

Report

Ground Water Monitoring Well Installation

General Motors Corp.
Fisher Guide Division
Trenton, New Jersey

June 1988



O'BRIEN & GERE



O'BRIEN & GERE

June 28, 1988

General Motors Corporation
Fisher Guide Division
1440 Parkway Avenue
Trenton, New Jersey 08650

Attention: Mr. Phil Kienle

Gentlemen:

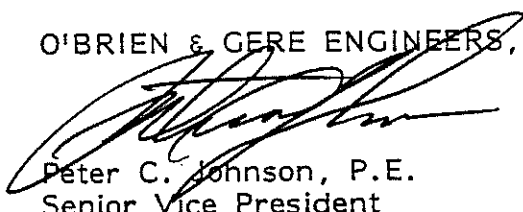
O'Brien & Gere Engineers, Inc. is pleased to present this report to General Motors Corporation describing the installation of ground water monitoring wells at the Fisher Guide Division in Trenton, New Jersey. The report presents information regarding field activities, observations, permits and well logs.

Should you have any questions, please feel free to contact myself or Geoffrey C. Seibel, CPG, at 215-628-9100.

We appreciate this opportunity to be of service to General Motors.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.



Peter C. Johnson, P.E.
Senior Vice President

PCJ/CCS/rms

REPORT

GENERAL MOTORS CORPORATION
FISHER GUIDE DIVISION
TRENTON, NEW JERSEY

GROUND WATER MONITORING
WELL INSTALLATION

JUNE, 1988

O'BRIEN & GERE ENGINEERS, NC.
521 Township Line Road
One Valley Square
Suite 200
Blue Bell, Pennsylvania 19422

GROUND WATER MONITORING WELL INSTALLATION
FISHER GUIDE DIVISION
TRENTON, NEW JERSEY

TABLE OF CONTENTS

	Page
Cover Letter	i
Introduction	1
Well Installation Plan	1
Site Health and Safety	2
Monitoring Well 9-A	2
Monitoring Well 1-A	4
Monitoring Well 13	5
Monitoring Well 7-A	6
Shallow Overburden Well	7

Appendicies

NJDEP Well Permits
NJDEP Well Records
Form A
OBG Drilling Administration Logs

REPORT

MONITORING WELL INSTALLATION GENERAL MOTORS CORPORATION FISHER GUIDE DIVISION TRENTON, NEW JERSEY

Introduction

In March 1988, the Fisher Guide Division of General Motors Corporation retained O'Brien & Gere Engineers, Inc., to install 5 monitoring wells at the Trenton, New Jersey facility. These wells were installed as an additional requirement of the Corporation's New Jersey Pollution Discharge Elimination System (NJPDES) Permit No. NJ0053295.

O'Brien & Gere subcontracted Stothoff Drilling Company of Flemington New Jersey, to drill, complete and develop the five monitoring wells. The rig used to complete the project was a Reich Drill T-650-W. Surveying of the monitoring wells was contracted directly by General Motors Corporation.

This report contains an account of those field activities related to the monitoring well installation program. Copies of the well permits, the Ground Water Monitoring Well Certification, Form A - As Built Certification and drilling logs are presented as appendicies.

Well Installation Plan

As developed by General Motors Corporation, this well installation program consisted of five (5) monitoring wells; four (4) bedrock wells and one (1) shallow overburden well (see Figure 1). The bedrock well design included the installation of a 6-inch steel casing through the overburden to be grouted in place at a depth of 10-feet into competent bedrock. Following a minimum 12 hour curing period for the grout as per NJDEP specifications, the borehole was to be advanced using a downhole air hammer until a blown yield of 2 gpm was recorded or a maximum depth of 50 feet into bedrock was reached. Upon completion, each well was to be developed using blown air until the discharged water was relatively free of

sediment. The steel surface casing was to be cut two to three feet above the ground surface and fitted with a locking cover for security.

The shallow monitoring well was designed to monitor any water in the overburden material. As discussed in a following section, this well was deleted from the program by General Motors based on field observations.

