.2	50	
931	9.59	817	10.9	1.0	26.4	80	
945	9.44	728	10.9	0.5	25.8	105	
953	9.45	754	10.9	0.0	35.6	135	
1003	9.36	781	10.9	8.8	36.3	155	
1010	9.28	851	10.9	0.2	28.0	170	
1020	9.14	859	10.9	5.3	27.8	190	
1029	9.06	866	10.9	4.8	29.2	210	
1036	9.07	856	11.0	4.4	27.8	230	

PUMPING START TIME:	11/6/01 0840	WATER LEVEL:	28.74
PUMPING STOP TIME:	11/6/01 1040	WATER LEVEL:	28.58

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME:	PROJECT #: 5427
NIROP Pilot Scale Study	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-MW-2

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/6/01	END DATE: 11/6/01
WELL DEPTH:	70	CASING DIAMETER:	3 inch
DEPTH TO WATER:	28.5	DATE: 11/6/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	40 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	cloudy with grey sediments	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1102	12.02	2630	11.3	2.0	32.9	25	
1110	12.27	2490	11.0	0.0	30.4	40	
1123	12.09	2080	11.0	1.8	35.7	65	
1131	11.5	1419	11.5	2.7	40.1	75	
1140	11.36	1180	10.9	3.4	290	85	
1150	11.2	1004	11.0	1.7	156	100	
1157	11.12	870	10.9	2.8	163	120	
1207	10.65	247	11.0	1.9	90	140	
1321	10.90	1038	11.1	2.7	130	160	
1331	10.78	911	11.1	2.1	135	175	
1347	10.25	816	11.0	1.8	113	220	
1356	9.25	807	11.0	2.5	86	240	
1406	9.71	649	11.0	2.3	113	260	
1417	9.78	629	11.0	2.7	110	280	

PUMPING START TIME:	11/6/01 1050	WATER LEVEL:	28.50
PUMPING STOP TIME:	11/6/01 1415	WATER LEVEL:	28.35

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME:	PROJECT #: 5427
NIROP Pilot Scale Study	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-MW-3

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/6/01	END DATE: 11/6/01
WELL DEPTH:	40	CASING DIAMETER:	3 inch
DEPTH TO WATER:	29.51	DATE: 11/6/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	35 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	cloudy with suspended sediment	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1455	7.06	927	11.6	3.1	143	10	
1505	7.02	929	11.4	4.5	126	20	
1515	7.01	955	11.0	3.7	193	30	
1532	6.82	976	11.0	2.5	127	45	
1545	6.91	981	11.1	2.8	19	55	
1550	6.86	962	11.1	2.4	21	60	
1600	6.85	923	11.1	2.2	68	70	
1612	6.87	953	11.0	2.7	61	80	
1618	6.85	967	10.9	2.1	65	90	
1625	6.87	982	10.9	2.7	18	100	
1630	6.87	974	10.9	2.0	17	105	

PUMPING START TIME:	11/6/01 1447	WATER LEVEL:	29.51
PUMPING STOP TIME:	11/6/01 1630	WATER LEVEL:	30.59

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME: NIROP Pilot Scale Study	PROJECT #: 5427
	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-MW-4

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/7/01	END DATE: 11/7/01
WELL DEPTH:	40	CASING DIAMETER:	3 inch
DEPTH TO WATER:	31.4	DATE: 11/7/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	38 feet	FT. BELOW MP	
SAMPLE APPEARANCE:		ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1607	7.37	948	11.1	7.3	65	5	
1611	7.34	977	11.0	5.7	152	10	
1615	7.36	1000	11.0	4.8	158	15	
1619	7.38	1001	11.0	4.1	122	25	
1625	7.36	1018	11.0	3.7	95	30	
1632	7.31	1026	11.0	2.8	28	45	
1636	7.31	1025	11.0	3.1	25	50	
1643	7.32	1029	10.9	2.5	22	60	

PUMPING START TIME:	11/7/01 1600	WATER LEVEL:	31.40
PUMPING STOP TIME:	11/7/01 1645	WATER LEVEL:	32.37

COMMENTS: Ending water is estimated since the well was recovering very quickly.

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME:	PROJECT #: 5427
NIROP Pilot Scale Study	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-MW-5

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/7/01	END DATE: 11/7/01
WELL DEPTH:	40	CASING DIAMETER:	3 inch
DEPTH TO WATER:	31.43	DATE: 11/7/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	38 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	cloudy, suspended sediment	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1030	6.78	1404	10.9	8.9	202	15	
1034	6.65	1421	10.8	7.8	187	20	
1039	6.69	1438	10.6	4.1	225	25	
1044	6.80	1446	10.7	3.6	133	40	
1050	6.83	1456	10.7	2.2	293	45	
1055	6.83	1452	10.6	2.7	151	50	
1102	6.84	1442	10.7	2.1	312	60	
1107	6.80	1435	10.8	1.4	170	65	
1111	6.80	1424	10.7	2.3	106	70	
1115	6.83	1431	10.6	2.1	75	75	
1120	6.80	1442	10.6	2.8	107	80	
1124	6.77	1435	10.6	2.1	103	85	
1127	6.60	1420	10.7	2.4	101	90	
1132	6.78	1401	10.6	2.6	105	95	

PUMPING START TIME:	11/7/01 1020	WATER LEVEL:	31.43
PUMPING STOP TIME:	11/7/01 1133	WATER LEVEL:	31.43

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME: NIROP Pilot Scale Study	PROJECT #: 5427
LOCATION: Anoka Riverfront Park	SAMPLING POINT:
	SAMPLE ID: PES-MW-6

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/6/01	END DATE: 11/6/01
WELL DEPTH:	60	CASING DIAMETER:	3 inch
DEPTH TO WATER:	28.51	DATE: 11/6/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	40 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	clear	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1113	9.79	678	11.0	0.0	489	15	
1127	9.59	794	11.4	1.8	327	30	
1134	9.74	540	10.9	2.5	314	45	
1142	9.36	584	11.0	3.1	204	60	
1151	9.31	592	10.9	1.1	94	70	
1200	9.04	592	10.9	1.8	175	85	
1208	9.00	201	11.0	2.3	163	100	
1325	8.92	593	10.8	2.7	106	120	
1334	9.02	610	10.8	2.1	113	140	
1351	8.25	786	10.9	1.8	96	175	
1358	8.37	808	11.0	1.5	101	205	
1409	8.34	801	11.0	1.9	99	215	

PUMPING START TIME:	11/6/01 1104	WATER LEVEL:	28.51
PUMPING STOP TIME:	11/6/01 1410	WATER LEVEL:	28.52

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME: NIROP Pilot Scale Study	PROJECT #: 5427
	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-MW-7

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/1/01	END DATE: 11/1/01
WELL DEPTH:	70	CASING DIAMETER:	3 inch
DEPTH TO WATER:	28.85	DATE: 11/1/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	40 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	cloudy with suspended sediment	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
901	10.86	840	11.0	1.8	23.8	20	
909	10.64	818	10.9	1.4	22.4	30	
918	10.39	799	10.9	1.1	22.7	40	
924	10.26	745	11.0	0.8	35.9	55	
934	9.97	715	11.0	0.7	32.7	70	
949	9.72	701	11.0	0.0	30.8	105	
956	9.66	640	11.0	0.0	33.9	140	
1012	9.40	790	11.1	1.1	29.2	165	
1023	9.30	807	11.0	2.4	26.1	185	
1033	9.23	807	11.0	1.9	32.3	205	
1041	9.14	797	11.0	2.9	33.7	220	

PUMPING START TIME:	11/1/01 0845	WATER LEVEL:	28.85
PUMPING STOP TIME:	11/1/01 1045	WATER LEVEL:	28.68

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME: NIROP Pilot Scale Study	PROJECT #: 5427
	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-MW-8

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/6/01	END DATE: 11/6/01
WELL DEPTH:	40	CASING DIAMETER:	3 inch
DEPTH TO WATER:	28.89	DATE: 11/6/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	35 feet	FT. BELOW MP	
SAMPLE APPEARANCE:	cloudy with brown tint	ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1118	8.68	996	11.5	0.0	427	10	
1129	9.51	1028	11.4	2.3	302	25	
1137	8.23	774	10.9	2.7	409	45	
1145	8.12	763	10.9	1.5	242	60	
1154	8.06	254	10.9	1.9	251	75	
1203	8.01	744	11	2.3	125	95	
1213	7.93	869	10.9	4.2	188	115	
1327	8.03	793	10.9	3.7	114	145	
1337	7.49	951	10.9	2.8	105	165	
1353	7.53	968	10.9	2.1	109	180	
1402	7.41	925	10.9	2.5	111	210	
1411	7.67	910	10.9	2.8	109	230	
1419	7.72	939	10.9	2.3	105	250	

PUMPING START TIME:	11/6/01 1112	WATER LEVEL:	28.89
PUMPING STOP TIME:	11/6/01 1422	WATER LEVEL:	28.93

COMMENTS:

FORM COMPLETED BY:

EMR INCORPORATED

WELL DEVELOPMENT FORM

PROJECT NAME:	PROJECT #: 5427
NIROP Pilot Scale Study	SAMPLING POINT:
LOCATION: Anoka Riverfront Park	SAMPLE ID: PES-MW-9

DRILLING METHOD:	HAS	SUPERVISOR Scott Carney	
PUMP METHOD(S):	Submersible	CONTRACTOR	Bergerson Caswell
SURGE METHOD(S):	Surge Block	CREW	Glen Holman
WELL INSTALLATION DATE		START DATE: 11/7/01	END DATE: 11/7/01
WELL DEPTH:	40	CASING DIAMETER:	3 inch
DEPTH TO WATER:	28.63	DATE: 11/7/01	TIME:
DISCHARGE RATE =		gpm x 0.00223 =	cfs.
PUMP INTAKE OR BAILER SET AT	38 feet	FT. BELOW MP	
SAMPLE APPEARANCE:		ODOR:	

DIAMETER FACTORS (GAL/FT)

DIAMETER (IN):	2	3	4	5	6	7
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2

EVACUATION / STABILIZATION TEST DATA

TIME	pH	SPECIFIC CONDUCTANCE (umhos/cm)	TEMPERATURE (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Cumulative Volume (gallons)	PUMPING RATE (gpm)
1328	7.1	983	11.6	6.5	3	5	
1332	7.06	1003	11.0	7.2	7	10	
1337	7.07	1022	11.0	5.9	5	15	
1342	7.1	1040	10.9	4.3	166	20	
1346	7.11	1034	11.0	4.8	108	25	
1353	7.13	1036	11.0	3.7	332	45	
1402	7.11	1025	10.8	3.1	225	55	
1406	6.85	1016	10.8	3.9	345	60	
1410	7.08	1013	10.8	2.7	325	65	
1413	7.1	1010	10.8	3.1	202	70	
1419	7.14	1002	10.9	2.3	251	75	
1422	7.07	999	10.8	3.4	226	80	
1425	7.08	1008	10.8	2.9	234	85	
1428	7.08	1009	10.9	3.3	242	90	

PUMPING START TIME:	11/7/01 1320	WATER LEVEL:	28.63
PUMPING STOP TIME:	11/7/01 1430	WATER LEVEL:	34.52

COMMENTS: Ending water level estimated since the well was recovering very quickly.

FORM COMPLETED BY:

Appendix C

Analytical Results

Appendix C1

Field Headspace Analysis Logs

FIELD HEADSPACE ANALYSIS

PROJECT NAME: NIROP Pilot Scale	PROJECT #: 5427-001-1
LOCATION: PES-BG-1	
AMBIENT OUTSIDE TEMPERATURE:	Approximately 45
HOLDING TEMPERATURE:	Approximately 70
WEATHER CONDITIONS:	Partly cloudy, light south wind
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B
DATE OF LAST FACTORY CALIBRATION:	1/2001
FIELD CALIBRATION GAS USED AND CONCENTRATION:	100 ppm Isobutylene
DATE AND TIME OF LAST FIELD CALIBRATION:	0730 10/17/01
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV
INSTRUMENT GAIN SETTING:	NA
ERRATIC INSTRUMENT READINGS:	NA
CLEANING OR REPAIRS PERFORMED IN THE FIELD:	None
DATE: 10/17/01	PAGE 1 OF 2

SAMPLE ID	HEADSPACE RESULT	MOISTURE CONTENT	ODOR
PES-BG-1-1	0	moist	None
PES-BG-1-3	1.0	dry	None
PES-BG-1-5	1.0	moist	None
PES-BG-1-7	1.0	moist	None
PES-BG-1-9	1.0	moist	None
PES-BG-1-11	1.0	moist	None
PES-BG-1-13	1.0	moist	None
PES-BG-1-15	No sample - poor recovery		
PES-BG-1-17	1.0	moist	None
PES-BG-1-19	1.0	moist	None
PES-BG-1-21	1.0	dry	None
PES-BG-1-23	1.0	dry	None
PES-BG-1-25	2.0	dry	None
PES-BG-1-27	2.0	moist	None
PES-BG-1-29	2.0	wet	None
PES-BG-1-31	28.2	wet	None
PES-BG-1-33	112.1	wet	None
PES-BG-1-35	19.1	wet	None
PES-BG-1-37	45.4	wet	None
PES-BG-1-39	No sample - USGS sampling		

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-BG-1		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 48		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Cloudy, calm wind		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:	1/2001		
FIELD CALIBRATION GAS USED AND CONCENTRATION:			100 ppm Isobutylene
DATE AND TIME OF LAST FIELD CALIBRATION:	0730 10/18/01		
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:			None
DATE:	10/17-18/01		PAGE 2 OF 2

SAMPLE ID	HEADSPACE RESULT	MOISTURE CONTENT	ODOR
PES-BG-1-41	No sample collect - USGS sampling		
PES-BG-1-43	4	wet	None
PES-BG-1-45	2.0	wet	None
PES-BG-1-47	4.0	wet	None
PES-BG-1-49	5.0	wet	None
PES-BG-1-51	11.7	wet	None
PES-BG-1-53	3.1	wet	None
PES-BG-1-55	4.2	wet	None
PES-BG-1-57	2.1	wet	None
PES-BG-1-59	3.1	wet	None
PES-BG-1-61	3.1	wet	None
PES-BG-1-63	4.2	wet	None
PES-BG-1-65	2.1	wet	None
PES-BG-1-67	3.1	wet	None
PES-BG-1-69	5.3	wet	None
PES-BG-1-71	2.1	wet	None
PES-BG-1-73	2.1	wet	None

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-BG-2		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 45		
HOLDING TEMPERATURE:	Approximately 45		
WEATHER CONDITIONS:	Cloudy with rain		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:	1/2001		
FIELD CALIBRATION GAS USED AND CONCENTRATION:	100 ppm Isobutylene		
DATE AND TIME OF LAST FIELD CALIBRATION:	0915 10/15/01		
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:	None		
DATE:	10/15/2001		PAGE 1 OF 2

[illegible]	[illegible]	MOISTURE CONTENT	ODOR
PES-BG-2-1	0.9	dry	None
PES-BG-2-3	1.8	moist	None
PES-BG-2-5	1.8	moist	None
PES-BG-2-7	0.9	moist	None
PES-BG-2-9	1.8	moist	None
PES-BG-2-11	1.8	moist	None
PES-BG-2-13	1.8	moist	None
PES-BG-2-15	1.8	moist	None
PES-BG-2-17	1.8	moist	None
PES-BG-2-19	1.8	moist	None
PES-BG-2-21	2.7	moist	None
PES-BG-2-23	2.7	moist	None
PES-BG-2-25	Sample not collected due to poor recovery		None
PES-BG-2-27	2.7	moist	None
PES-BG-2-29	6.4	moist	None
PES-BG-2-31	13.7	moist	None
PES-BG-2-33	53.2	wet	None
PES-BG-2-35	49.3	wet	None
PES-BG-2-37	97.2	wet	None
PES-BG-2-39	9.1	wet	None

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-BG-2		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 35		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Cloudy with rain		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0715 10/16/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/16/2001	PAGE 2 OF 2	

[illegible]	[illegible] SPACE RESULT	[illegible] MOISTURE CONTENT	[illegible]
PES-BG-2-41	7.8	wet	None
PES-BG-2-43	10.5	wet	None
PES-BG-2-45	10.5	wet	None
PES-BG-2-47	2.3	wet	None
PES-BG-2-49	5.0	wet	None
PES-BG-2-51	2.3	wet	None
PES-BG-2-53	2.3	wet	None
PES-BG-2-55	1.3	wet	None
PES-BG-2-57	1.3	wet	None
PES-BG-2-59	1.3	wet	None
PES-BG-2-61	1.3	wet	None
PES-BG-2-63	1.3	wet	None
PES-BG-2-65	1.3	wet	None
PES-BG-2-67	1.3	wet	None
PES-BG-2-69	1.3	wet	None
PES-BG-2-71	2.3	wet	None
PES-BG-2-73	1.3	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-BG-3		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 28		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Clear, light wind		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0730 10/16/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/16/2001	PAGE 1 OF 2	

SAMPLE ID	RESULT	MOISTURE CONTENT	DILUTION
PES-BG-3-1	0.9	dry	None
PES-BG-3-3	0.9	dry	None
PES-BG-3-5	0.9	moist	None
PES-BG-3-7	0.9	moist	None
PES-BG-3-9	0.9	moist	None
PES-BG-3-11	0.9	moist	None
PES-BG-3-13	0.9	moist	None
PES-BG-3-15	0.9	moist	None
PES-BG-3-17	0.9	moist	None
PES-BG-3-19	0.9	moist	None
PES-BG-3-21	0.9	dry	None
PES-BG-3-23	0.9	dry	None
PES-BG-3-25	0.9	dry	None
PES-BG-3-27	1.9	moist	None
PES-BG-3-29	32.6	wet	None
PES-BG-3-31	64.3	wet	None
PES-BG-3-33	40.5	wet	None
PES-BG-3-35	23.7	wet	None
PES-BG-3-37	29.7	wet	None
PES-BG-3-39	10.2	wet	None

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-BG-3		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 40		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Clear, light south wind		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0730 10/17/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/17/2001	PAGE 2 OF 2	

	HEADSPACE	[illegible]	[illegible]
PES-BG-3-41	18.4	wet	None
PES-BG-3-43	4.1	wet	None
PES-BG-3-45	1.0	wet	None
PES-BG-3-47	2.0	wet	None
PES-BG-3-49	4.1	wet	None
PES-BG-3-51	2.0	wet	None
PES-BG-3-53	4.1	wet	None
PES-BG-3-55	2.0	wet	None
PES-BG-3-57	3.0	wet	None
PES-BG-3-59	2.0	wet	None
PES-BG-3-61	1.0	wet	None
PES-BG-3-63	1.0	wet	None
PES-BG-3-65	2.0	wet	None
PES-BG-3-67	1.0	wet	None
PES-BG-3-69	1.0	wet	None
PES-BG-3-71	2.0	wet	None
PES-BG-3-73	0.0	wet	None

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-INJ-1		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 40		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Clear, calm		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:	1/2001		
FIELD CALIBRATION GAS USED AND CONCENTRATION:	100 ppm Isobutylene		
DATE AND TIME OF LAST FIELD CALIBRATION:	1330 10/23/01		
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:	None		
DATE:	10/23/01		PAGE 1 OF 2

[illegible]	[illegible]DSPACE RESULT	[illegible]URE CONTENT	[illegible]
VG-INJ-1-1	0.0	moist	None
VG-INJ-1-3	0.0	dry	None
VG-INJ-1-5	0.0	dry	None
VG-INJ-1-7	0.0	dry	None
VG-INJ-1-9	0.0	dry	None
VG-INJ-1-11	0.0	dry	None
VG-INJ-1-13	1.7	dry	None
VG-INJ-1-15	1.7	dry	None
VG-INJ-1-17	1.7	dry	None
VG-INJ-1-19	1.7	dry	None
VG-INJ-1-21	1.7	moist	None
VG-INJ-1-23	No sample - poor recovery		
VG-INJ-1-25	2.9	moist	None
VG-INJ-1-27	0.7	dry	None
VG-INJ-1-29	4.1	wet	None
VG-INJ-1-31	21.7	wet	None
VG-INJ-1-33	45.2	wet	None
VG-INJ-1-35	58.2	wet	None
VG-INJ-1-37	7.6	wet	None
VG-INJ-1-39	11.1	wet	None
VG-INJ-1-41	48.8	wet	None

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-INJ-1		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 42		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Clear, windy		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:	1/2001		
FIELD CALIBRATION GAS USED AND CONCENTRATION:	100 ppm Isobutylene		
DATE AND TIME OF LAST FIELD CALIBRATION:	0745 10/24/01		
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:	None		
DATE:	10/24/01		PAGE 2 OF 2