Site Health and Safety

At each well location, periodic air monitoring was performed by O'Brien & Gere in the work zone. A Tip II photoionization unit was calibrated to a benzene matrix to monitor the presence of organic vapor. Monitoring included the work area around the drilling rig, the borehole and background (upwind) areas. Specific information regarding the results of the air monitoring and any personnel protection measures required are discussed in the following well specific section.

Monitoring Well 9-A

Drilling for the installation of Well 9-A began with a 10-inch diameter downhole hammer for the purpose of setting 6-inch steel casing to a depth of 10-feet into the competent bedrock surface. At a depth of approximately 13 feet from the surface, the overburden material changed from a red to brown, silty soil possessing some sand and clay to a more dense gray to white, medium to coarse grained sandy material also intermixed with some gravel and clay. The deeper material had characteristics indicative of a weathered sandstone. The drilling log from existing MW#9, adjacent to this location, also noted this material. After intercepting what appeared to be competent material at 13 feet, the 10-inch diameter hole was advanced to a depth of 23-feet (10-feet into the sandy unit). While drilling, water was encountered at approximately 18 feet. The drill pipe was removed and 6-inch diameter steel was installed. To test the competency of the rock, Stothoff Drilling was instructed to increase the load on the casing. The casing advanced beyond 23-feet, indicating that the material encountered was not as competent as the drilling had originally indicated. Upon instruction from O'Brien & Gere, the 6-inch casing was removed from the well bore and the 10-inch lead hole was advanced into more competent material. Inspection of the casing indicated it was plugged with red/brown weathered sandstone and shale. The white to gray and brown sand and

gravel zone, originally thought to be a weathered sandstone unit is more reflective of alluvial sediments or possibly fill material than of sandstone as noted on the boring log for the adjacent well. The red/brown shale and sandstone material is typical of the Brunswick Formation in this area. The 10-inch bore hole was advanced to a final depth of 33-feet (10-feet into the Brunswick Formation) where 6-inch steel casing was set. Drilling from 23 feet to 33 feet was relatively uniform, with rock fragments of both sandstone and shale being blown from the well bore. Some of the rock fragments had oxidation staining on the surfaces. The casing was grouted in place at a depth of 33 feet using a mixer and pressure grouting equipment. The 6-inch steel casing was cut leaving an approximate 2-foot stick-up above the ground surface. The grout was allowed to cure overnight before drilling into the bedrock continued.

During the drilling of Well 9-A, an odor indicative of petroleum hydrocarbon (mineral spirits) was detected throughout the overburden material. The strongest odor was observed at a depth corresponding to the gray to white sand and gravel material (13 feet). Water encountered at approximately 18-feet below the ground surface also contained a detectable hydrocarbon odor. The water level in the borehole after the surface casing had been set was approximately 16-feet below the ground surface.

To complete Well 9-A, a 6-inch downhole hammer was lowered through the 6-inch steel casing to the base of the casing at 33 feet. The water in the casing was completely evacuated using air and did not re-enter the borehole, indicating that the water intercepted at the bedrock interface at a depth of approximately 18 feet had been sealed off. Drilling continued with the 6-inch hammer from 33 to 40 feet. The drill cuttings consisted of red sandstone. Water was intercepted at 37 feet and maintained a blown yield of approximately 10 gallons per minute (gpm). During drilling, a slight hydrocarbon odor was detected in the well bore. Air monitoring indicated the presence of only a slight concentration of volatile organic constituents emanating directly from the well bore. This level dropped off to background within a few feet of the wellhead. The well was developed for 20 minutes and maintained a steady yield of 10+ GPM. During development, sandstone fragments were blown from the well bore, indicating that the underlying rock may be fairly weathered. This was common with the sandstone units intercepted during drilling. After the water had cleared,

the air surging was terminated. The cement pad and diversion apron were then placed around Monitoring Well 9A. All drilling tools were steam cleaned prior to setting up at the next drilling location.

After placing the cement diversion apron and pad around Monitoring Well 9A, a new cement pad was placed around existing monitoring well 9. The original cement was severely cracked and in need of replacement.