[illegible]	[illegible]	[illegible]	[illegible]
VG-INJ-1-43	7.6	wet	None
VG-INJ-1-45	4.1	wet	None
VG-INJ-1-47	5.0	wet	None
VG-INJ-1-49	10.0	wet	None
VG-INJ-1-51	6.2	wet	None
VG-INJ-1-53	7.5	wet	None
VG-INJ-1-55	5.0	wet	None
VG-INJ-1-57	3.7	wet	None
VG-INJ-1-59	5.0	wet	None
VG-INJ-1-61	2.7	wet	None
VG-INJ-1-63	6.2	wet	None
VG-INJ-1-65	3.7	wet	None
VG-INJ-1-67	5.0	wet	None
VG-INJ-1-69	2.5	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-INJ-2		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 40		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Clear, calm		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0730 10/22/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/22/2001	PAGE 1 OF 2	

	HEADSPACE RESULT	MOISTURE CONTENT	[illegible]
PES-INJ-2-1	1.7	dry	None
PES-INJ-2-3	0.0	dry	None
PES-INJ-2-5	1.7	dry	None
PES-INJ-2-7	1.7	dry	None
PES-INJ-2-9	1.7	dry	None
PES-INJ-2-11	1.7	dry	None
PES-INJ-2-13	1.7	dry	None
PES-INJ-2-15	1.7	dry	None
PES-INJ-2-17	No sample collected - no recovery		
PES-INJ-2-19	2.8	dry	None
PES-INJ-2-21	1.7	dry	None
PES-ING-2-23	0.0	dry	None
PES-INJ-2-25	2.8	moist	None
PES-INJ-2-27	1.7	moist	None
PES-INJ-2-29	8.5	wet	None
PES-INJ-2-31	28.9	dry	None
PES-INJ-2-33	109.5	wet	None
PES-INJ-2-35	133.5	wet	None
PESINJ-2-37	34.6	wet	None
PES-INJ-2-39	64.2	wet	None
PES-INJ-2-41	22.1	wet	None

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-INJ-2		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 50		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Clear, calm		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0730 10/22/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/22/2001	PAGE 2 OF 2	

	RESULT		
PES-INJ-2-43	11.9	wet	None
PES-INJ-2-45	15.3	wet	None
PES-INJ-2-47	2.8	wet	None
PES-INJ-2-49	5.1	wet	None
PES-INJ-2-51	1.7	wet	None
PES-INJ-2-53	1.7	wet	None
PES-INJ-2-55	2.8	wet	None
PES-INJ-2-57	1.7	wet	None
PES-INJ-2-59	1.7	wet	None
PES-INJ-2-61	1.7	wet	None
PES-INJ-2-63	1.7	wet	None
PES-INJ-2-65	0.5	wet	None
PES-INJ-2-67	1.7	wet	None
PES-INJ-2-69	0.5	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-INJ-3		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 40		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Clear, calm		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0730 10/19/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/19/2001	PAGE 1 OF 2	

[illegible]	[illegible]	Moisture	[illegible]
PES-INJ-3-1	0.0	moist	None
PES-INJ-3-3	1.6	moist	None
PES-INJ-3-5	1.6	moist	None
PES-INJ-3-7	2.7	moist	None
PES-INJ-3-9	1.6	moist	None
PES-INJ-3-11	7.0	moist	None
PES-INJ-3-13	3.8	moist	None
PES-INJ-3-15	3.8	moist	None
PES-INJ-3-17	NC	moist	None
PES-INJ-3-19	1.6	moist	None
PES-INJ-3-21	3.8	moist	None
PES-ING-3-23	3.8	moist	None
PES-INJ-3-25	3.8	moist	None
PES-INJ-3-27	3.8	moist	None
PES-INJ-3-29	24.9	wet	None
PES-INJ-3-31	69.5	wet	None
PES-INJ-3-33	14.1	dry	None
PES-INJ-3-35	28.2	dry	None
PESINJ-3-37	34.6	wet	None
PES-INJ-3-39	64.2	wet	None
PES-INJ-3-41	22.1	wet	

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-INJ-3		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 35		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Clear, calm		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0730 10/22/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/22/2001	PAGE 2 OF 2	

[illegible]	[illegible]	[illegible]	[illegible] CONTENT
PES-INJ-3-43	6.5	wet	None
PES-INJ-3-45	18.4	wet	None
PES-INJ-3-47	9.6	wet	None
PES-INJ-3-49	34.6	wet	None
PES-INJ-3-51	43.7	wet	None
PES-INJ-3-53	2.8	wet	None
PES-INJ-3-55	2.8	wet	None
PES-INJ-3-57	3.9	wet	None
PES-INJ-3-59	3.9	wet	None
PES-INJ-3-61	1.7	wet	None
PES-INJ-3-63	1.7	wet	None
PES-INJ-3-65	2.8	wet	None
PES-INJ-3-67	0.0	wet	None
PES-INJ-3-69	0.0	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-1		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 35		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	light snow, cloudy, windy		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:	1/2001		
FIELD CALIBRATION GAS USED AND CONCENTRATION:	100 ppm Isobutylene		
DATE AND TIME OF LAST FIELD CALIBRATION:	1000 10/25/01		
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:	None		
DATE:	10/25/01		PAGE 1 OF 2

SAMPLE ID	HEADSPACE RESULT	MOISTURE CONTENT	ODOR
PES-MW-1-1	1.4	dry	None
PES-MW-1-3	0.0	dry	None
PES-MW-1-5	0.0	dry	None
PES-MW-1-7	4.0	dry	None
PES-MW-1-9	4.0	dry	None
PES-MW-1-11	1.3	dry	None
PES-MW-1-13	4.0	dry	None
PES-MW-1-15	2.7	dry	None
PES-MW-1-17	4.0	dry	None
PES-MW-1-19	2.7	dry	None
PES-MW-1-21	5.4	moist	None
PES-MW-1-23	5.4	moist	None
PES-MW-1-25	4.0	moist	None
PES-MW-1-27	1.3	moist	None
PES-MW-1-29	1.3	moist	None
PES-MW-1-31	5.4	moist	None
PES-MW-1-33	45.9	moist	None
PES-MW-1-35	12.1	wet	None
PES-MW-1-37	NR	wet	None
PES-MW-1-39	2.7	wet	None
PES-MW-1-41	15.4	wet	None

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-1		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 37		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Clear, windy		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		1000 10/25/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/25/01	PAGE 2 OF 2	

[illegible]	HEADSPACE [illegible]	MOISTURE [illegible]	ODOR
PES-MW-1-43	8.1	wet	None
PES-MW-1-45	2.7	wet	None
PES-MW-1-47	2.7	wet	None
PES-MW-1-49	4.0	wet	None
PES-MW-1-51	5.4	wet	None
PES-MW-1-53	6.7	wet	None
PES-MW-1-55	4.0	wet	None
PES-MW-1-57	2.7	wet	None
PES-MW-1-59	4.0	wet	None
PES-MW-1-61	4.0	wet	None
PES-MW-1-63	2.7	wet	None
PES-MW-1-65	4.0	wet	None
PES-MW-1-67	2.7	wet	None
PES-MW-1-69	No sample collected		

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME: NIROP Pilot Scale	PROJECT #: 5427-001-1
LOCATION: PES-MW-2	
AMBIENT OUTSIDE TEMPERATURE:	Approximately 42
HOLDING TEMPERATURE:	Approximately 65
WEATHER CONDITIONS:	Cloudy, moderate north wind
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B
DATE OF LAST FACTORY CALIBRATION:	1/2001
FIELD CALIBRATION GAS USED AND CONCENTRATION:	100 ppm Isobutylene
DATE AND TIME OF LAST FIELD CALIBRATION:	0900 10/30/01
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV
INSTRUMENT GAIN SETTING:	NA
ERRATIC INSTRUMENT READINGS:	NA
CLEANING OR REPAIRS PERFORMED IN THE FIELD:	None
DATE: 10/30/01	PAGE 1 OF 2

SAMPLE ID	HEADSPACE RESULT	MOISTURE CONTENT	ODOR
PES-MW-2-1	1.5	dry	None
PES-MW-2-3	3.0	dry	None
PES-MW-2-5	3.0	dry	None
PES-MW-2-7	4.5	dry	None
PES-MW-2-9	4.5	dry	None
PES-MW-2-11	4.5	dry	None
PES-MW-2-13	6.0	dry	None
PES-MW-2-15	No sample collected - no recovery		
PES-MW-2-17	6.0	dry	None
PES-MW-2-19	3.0	dry	None
PES-MW-2-21	6.0	dry	None
PES-MW-2-23	4.5	dry	None
PES-MW-2-25	3.0	moist	None
PES-MW-2-27	9.0	moist	None
PES-MW-2-29	12.0	moist	None
PES-MW-2-31	15.0	moist	None
PES-MW-2-33	No sample collected - no recovery		
PES-MW-2-35	22.5	wet	None
PES-MW-2-37	16.5	wet	None
PES-MW-2-39	13.5	wet	None
PES-MW-2-41	4.5	wet	None

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-2		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 42		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Cloudy, windy		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0900 10/30/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/30/01	PAGE 2 OF 2	

SAMPLE ID	RESULT	MOISTURE CONTENT	COMMENTS
PES-MW-2-43	30.0	wet	None
PES-MW-2-45	24.0	wet	None
PES-MW-2-47	19.5	wet	None
PES-MW-2-49	4.5	wet	None
PES-MW-2-51	12.0	wet	None
PES-MW-2-53	10.5	wet	None
PES-MW-2-55	12.0	wet	None
PES-MW-2-57	9.0	wet	None
PES-MW-2-59	6.0	wet	None
PES-MW-2-61	7.5	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-3		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 60		
HOLDING TEMPERATURE:	Approximately 65		
WEATHER CONDITIONS:	Cloudy, light rain, calm		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0745 11/1/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	11/01/2001	PAGE 1 OF 1	

[illegible]	[illegible]	MOISTURE	ODOR
PES-MW-3-1	1.5	dry	None
PES-MW-3-3	0.0	dry	None
PES-MW-3-5	0.0	dry	None
PES-MW-3-7	1.5	dry	None
PES-MW-3-9	1.5	dry	None
PES-MW-3-11	1.5	dry	None
PES-MW-3-13	3.1	dry	None
PES-MW-3-15	1.5	dry	None
PES-MW-3-17	1.5	dry	None
PES-MW-3-19	3.1	dry	None
PES-MW-3-21	3.1	dry	None
PES-MW-3-23	3.1	moist	None
PES-MW-3-25	4.7	moist	None
PES-MW-3-27	4.7	moist	None
PES-MW-3-29	6.3	moist	None
PES-MW-3-31	19	wet	None
PES-MW-3-33	20.6	wet	None
PES-MW-3-35	Not collected - bulk sample collection		None
PES-MW-3-37	23.8	wet	None
PES-MW-3-39	20.6	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-4		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 65		
HOLDING TEMPERATURE:	Approximately 65		
WEATHER CONDITIONS:	Cloudy, light rain, calm		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0745 11/1/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	11/01/2001	PAGE 1 OF 1	

[illegible]	HEADSPACE RESULT	MOISTURE CONTENT	[illegible]
PES-MW-4-1	2.2	dry	None
PES-MW-4-3	2.2	dry	None
PES-MW-4-5	2.2	dry	None
PES-MW-4-7	2.2	dry	None
PES-MW-4-9	2.2	dry	None
PES-MW-4-11	3.8	dry	None
PES-MW-4-13	2.2	dry	None
PES-MW-4-15	3.8	dry	None
PES-MW-4-17	3.8	dry	None
PES-MW-4-19	3.8	dry	None
PES-MW-4-21	2.2	dry	None
PES-MW-4-23	5.3	dry	None
PES-MW-4-25	5.3	dry	None
PES-MW-4-27	14.5	moist	None
PES-MW-4-29	9.9	wet	None
PES-MW-4-31	26.7	wet	None
PES-MW-4-33	29.7	wet	None
PES-MW-4-35	20.6	wet	None
PES-MW-4-37	28.2	wet	None
PES-MW-4-39	6.8	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-5		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 45		
HOLDING TEMPERATURE:	Approximately 65		
WEATHER CONDITIONS:	Clear, light winds		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:	1/2001		
FIELD CALIBRATION GAS USED AND CONCENTRATION:	100 ppm Isobutylene		
DATE AND TIME OF LAST FIELD CALIBRATION:	0830 11/2/01		
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:	None		
DATE:	11/02/2001		PAGE 1 OF 1

SAMPLE ID	HEADSPACE RESULT	MOISTURE CONTENT	ODOR
PES-MW-5-1	0.7	dry	None
PES-MW-5-3	2.3	dry	None
PES-MW-5-5	2.3	dry	None
PES-MW-5-7	0.7	dry	None
PES-MW-5-9	2.3	dry	None
PES-MW-5-11	2.3	dry	None
PES-MW-5-13	2.3	dry	None
PES-MW-5-15	2.3	dry	None
PES-MW-5-17	2.3	dry	None
PES-MW-5-19	2.3	dry	None
PES-MW-5-21	2.3	dry	None
PES-MW-5-23	2.3	dry	None
PES-MW-5-25	2.3	dry	None
PES-MW-5-27	2.3	moist	None
PES-MW-5-29	3.8	wet	None
PES-MW-5-31	2.3	wet	None
PES-MW-5-33	2.3	wet	None
PES-MW-5-35	2.3	wet	None
PES-MW-5-37	2.3	wet	None
PES-MW-5-39	2.3	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-6		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 42		
HOLDING TEMPERATURE:	Approximately 65		
WEATHER CONDITIONS:	Cloudy, moderate north wind		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0735 10/29/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/29/01	PAGE 1 OF 2	

SAMPLE ID	HEADSPACE RESULT	MOISTURE CONTENT	ODOR
PES-MW-6-1	5.8	dry	None
PES-MW-6-3	2.9	dry	None
PES-MW-6-5	1.4	dry	None
PES-MW-6-7	4.3	dry	None
PES-MW-6-9	4.3	dry	None
PES-MW-6-11	4.3	dry	None
PES-MW-6-13	8.7	dry	None
PES-MW-6-15	5.8	dry	None
PES-MW-6-17	2.9	dry	None
PES-MW-6-19	1.4	dry	None
PES-MW-6-21	7.2	dry	None
PES-MW-6-23	5.8	moist	None
PES-MW-6-25	5.8	moist	None
PES-MW-6-27	7.2	moist	None
PES-MW-6-29	10.2	moist	None
PES-MW-6-31	7.2	moist	None
PES-MW-6-33	35.0	moist	None
PES-MW-6-35	70.0	wet	None
PES-MW-6-37	23.3	wet	None
PES-MW-6-39	74.4	wet	None
PES-MW-6-41	35.0	wet	None

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-6		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 35		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Cloudy, windy		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0735 10/29/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/29/01	PAGE 2 OF 2	

	GE RESULTS	MOISTURE CONTENT	[illegible]
PES-MW-6-43	27.2		
PES-MW-6-45	29.1	wet	None
PES-MW-6-47	14.5	wet	None
PES-MW-6-49	18.9	wet	None
PES-MW-6-51	11.6	wet	None
PES-MW-6-53	17.5	wet	None
PES-MW-6-55	8.7	wet	None
PES-MW-6-57	10.7	wet	None
PES-MW-6-59	7.2	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-7		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 35		
HOLDING TEMPERATURE:	Approximately 65		
WEATHER CONDITIONS:	Cloudy, moderate north wind		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0815 10/26/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/26/01	PAGE 1 OF 2	

FIELD ID	HEADSPACE RESULT	MOISTURE CONTENT	OTHER
PES-MW-7-1	0.7	dry	None
PES-MW-7-3	0.7	dry	None
PES-MW-7-5	2.1	dry	None
PES-MW-7-7	0.7	dry	None
PES-MW-7-9	2.1	dry	None
PES-MW-7-11	2.1	dry	None
PES-MW-7-13	Not collected - poor recovery		
PES-MW-7-15	0.7	dry	None
PES-MW-7-17	2.1	dry	None
PES-MW-7-19	0.7	dry	None
PES-MW-7-21	0.7	dry	None
PES-MW-7-23	2.1	moist	None
PES-MW-7-25	2.1	moist	None
PES-MW-7-27	2.1	moist	None
PES-MW-7-29	12.0	moist	None
PES-MW-7-31	20.5	wet	None
PES-MW-7-33	10.6	moist	None
PES-MW-7-35	99.9	wet	None
PES-MW-7-37	91.4	wet	None
PES-MW-7-39	19.1	wet	None
PES-MW-7-41	7.8	wet	None

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-1		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 35		
HOLDING TEMPERATURE:	Approximately 70		
WEATHER CONDITIONS:	Cloudy, windy		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0815 10/26/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/26/01	PAGE 2 OF 2	

	HEADSPACE RESULT	MOISTURE CONTENT	ODOR
PES-MW-7-43	No sample collected - poor recovery		
PES-MW-7-45	7.8	wet	None
PES-MW-7-47	2.1	wet	None
PES-MW-1-49	2.1	wet	None
PES-MW-7-51	4.9	wet	None
PES-MW-7-53	4.9	wet	None
PES-MW-7-55	4.9	wet	None
PES-MW-7-57	6.3	wet	None
PES-MW-7-59	4.9	wet	None
PES-MW-7-61	3.5	wet	None
PES-MW-7-63	2.1	wet	None
PES-MW-7-65	3.5	wet	None
PES-MW-7-67	No sample collected - poor recovery		
PES-MW-7-69	4.9	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-8		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 60		
HOLDING TEMPERATURE:	Approximately 60		
WEATHER CONDITIONS:	Partly cloudy, calm		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0745 10/31/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	10/31/2001	PAGE 1 OF 1	

	PID RESULT	SOIL MOISTURE CONTENT	
PES-MW-8-1	1.4	dry	None
PES-MW-8-3	1.4	dry	None
PES-MW-8-5	1.4	dry	None
PES-MW-8-7	1.4	dry	None
PES-MW-8-9	1.4	dry	None
PES-MW-8-11	1.4	dry	None
PES-MW-8-13	1.4	dry	None
PES-MW-8-15	1.4	dry	None
PES-MW-8-17	1.4	dry	None
PES-MW-8-19	1.4	dry	None
PES-MW-8-21	1.4	moist	None
PES-MW-8-23	2.9	moist	None
PES-MW-8-25	2.9	wet	None
PES-MW-8-27	2.9	moist	None
PES-MW-8-29	2.9	moist	None
PES-MW-8-31	4.4	moist	None
PES-MW-8-33	1.4	wet	None
PES-MW-8-35	1.4	wet	None
PES-MW-8-37	86.5	wet	None
PES-MW-8-39	68.6	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-MW-9		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 60		
HOLDING TEMPERATURE:	Approximately 60		
WEATHER CONDITIONS:	Partly cloudy, calm		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:	1/2001		
FIELD CALIBRATION GAS USED AND CONCENTRATION:	100 ppm Isobutylene		
DATE AND TIME OF LAST FIELD CALIBRATION:	0745 10/31/01		
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:	None		
DATE:	10/31/2001		PAGE 1 OF 1

[illegible]	HEADSPACE RESULT	MOISTURE CONTENT	ODOR
PES-MW-9-1	1.4	dry	None
PES-MW-9-3	1.4	dry	None
PES-MW-9-5	1.4	dry	None
PES-MW-9-7	1.4	dry	None
PES-MW-9-9	1.4	dry	None
PES-MW-9-11	1.4	dry	None
PES-MW-9-13	2.9	dry	None
PES-MW-9-15	2.9	dry	None
PES-MW-9-17	1.4	dry	None
PES-MW-9-19	1.4	dry	None
PES-MW-9-21	2.9	dry	None
PES-MW-9-23	4.4	dry	None
PES-MW-9-25	4.4	moist	None
PES-MW-9-27	2.9	moist	None
PES-MW-9-29	14.9	wet	None
PES-MW-9-31	26.8	wet	None
PES-MW-9-33	53.7	wet	None
PES-MW-9-35	Not collected - bulk density sample		None
PES-MW-9-37	35.8	wet	None
PES-MW-9-39	10.4	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-CW-1		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 45		
HOLDING TEMPERATURE:	Approximately 65		
WEATHER CONDITIONS:	Clear, light winds		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:	1/2001		
FIELD CALIBRATION GAS USED AND CONCENTRATION:	100 ppm Isobutylene		
DATE AND TIME OF LAST FIELD CALIBRATION:	0730 11/5/01		
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:	None		
DATE:	11/05/2001		PAGE 1 OF 1

SAMPLE ID	HEADSPACE RESULT	MOISTURE CONTENT	ODOR
PES-CW-1-1	1.6	dry	None
PES-CW-1-3	1.6	dry	None
PES-CW-1-5	1.6	dry	None
PES-CW-1-7	1.6	dry	None
PES-CW-1-9	1.6	dry	None
PES-CW-1-11	1.6	dry	None
PES-CW-1-13	0.0	dry	None
PES-CW-1-15	1.6	dry	None
PES-CW-1-17	1.6	dry	None
PES-CW-1-19	1.6	dry	None
PES-CW-1-21	1.6	moist	None
PES-CW-1-23	1.6	moist	None
PES-CW-1-25	1.6	moist	None
PES-CW-1-27	1.6	moist	None
PES-CW-1-29	1.6	wet	None
PES-CW-1-31	3.3	wet	None
PES-CW-1-33	1.6	wet	None
PES-CW-1-35	Not collected - bulk density sample		None
PES-CW-1-37	1.6	wet	None
PES-CW-1-39	1.6	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-CW-2		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 45		
HOLDING TEMPERATURE:	Approximately 65		
WEATHER CONDITIONS:	Clear, light winds		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0730 11/5/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	11/05/2001	PAGE 1 OF 1	

SAMPLE ID	HEADSPACE RESULT	MOISTURE CONTENT	
PES-CW-2-1	0.0	dry	None
PES-CW-2-3	0.0	dry	None
PES-CW-2-5	1.6	dry	None
PES-CW-2-7	0.0	dry	None
PES-CW-2-9	0.0	dry	None
PES-CW-2-11	0.0	dry	None
PES-CW-2-13	0.0	dry	None
PES-CW-2-15	0	dry	None
PES-CW-2-17	0.0	dry	None
PES-CW-2-19	1.6	dry	None
PES-CW-2-21	1.6	dry	None
PES-CW-2-23	0.0	dry	None
PES-CW-2-25	0.0	dry	None
PES-CW-2-27	1.6	moist	None
PES-CW-2-29	1.6	wet	None
PES-CW-2-31	3.3	wet	None
PES-CW-2-33	1.6	wet	None
PES-CW-2-35	Not collected - bulk density sample		None
PES-CW-2-37	3.3	wet	None
PES-CW-2-39	1.6	wet	None

NC - Not collected

FIELD HEADSPACE ANALYSIS

PROJECT NAME:	NIROP Pilot Scale	PROJECT #:	5427-001-1
LOCATION:	PES-CW-3		
AMBIENT OUTSIDE TEMPERATURE:	Approximately 55		
HOLDING TEMPERATURE:	Approximately 65		
WEATHER CONDITIONS:	Clear, light winds		
INSTRUMENT MAKE AND MODEL:	Thermo Environmental 580B		
DATE OF LAST FACTORY CALIBRATION:		1/2001	
FIELD CALIBRATION GAS USED AND CONCENTRATION:		100 ppm Isobutylene	
DATE AND TIME OF LAST FIELD CALIBRATION:		0830 11/2/01	
LAMP ENERGY IN ELECTROVOLTS:	10.7 eV		
INSTRUMENT GAIN SETTING:	NA		
ERRATIC INSTRUMENT READINGS:	NA		
CLEANING OR REPAIRS PERFORMED IN THE FIELD:		None	
DATE:	11/02/2001	PAGE 1 OF 1	

SAMPLE ID	HEADSPACE	MOISTURE	ODOR
PES-CW-3-1	2.3	dry	None
PES-CW-3-3	2.3	dry	None
PES-CW-3-5	2.3	dry	None
PES-CW-3-7	2.3	dry	None
PES-CW-3-9	2.3	dry	None
PES-CW-3-11	2.3	dry	None
PES-CW-3-13	2.3	dry	None
PES-CW-3-15	2.3	dry	None
PES-CW-3-17	2.3	dry	None
PES-CW-3-19	2.3	dry	None
PES-CW-3-21	0.7	dry	None
PES-CW-3-23	0.7	dry	None
PES-CW-3-25	0.7	dry	None
PES-CW-3-27	2.3	dry	None
PES-CW-3-29	0.7	dry	None
PES-CW-3-31	3.8	wet	None
PES-CW-3-33	3.8	wet	None
PES-CW-3-35	Not collected - bulk density sample		None
PES-CW-3-37	6.9	wet	None
PES-CW-3-39	2.3	wet	None

NC - Not collected

Appendix C2

Soil Total Organic Carbon and Volatile Organic Compound Analytical Data Summary

Soil TOC and VOC Analytical Summary

Well	Total Organic Carbon	Volatile Organic Compound
Soil		
PES-BG-1	1100 ppm	21 ppb Trichloroethene
PES-INJ-1	610 ppm	38 ppb Trichloroethene
PES-INJ-2	920 ppm	420 ppb Trichloroethene
PES-INJ-3	650 ppm	80 ppb Trichloroethene
PES-MW-1	1200 ppm	41 ppb Trichloroethene
PES-MW-2	570 ppm	140 ppb Trichloroethene 7.9 ppb Carbon Tetrachloride
PES-MW-3	590 ppm	12 ppb Acetone 200 ppb Trichloroethene
PES-MW-4	630 ppm	620 ppb Trichloroethene 22 ppb trans-1,2-Dichloroethene 8.9 ppb cis-1,2-Dichloroethene
PES-MW-5	6000 ppm	9.2 ppb Trichloroethene
PES-MW-6	<500 ppm	710 ppb Trichloroethene
PES-MW-6 Duplicate	<500 ppm	1100 ppb Trichloroethene 19 ppb trans-1,2-Dichloroethene
PES-MW-7	590 ppm	All Values Below EQLs
PES-MW-8	<500 ppm	130 ppb Trichloroethene
PES-MW-9	1400 ppm	100 ppb Trichloroethene
PES-CW-1	1700 ppm	48 ppb Trichloroethene
PES-CW-2	7100 ppm	51 ppb Trichloroethene
PES-CW-3	510 ppm	43 ppb Trichloroethene

ppb = parts per billion
ppm = parts per million

Appendix C3

Soil Bulk Density Analytical Data

PROJECT: NIROP WELL INSTALLATIONS - FRIDLEY, MN. # 5427-001-1

REPORTED TO: BERGERSON - CASWELL

DATE: 11-9-01

JOB NO. 4324

WATER CONTENT / DRY DENSITY

SAMPLE ID	WELL TYPE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	WATER CONTENT (%)	DRY DENSITY (PCF)
VG-INJ-3 41-42	INJECTION WELL #3	41-42	2" LINER	SAND, FINE TO MED-GRAINED (SP)	15.5	112.4
VG-INJ-2 44-46	INJECTION WELL #2	44-46	2" LINER	SAND, FINE GRAINED (SP/SP-SM)	18.9	106.6
PFS-BG-1 36-38	BACKGROUND WELL #1	36-38	BAG	SAND, FINE GRAINED (SP/SP-SM)	17.9	103.6
VG-INJ-1 41-42	INJECTION WELL #1	41-42	2" LINER	SAND, FINE GRAINED (SP/SP-SM)	18.1	107.9
PES-MW-1 43-44	MONITORING WELL #1	43-44	2" LINER	SAND, FINE GRAINED (SP/SP-SM)	17.8	110.9
PES-MW-2 41-42	MONITORING WELL #2	41-42	2" LINER	SAND W/A TRACE OF GRAVEL, FINE GRAINED (SP/SP-SM)	14.7	120.8
PES-MW-6 35-36	MONITORING WELL #6	35-36	2" LINER	CLAYEY SAND W/A LITTLE GRAVEL (SC/SC-SM)	10.6	130.3
PES-MW-6 41-42	MONITORING WELL #6	41-42	2" LINER	SAND, FINE GRAINED (SP/SP-SM)	19.5	105.1
PES-MW-7 43-43.5	MONITORING WELL #7	43-43.5	2" LINER	SAND W/A TRACE OF GRAVEL, FINE TO MEDIUM GRAINED (SP/SP-SM)	16.7	115.0
PES-MW-9 35-36	MONITORING WELL #9	35-36	2" LINER	CLAYEY SAND W/A LITTLE GRAVEL (SC/CL)	10.1	131.4
PES-CW-1 35.5-36	CONTINGENCY WELL #1	35.5-36	2½" LINER	SAND, FINE GRAINED (SP/SP-SM)	17.0	104.8
PES-CW-2 37.5-38	CONTINGENCY WELL #2	37.5-38	2½" LINER	SAND, FINE GRAINED (SP/SP-SM)	18.4	105.7
PES-CW-3 35-36	CONTINGENCY WELL #3	35-36	2" LINER	CLAYEY SAND W/A TRACE OF GRAVEL (SC)	12.0	125.8
PES-MW-3 35-36	MONITORING WELL #3	35-36	2" LINER	SILTY CLAYEY SAND (SC-SM)	9.6	132.1
PES-MW-4 35.5-36	MONITORING WELL #4	35.5-36	2½" LINER	CLAYEY SAND (SC-SM/SC)	15.6	116.2
PES-MW-5 35.5-36	MONITORING WELL #5	35.5-36	2½" LINER	SAND, FINE TO MEDIUM GRAINED (SP/SP-SM)	21.1	104.9

Appendix C4

Groundwater Sampling Information Forms

Sampling Information Form

Weather Conditions:

Cloud Cover: Clear

Wind Speed & Direction: South calm

Temperature: ~65⁰

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-INJ-1

Location: Anoka County Park

Well Depth (ft. Below TOC): 45′

FID/PID reading @ Wellhead: 4.0 ppm

Depth to Water (below TOC): 28.23′

Sample Date: 11/19/01

Sample Time: 1126

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.01 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 31 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 4/19/01
PROJECT NAME: ~~4~~/ROP PILOT SCALE STUDY
SAMPLE LOCATION : PES-INJ-1
SAMPLED BY : SJL

PROJECT NUMBER: 5427
SAMPLE ID: GWINJ-1/SA
PUMP TYPE : BLADDER
PURGE RATE: ≈900 mL/min

WELL DIMENSIONS

Static Water Level (ft):	28.73	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	45'	
Well Diameter (in):		0
Casing Diameter (in):		
Screened Interval (in):	35-45	0

PURGE CALCULATIONS

Standing Water Column (ft):	16.27	0
1 Casing Volume (gal):	5.97	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	17.9	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT APPLICABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
4.0	7.83	1001	10.9	1.0	0.12	53	8.3	1016	WATER IS CLEAR	SJL
6.0	7.76	1010	10.8	0.8	0.09	50	7.9	1028		
8.0	7.75	1011	10.7	0.8	0.09	47	9.1	1038		
10.0	7.72	1012	10.6	0.8	0.09	41	10.5	1045		
12.0	7.68	1016	10.7	0.9	0.1	32	12.8	1055		
14.0	7.68	1016	10.7	0.9	0.1	26	7.1	1101		
15.0	7.64	1019	10.6	1.0	0.11	15	3.8	1107		
16.0	7.64	1017	10.7	1.2	0.12	9	3.6	1114		
17.0	7.61	1017	10.6	1.3	0.14	3	4.5	1119		
18.0	7.62	1015	10.7	1.2	0.14	-1	4.5	1124		
									SAMPLING INITIATED @ 1126	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: Clear

Wind Speed & Direction: South calm

Temperature: ~65⁰

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-INJ-2

Location: Anoka County Park

Well Depth (ft. Below TOC): 45′

FID/PID reading @ Wellhead: 3.4 ppm

Depth to Water (below TOC): 29.20′

Sample Date: 11/19/01

Sample Time: 0913

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.10 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 31 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/19/01
PROJECT NAME: NIAGP PILOT SCALE STUDY
SAMPLE LOCATION: PES-INJ-2
SAMPLED BY: SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWINJ-2/SA
PUMP TYPE: BLADDER
PURGE RATE: 900 ml/min

WELL DIMENSIONS

Static Water Level (ft):	29.20	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	45	
Well Diameter (in):		0
Casing Diameter (in):	3"	
Screened Interval (in):	35-45	0

PURGE CALCULATIONS

Standing Water Column (ft):	15.8	0
1 Casing Volume (gal):	5.79	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	17.4	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT APPLICABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
2.0	6.91	912	9.8	1.2	0.12	121	2.5	0750	WATER IS CLEAR	SJC
4.0	7.33	963	10.0	0.2	0.1	120	1.8	0800		
6.0	7.67	963	10.2	0.1	0.01	110	1.3	0810		
8.0	7.77	965	10.2	0.0	0.0	104	2.6	0820		
10.0	7.82	966	10.4	0.0	0.0	98	1.2	0830		
12.0	7.84	968	10.4	0.0	0.0	92	1.4	0840		
14.0	7.81	970	10.4	0.0	0.0	84	0.5	0851		
16.0	7.80	971	10.5	0.0	0.0	81	6.5	0900		
17.0	7.78	971	10.5	0.0	0.0	76	7.5	0905		
18.0	7.77	971	10.5	0.0	0.0	74	7.4	0910		
									SAMPLING INITIATED @ 0913	

Comments:

Serra/work/projects/template/field/gwsample.xls

Sampling Information Form

Weather Conditions:

Cloud Cover: Clear

Wind Speed & Direction: South calm

Temperature: ~63⁰

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-INJ-3

Location: Anoka County Park

Well Depth (ft. Below TOC): 50′

FID/PID reading @ Wellhead: 6.7 ppm

Depth to Water (below TOC): 50′

Sample Date: 11/16/01

Sample Time: 1334

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.12 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 31 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/16/01
PROJECT NAME: N. ROP PILOT SCALE STUDY
SAMPLE LOCATION : DES-IW1-3
SAMPLED BY : SJC

PROJECT NUMBER: 5427
SAMPLE ID: GW1W1-3(SA
PUMP TYPE : BLADDER
PURGE RATE: 950 ml/min

WELL DIMENSIONS

Static Water Level (ft):	29.02	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	50'	
Well Diameter (in):	3"	0
Casing Diameter (in):		
Screened Interval (in):	40-50	0

PURGE CALCULATIONS

Standing Water Column (ft):	20.98	0
1 Casing Volume (gal):	7.69	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	23.0	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT APPLICABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
2.0	8.62	609	12.1	29.6	3.12	-4	1.8	1155	WATER IS CLEAR	SJC
4.0	8.41	827	11.9	16.4	1.73	-21	1.4	1204		
6.0	8.50	828	12.0	11.4	1.18	-51	3.1	1213		
8.0	8.58	833	12.0	11.0	1.15	-61	4.7	1221		
10.0	8.61	832	11.9	10.2	1.08	-68	4.5	1231		
12.0	8.57	868	12.0	10.4	1.09	-70	4.0	1240		
14.0	8.54	872	12.0	10.1	1.07	-71	3.6	1247		
16.0	8.52	874	12.0	9.5	1.0	-73	2.8	1256		
18.0	8.50	875	12.1	9.8	1.03	-74	2.7	1304		
20.0	8.49	877	12.1	9.4	1.01	-76	4.8	1313		
22.0	8.48	878	12.1	9.4	1.00	-77	3.1	1323		
24.0	8.47	881	12.1	9.2	0.92	-79	3.0	1331		
									SAMPLING INITIATED @ 1334	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: Clear

Wind Speed & Direction: South calm

Temperature: ~49°

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-MW-1

Location: Anoka County Park

Well Depth (ft. Below TOC): 45′

FID/PID reading @ Wellhead: 3.3 ppm

Depth to Water (below TOC): 28.79′

Sample Date: 11/16/01

Sample Time: 0906

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.03 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 31 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/16/01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION : PES-MW-1
SAMPLED BY : SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWMW-1/SA
PUMP TYPE : BLADDER
PURGE RATE: 800mL/min

80
32
112

168
112
56
40
16

WELL DIMENSIONS

Static Water Level (ft):	28.79	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	45	
Well Diameter (in):		0
Casing Diameter (in):	3"	
Screened Interval (in):	35-45	0

PURGE CALCULATIONS

Standing Water Column (ft):	16.21	0
1 Casing Volume (gal):	5.94	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	17.8	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh:
Cond.:
pH:

NOT APPLICABLE

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
2.5	7.72	845	10.6	5.8	0.63	46	2.2	0745	WATER IS CLEAR	SJC
4.0	8.12	857	10.8	4.6	0.48	45	2.6	0752		
6.0	8.20	869	10.8	8.6	0.90	38	3.2	0807		
8.0	8.21	868	10.9	6.8	0.74	31	4.6	0813		
10.0	8.23	866	11.0	9.3	0.99	11	2.0	0825		
12.0	8.25	866	11.1	8.5	0.92	5	1.6	0834		
14.0	8.25	866	10.9	8.7	0.94	-16	2.0	0841		
15.0	8.30	867	10.9	12.3	1.33	-36	1.8	0845		
16.0	8.28	870	~~11.5~~	~~1.23~~	1.25	-45	1.8	0852		
1			10.9	11.5						
17.0	8.28	871	11.0	12.0	1.32	-46	1.9	0900		
18.0	8.29	873	11.0	11.8	1.27	-50	1.9	0904		
									SAMPLING INITIATED @ 0906	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: Clear

Wind Speed & Direction: South calm

Temperature: ~63^0

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-MW-2

Location: Anoka County Park

Well Depth (ft. Below TOC): 45′

FID/PID reading @ Wellhead: 5.2 ppm

Depth to Water (below TOC): 28.69′

Sample Date: 11/15/01

Sample Time: 0913

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.0 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 32 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/15/01
PROJECT NAME: NIBOP PILOT SCALE STUDY
SAMPLE LOCATION : PEC-MW-2
SAMPLED BY : SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWMW-2/SA
PUMP TYPE : BLADDER PUMP
PURGE RATE: 900 ml/min

WELL DIMENSIONS

Static Water Level (ft):	28.69	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	70'	
Well Diameter (in):		0
Casing Diameter (in):		
Screened Interval (in):	35-45	0

PURGE CALCULATIONS

Standing Water Column (ft):	16.31	0
1 Casing Volume (gal):	5.98	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	17.9	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT APPLICABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
2.0	11.73	1518	11.6	5.0	0.53	4.91	-158	1223	WATER IS CLEAR	SJC
4.0	11.79	1491	11.6	4.3	0.45	4.6	-170	1232		
6.0	11.78	1487	11.6	4.1	0.43	3.4	-166	1241		
8.0	11.76	1345	11.6	3.9	0.41	3.1	-164	1248		
10.0	11.73	1312	11.5	3.9	0.41	2.9	-164	1256		
12.0	11.71	1287	11.5	3.9	0.41	2.7	-167	1304		
14.0	11.71	1264	11.5	3.8	0.40	2.9	-171	1311		
16.0	11.67	1204	11.5	3.8	0.40	3.5	-179	1320		
17.0	11.66	1181	11.5	3.7	0.40	3.6	-184	1328		
18.0	11.66	1181	11.5	3.7	0.39	3.5	-185	1331		
									SAMPLES COLLECTED @ 1330 DUPLICATE #1 (IO MW400) COLLECTED HERE.	

Comments

Serra/work/projects/template/field/gwsample.xls

Sampling Information Form

Weather Conditions:

Cloud Cover: Cloudy

Wind Speed & Direction: South calm

Temperature: ~58⁰

Precipitation: Light mist

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-MW-3

Location: Anoka County Park

Well Depth (ft. Below TOC): 42.43′

FID/PID reading @ Wellhead: 26.8 ppm

Depth to Water (below TOC): 29.61′

Sample Date: 11/14/01

Sample Time: 1044

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.19 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 32 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/14/01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION: PES-MW-3
SAMPLED BY: SSL

PROJECT NUMBER: 5427
SAMPLE ID: GWMW-3/SA
PUMP TYPE: BLADDER
PURGE RATE: ≈900 mL/min

WELL DIMENSIONS

Static Water Level (ft):	29.61	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	42.43	
Well Diameter (in):	3"	0
Casing Diameter (in):		
Screened Interval (in):	30-40	0

PURGE CALCULATIONS

Standing Water Column (ft):	12.82	0
1 Casing Volume (gal):	4.7	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	14.11	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT AVAILABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad:
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
2.0 ~~4.0~~	7.06	1082	12.3	6.5	0.67	-71	1.86 ~~[illegible]~~	1525	WATER IS CLEAR	SSL
4.0	7.05	1078	12.2	4.4	0.46	-74	1.02	1535		
6.0	7.05	1078	12.2	3.9	0.40	-74	0.36	1546		
9.0 ~~8.0~~	7.05	1080	12.3	3.7	0.38	-76	0.31	1607		
10.0	7.05	1079	12.2	3.6	0.37	-76	0.26	1613		
11.0	7.05	1077	12.1	3.5	0.37	-76	0.16	1620		
12.0	7.05	1079	12.1	3.5	0.36	-76	0.10	1629		
~~13.0~~	7.05	1078	12.1	3.4	0.35	-76	0.10	1639		
									SAMPLES COLLECTED @ 1644	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: Cloudy

Wind Speed & Direction: South calm

Temperature: ~59^0

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-MW-4

Location: Anoka County Park

Well Depth (ft. Below TOC): 42.45′

FID/PID reading @ Wellhead: 16.8 ppm

Depth to Water (below TOC): 31.54′

Sample Date: 11/14/01

Sample Time: 1341

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.25 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 33 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 4/14/01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION : PES-MW-4
SAMPLED BY : SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWMW-4/SA
PUMP TYPE : BLADDER
PURGE RATE: 800 ml/min

WELL DIMENSIONS

Static Water Level (ft):	31.54	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	42.45	
Well Diameter (in):	3"	0
Casing Diameter (in):		
Screened Interval (in):	30-40	0

PURGE CALCULATIONS

Standing Water Column (ft):	10.91	0
1 Casing Volume (gal):	4.00	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	12.00	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh:
Cond.: NOT APPLICABLE
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
							1.82			
3.0	7.13	1101	12.3	11.6	1.23	-50	~~[illegible]~~	1245	WATER IS CLEAR	SJC
5.0	7.13	1106	12.3	11.0	1.16	-56	4.06	1255		
7.0	7.12	1111	12.4	11.2	1.14	-57	1.68	1305		
9.0	7.12	1113	12.2	11.3	1.16	-55	1.01	1312		
10.0	7.12	1113	12.1	11.5	1.20	-54	0.72	1320		
11.0	7.12	1114	12.1	11.7	1.23	-52	0.33	1326		
12.0	7.12	1114	12.1	12.1	1.27	-50	0.30	1332		
13.0	7.12	1115	12.1	12.6	1.32	-48	0.30	1337		
									SAMPLED @ 1341	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: Cloudy Light fog

Wind Speed & Direction: South calm

Temperature: ~59⁰

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-MW-5

Location: Anoka County Park

Well Depth (ft. Below TOC): 42.4′

FID/PID reading @ Wellhead: 0.0 ppm

Depth to Water (below TOC): 31.55′

Sample Date: 11/14/01

Sample Time: 1122

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.26 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 34 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:

-Dissolved Oxygen probe checked and changed. Recalibrated prior to use.

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/14/01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION : PES-MW-5
SAMPLED BY : SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWOMW-5/SA
PUMP TYPE : BLADDER
PURGE RATE:

WELL DIMENSIONS

Static Water Level (ft):	31.55	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	42.4	
Well Diameter (in):	3"	0
Casing Diameter (in):	3"	
Screened Interval (in):		0

PURGE CALCULATIONS

Standing Water Column (ft):	10.85	0
1 Casing Volume (gal):	3.48	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	11.54	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh:
Cond.:
pH:

NOT APPLICABLE

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference: ~~YES~~
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
9.0	6.81	1274	11.7	13.5	1.42	104	2.13	1030	WATER IS CLEAR	SJC
6.0	6.81	1281	11.7	13.7	1.40	104	2.46	1042		
8.0	6.81	1280	11.7	13.1	1.40	105	1.85	1050		
9.0	6.81	1281	11.7	13.3	1.40	105	2.60	1059		
10.0	6.81	1281	11.8	13.7	1.44	104	2.80	1104		
11.0	6.80	1280	11.8	13.5	1.42	104	2.48	1108		
12.0	6.80	1281	11.8	13.8	1.44	105	1.42	1113		
13.0	6.80	1279	11.7	13.7	1.42	104	2.07	1118		
									BEGIN SAMPLING @ 1122	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: Clear

Wind Speed & Direction: South calm

Temperature: ~65⁰

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-MW-6

Location: Anoka County Park

Well Depth (ft. Below TOC): 45′

FID/PID reading @ Wellhead: 24.5 ppm

Depth to Water (below TOC): 28.72′

Sample Date: 11/15/01

Sample Time: 1542

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.0 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 31 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/15/01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION: PES-MW-6
SAMPLED BY: SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWMW-6/SA
PUMP TYPE: BLADDER
PURGE RATE:

WELL DIMENSIONS

Static Water Level (ft):	28.72	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	45.70'	
Well Diameter (in):		0
Casing Diameter (in):	3"	
Screened Interval (in):	35-45	0

PURGE CALCULATIONS

Standing Water Column (ft):	16.28	0
1 Casing Volume (gal):	5.9	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	17.9	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT APPLICABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
2.0	8.44	1064	11.6	2.9	0.30	-79	4.7	1432	WATER IS CLEAR	SJC
4.0	8.29	1065	11.6	2.6	0.27	-86	4.5	1440		
6.0	8.02	1056	11.6	2.1	0.23	-40	3.6	1447		
8.0	7.93	1046	11.6	2.1	0.23	-124	4.0	1457		
10.0	7.87	1040	11.6	2.1	0.22	-132	3.1	1508		
12.0	7.85	1036	11.6	2.1	0.22	-141	3.2	1515		
14.0	7.82	1033	11.5	2.1	0.22	-148	2.6	1522		
15.0	7.80	1031	11.5	2.1	0.22	-150	2.4	1527		
16.0	7.80	1031	11.5	2.1	0.22	-153	2.4	1531		
17.0	7.80	1029	11.5	2.1	0.22	-155	2.3	1535		
18.0	7.79	1030	11.5	2.1	0.22	-158	1.8	1540		
									SAMPLED @ 1542	

Comments:

Serra/work/projects/template/field/gwsample.xls

Sampling Information Form

Weather Conditions:

Cloud Cover: Clear

Wind Speed & Direction: South calm

Temperature: ~60⁰

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-MW-7

Location: Anoka County Park

Well Depth (ft. Below TOC): 45′

FID/PID reading @ Wellhead: 3.3 ppm

Depth to Water (below TOC): 28.90′

Sample Date: 11/16/01

Sample Time: 1110

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.0 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 31 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/16/01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION : PES-MW-7
SAMPLED BY : SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWMW-7154
PUMP TYPE : BLADDER
PURGE RATE: 800 mL

WELL DIMENSIONS

Static Water Level (ft):	28.90	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	45	
Well Diameter (in):		0
Casing Diameter (in):	3"	
Screened Interval (in):	35-45	0

PURGE CALCULATIONS

Standing Water Column (ft):	16.1	0
1 Casing Volume (gal):	5.9	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	17.7	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh:
Cond.: NO APPLICABLE
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
2.0	8.62	551	11.4	~~265~~ 230	~~230~~ 26.8	-28	17.2	~~0953~~	WATER IS CLEAR	SJC
4.0	9.25	682	11.4	68	7.05	-36	20.4	1003		
6.0	9.19	794	11.4	26.3	2.78	-37	49.2	1012		
8.0	9.08	821	11.5	23.6	2.55	-35	32.7	1023		
10.0	9.03	838	11.5	21.2	2.26	-37	24.7	1031		
12.0	8.99	846	11.6	21.8	2.30	-31	59.9	1045		
15.0	8.98	848	11.6	21.4	2.30	-30	27.3	1050		
16.0	8.97	850	11.6	21.5	2.31	-29	31.3	1055		
17.0	8.97	851	11.6	21.2	2.20	-27	32.0	1059		
18.0	8.96	854	11.6	21.9	2.28	-26	31.1	1104		
									SAMPLING INITIATED @ ~~1106~~ 1110	

Comments:

Serra/work/projects/template/field/gwsample.xls

Sampling Information Form

Weather Conditions:

Cloud Cover: Clear

Wind Speed & Direction: South calm

Temperature: ~62⁰

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-MW-8

Location: Anoka County Park

Well Depth (ft. Below TOC): 42.58′

FID/PID reading @ Wellhead: 14.2 ppm

Depth to Water (below TOC): 28.97′

Sample Date: 11/15/01

Sample Time: 1133

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.19 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 31 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/15/01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION : PES-MW-8
SAMPLED BY : SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWMW-8/SA
PUMP TYPE : BLADDER PUMP
PURGE RATE: 900 ml/min

WELL DIMENSIONS

Static Water Level (ft):	28.97	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	42.58	
Well Diameter (in):		0
Casing Diameter (in):	3"	
Screened Interval (in):	30 - 40	0

PURGE CALCULATIONS

Standing Water Column (ft):	13.61	0
1 Casing Volume (gal):	4.44	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	14.9	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT APPLICABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
2.0	7.02	1125	11.5	4.1	0.43	-59	51.2	1020	WATER IS CLEAR	SJC
4.0	7.01	1119	11.6	3.4	0.36	-57	18.1	1034		
6.0	7.02	1120	11.6	3.5	0.37	-58	7.2	1044		
8.0	7.02	1120	11.6	3.8	0.40	-57	6.6	1056		
10.0	7.02	1120	11.6	3.9	0.42	-55	5.2	1108		
12.0	7.02	1119	11.6	4.1	0.43	-55	4.2	1116		
14.0	7.02	1121	11.6	4.0	0.42	-55	3.5	1124		
16.0	7.02	1120	11.6	4.1	0.43	-54	3.3	1132		
									INITIATE SAMPLE COLLECTION @ 1132.	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: Clear

Wind Speed & Direction: South calm

Temperature: ~49°

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-MW-9

Location: Anoka County Park

Well Depth (ft. Below TOC): 42.40′

FID/PID reading @ Wellhead: 14.2 ppm

Depth to Water (below TOC): 29.21′

Sample Date: 11/15/01

Sample Time: 0907

Casing Diameter: 3.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 3.1 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 32 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/15/01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION: PES-MW-9
SAMPLED BY: SJC

PROJECT NUMBER: 5027
SAMPLE ID: GWMW-9/SA
PUMP TYPE: BLADDER
PURGE RATE: 800 ml/min

WELL DIMENSIONS

Static Water Level (ft):	29.21	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	42.40	
Well Diameter (in):	3"	0
Casing Diameter (in):		
Screened Interval (in):	30-40	0

PURGE CALCULATIONS

Standing Water Column (ft):	13.19	0
1 Casing Volume (gal):	4.84	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	14.5	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT APPLICABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
3.0	6.88	1042	10.9	2.9	0.31	-117	30.1	0755	WATER IS CLEAR	SJC
5.0	7.02	1049	10.8	4.3	0.45	-130	12.3	0810		
8.0	7.06	1049	10.9	5.8	0.62	-133	6.3	0820		
10.0	7.08	1051	10.9	9.0	0.97	-129	6.3	0835		
12.0	7.09	1053	10.9	10.8	1.16	-128	4.8	0842		
13.0	7.09	1053	10.9	11.0	1.19	-125	4.0	0847		
14.0	7.09	1051	10.9	11.1	1.19	-124	4.1	0854		
15.0	7.09	1051	10.9	10.1	1.05	-123	6.5	0903		
									BEGIN SAMPLE COLLECTION @ 0907	

Comments:

Serra/work/projects/template/field/gwsample.xls

Sampling Information Form

Weather Conditions:

Cloud Cover: Cloudy

Wind Speed & Direction: South Calm

Temperature: ~53⁰

Precipitation: ~0.1" overnight

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-CW-1

Location: Anoka County Park

Well Depth (ft. Below TOC): 42.2'

FID/PID reading @ Wellhead: 1.7 ppm

Depth to Water (below TOC): 30.70'

Sample Date: 11/13/01

Sample Time: 1145

Casing Diameter: 2.0"

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.01 gpm

Well Volumes Removed Prior to Sampling: 3.20 gal

Gallons per Lineal Foot 2"ID=0.163, 4"ID=0.661, 6"ID=1.5, 12"ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 33 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11-13-01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION: PES-CW-1
SAMPLED BY: SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWCW-1/S4
PUMP TYPE: BLADDER
PURGE RATE: 200mL/min

WELL DIMENSIONS

Static Water Level (ft):	30.70	
Filter Pack Thickness (ft):		0
Well Depth (ft:) TOC	42.2	
Well Diameter (in):	2"	0
Casing Diameter (in):	2"	
Screened Interval (in):	30-40'	0

PURGE CALCULATIONS

Standing Water Column (ft):	11.5	0
1 Casing Volume (gal):	1.87	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	5.62	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT APPLICABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
1.5	6.86	1069	11.9	5.5	0.58	-5	1.37	0825	WATER IS CLEAR	SJC
3.0	6.99	1068	11.8	3.5	0.37	-18	0.33	0840		
4.5	7.03	1065	11.8	3.1	0.32	-22	0.16	0855		
5.5	7.08	1064	12.8	2.3	0.24	-24	0.05	0905		
6.0	7.08	1064	11.9	2.4	0.25	-25	0.04	0914		
									SAMPLES COLLECTED @ 1145	

Comments:

Serra/work/projects/template/field/gwsample.xls

Sampling Information Form

Weather Conditions:

Cloud Cover: Partly Cloudy

Wind Speed & Direction: Calm

Temperature: ~55⁰

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-CW-2

Location: Anoka County Park

Well Depth (ft. Below TOC): 41.55′

FID/PID reading @ Wellhead: 1.7 ppm

Depth to Water (below TOC): 31.82′

Sample Date: 11/13/01

Sample Time: 1320

Casing Diameter: 2.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.02 gpm

Well Volumes Removed Prior to Sampling: 4.0 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 20 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/13/01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION: PES-CW-2
SAMPLED BY: SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWCW-2/SA
PUMP TYPE: BLADDER
PURGE RATE: 900 mL/min

WELL DIMENSIONS

Static Water Level (ft):	31.82	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	41.55	
Well Diameter (in):	2"	0
Casing Diameter (in):	2"	
Screened Interval (in):		0

PURGE CALCULATIONS

Standing Water Column (ft):	9.73	0
1 Casing Volume (gal):	1.59	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	4.75	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT APPLICABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
1.5	7.06	1064	12.0	3.3	0.35	-26	2.10	1253	WATER IS CLEAR	SJC
3.0	7.05	1064	12.0	3.1	0.33	-28	1.10	1303	↓	↓
4.5	7.05	1064	12.1	2.8	0.30	-30	1.21	1309	↓	↓
6.5	7.05	1064	12.0	2.7	0.28	-32	1.13	1319	↓	↓
									SAMPLES COLLECTED @ 1320	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: Hazy Sun

Wind Speed & Direction: Calm

Temperature: ~58°

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: PES-CW-3

Location: Anoka County Park

Well Depth (ft. Below TOC): 42.25'

FID/PID reading @ Wellhead: 1.7 ppm

Depth to Water (below TOC): 34.48'

Sample Date: 11/13/01

Sample Time: 1538

Casing Diameter: 2.0"

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.01 gpm

Well Volumes Removed Prior to Sampling: 3.96 gal

Gallons per Lineal Foot 2"ID=0.163, 4"ID=0.661, 6"ID=1.5, 12"ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 37 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/13/01
PROJECT NAME: NIROP PILOT SCALE STUDY
SAMPLE LOCATION : PES-LW-1
SAMPLED BY : SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWCW-3/SA SJC
PUMP TYPE : BLADDER
PURGE RATE: ≈500 ml/min

WELL DIMENSIONS

Static Water Level (ft):	34.48	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	42.25	
Well Diameter (in):	2"	0
Casing Diameter (in):	2"	
Screened Interval (in):		0

PURGE CALCULATIONS

Standing Water Column (ft):	7.77	0
1 Casing Volume (gal):	1.26	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	3.79	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh:
Cond.:
pH:

NOT APPLICABLE.

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
1.0	7.07	1012	12.9	5.4	0.55	4	2.08	1442	WATER IS CLEAR	SJC
2.0	7.07	1013	12.8	5.2	0.53	14	1.72	1452		↓
3.0	7.06	1012	12.9	5.4	0.54	24	0.89	1510		
4.0	7.06	1012	12.9	6.0	0.60	31	0.81	1523		
5.0	7.07	1014	12.8	5.9	0.60	32	1.02	1536		
									SAMPLED @ 1538	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: Clear

Wind Speed & Direction: South calm

Temperature: ~65⁰

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: MS-46S

Location: Anoka County Park

Well Depth (ft. Below TOC): 35.74'

FID/PID reading @ Wellhead: 0.0 ppm

Depth to Water (below TOC): 27.95'

Sample Date: 11/19/01

Sample Time: 1317

Casing Diameter: 3.0"

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.01 gpm

Well Volumes Removed Prior to Sampling: 3.57 gal

Gallons per Lineal Foot 2"ID=0.163, 4"ID=0.661, 6"ID=1.5, 12"ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 30 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/19/01
PROJECT NAME: WIROP PILOT SCALE STUDY
SAMPLE LOCATION: MS-465
SAMPLED BY: SAC

PROJECT NUMBER: 5827
SAMPLE ID: GWMS-465/SA
PUMP TYPE: BLADDER
PURGE RATE: ≈400 ml/min

WELL DIMENSIONS

Static Water Level (ft):	27.95	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	35.74	
Well Diameter (in):	2.1	0
Casing Diameter (in):		
Screened Interval (in):	25-35 ASSUMED	0

PURGE CALCULATIONS

Standing Water Column (ft):	7.79	0
1 Casing Volume (gal):	1.26	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	3.80	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT AVAILABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
0.5	7.12	1134	10.2	4.4	0.49	-80	21.0	1237	WATER IS SLIGHTLY CLOUDY	SAC
1.0	7.11	1134	10.2	4.3	0.50	-81	16.3	1243		
2.0	7.08	1134	10.0	4.7	0.53	-82	11.3	1251		
2.5	7.07	1134	10.0	5.1	0.57	-82	8.5	1258		
3.0	7.06	1134	10.1	5.0	0.56	-82	8.3	1303		
3.5	7.05	1134	10.1	5.2	0.57	-82	7.9	1306		
4.0	7.05	1134	10.1	5.1	0.57	-82	8.2	1310		
4.5	7.04	1134	10.1	5.2	0.57	-82	7.3	1314		
									SAMPLES INITIATED @ 1317	
									DUPLICATE ID MWG01 COLLECTED	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: Cloudy Light Fog

Wind Speed & Direction: South Calm

Temperature: ~59^0

Precipitation: None

Facility ID#_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: MS-47S

Location: Anoka County Park

Well Depth (ft. Below TOC): 39.6′

FID/PID reading @ Wellhead: 0.0 ppm

Depth to Water (below TOC): 34.13′

Sample Date: 11/14/01

Sample Time: 0831

Casing Diameter: 2.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.01 gpm

Well Volumes Removed Prior to Sampling: 4.49 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 36 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Slightly turbid-brown tint. Clearing by 0.5 gallons

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/14/01
PROJECT NAME: NIROP PILOT-SCALE STUDY
SAMPLE LOCATION : MS-475
SAMPLED BY : SJC

PROJECT NUMBER: 5427
SAMPLE ID: GWMS475/SA
PUMP TYPE : BLADDER
PURGE RATE: 400 mL/min

WELL DIMENSIONS

Static Water Level (ft):	34.13	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	39.6	
Well Diameter (in):	2"	0
Casing Diameter (in):	2"	
Screened Interval (in):	Assumed 30-40	0

PURGE CALCULATIONS

Standing Water Column (ft):	5.47	0
1 Casing Volume (gal):	0.89	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	2.67	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh: NOT AVAILABLE
Cond.:
pH:

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: YES
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
1.0	6.83	408	13.0	16.9	1.69	85	9.35	0753	WATER IS ONLY SLIGHTLY TURBID	SJC
2.0	6.81	401	12.9	17.9	1.83	105	4.46	0809	WATER IS CLEAR	SJC
3.0	6.81	401	12.9	17.0	1.71	112	2.01	0821	"	SJC
4.0	6.82	402	12.9	16.7	1.68	115	1.75	0831	"	SJC
									COLLECTING SAMPLES STARTING @ 0831	

Comments:

Sampling Information Form

Weather Conditions:

Cloud Cover: None

Wind Speed & Direction: South ~10 mph

Temperature: ~60°

Precipitation: None

Facility ID#:_____

Facility Name: NIROP Fridley

MPCA Master ID:_____

Project Name: Anoka County Park Pilot Scale Study

Station ID#: MS-27S

Location: Anoka County Park

Well Depth (ft. Below TOC): 40.0′

FID/PID reading @ Wellhead: 0.0 ppm

Depth to Water (below TOC): 17.49′

Sample Date: 11/12/01

Sample Time: 1625

Casing Diameter: 2.0″

FID/PID Background Conc.: 0.0 ppm

Purge Rate: 0.20 gpm

Well Volumes Removed Prior to Sampling: 3.54 gal

Gallons per Lineal Foot 2″ID=0.163, 4″ID=0.661, 6″ID=1.5, 12″ID=5.88

Sampling Method:_____ Tap _____ Submersible Pump_____ Bailer Other (detail): Bladder Pump

Pump intake or bailer set at 20 ft. Below TOC.

Tubing Type: Teflon New, Previously Used and Cleaned was used to collect all samples Yes N

Flow Cell Used Yes N

Purging and Stabilization Protocol Followed Yes N

Sample Appearance (describe): Clear

Field Cleaning of Equipment Performed: 4 step decontamination

Describe any deviations from Sampling Protocol:

-Preservatives for VOCs added by laboratory

-Pump tubing stored on hose reel

-Disposable PPE combined with soil

Transportation (Thermal Preservation) Type: Ice Filled Cooler

Comments:_____

Form Completed By: Scott Carney

Well Sampled By: Scott Carney

GROUNDWATER COLLECTION LOG

EMR INCORPORATED

DATE: 11/12/01
PROJECT NAME: NIROP
SAMPLE LOCATION: 275
SAMPLED BY: SJC

PROJECT NUMBER: 5427
SAMPLE ID: GW275-1
PUMP TYPE: BLADDER
PURGE RATE: ≈ 750 ml/min

WELL DIMENSIONS

Static Water Level (ft):	17.49	
Filter Pack Thickness (ft):		0
Well Depth (ft:)	Assumed 40'	
Well Diameter (in):	2"	0
Casing Diameter (in):	2"	
Screened Interval (in):	Assumed 30-40	0

PURGE CALCULATIONS

Standing Water Column (ft):	22.51	0
1 Casing Volume (gal):	3.669	0
1 Well Volume (gal):		0
Filter Pack Saturated Thickness (ft):		0
Filter Pack Volume (gal):		0
Recommended purged volume: (3 Well Volumes)	11.0	0

SAMPLING INFORMATION

Analytical Parameters:
Previous Event
Elevation:
DO:
Eh:
Cond.:
pH:

NOT APPLICABLE

WELL HEAD CONDITIONS

Protective Cover: YES
External Surface Seal: YES
Concrete Pad: YES
Cap: NO
Datum Reference:
Internal Surface Seal: YES

WATER QUALITY MEASUREMENTS

PURGED VOLUME (gal)	PH	SPECIFIC CONDUCTANCE (uMHOS/CM)	TEMP (C)	DISSOLVED OXYGEN (%)	DISSOLVED OXYGEN (mg/L)	OX-REDOX POTENTIAL EH (mV)	TURBIDITY (NTU)	TIME (MINUTES)	COMMENTS	INITIALS
4.0	9.70	436	12.6	4.4	0.44	-105	3.24	1523	WATER IS CLEAR	SJC
6.5	9.76	436	12.5	3.4	0.36	-123	3.08	1539	" " "	
8.0	9.78	437	12.6	2.8	0.28	-127	3.12	1550		
9.0	9.80	437	12.5	3.0	0.30	-127	3.12	1557		
11.0	9.80	437	12.5	3.3	0.33	-129	2.35	1607		
12.0	9.81	436	12.5	3.0	0.30	-132	1.91	1615		
13.0	9.81	436	12.5	~~2.8~~ 3.2	0.34	-135	1.78	1622		
									SAMPLES COLLECTED @ 1625	

Comments:

Appendix C5

Groundwater Analytical Data Summary

Groundwater Analytical Summary

Laboratory Analysis									Field Analysis													
Well	Volatile Organic Compound	Total Organic Compound	Ethene	Ethane	Nitrate+Nitrite as Nitrogen Method 300.1	Nitrate+Nitrite as Nitrogen Method 353.2	Methane	Hydrogen	pH	Temperature	Conductivity	Dissolved Oxygen	Turbidity	Oxidation/Reduction Potential	Carbon Dioxide	Alkalinity	Sulfate	Chloride	Sulfide	Manganese	Ferrous Iron	Ammonia
PES-INJ-1	16 ppb cis-1,2-Dichloroethene 20 ppb trans-1,2-Dichloroethene 1400 ppb Trichloroethene	1.1	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	7.62	10.7°C	1015 umhos/cm	0.14	4.5 NTU	-1 mV	25	323	140*	55	0.00	0.6	0.01	0.03
PES-INJ-2	8.6 ppb cis-1,2-Dichloroethene 7.9 ppb trans-1,2-Dichloroethene 630 ppb Trichloroethene	0.8	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	7.77	10.5°C	971 umhos/cm	0.0	7.4 NTU	74 mV	25	289	130*	55	0.00	0.3	0.01	0.04
PES-INJ-3	9.1 (J) ppb trans-1,2-Dichloroethene 760 ppb Trichloroethene	1.0	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	8.47	12.1°C	881 umhos/cm	0.92	3.0 NTU	-79 mV	10	255	110*	60	0.00	0.6	0.01	0.06
PES-MW-1	14 ppb cis-1,2-Dichloroethene 15 ppb trans-1,2-Dichloroethene 1100 ppb Trichloroethene	1.0	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	8.29	11.0°C	873 umhos/cm	1.27	1.9 NTU	-50 mV	15	255	100*	55	0.00	0.6	0.02	0.03
PES-MW-2	22 ppb cis-1,2-Dichloroethene 27 ppb trans-1,2-Dichloroethene 2100 ppb Trichloroethene	1.7	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	11.66	11.5°C	1181 umhos/cm	0.39	3.5 NTU	-185 mV	500**	1700**	190*	60	0.00	0.4	0.17	0.09
PES-MW-2 Duplicate	22 ppb cis-1,2-Dichloroethene 29 ppb trans-1,2-Dichloroethene 2100 ppb Trichloroethene	1.6	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	NA	NA	NA	NA	NA	NA	500**	1700**	130*	60	0.00	0.1	0.18	0.06
PES-MW-3	73 ppb cis-1,2-Dichloroethene 110 ppb trans-1,2-Dichloroethene 5000 ppb Trichloroethene	72	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	7.05	12.1°C	1078 umhos/cm	0.35	0.10 NTU	-76 mV	40	340	150*	45	0.01	0.9	0.48	0.02
PES-MW-4	83 ppb cis-1,2-Dichloroethene 120 ppb trans-1,2-Dichloroethene 3300 ppb Trichloroethene	NA*	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	7.12	12.1°C	1113 umhos/cm	1.32	2.07 NTU	104 mV	55	374	230*	70	0.00	0.9	0.00	0.02
PES-MW-5	0.76 (J) ppb 1,1-Dichloroethane 29 ppb cis-1,2-Dichloroethene 1.8 ppb trans-1,2-Dichloroethene 75 ppb Trichloroethene	1.6	1.4 U	1.6 U	Nitrate <0.58 Nitrite <0.13	0.73	2.0 U	NA	6.80	11.5°C	1030 umhos/cm	0.22	1.8 NTU	-158 mV	85	442	120*	105	0.00	0.4	0.02	0.00
PES-MW-6	88 ppb cis-1,2-Dichloroethene 140 ppb trans-1,2-Dichloroethene 6200 ppb Trichloroethene	1.4	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	7.79	11.7°C	1279 umhos/cm	1.42	0.30 NTU	-48 mV	40	306	160*	55	0.20	0.5	0.01	0.04
PES-MW-7	5.2 ppb cis-1,2-Dichloroethene 3.6 ppb trans-1,2-Dichloroethene 300 ppb Trichloroethene	1.4	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	8.96	11.6°C	854 umhos/cm	2.28	31.1 NTU	-26 mV	50***	238	110*	60	0.00	0.2	0.00	0.03

Groundwater Analytical Summary

Laboratory Analysis									Field Analysis													
Well	Volatile Organic Compound	Total Organic Compound	Ethene	Ethane	Nitrate+Nitrite as Nitrogen Method 300.1	Nitrate+Nitrite as Nitrogen Method 353.2	Methane	Hydrogen	pH	Temperature	Conductivity	Dissolved Oxygen	Turbidity	Oxidation/Reduction Potential	Carbon Dioxide	Alkalinity	Sulfate	Chloride	Sulfide	Manganese	Ferrous Iron	Ammonia
PES-MW-8	160 ppb cis-1,2-Dichloroethene 220 ppb trans-1,2-Dichloroethene 6700 ppb Trichloroethene	2.4	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	7.02	11.6^{o}C	1120 umhos/cm	0.43	3.3 NTU	-54 mV	55	408	110*	65	0.00	0.9	0.70	0.04
PES-MW-9	15 ppb cis-1,2-Dichloroethene 20 ppb trans-1,2-Dichloroethene 1400 ppb Trichloroethene	1.4	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	NA	7.09	10.9^{o}C	1051 umhos/cm	1.05	6.5 NTU	-123 mV	45	391	140*	60	0.01	1.1	0.40	0.03
PES-CW-1	12 ppb cis-1,2-Dichloroethene 7.5 ppb trans-1,2-Dichloroehtene 630 ppb Trichloroethene	1.0	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	<0.014	2.0 U	NA	7.08	11.9^{o}C	1064 umhos/cm	0.25	0.04 NTU	-25 mV	60	333.2	80	60	0.00	0.6	0.04	0.00
PES-CW-2	7.3 ppb cis-1,2-Dichloroethene 290 ppb Trichloroethene	0.97	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	<0.014	2.0 U	NA	7.05	12.0^{o}C	1064 umhos/cm	0.28	1.13 NTU	-32 mV	74	323	50*	65	0.00	1.1	0.30	0.05
PES-CW-3	5.5 ppb cis-1,2-Dichloroethene 240 ppb Trichloroethene	0.75	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	<0.014	2.0 U	NA	7.07	12.8^{o}C	1014 umhos/cm	0.6	1.02 NTU	32 mV	70	357	110*	62.5	0.00	1.0	0.02	0.04
MS-46S	200 (J) ppb trans-1,2-Dichloroethene 20000 ppb Trichloroethene	1.8	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	0.83	7.04	10.1^{o}C	1134 umhos/cm	0.57	7.3 NTU	-82 mV	50	391	210*	15	0.01	1.9	2.15	0.07
MS-46S Duplicate	200 (J) ppb trans-1,2-Dichloroethene 20000 ppb Trichloroethene	2.0	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	NA	2.0 U	0.92	NA	NA	NA	NA	NA	NA	50	374	200*	15	0.00	1.1	2.11	0.05
MS-27S	3.3 ppb (J) Acetone 12 ppb Benzene	3.7	1.4 U	1.6 U	Nitrate <0.13 Nitrite <0.13	<0.014	46 ppb	NA	9.81	12.5^{o}C	436 umhos/cm	0.34	1.78 NTU	-123 mV	1.25	119	19	20	0.00	0.1	0.05	0.12
MS-47S	0.89 (J) ppb 1,1-Dichloroethane 22 ppb cis-1,2-Dichloroethene 0.92 (J) ppb Tetrachloroethene 1.1 ppb trans-1,2-Dichloroethene 44 ppb Trichloroethene	1.7	1.4 U	1.6 U	Nitrate 1.3 Nitrite <0.13	1.6	2.0 U	NA	6.82	12.9^{o}C	1102 umhos/cm	1.68	1.75 NTU	115 mV	134	459	70*	50	0.13	1.8	0.00	0.00

* = Dilution of 1 part sample to 9 parts deionized water
** = Dilution of 1 part sample to 10 parts deionized water
*** = Dilution of 1 part sample to 100 parts deionized water
J = Estimated
U = Not detected above the Method Detection Limit
NA = Not Analyzed
NA* = Not Analyzed. Laboratory did not receive sample
^{o}C = degrees Centrigrade
umhos/cm = microseimens per centimeter
NTU = Nephelometric Turbidity Units
mV = millivolt
Note: All units are milligrams per liter (mg/L) (except pH) unless otherwise noted

Appendix C6

Waste Soil Analytical Data Summary

Sample ID		Stockpile 10/23 Soil Composite
Lab ID		913741-005
TCLP Semivolatiles by Method 1311/8270C	**UNITS**	
2,4,5-Trichlorophenol	mg/L	<0.12
2,4,6-Trichlorophenol	mg/L	<0.050
2,4-Dinitrotoluene	mg/L	<0.050
Hexachlorobenzene	mg/L	<0.050
Hexachlorobutadiene	mg/L	<0.050
Hexachloroethane	mg/L	<0.050
Cresols	mg/L	<0.050
Nitrobenzene	mg/L	<0.050
Pentachlorophenol	mg/L	<0.12
Pyridine	mg/L	<0.050
TCLP Volatiles by Method 1311/8260B		
1,1-Dichloroethene	mg/L	<0.10
1,2-Dichloroethane	mg/L	<0.10
2-Butanone	mg/L	<0.20
Benzene	mg/L	<0.10
Carbon tetrachloride	mg/L	<0.10
Chlorobenzene	mg/L	<0.10
Chloroform	mg/L	<0.10
Tetrachloroethene	mg/L	<0.10
Trichloroethene	mg/L	<0.10
Vinyl chloride	mg/L	<0.050
TCLP Pesticides by Method 1311/8081A		
Chlordane	mg/L	<0.010
Endrin	mg/L	<0.0010
Lindane	mg/L	<0.00050
Heptachlor	mg/L	<0.00050
Heptachlor epoxide	mg/L	<0.00050
Methoxychlor	mg/L	<0.0050
Toxaphene	mg/L	<0.050
TCLP Herbicides by Method 1311/8150		
2,4,5-TP	mg/L	<0.0050
2,4-D	mg/L	<0.025
TCLP Metals by Method 1311/6010B/7470A		
TCLP Silver	mg/L	<0.010
TCLP Arsenic	mg/L	<0.70
TCLP Barium	mg/L	0.30
TCLP Cadmium	mg/L	<0.010
TCLP Chromium	mg/L	<0.010
TCLP Mercury	mg/L	<0.00020
TCLP Lead	mg/L	<0.20
TCLP Selenium	mg/L	<0.70

Sample ID		Stockpile 10/23 Soil Composite
Lab ID		913741-005
Various Inorganic Analyses	**UNITS**	
Ignitability by Method 1020A	deg.	>210 F
Corrosivity by Method 9045C		8.4
Reactive Sulfide by Method SW-846 7.3.4.1	mg/kg	<25.0
Reactive Cyanide by Method SW-846 7.3.3.2	mg/kg	<2.50

ND = The compound was not detected at the reporting limit
J = Estimated value below the reporting limit and above the method detection limit
mg/L = milligrams per liter
mg/kg = milligrams per kilogram

Appendix C7

Waste Liquids Analytical Data Summary

	Sample ID	NIROP DISPOSAL
	Lab ID	913854-004
Volatiles by Method 8260B		
Chloromethane	ug/L	<2.0
Bromomethane	ug/L	<2.0
Vinyl chloride	ug/L	<2.0
Chloroethane	ug/L	<2.0
Methylene chloride	ug/L	<1.0
Acetone	ug/L	<5.0
Carbon Disulfide	ug/L	<1.0
1,1-Dichloroethene	ug/L	<1.0
1,1-Dichloroethane	ug/L	<1.0
cis-1,2-Dichloroethene	ug/L	4.9
trans-1,2-Dichloroethene	ug/L	5.4
Chloroform	ug/L	2.1
1,2-Dichloroethane	ug/L	<1.0
2-Butanone	ug/L	<5.0
1,1,1-Trichloroethane	ug/L	<1.0
Carbon tetrachloride	ug/L	<1.0
Bromodichloromethane	ug/L	<1.0
1,2-Dichloropropane	ug/L	<1.0
Trichloroethene	ug/L	370
Benzene	ug/L	<1.0
Dibromochloromethane	ug/L	<1.0
trans-1,3-Dichloropropene	ug/L	<1.0
1,1,2-Trichloroethane	ug/L	<1.0
Bromoform	ug/L	<1.0
4-Methyl-2-pentanone	ug/L	<5.0
2-Hexanone	ug/L	<5.0
Tetrachloroethene	ug/L	<1.0
1,1,2,2-Tetrachloroethane	ug/L	<1.0
Toluene	ug/L	2.7
Chlorobenzene	ug/L	<1.0
Ethylbenzene	ug/L	<1.0
Styrene	ug/L	<1.0
Xylenes, Total	ug/L	<5.0

ug/L = micrograms per liter

Appendix C8

Chain of Custody Forms

CH2MHILL Constructors, Inc.

115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9202

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427-001-2

[2] PROJECT NAME: NIROP PILOT SCALE SEWOH

[3] PROJECT NUMBER: 5427-001-1

[5] LAB NAME AND CONTACT: ENCHEM LABORATORY

[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): SANDY SWIEBEL EMR, INC

[14] RECIPIENT 1 (Address, Tel No., and Fax No.): 325 LAKE AVENUE SOUTH SUITE #603 DULUTH, MN 55802

[3] PROJECT PHASE/SITE/TASK: 153691

[6] CTO OR DO NUMBER: 0024

[9] LAB PO NUMBER: 5427-001-1

[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):

[15] RECIPIENT 2 (Address, Tel No., and Fax No.):

[4] PROJECT CONTACT: SCOTT CARNEY

[7] PROJECT TEL NO AND FAX NO: (218)393-0936

[10] LAB TEL NO AND FAX NO:

[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):

[16] RECIPIENT 3 (Address, Tel No., and Fax No.):

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC SW8260B	TOC	EC/GS-1	[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	PES-BG-1 (37')	BACKGROUND WELL #1	S	10/17/01	1600		7 DAY	X	X		N	MS/MSD 0060	913683-09
2	EB-10/18	EQUIPMENT RINSEATE	W	10/18/01	0900		↓	X			EB		-002
3	TB-10/19	TRIP BLANK	W	10/19/01	1321			X			TB		-003
4	EB-10/19	EQUIPMENT RINSEATE	W	10/19/01	1230		↓	X			EB		-004
5													
6													
7													
8													
9													
10													

[29] SAMPLER(S) AND COMPANY: (please print)

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use)

[32] RELINQUISHED BY

Printed Name and Signature:	DATE	TIME
SCOTT CARNEY	10-19-01	1439
	10-19-01	1400
Fed Ex	10/20/01	1000

[33] RECEIVED BY

Printed Name and Signature:	DATE	TIME
	10-19	1445
UPS		
	10/20/01	1000

Rec'd. 3° on Ice

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File; [ ] Copy 2 - PMO

Form CCI001, Rev 06/00

CH2MHILL Constructors, Inc.

115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9202

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427-001-3

[2] PROJECT NAME: NIROP PILOT-SCALE STUDY	[5] PROJECT NUMBER: 5427-001-3	[8] LAB NAME AND CONTACT: ENCHEM LABORATORY, INC	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): SANDY ZWIEBEL EMR, INC	[14] RECIPIENT 1 (Address, Tel No., and Fax No.): 325 LAKE AVENUE SOUTH #603 DULUTH, MN 55802
[3] PROJECT PHASE/SITE/TASK: 5427-001-3	[6] CTO OR DO NUMBER: 0024	[9] LAB PO NUMBER: 5427-001-1	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):	[15] RECIPIENT 2 (Address, Tel No., and Fax No.):
[4] PROJECT CONTACT: ~~SCOTT CARNEY~~ SCOTT CARNEY ~~PAULA CHIARAZZIA~~ SJC	[7] PROJECT TEL NO AND FAX NO: (218) 398-0936	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):	[16] RECIPIENT 3 (Address, Tel No., and Fax No.):

OK

[22] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC 8260B	TOC E415.1	TCLP VOC	TCLP SEMIVOLATILES	TCLP PESTICIDES	TCLP HERBICIDES	TCLP METALS	IGNITABILITY	CORROSIVITY	REACTIVITY	[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	VG-INJ-3 (47')	~~VG-INJ-3~~ Injection Well #3	S	10/22/01	7:50 AM		7	X	X									N	008 009 MS/MSD 913741	-001
2	VG-INJ-2 (44')	Injection Well #2	S	10/22/01	2:20 PM		7	X	X									N		-002
3	EB-10/22	EQUIPMENT BLANK	W	10/22/01	4:40 PM		7	X										N (EB)		-003
4	EB-10/23	EQUIPMENT BLANK	W	10/23/01	1:00 PM		7	X										N (EB)		-004
5	STOCKPILE 10/23	SOIL ROLL OFF BOX	S	10/23/01	1:15 PM		7			X	X	X	X	X	X	X	X	N	010 MS ~~MSD~~	-005 ~~-006~~
6	TB 10/23	TRIB BLANK 10/23	W	10/23/01	1:30		7	X										(TB)	BJN 10/25/01	-006 BJN 10/31/01
7	VG-INJ-1 (37')	Injection Well #1	S	10/23/01	3:20		7	X	X									N		-007
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print)

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use): 4°C ROI

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: SCOTT CARNEY	10-23-01	1550	Printed Name and Signature:		
Printed Name and Signature:	10-23	1900	Printed Name and Signature: Dunham		
Printed Name and Signature: Dunham	10/25/01	0815	Printed Name and Signature:	10/25/01	0815

Distribution: [ ] Original - Laboratory (To be returned with Analytical Report); [ ] Copy 1 - Project File; [ ] Copy 2 - PMO

Form CC1001, Rev 06/00

CH[illegible]MHILL Constructors, Inc.

Atlanta, GA 30340-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9282

CHAIN-O[illegible]-CUSTODY RECORD

[1] COC NUMBER: 5477-001-4

[2] PROJECT NAME: MPOP PILOT SCALE STUDY	[5] PROJECT NUMBER: 5477-001-1	[8] LAB NAME AND CONTACT: [illegible] SOIL ENGINEERING TESTING	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): FANNY ZWIEBEL FMTR, INC	[14] RECIPIENT 1 (Address, Tel No., and Fax No.): 325 LAKE AVENUE SOUTH #603
[3] PROJECT PHASE/SITE/TASK: 153611	[6] CTO OR DO NUMBER: 0024	[9] LAB PO NUMBER: ~~[illegible]~~	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):	[15] RECIPIENT 2 (Address, Tel No., and Fax No.):
[4] PROJECT CONTACT: SCOTT CARNEY	[7] PROJECT TEL NO AND FAX NO: (218) 353-0536	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):	[16] RECIPIENT 3 (Address, Tel No., and Fax No.):

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	BULK DENSITY										[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	VG-INJ-3 41-42	INJECTION WELL #3	S	10/22/01	0720		7 DAY	X										Z		
2	VG-INJ-3 43-44	INJECTION WELL #3	S	10/22/01	0720		7 DAY	X										Z		
3	VG-INJ-2 44-46	INJECTION WELL #2	S	10/22/01	1425		7 DAY	X										Z		
4	VG-INJ-2 46-48	INJECTION WELL #2	S	10/22/01	1435		7 DAY	X										Z		
5	PES-BG-1 37-38	BACKGROUND WELL #1	S	10/17/01	1245		7 DAY	X										Z		
6	PES-BG-1 38-39	BACKGROUND WELL #1	S	10/17/01	1245		7 DAY	X										Z		
7	VG-INJ-1 39-40	INJECTION WELL #1																		
8	VG-INJ-1 41-42	INJECTION WELL #1																		
9	*TWO SAMPLE INTERVALS SUPPLIED FOR ALL WELLS - ONLY ANALYZE ONE PER WELL.																			
10																				

[29] SAMPLER(S) AND COMPANY: (please print) GLEN HOLMAN BRIGGSON-CARNEY	[30] COURIER AND SHIPPING NUMBER:	[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use) NA

[32] RELINQUISHED BY Printed Name and Signature:	DATE	TIME	[33] RECEIVED BY Printed Name and Signature:	DATE	TIME
SCOTT CARNEY [signature]	10-23-01	1546			
Rob Carlo	10-23-01	1546			

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Form CC1001, Rev 06/00

CH2MHILL Constructors, Inc
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9282

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427-001-5

[2] PROJECT NAME: NUROP PILOT SCALE STUDY	[5] PROJECT NUMBER: 5427-001-1	[8] LAB NAME AND CONTACT: ENCHEM LABORATORIES	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company) RANDY PWIEBER	[14] RECIPIENT 1 (Address, Tel No. , and Fax No.): 325 LAKE AVENUE SOUTH
[3] PROJECT PHASE/SITE/TASK: 153691	[6] CTO OR DO NUMBER: 0024	[9] LAB PO NUMBER: 5427-001-1	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)	[15] RECIPIENT 2 (Address, Tel No. , and Fax No.):
[4] PROJECT CONTACT: SCOTT CARNEY	[7] PROJECT TEL NO AND FAX NO: (218)393-0936	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)	[16] RECIPIENT 3 (Address, Tel No. , and Fax No.):

[23] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC 8260B	TOC E415.1								[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	PES-MW-1 (39')	MONITORING WELL #1	S	10/25/01	1157		7/DAY	X	X								N	MS MSD 0006 0007	913799
2	EB-10/25	EQUIPMENT BLANK 10/25	W	10/25/01	1437		7/DAY	X									EB		-001
3	TB-10/26	TRIP BLANK	W	10/26/01	1330		7/DAY	X									TB		-002
4	PES-MW-7 (45')	Monitoring Well #7	S	10/26/01	1108		7/DAY	X	X								N		-003
5	EB-10/26	EQUIPMENT BLANK 10/26	W	10/26/01	1340		7/DAY	X									EB		-004
6																			-005
7																			
8																			
9																			
10																			

[29] SAMPLER(S) AND COMPANY: (please print)
MIKE GOLAN / SCOTT CARNEY
EMR, INC

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use)
1°C ROI

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature:	10/26/01	1600	Printed Name and Signature:	10-26	1600
Printed Name and Signature:	10-29	1900	Printed Name and Signature:		
Printed Name and Signature:	10/30/01	0915	Printed Name and Signature:	10/30/01	0915

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Form CCI001, Rev 06/00

CH2MHILL Constructors, Inc.
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9282

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427-001-6

[2] PROJECT NAME: NIROP PILOT SCALE STUDY

[3] PROJECT NUMBER: 5427-001-1

[4] LAB NAME AND CONTACT: ENCHEM LABORATORY

[11] FAX AND MAIL REPORTS/BDD TO:: RECIPIENT 1 (Name and Company): BANDY BUIEGEL EMR, INC

[14] RECIPIENT 1 (Address, Tel No., and Fax No.): 325 LAKE AVENUE SOUTH #603 DULUTH, MN 55802 (218) 723-8140

[5] PROJECT PHASE/SITE/TASK:

[6] CTO OR DO NUMBER: 0024

[9] LAB PO NUMBER:

[12] FAX AND MAIL REPORTS/BDD TO:: RECIPIENT 2 (Name and Company):

[15] RECIPIENT 2 (Address, Tel No., and Fax No.):

[8] PROJECT CONTACT: SCOTT CARNEY EMR, INC

[7] PROJECT TEL NO AND FAX NO: (218) 393-0936

[10] LAB TEL NO AND FAX NO:

[13] FAX AND MAIL REPORTS/BDD TO:: RECIPIENT 3 (Name and Company):

[16] RECIPIENT 3 (Address, Tel No., and Fax No.):

OK

[23] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC 8260B	TOC 5415.1									[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	PES-MW-2 (40') SEE B	MONITORING WELL #2	S	10/29	0942		7 DAY	X	X									N	013 014 MS MSD	913819
2	EQUIPMENT BB-10/29 SEE	EQUIPMENT BLANK 10/29	W	10/29	1430		7 DAY	X										BB		-001
3	DUPLICATE #1	DUPLICATE #1	S				7 DAY	X	X									N		-002
4	PES-MW-2 (41')	Monitoring Well #2	S	10/30	1325		7 Day	X	X									N		-003
5	EB-10/30	Equipment Blank 10/30	W	10/30	1452		7 Day	X										EB		-004
6	TB-10/30	Trip Blank	W	10/30			7 Day	X										TB		-005
7																				-006
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print) MIKE BOLAN/SCOTT CARNEY EMR, INC

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use)

[32] RELINQUISHED BY Printed Name and Signature:	DATE	TIME	[33] RECEIVED BY Printed Name and Signature:	DATE	TIME
SCOTT CARNEY	10/30/01	1505		10-30	1400
Printed Name and Signature:	10-30	1600	Printed Name and Signature: Dunham		
Printed Name and Signature: Dunham	10/31/01	1000	Printed Name and Signature: Kris Mix	10/31/01	1000

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Form CC1001, Rev 06/00

ROI 3rd

CH2M HILL Constructors, Inc.

115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9262

CHAIN-OF-CUSTODY RECORD

COC NUMBER: 5427-084-7

1 PROJECT NAME: MIROP PILOT-SCALE STUDY	5 PROJECT NUMBER: 5427-001-1	8 LAB NAME AND CONTACT: SOK ENGINEERING TESTING	11 FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company) FANDY ZWIEBEL EMRI, INC	14 RECIPIENT 1 (Address, Tel No., and Fax No.): 325 LAKE AVENUE SOUTH SUITE 603 DULUTH, MN 55802
3 PROJECT PHASE/SITE/TASK: 153691	6 CTO OR DO NUMBER: 0024	9 LAB PO NUMBER:	12 FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)	15 RECIPIENT 2 (Address, Tel No., and Fax No.):
4 PROJECT CONTACT: SCOTT CADWELL	7 PROJECT TEL NO AND FAX NO: (214) 373-0436	10 LAB TEL NO AND FAX NO:	13 FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)	16 RECIPIENT 3 (Address, Tel No., and Fax No.):

23 ANALYSES REQUIRED (Include Method Numbers)

17 ITEM	18 SAMPLE IDENTIFIER	19 SAMPLE DESCRIPTION/LOCATION	20 MATRIX (see codes on SOP)	21 DATE COLLECTED	22 TIME COLLECTED	23 DATA PKG LEVEL (see codes on SOP)	24 TAT (calendar days)	BLK CRUSHING										26 SAMPLE TYPE (see codes on SOP)	27 COMMENTS/ SCREENING READINGS	28 LAB ID (for lab's use)
1	PES-MW-6 41-42'	MONITORING WELL #6	S	10/29/01	0950		7 DAY	Y										BD		
2	PES-MW-7 43-44.5	MONITORING WELL #7	S	10/26/01	1100		7 DAY	X										BD		
3	PES-MW-1 43-44'	MONITORING WELL #1	S	10/25/01	1250		7 DAY	X										BD		
4	PES-MW-2 41-42'	MONITORING WELL #2	S	10/26/01	1230		7 DAY	X										BD		
5	PES-MW-9 35-36'	MONITORING WELL #9	S	10/25/01	0920		7 DAY	X										BD		
6	PES-MW-6 35-36'	MONITORING WELL #6	S	10/25/01	1149		7 DAY	X										BD		
7																				
8																				
9																				
10																				

29 SAMPLER(S) AND COMPANY: (please print)
KEN HOLMAN - BISHOP ENGINEERING
SCOTT CADWELL - CH2M, INC

30 COURIER AND SHIPPING NUMBER:

31 SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use)

32 RELINQUISHED BY	DATE	TIME	33 RECEIVED BY	DATE	TIME
Printed Name and Signature:	11/1/01	0940	Printed Name and Signature:		
Printed Name and Signature: ROBCAHO	11/1/01	0940	Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

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Form CC2001, Rev 06/00

CH2MHILL Constructors, Inc.
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9282

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427-001-8

[2] PROJECT NAME: NIROP PILOT SCALE STUDY

[5] PROJECT NUMBER: 5427-001-1

[8] LAB NAME AND CONTACT: ENCHEM LABS

[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): RANDY ZWIEBEL EMR, INC

[14] RECIPIENT 1 (Address, Tel No., and Fax No.): 325 LAKE AVENUE SOUTH #602 DULUTH, MN 55802 (218) 723-8140

[3] PROJECT PHASE/SITE/TASK: 153691

[6] CTO OR DO NUMBER: 0024

[9] LAB PO NUMBER:

[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):

[15] RECIPIENT 2 (Address, Tel No., and Fax No.):

OK

[4] PROJECT CONTACT: SCOTT CARNEY

[7] PROJECT TEL NO AND FAX NO: (218) 393-0936

[10] LAB TEL NO AND FAX NO:

[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):

[16] RECIPIENT 3 (Address, Tel No., and Fax No.):

[23] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC 8260B	E415.1 TOC								[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	PES-MW-9(32')	Monitoring Well #9	S	10/31/01	0915		7 Day	X	X								N	MS-MSD 008 009	913854 -001
2	PES-MW-8(35')	Monitoring Well #8	S	10/31/01	1145		7 Day	X	X								N		-002
3	EB-10/31	Equipment Blank 10/31	W	10/31/01	1215		7 Day	X									EB		-003
4	NIROP Disposal		W	11/1/01	0845		~~7 Day~~	X										48-HOUR TAT *	-004
5	PES-MW-3(35')	Monitoring Well #3	S	11/1/01	1310		7 Day	X	X								N		-005
6	~~EQUIPMENT~~ EB-11/1	EQUIPMENT BLANK 11/1	W	11/1/01	1340		7 Day	X									EB		-006
7	TB 11/1	TRIP BLANK 11/1	W	11/1/01	1345		7 Day	X									TB		-007
8																			
9																			
10																			

* notified Raghu will do 7 Cal TAT

[29] SAMPLER(S) AND COMPANY: (please print) MIKE GOLDEN/SCOTT CARNEY EMR, INC

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use): 2°C ROI

[32] RELINQUISHED BY

Printed Name and Signature:	DATE	TIME
SCOTT CARNEY	11/1/01	1350
	11-1	1900
Dunham	11/2/01	0730

[33] RECEIVED BY

Printed Name and Signature:	DATE	TIME
11-1	1350	11-1 1350
Dunham		
	11/2/01	0730

DJN 11/5/01

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Form CC1001, Rev 06/00

CH2MHILL Constructors, Inc.
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9282

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427-001-9

[2] PROJECT NAME: NIROP PILOT-SCALE STUDY

[3] PROJECT NUMBER: 5427-001-1

[5] PROJECT PHASE/SITE/TASK: 153691

[6] CTO OR DO NUMBER: 0024

[8] LAB NAME AND CONTACT: ENCHEM LABORATORIES

[9] LAB PO NUMBER:

[4] PROJECT CONTACT: SCOTT CARNEY

[7] PROJECT TEL NO AND FAX NO: (218) 393-0936

[10] LAB TEL NO AND FAX NO:

[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): BRANDY BWIEBEL EMR, INC

[14] RECIPIENT 1 (Address, Tel No., and Fax No.): 325 LAKE AVENUE SOUTH #605 DULUTH, MN 55802

[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):

[15] RECIPIENT 2 (Address, Tel No., and Fax No.):

[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):

[16] RECIPIENT 3 (Address, Tel No., and Fax No.):

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC	TOC									[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use) 913891
1	PES-MW-5(35')	Monitoring Well #5	S	11/2/01	1045		7 Day	X	X									N	MS-MSD 009 010	001
2	PES-MW-4(35')	Monitoring Well #4	S	11/1/01	1557		7 Day	X	X									N		002
3	EB-11/2	Equipment Blank	S	11/2/01	1100		7 Day	X										EB		003
4	PES-CW-3	Contingency Well #3	S	11/2/01	1312		7 DAY	X	X									N		004
5	PES-CW-2(37')	Contingency Well #2	S	11/5/01	0855		7 Day	X	X									N		005
6	PES-CW-1(35')	Contingency Well	S	11/5/01	1138		7 DAY	X	X									N		006
7	EB 11/5	EQUIPMENT BLANK 11/5	W	11/5/01	1200		7 DAY	X										EB		007
8	~~TRIP BLANK~~ TB 11/5	TRIP BLANK 11/5	W	11/5/01	1200		7 DAY	X										TB		008
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print) MIKE GOALEN EMR, INC

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use): 6°C ROI

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: [signature]	11-5-01	1340	Printed Name and Signature: [signature] 11-5	1400	
Printed Name and Signature: [signature]	11-5	1400	Printed Name and Signature: Dunlan		
Printed Name and Signature: Dunlan	11/6/00	800	Printed Name and Signature: Ryan Ohrouska	11/6/01	800

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Form CC1001, Rev 06/00

CH2MHILL Constructors, Inc.
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9282

CHAIN OF-CUSTODY RECORD

COC NUMBER: 5427-001-10

[2] PROJECT NAME: NIROP PILOT-SCALE STUDY	[5] PROJECT NUMBER: 5427-001-1	[8] LAB NAME AND CONTACT: ENCHEM LABS	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): TANDI ZWIEBEL EMR, INC	[14] RECIPIENT 1 (Address, Tel No., and Fax No.): 325 LAKE AVENUE SOUTH #603 DULUTH, MN 55802 (218)723-8140
[3] PROJECT PHASE/SITE/TASK: 153661	[6] CTO OR DO NUMBER: 00024	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):	[15] RECIPIENT 2 (Address, Tel No., and Fax No.):
[4] PROJECT CONTACT: SCOTT CARNEY	[7] PROJECT TEL NO AND FAX NO: (218) 391-0936	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):	[16] RECIPIENT 3 (Address, Tel No., and Fax No.):

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	[25] VOC 8260										[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use
1	PTS-MW-4 33.5-36	MONITORING WELL #4	S	11/1/01	1605		7 DAY	X												
2	PTS-MW-3 35-36	MONITORING WELL #3	S	11/1/01	1215		7 DAY	X												
3	PTS-MW-5 35-36	MONITORING WELL #5	S	11/2/01	1055		7 DAY	X												
4	PTS-CW-6 35-36	CONTINGENCY WELL #2	S	11/2/01	1320		7 DAY	X												
5	PTS-CW-7 37.5-38	CONTINGENCY WELL #2	S	11/6/01	0855		7 DAY	X												
6	PTS-CW-1 35-36	CONTINGENCY WELL #1	S	11/6/01	1145		7 DAY	X												
7																				
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print)
PETERSON-CARNEY
ERIN HOLMAN / SCOTT CARNEY

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use)

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: SCOTT CARNEY	11-8-01	0703	Printed Name and Signature:		
Printed Name and Signature: David Lozmeier	11-8-01	0807	Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

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Form CC1001, Rev 06/00

CH2MHILL Constructors, Inc.
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9262

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427-001-4

[2] PROJECT NAME: MROP PILOT SCALE EWDY

[3] PROJECT PHASE/SITE/TASK: 153691

[4] PROJECT CONTACT: ~~SCOTT CARNEY~~ RAGHU CHATRATHI

[5] PROJECT NUMBER: 5427-001-1

[6] CTO OR DO NUMBER: 0024

[7] PROJECT TEL NO AND FAX NO: (630) 789-9336

[8] LAB NAME AND CONTACT: EW CHEM LABORATORIES

[9] LAB PO NUMBER:

[10] LAB TEL NO AND FAX NO:

[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)

[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)

[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)

[14] RECIPIENT 1 (Address, Tel No. , and Fax No.):

[15] RECIPIENT 2 (Address, Tel No. , and Fax No.):

[16] RECIPIENT 3 (Address, Tel No. , and Fax No.):

[23] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[25] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC 8260B	SVOC	NITRATE + NITRITE E300.1	TOC SW9060	CYANIDE						[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	~~GWMW275/SA~~	CONTINGENCY WELL #27	W	11/12/01	1625		7 DAY	X	X	X	X	X						SA	011-012 MS MSD	914018
2	GWCW-1/SA	CONTINGENCY WELL #1	W	11/13/01	0923		7 DAY	X	X	X	X	X						SA		-001
3	GWCW-2/SA	CONTINGENCY WELL #2	W	11/13/01	1320		7 DAY	X	X	X	X	X						SA		-002
4	GWCW-3/SA	CONTINGENCY WELL #3	W	11/13/01	1538		7 DAY	X	X	X	X	X						SA		-003
5	GWMS-475/SA	MONITORING WELL #475	W	11/14/01	0836		7 DAY	X	X	X	X	X						SA		-004
6	ER-11/13	EQUIPMENT BLANK	W	11/13/01	1650		7 DAY	X										SA		-005
7	FB-11/13	FIELD BLANK 11/13	W	11/13/01	1540		7 DAY	X										~~SA~~ EB		-006
8	GWMW-5/SA	MONITORING WELL #5	W	11/14/01	1122		7/DAY	X	X	X	X	X						FB		-007
9	GWMW-4/SA	MONITORING WELL #4	W	11/14/01	1341		7/DAY	X	X	X	X	X						SA		-008
10	TB-11/14	TRIP BLANK-11/14	W	11/14/01	1403		7/DAY	X										SA		-009
																		TB		-010

[29] SAMPLER(S) AND COMPANY: (please print) SCOTT CARNEY - EMR INC

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use): 4°C ROI

[32] RELINQUISHED BY Printed Name and Signature:	DATE	TIME	[33] RECEIVED BY Printed Name and Signature:	DATE	TIME
SCOTT CARNEY	11-14-01	1403		11-14	1405
	11-14	1900	Dunham		
Dunham	11/15/01	0810		11/15/01	0810

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CH2MHILL Constructors, Inc.
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9262

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427-001-13

[2] PROJECT NAME: NIROP PILOT SCALE STUDY

[3] PROJECT NUMBER: 5427-001-1

[4] PROJECT PHASE/SITE/TASK: 153691

[5] CTO OR DO NUMBER: 0024

[6] PROJECT CONTACT: RAGHU CHATRATHI

[7] PROJECT TEL NO AND FAX NO: (630) 789-5336

[8] LAB NAME AND CONTACT: BWCHEM LABORATORY

[9] LAB PO NUMBER:

[10] LAB TEL NO AND FAX NO:

[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): BRANDY BURBER EMR, INC

[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):

[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):

[14] RECIPIENT 1 (Address, Tel No., and Fax No.): 225 LAKE AVENUE SOUTH SUITE 603 DULUTH, MN 55802

[15] RECIPIENT 2 (Address, Tel No., and Fax No.):

[16] RECIPIENT 3 (Address, Tel No., and Fax No.):

[23] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC 8260B	METHANE ETHANE ETHENE RSK-175	NITROGEN E300.1	TOC SW9060	[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	GWMW-3/SA	MONITORING WELL #3	W	11/14/01	1644		7 BAH	X	X	X	X	SA	030	914076
2	EB-11/14	EQUIPMENT BLANK 11/14	W	11/14/01	1700			X				EB	~~026~~ MS ~~029~~ MSD 031 BJN 11/27/01	-010
3	GWMW-9/SA	MONITORING WELL #9	W	11/15/01	0907			X	X	X	X	SA		-011
4	GWMW-8/SA	MONITORING WELL #8	W	11/15/01	1133			X	X	X	X	SA		-012
5	GWMW-2/SA	MONITORING WELL #2	W	11/15/01	1320			X	X	X	X	SA		-013
6	ID MW900	DUPLICATE #1	W	11/15/01	1332			X	X	X	X	ID	Same as 910 Per Scott Carney BJN 11/27/01	-009
7	GWMW-6/SA	MONITORING WELL #6	W	11/15/01	1542			X	X	X	X	SA		-014
8	EB-11/15	EQUIPMENT BLANK	W	11/15/01	1540			X				EB		-015
9	GWMW-9/SA	MONITORING WELL #9	W	11/15/01	0907					X		SA		-016
10	GWMW-8/SA	MONITORING WELL #8	W	11/15/01	1133					X		SA		-012
												SA		-013

[29] SAMPLER(S) AND COMPANY: (please print) SCOTT CARNEY - EMR, INC

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use):

[32] RELINQUISHED BY Printed Name and Signature:	DATE	TIME	[33] RECEIVED BY Printed Name and Signature:	DATE	TIME
	11-16-01	1348			
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature: Dunham	11/20/01	0800	Dunham Printed Name and Signature:		

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115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9282

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427-001-15

[2] PROJECT NAME: NIROP PILOT SCALE STUDY	[5] PROJECT NUMBER: 5427-001-1	[8] LAB NAME AND CONTACT: ENCHEM LABORATORY	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): ZANDY ZWIEBEL EMR, INC	[14] RECIPIENT 1 (Address, Tel No. , and Fax No.): 325 LAKE AVE S. #603 DULUTH, MN 55802
[3] PROJECT PHASE/SITE/TASK: 153691	[6] CTO OR DO NUMBER: 0024	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):	[15] RECIPIENT 2 (Address, Tel No. , and Fax No.):
[4] PROJECT CONTACT: RAGHU CHATTRATHI	[7] PROJECT TEL NO AND FAX NO: (630) 789-9336	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):	[16] RECIPIENT 3 (Address, Tel No. , and Fax No.):

[23] ANALYSES REQUIRED (Include Method Numbers): NITRATE/NITRITE 300.0

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[25] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	NITRATE/NITRITE 300.0	[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	GWMW-27S/SA	MONITORING WELL #27	W	11/12/01	1634		T AM	X	BON 11/26/01 SA	48 HOUR	914076
2	GWCW-1/SA	CONTINGENCY WELL #1	W	11/13/01	1145		48 HOUR	X		TAT ON NITRATE/NITRITE	-001
3	GWCW-2/SA	CONTINGENCY WELL #2	W	11/13/01	1320			X			-002
4	GWMW-5/SA	MONITORING WELL #5	W	11/14/01	1122			X			-003
5	GWMW-47S/SA	MONITORING WELL #47S	W	11/14/01	0836			X			-004
6	GWMW-3/SA	MONITORING WELL #3	W	11/14/01	1645			X			-005
7	GWMW-4/SA	MONITORING WELL #4	W	11/14/01	1341			X			-006
8	~~GWCW-1/SA~~	~~CONTINGENCY WELL #1~~	~~W~~	~~11/13/01~~	~~0829~~			~~X~~ RC			-007
9	GWCW-3/SA	CONTINGENCY WELL #3	W	11/13/01	1538			X			
10	GWMW-2/SA	MONITORING WELL #2	W	11/15/01	1333			X			-008
											-009

[29] SAMPLER(S) AND COMPANY: (please print): SCOTT CARNEY EMR, INC

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use):

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: [signature]	11-16-01	1348	Printed Name and Signature: [signature]		
Printed Name and Signature:			Printed Name and Signature: Dunham		
Printed Name and Signature: Dunham	11/20/01	0800	Printed Name and Signature: [signature]	11/20/01	0800

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115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9282

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427 - 001 - 16

[2] PROJECT NAME: NIROP PILOT SCALE STUDY

[3] PROJECT NUMBER: 5427-001-1

[4] PROJECT PHASE/SITE/TASK: 153691

[5] CTO OR DO NUMBER: 0024

[6] LAB NAME AND CONTACT: ~~[illegible]~~ ENCHEM LABORATORY

[7] PROJECT TEL NO AND FAX NO: (630) 789-9336

[8] PROJECT CONTACT: RAGHU CHATRATHI

[9] LAB PO NUMBER:

[10] LAB TEL NO AND FAX NO:

[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): RANDY BUTBER EMR, INC

[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):

[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):

[14] RECIPIENT 1 (Address, Tel No. , and Fax No.): 325 LAKE AVE S. SUITE #603 DULUTH, MN 55802

[15] RECIPIENT 2 (Address, Tel No. , and Fax No.):

[16] RECIPIENT 3 (Address, Tel No. , and Fax No.):

[23] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC 8260B	NITRATE/NITRITE 353.2	METHANE ETHANE 3810M	TOC SW9060	[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	GWMW-1/SA	MONITORING WELL #1	W	11/16/01	0906		7 DAY	X	X	X	X	SA	48-HOUR TURNAROUND ON	914076
2	GWMW-7/SA	MONITORING WELL #7	W	11/16/01	1110		7/DAY	X	X	X	X	SA	NITRATE/NITRITE	-017
3	GW ~~[illegible]~~ INJ-3/SA	INJECTION WELL #3	W	11/16/01	1334		7/DAY	X	X	X	X		SAMPLE	-018
4	TB-11/16	TRIP BLANK 11/16	W	11/16/01	1345		7/DAY	X						-019
5														-020
6														
7														
8														
9														
10														

[29] SAMPLER(S) AND COMPANY: (please print) SCOTT CARNEY - EMR

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use)

[32] RELINQUISHED BY

Printed Name and Signature:	DATE	TIME
SCOTT CARNEY	11-16-01	1348
[signature]	11-19	1900
Dunham	11/20/01	0800

[33] RECEIVED BY

Printed Name and Signature:	DATE	TIME
[signature]		
Dunham		
[signature]	11/20/01	0800

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CH2MHILL Constructors, Inc.

115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9282

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427 - 001 - 17

[2] PROJECT NAME: NIROD PILOT SCALE STUDY	[5] PROJECT NUMBER: 5427-001-1	[8] LAB NAME AND CONTACT: ENCHEM LABORATORY	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): DANA SWIGER EMR INC	[14] RECIPIENT 1 (Address, Tel No. , and Fax No.): 325 LAKE AVE SOUTH #603 DULUTH, MN 55802
[3] PROJECT PHASE/SITE/TASK: 153691	[6] CTO OR DO NUMBER: 0024	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):	[15] RECIPIENT 2 (Address, Tel No. , and Fax No.):
[4] PROJECT CONTACT: RASHU CHATRATH	[7] PROJECT TEL NO AND FAX NO: (630) 789-9336	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):	[16] RECIPIENT 3 (Address, Tel No. , and Fax No.):

[23] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC 8260	NITRATE/NITRITE 300.0	TOC SW9060	METH/ETHANE ETHENE SW8015							[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	GWINS-2/SA	INJECTION WELL #2	W	11/19/01	0913		7 DAY	X	X	X	X							SA	~~HEDR TAT~~	914076
2	EB - 11/16	EQUIPMENT BLANK 11/16	W	11/16/01	1830		7 DAY	X										EB		-021
3	GWINS-1/SA	INJECTION WELL #1		11/19/01	1126			X	X	X	X									-022
4	ID MW901	DUPLICATE #2	W	11/19/01				X	X	X	X									-023
5	GWMS-46S	MONITORING WELL #46S	W	11/19/01	1317			X	X	X	X				NO3 MS NO2 MSD only			30032 31033		-024
6	EB- 11/19	EQUIPMENT BLANK 11/19	W	11/19/01	~~1530~~ 1445			X									BTN 11/27/01			-025
7	FB-11/19	FIELD BLANK 11/19	W	11/19/01	1430			X										See non cont. BTN 11/27/01	MeOH Blank KM 11/20	-026
8																				-027
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print): SCOTT CARNEY EMR, INC

[30] COURIER AND SHIPPING NUMBER:

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use)

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: [signature]	11-19-01	1536	Printed Name and Signature: [signature]	11-19	1600
Printed Name and Signature: [signature]	11-19	1800	Printed Name and Signature: [signature]		
Printed Name and Signature: Dunham	11/20/01	0800	Printed Name and Signature: [signature]	11/20/01	0800

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Q 0110936

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** Fax No. : (412) 826-3433

Company : ENVIRONMENTAL MANAGEMENT RESOURCES, INC
Co. Address : 325 LAKE AVENUE SOUTH SUITE 603
Proj. Manager: SCOTT CARNEY X203 DULUTH MN 55802
Proj. Location: ANOKA COUNTY REGIONAL RIVERFRONT PARK
Proj. Number: 5127
Phone # : (218) 723-8140 **Fax # :** (218) 723-8132

Sampler's signature :

Results to : SCOTT CARNEY

Invoice to : SCOTT CARNEY

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	Parameters Requested: HYDROCEN								Remarks
01	MS-465	MONITORING WELL #465	11/19/01	1422		X	1	X								
02	ID MW901	DUPLICATE	11/19/01			X	1	X								
03	BACKGROUND	BACKGROUND SAMPLE	11/19/01	1420		X	1	X								

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
	EMR, INC	11/19/01	1515		Microseeps	11/21/01	12:22
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

Enchem

CHURCHILL Constructors, Inc.

115 Perimeter Center Place, Suite 700
Atlanta, GA 30346-1278
Tel No: (770) 604-9182
Fax No: (770) 604-9282

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: 5427-001-30

[2] PROJECT NAME: NIROP Pilot Scale Study	[5] PROJECT NUMBER: 5427-001-1	[8] LAB NAME AND CONTACT: Enchem Labs, Inc.	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company): Zandy Zwiebel EMR, Inc.	[14] RECIPIENT 1 (Address, Tel No. , and Fax No.): 325 Lake Ave, South Suite 603 Duluth, MN 55802
[3] PROJECT PHASE/SITE/TASK: 153691	[6] CTO OR DO NUMBER: 0024	[9] LAB PO NUMBER: 5427-001-1	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company):	[15] RECIPIENT 2 (Address, Tel No. , and Fax No.):
[4] PROJECT CONTACT: Raghu Chatrathi Z.A. Zwiebel	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company):	[16] RECIPIENT 3 (Address, Tel No. , and Fax No.):

[25] ANALYSES REQUIRED (Include Method Numbers)

[17] ITEM	[18] SAMPLE IDENTIFIER	[19] SAMPLE DESCRIPTION/LOCATION	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	VOC 8260A										[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	PES-INJ-2-oil	Vegetable Oil	Oil	12/11/01	5:15pm		7 Day	X										N	007 008 MS MSD	914375 -001
2	PES-INJ-2A oil	Vegetable Oil	Oil	12/11/01	5:16pm		7 Day	X										FD		-002
3	TB-12-11	Trip Blank	W	12/11/01	NA		7 Day	X										TB		-003
4																				
5																				
6																				
7																				
8																				
9																				
10																				

[29] SAMPLER(S) AND COMPANY: (please print)
Z.A. Zwiebel - EMR, Inc. T. Turner - EMR

[30] COURIER AND SHIPPING NUMBER:
ENCHEM

[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use)

[32] RELINQUISHED BY	DATE	TIME	[33] RECEIVED BY	DATE	TIME
Printed Name and Signature: RAGHU CHATRATHI	12/12/01	1245	Printed Name and Signature: Gary Barker Enchem	12-12-01	1245
Printed Name and Signature:	12-12	1420	Printed Name and Signature:		
Printed Name and Signature: Dunham	12/13/01	0800	Printed Name and Signature: Kris Mix	12/13/01	0800

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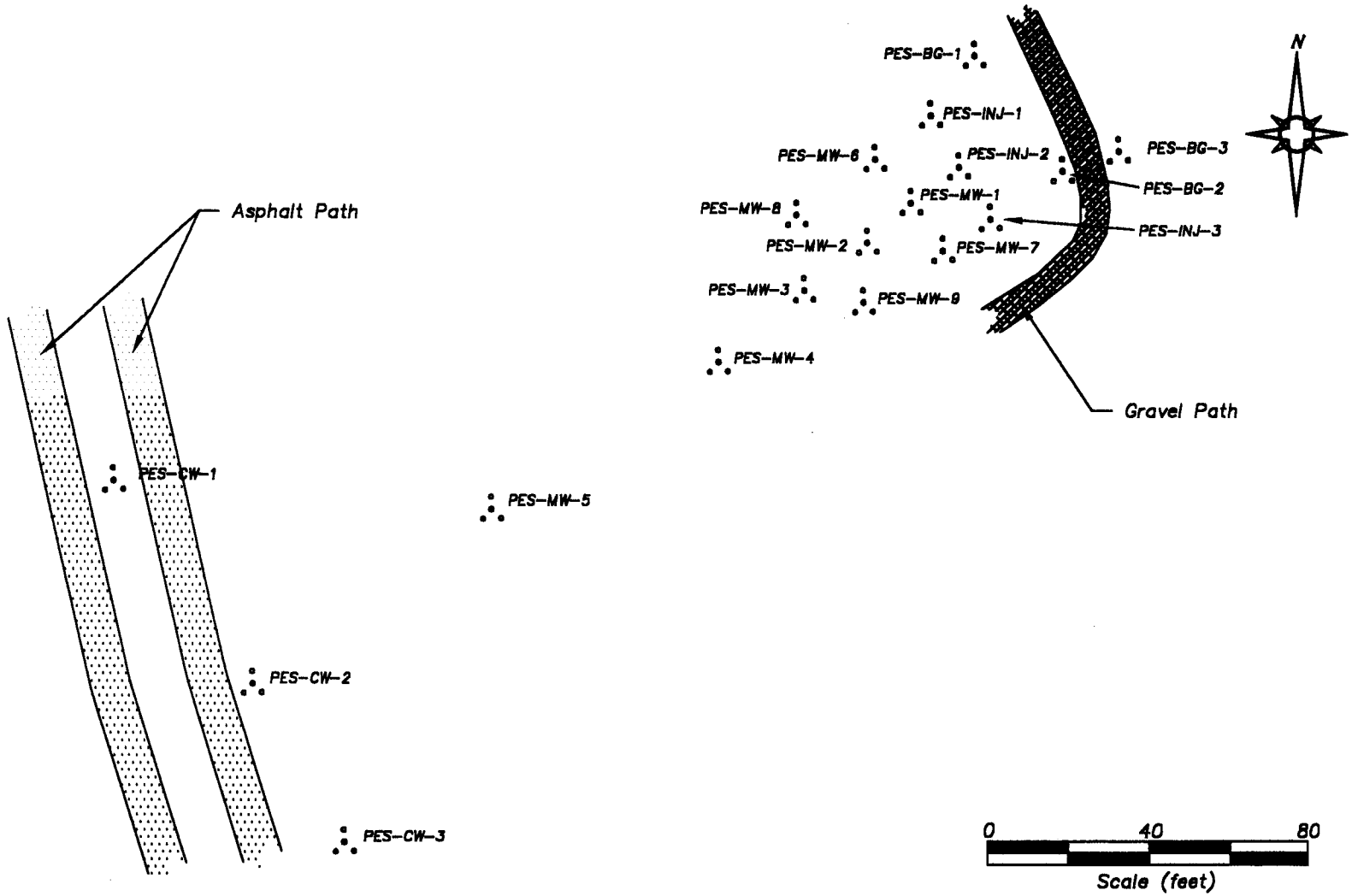
Appendix D

As-built Drawings



LEGEND

Injection/Monitoring/Contingency Well Location

NIROP Pilot-Scale Study Project
Anoka County Regional Riverfront Park – Fridley, MN

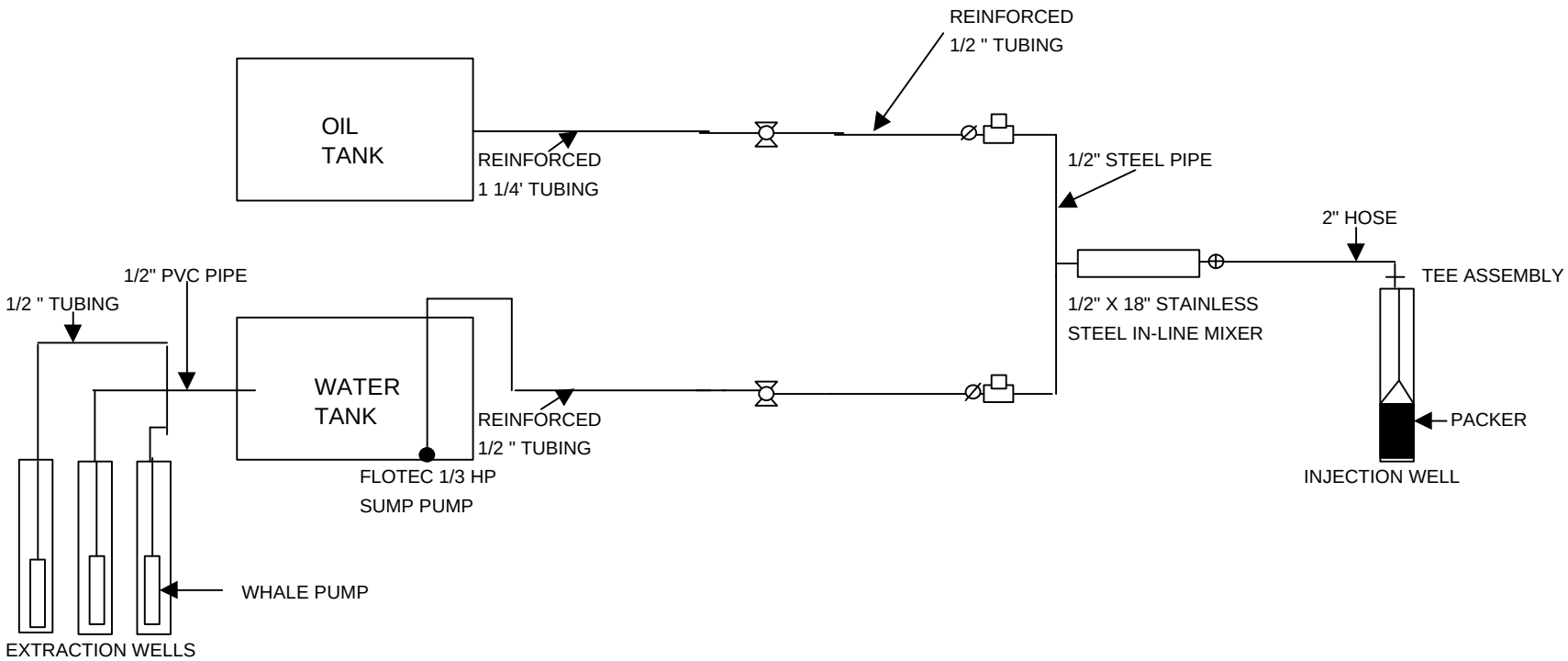
As-Built Well Location Map

DRAWN BY:	SJC	PROJECT NO.	5427-4
CHECKED BY:	ZAZ	DATE:	12-7-01
REVISION NO.	1	SCALE:	AS NOTED

EMR INCORPORATED
ENVIRONMENTAL MANAGEMENT RESOURCES

Appendix D2

Injection System Diagram



INJECTION SYSTEM DIAGRAM

Sandpiper Double Diaphragm Pump

Readall Brass Flowmeter

Ball Valve

Gate Valve

Appendix E

Waste Disposal Documentation

Appendix E1

Waste Disposal Log

WASTE DISPOSAL LOG
ANOKA COUNTY PARK - PILOT SCALE STUDY
NIROP FRODLEY

Container #	Container Type	Qty.	Contents	Acc. Start Date	Storage Location	Sample ID	Profile No.	Ticket No.	Waste Characteristics and Waste Codes	Transporter	Disposal Location	Disposal Date
1	DM	55 Gal	Decon Water	10/15/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
	CM	30 CY	Soil	10/15/01	Anoka County Park	Stockpile 10/23	01-0260-3.7A	NA	Non Hazardous	Onyx Environmental	Superior FDR Landfill	12/13/01
2	DM	55 Gal	Decon Water	10/16/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
3	DM	55 Gal	Decon Water	10/16/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
4	DM	55 Gal	Decon Water	10/17/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
5	DM	55 Gal	Decon Water	10/17/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
6	DM	55 Gal	Decon Water	10/18/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
7	DM	55 Gal	Decon Water	10/18/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
8	DM	55 Gal	Decon Water	10/19/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
9	DM	55 Gal	Decon Water	10/19/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
10	DM	55 Gal	Decon Water	10/22/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
11	DM	55 Gal	Decon Water	10/22/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
12	DM	55 Gal	Decon Water	10/22/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
13	DM	55 Gal	Decon Water	10/22/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
14	DM	55 Gal	Decon Water	10/23/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
15	DM	55 Gal	Decon Water	10/23/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
	CM	30 CY	Soil	10/24/01	Anoka County Park	Stockpile 10/23	01-0260-3.7A	NA	Non Hazardous	Onyx Environmental	Superior FDR Landfill	12/13/01
16	DM	55 Gal	Decon Water	10/24/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
17	DM	55 Gal	Decon Water	10/24/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
18	DM	55 Gal	Decon Water	10/25/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
19	DM	55 Gal	Decon Water	10/25/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
*20	DM	55 Gal	PES-INJ-2 Purge Water	10/26/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	Combined with other existing drums 10/30/01	11/13/01
*21	DM	55 Gal	Decon Water	10/26/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	Combined with other existing drums 10/30/01	11/13/01
*22	DM	55 Gal	Decon Water	10/26/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	Combined with other existing drums 10/30/01	11/13/01
*23	DM	55 Gal	Decon Water	10/29/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	Combined with other existing drums 10/30/01	11/13/01
	TP	2100 Gal	Development Water	10/31/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
20	DM	55 Gal	Decon Water	11/1/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
21	DM	55 Gal	Decon Water	11/1/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
22	DM	55 Gal	Decon Water	11/1/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
23	DM	55 Gal	Decon Water	11/2/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
24	DM	55 Gal	Decon Water	11/2/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
25	DM	55 Gal	Decon Water	11/2/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
26	DM	55 Gal	Decon Water	11/2/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01

WASTE DISPOSAL LOG
ANOKA COUNTY PARK - PILOT SCALE STUDY
NIROP FRODLEY

Container #	Container Type	Qty.	Contents	Acc. Start Date	Storage Location	Sample ID	Profile No.	Ticket No.	Waste Characteristics and Waste Codes	Transporter	Disposal Location	Disposal Date
27	DM	55 Gal	Development Water	11/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
28	DM	55 Gal	Development Water	11/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
29	DM	55 Gal	Development Water	11/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
30	DM	55 Gal	Development Water	11/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
31	DM	55 Gal	Development Water	11/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
32	DM	55 Gal	Development Water	11/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
33	DM	55 Gal	Development Water	11/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
34	DM	55 Gal	Development Water	11/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
35	DM	55 Gal	Development Water	11/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
36	DM	55 Gal	Development Water	11/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
37	DM	55 Gal	Development Water	11/7/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
38	DM	55 Gal	Development Water	11/7/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
39	DM	55 Gal	Development Water	11/7/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
40	DM	55 Gal	Development Water	11/7/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
41	DM	55 Gal	Development Water	11/7/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
42	DM	55 Gal	Development Water	11/7/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
43	DM	55 Gal	Development Water	11/7/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
44	DM	55 Gal	Development Water	11/7/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
45	DM	55 Gal	Development Water	11/7/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
46	DM	55 Gal	Development Water	11/7/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	McCarty Water and Waste	NIROP GWTF	11/13/01
47	DM	55 Gal	Purge Water	11/12/01	Anoka County Park	NIROP Disposal	NA	2110895	Non Hazardous	McCarty Water and Waste	MWCC	12/13/2001
48	DM	55 Gal	Purge Water	11/13/01	Anoka County Park	NIROP Disposal	NA	2110895	Non Hazardous	McCarty Water and Waste	MWCC	12/13/2001
49	DM	55 Gal	Sediment	11/13/01	Anoka County Park	Stockpile 10/23	01-0260-3.7A	NA	Non Hazardous	Onyx Environmental	Superior FDR Landfill	12/13/2001
50	DM	55 Gal	Sediment	11/13/01	Anoka County Park	Stockpile 10/23	01-0260-3.7A	NA	Non Hazardous	Onyx Environmental	Superior FDR Landfill	12/13/2001
51	DM	55 Gal	Purge Water	11/14/01	Anoka County Park	NIROP Disposal	NA	2110895	Non Hazardous	McCarty Water and Waste	MWCC	12/13/2001
52	DM	55 Gal	Purge/Lab Water	11/15/01	Anoka County Park	NIROP Disposal	NA	2110895	Non Hazardous	McCarty Water and Waste	MWCC	12/13/2001
53	DM	55 Gal	Purge/Lab Water	11/15/01	Anoka County Park	NIROP Disposal	NA	2110895	Non Hazardous	McCarty Water and Waste	MWCC	12/13/2001
54	DM	55 Gal	Purge/Lab Water	11/16/01	Anoka County Park	NIROP Disposal	NA	2110895	Non Hazardous	McCarty Water and Waste	MWCC	12/13/2001
55	DM	55 Gal	Purge/Lab Water	11/19/01	Anoka County Park	NIROP Disposal	NA	2110895	Non Hazardous	McCarty Water and Waste	MWCC	12/13/2001
56	DM	55 Gal	USGS Water	12/3/01	Anoka County Park	NIROP Disposal	NA	2110895	Non Hazardous	McCarty Water and Waste	MWCC	12/13/2001
57	DM	55 Gal	Development Water	12/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	NA	Used for Injection	12/10/2001
58	DM	55 Gal	Development Water	12/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	NA	Used for Injection	12/10/2001
59	DM	55 Gal	Development Water	12/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	NA	Used for Injection	12/10/2001
60	DM	55 Gal	Development Water	12/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	NA	Used for Injection	12/10/2001
61	DM	55 Gal	Development Water	12/6/01	Anoka County Park	NIROP Disposal	NA	NA	Non Hazardous	NA	Used for Injection	12/10/2001

Appendix E2

Waste Soil Profile

Special Waste Profile Sheet

Superior FCR Landfill, Inc.

PROFILE #	
Original submittal	X
Recertification	☐
One time project	X

A. Generator

Name: UNITED STATES NAVY
Site Address: ANOKA COUNTY REGIONAL RIVERFRONT PARK
City, State, Zip: FRIDLEY, MN 55421
Contact: R.W. AUBERT
Phone: (218) 393-0936 (SCOTT CARNEY - EMR)
Fax: (218) 723-8198 (EMR - DULUTH)

B. Billing

Name: Onyx Environmental Services
Address: 3230 101st Ave NE
City, State, Zip: Blaine MN 55449
Contact: Wendy Nguyen
Phone: 763-786-3660 X108

C. Description of Waste

Name of Waste: SOIL
Estimated Volume: ESTIMATED 70,000 LBS
Frequency: ONE TIME
Physical State: SOLID
Flash Point (°F): >210
Color: BROWN
pH: 8.4
Process Generating Waste: MONITORING WELL INSTALLATION / DRILLING
Free Liquids: NONE
Total Solids: 92%

D. Other Waste Data or Comments

E. Sample Information

Check all that apply:

☐ Sample submitted with profile ☒ Laboratory Analysis submitted ☐ Material Safety Data Sheet Submitted

Laboratory Name: EnCHEM LABORATORIES Sample Date: 10/23/01 Sample I.D.: STOCKPILE 10/23

F. Generator Certifications

1. This waste is not a hazardous waste as defined in Minnesota Rules Chapter 7045 or 40 CFR 261.
2. This waste does not contain regulated quantities of PCB's.
3. This waste does not contain regulated quantities of herbicides or pesticides.
4. This waste does not contain infectious wastes as defined in Minnesota Rules Chapter.
5. All information submitted in this and all attached documents contains true and accurate descriptions of this waste. Any sample submitted is representative as defined in 40 CFR 261 - Appendix 1 and was obtained by using this or an equivalent sampling method. All relevant information regarding known or suspected hazards in the possession of the generator has been disclosed.

Generator's Signature: R.W. Aubert Title: NAVSEA

Print Name: R.W. AUBERT Date: 11/14/01

G. Landfill Approval

My approval is based upon the laboratory analysis of a representative sample and/or material safety data sheets submitted by the generator.

Landfill Signature _____ Date _____

Approvals Signature _____ Date _____

Waste Category _____ Analytical Protocol _____ Disposal Operation _____ Recert. Date _____

Appendix E3

Waste Soil Manifests

SUPERIOR NON-HAZARDOUS WASTE MANIFEST

Cust. #: 353 Site: 2

GENERATOR

Name: Southern Division-U.S. Naval Facilities Engineering Command
Generating Location: Anoka County Riverfront Park
Address: Anoka County Regional Riverfront Park
Fridley, MN 55421
Phone No. EMR (218) 723-8140
Profile No. 01-0260-3.7A

CODES:
D – DRUM
B – BAG
C – CARTON
P POUNDS
Y – YARDS
T – TONS
O – OTHER

WASTE CODE	WASTE DESCRIPTION	QUANTITY	UNITS
	SOIL	20	Y

I hereby certify that the above listed material(s), is (are) not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law. That each waste has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

R. J. AUBERT — 12/18/01 — SIGNATURE
AUTHORIZED AGENT'S NAME (PRINT) DATE

CONTRACTOR/CONSULTANT/AGENT

Name: Onyx Environmental Services L.L.C.
Phone No. (763) 786-3660
Address: 3230 101st Avenue NE Blaine, MN 55449

TRANSPORTER

Name: Onyx Environmental Services L.L.C.
Phone No. (612) 328-3094
Address: 175 County Road 37 NE
Buffalo, MN 55313
Driver's Name: Rob Merritt
Vehicle's No. 102095

I hereby certify that the above named material was picked up at the Generator site listed above and delivered without incident to the disposal facility listed below.

12-13-01 — SHIPMENT DATE — DRIVER'S SIGNATURE
12-13-01 — DELIVERY DATE — DRIVER'S SIGNATURE

DISPOSAL FACILITY

Site Name: Superior FCR Landfill, Inc.
Phone No. 800-963-3158
Address: 175 Co. Rd. 37 N.E., Buffalo, MN 55313
Permit No. SW60

I hereby certify that the above material has been accepted and that information presented on this document are true and accurate.

NAME — DATE 12-13-01 — SIGNATURE

White Copy – Generator retains at time of loading
Yellow Copy – Hauler retains after delivery to landfill
Pink Copy – Landfill retains

Ticket No. 28-114 Tons 234
Yards

SUPERIOR NON-HAZARDOUS WASTE MANIFEST

Cust. #: 353 Site: 2

GENERATOR

Name: Southern Division-U.S. Naval Facilities Engineering Command

Generating Location: Anoka County Riverfront Park

Address: Anoka County Regional Riverfront Park

Fridley, MN 55481

Phone No.: EMR (218) 723-8140

Profile No.: 0 1 - 0 2 6 0 - 3 . 7 A

CODES:
D – DRUM
B – BAG
C – CARTON
P – POUNDS
Y – YARDS
T – TONS
O – OTHER

WASTE CODE	WASTE DESCRIPTION	QUANTITY	UNITS
	SOIL	20	Y

I hereby certify that the above listed material(s), is (are) not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law. That each waste has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

AUTHORIZED AGENT'S NAME (PRINT): Paul Albert

DATE: 12/13/01

SIGNATURE: [signature]

CONTRACTOR/CONSULTANT/AGENT

Name: Onyx Environmental Services L.L.C.

Phone No.: (763) 786-3660

Address: 3230 101st Avenue NE Blaine, MN 55449

TRANSPORTER

Name: Onyx Environmental Services L.L.C.

Phone No.: (612) 328-3094

Address: 175 County Road 37 NE

Buffalo, MN 55313

Driver's Name: Rob Merritt

Vehicle's No.: TD 2075

I hereby certify that the above named material was picked up at the Generator site listed above and delivered without incident to the disposal facility listed below.

SHIPMENT DATE: 12-13-01

DRIVER'S SIGNATURE: [signature]

DELIVERY DATE: 12-13-01

DRIVER'S SIGNATURE: [signature]

DISPOSAL FACILITY

Site Name: Superior FCR Landfill, Inc.

Phone No.: 800-963-3158

Address: 175 Co. Rd. 37 N.E., Buffalo, MN 55313

Permit No.: SW60

I hereby certify that the above material has been accepted and that information presented on this document are true and accurate.

NAME: Toni Kappore

DATE: 12-13-01

SIGNATURE: [signature]

White Copy – Generator retains at time of loading
Yellow Copy – Hauler retains after delivery to landfill
Pink Copy – Landfill retains
Gold Copy – Facility mails to customer

Ticket No.: 28881

Tons: 21.23

Yards:

Superior FCR Landfill, Inc.
175 County Road 37NE
Buffalo, Minnesota 55313
(320) 963-3158
(800) 963-3158
FAX (320) 963-3051

January 10, 2002

Scott Carney
EMR-Duluth
325 Lake Ave. S., Suite 603
Duluth, MN 55802

Dear Scott,

The 44.70 tons of soil from the southern Division-U.S. Naval Facilities Engineering Command project at the Anoka County Regional Riverfront Park was properly disposed of on December 13, 2001 at Superior FCR Landfill. The waste soil was accepted under approval number 01-0260-37A.

Thank You,

Tanya Horne

Tanya Horne
Superior FCR Landfill

Appendix E4

Waste Water Profile

Special Waste Disposal, Inc.

3130 Excelsior Blvd. Minneapolis, MN 55416 Phone (612) 285-0805 Fax (612) 285-6790

Profile Number: _____

Application for Disposal / Solidification of Liquid Non-Hazardous Industrial Wastes

STEP 1

Company: UNITED STATES NAVY EPA ID #: _____

Contact Name: R.W. AUBERT Title: NAVSEA

Address: ANOKA COUNTY REGIONAL RIVERFRONT PARK

City: FRIDLEY State: MN Zip: 55421

Phone: (218) 723-8140 (EMR DULUTH) Fax: (218) 723-8132 (EMR-DULUTH)

STEP 2

Type of Packaging:
- ☐ Bulk
- ☒ Drums
- ☐ Other _____

Estimated Volume: 450 gallons / year

STEP 3

Please provide a brief description of the waste material and the process generating the waste material:

THE WATER WAS GENERATED DURING GROUNDWATER SAMPLING. THE WATER WAS GENERATED BY THE PURGING OF GROUNDWATER MONITORING WELLS AND THE DECONTAMINATION OF SAMPLING EQUIPMENT.

STEP 4

Please check the following:

True	False	
☒	☐	My industrial waste is not a listed hazardous waste.
☒	☐	My industrial waste is not a characteristically hazardous waste.
☒	☐	My industrial waste has not been commingled with or contaminated by any other waste materials than described herein.

STEP 5

Properties of Waste

A. Physical State:
- ☒ Liquid
- ☐ Semi-Solid
- ☐ Powder
- ☐ Other _____

B. Odor:
Describe _____
- ☒ None
- ☐ Mild
- ☐ Strong

C. Flash Point (degrees Fahrenheit)
- ☐ ≤ 140
- ☐ 141-200
- ☐ ≥ 201
- ☒ N/A
- ☐ N/D

D. Minimum Percent Solids (%) N/A

E. Density Range: ____ to ____
- ☒ N/D
- ☐ g. / cc.
- ☐ lbs. / gal.
- ☐ lbs. / cu. yd
- ☐ Other _____

F. Color(s):
Describe: SLIGHTLY TURBID W/ SUSPENDED SEDIMENTS

G. pH (standard units):
- ☐ ≤ 2.0
- ☐ 2.1-5.0
- ☒ 5.1-9.0
- ☐ 9.1-12.4
- ☐ ≥ 12.5
- ☐ N/A
- ☐ N/D

H. Layers:
- ☒ Single Phased
- ☐ Bi-Layered
- ☐ Multi-Layered

Required Analytical:
- ☒ pH
- ☒ Total Volatile Organic Compounds
- ☒ TCLP (8 RCRA metals) NA SW
  Including: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium & Silver
- ☐ Other _____

STEP 6

As an authorized representative of the generator, I hereby certify that the information above, including all attachments, is correct and that no deliberate or willful omission of composition or properties exist, and that all known or suspected hazards have been disclosed, and to the best of my knowledge, my industrial waste is not known to be hazardous, nor commingled with or contaminated with any hazardous materials. I understand the above information and all attachments will be reviewed by Special Waste Disposal, Inc. (SWDI) and SWDI will either (1) approve my waste (2) request additional information, or (3) reject my waste.

Name (print): R W AUBERT Signature: [signature] Title: NAVSEA Date: 11/30/01

Metropolitan Council
Improve regional competitiveness in a global economy

Environmental Services

December 8, 2001

Mary McCarty
McCarty Water & Waste
6240 Hwy 12 West
Maple Plain, MN 55359

Re: **MCES Discharge Approval**

Responsible Party/Site: **US Navy**
Anoka County Regional Riverfront Park
East River Road
Fridley, MN

Based on the request letter and data provided on **12/5/01**, the MCES hereby approves the discharge of . This wastewater must be hauled by a permitted Liquid Waste Hauler who has approval to use the designated disposal site.
Volume: **450 gallons**
Treatment Requirements: **None**
Conditions of Approval: **See below**
Discharge Point: **Disposal Site #1, 3rd & Commercial, St. Paul**
Wastewater transported by: **McCarty Water & Waste**
Approval Effective Date - Start: **12/8/01** End: **1/15/02**
Contact MCES 24 hours prior to discharge - **No**
Submit formal report within 30 days of discharge - **No**

This is a one-time approval only for the waste described herein. It does not release the Responsible Party from any conditions/regulations set forth by the MPCA, the city in which the discharge takes place, and/or any other agency that regulates the waste being discharged. In addition, this approval does not release the Responsible Party or any consultant/contractor involved from any subsequent liabilities associated with conducting this discharge.

If there are any questions, please contact me at (651) 602-4705.

Sincerely,

Robert H. Golden

Robert H. Golden , P.E.
Principal Engineer
Industrial Waste & Pollution Prevention Section

cc: Mike Flaherty, MCES

Appendix E5

Waste Water Manifest

SWDI
Special Waste Disposal, Inc.

3130 Excelsior Boulevard
Minneapolis, MN 55416
612-285-9865 Fax: 612-285-6790

Manifest # 2110895

Non-Hazardous Waste Shipping Manifest

Generator Information

1. Generator's EPA ID No. (if applicable)

2. Page 1 of 1 Page(s)

3. Generator's Name: United States Navy
Mailing Address (if different): Arnold City Park, Northport Park
Facility Address: Grounds on Arnold Park on Hay and East River Road
Friday, MN 55421
Generator's Phone: 218-723-8140
Contact Name: R.W. Aubert
Fax: Scott Carney

4. Transporter 1: McCarty Water and Waste
DOT ID No.:
Phone: 763-479-4343

5. Transporter 2 (if applicable):
DOT ID No.:
Phone:

6. TSD Facility Name: Metropolitan Council Env. Serv. Ind. Disposal Site
Site Address: 3rd Avenue & Commercial Site
St. Paul, MN
Phone:
Notes:

7. Description / U.S. DOT Description (including Proper Shipping Name) including Special Handling Procedures	8. Container Type	9. Quantity	10. Wt. / Vol.	11. Waste Profile #
a. Development Water	Tanker	500	Gallons	N/A
b.				
c.				
d.				

12. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable national and international government regulations.

Printed / Typed Name: [illegible] Signature: R.W. AUBERT Date: 12/13/01

Transporter

13. Transporter 1 Acknowledgement of Receipt of Materials

Printed / Typed Name: Jason Doboszeski Signature: [illegible] Date: 12/14/01 S.T.

14. Transporter 2 (if applicable) Acknowledgement of Receipt of Materials

Printed / Typed Name: Signature: Date:

TSD Facility

15. Discrepancy Indication

16. Facility Owner or Operator: Certification of receipt of non-hazardous materials covered by this manifest except as noted in Item 15.

Printed / Typed Name: Signature: Date:

Load #: Scale Wt. Volume

White - SWDI Copy Green - TSD Facility Copy Yellow - Transporter #2 Pink - Transporter #1 Gold - Generator Copy

McCarty
Water & Waste

January 3, 2002

TO: Rob Tapp
SWDI

RE: US Navy
Anoka Riverfront Park Site
Fridley, MN

Development water from this site was transported to the Metro Council Environmental Services Industrial Disposal site at 3rd and Commercial in St. Paul on December 14, 2001. The discharge was conducted in full accordance with MCES rules, and as permitted by Robert Golden. Total volume was 500 gallons.

Mary McCarty

Mary McCarty
President

6240 Highway 12 West • Maple Plain, Minnesota 55359
763-479-4343 • Fax 763-479-1872

Appendix F

Representative Project Photographs

1. PES-INJ-1 During Boring. Facing West.

2. PES-INJ-1 During Installation. Facing West.

3. PES-INJ-1 Installed. Facing West.

4. PES-INJ-1 During Development. Facing West.

5. PES-MW-3 During Gamma Logging. Facing West.

6. Purging PES-MW-8. Facing West.

7. Completed Wells. Facing West.

8. Construction of Temporary Building. Facing West.

9. Construction of Temporary Building. Facing West.

10. Injecting Vegetable Oil / Lecithin into PES-INJ-2. Facing West.

11. Slug Testing PES-MW-1 Prior to Injection. Facing West.

12. Slug Testing PES-INJ-1. Facing Northwest.