Monitoring Well 1-A

A 10-inch downhole hammer was used to advance the lead hole for the purpose of setting the 6-inch steel casing to a depth of 10-feet into competent bedrock at Monitoring Well 1-A. The overburden material consisted of interbedded red soil containing sand, silt and some clay and an orange silt and clay material. Wood fragments and cinders were encountered throughout the overburden material indicating past filling in this area. At approximately 8 feet, incompetent weathered red sandstone was encountered. An abundance of silt was also blown from the borehole. Water was encountered at approximately 20 feet. At a depth of 23 feet from the surface, the rock was more competent and drill cuttings suggested that a shaley unit had been encountered. The 10-inch hole continued to a depth of 33 feet into the more competent rock, where 6-inch steel casing was installed. The casing did not advance under the weight of the drill rig, indicating that it was in competent material. The casing was grouted into place.

During the drilling through the overburden into the top of competent rock, no odors were detected in the ground water or the associated drill cuttings being blown from the well bore. Ground water is suspected to be flowing at the competent bedrock interface.

Prior to drilling the open bedrock hole at Well 1-A, the casing was evacuated of water using compressed air forced through the drill pipe and downhole hammer. The water in the casing did not drain, indicating that water was flowing in at the base of the casing. To complete Well 1-A, the 6-inch downhole hammer was advanced from 33 feet (the bottom of the 6-inch steel casing) to 40 feet. Drill cuttings from 33 to 40 feet were predominantly, red to gray sandstone fragments with some shale material.

After completion of the 6-inch hole to a final depth of 40 feet, the well was developed using air surging techniques. Flow was estimated at

approximately 30 GPM, and the water cleared quickly. This larger water yield may be attributable to the interception of a fracture by the well bore or the greater abundance of sandstone in this area. Development continued for approximately 10 minutes, at which time the work area became too flooded to continue working. Following well development, a cement pad and diversion apron was placed around the surface of the 6-inch steel casing and a locking cap was installed.

Monitoring Well 13

Monitoring Well 13 was located across Gold Creek, a small tributary which dissects the plant. A 10-inch diameter downhole hammer was advanced through the overburden for the purpose of setting the 6-inch steel casing. Overburden material consisting of a red/brown silt continued to an approximate depth of 3 feet where shale and sandstone cuttings were noted along with the silty soils. The percentage of rock fragments in the drill cuttings increased with depth and at approximately 7 feet it was apparent that a weathered bedrock zone had been encountered. At a depth of 11 feet, drill cuttings indicated that a red shale unit consisting of competent bedrock material had been reached. The 10-inch lead hole was advanced an additional 10-feet into the competent material and the 6-inch steel casing was grouted 21 feet. Water was not encountered in the overburden material, however, water was noted at approximately 16½ feet (in competent rock), suggesting a fracture or joint had been encountered. Water rose to a depth of 3 feet in the well bore following drilling.

After the grout had cured overnight, the water was evacuated from the well and the well bore remained dry, indicating that the water bearing zone encountered at 16½ feet was cased off. Drilling continued to a depth of 37 feet where a soft weathered water bearing zone was encountered. Drilling was soft from 37-39 feet. The flow rate was in excess of 2 GPM, therefore, the borehole was terminated at 40 feet. The drill cuttings from 21-40 feet were comprised of both sandstone and shale with the shaley zones being more resistant and less weathered than the sandstone zones.

Following completion, Well 13 was developed using compressed air blown through the drill pipe and downhole hammer. The blown yield of the well as measured through a piece of PVC piping, varied from 2.5 to 3 GPM.

Monitoring Well 13 was blown for a period of 30 minutes. Following development, a cement pad and diversion apron were placed around the 6-inch steel casing to divert any runoff away from the well bore. A locking cap was affixed to the well casing. During the drilling and completion of Monitoring Well 13, the photoionization detection equipment showed no detection of volatile organic constituents in either the drill cuttings, the groundwater, or the well bore.

Monitoring Well 7-A

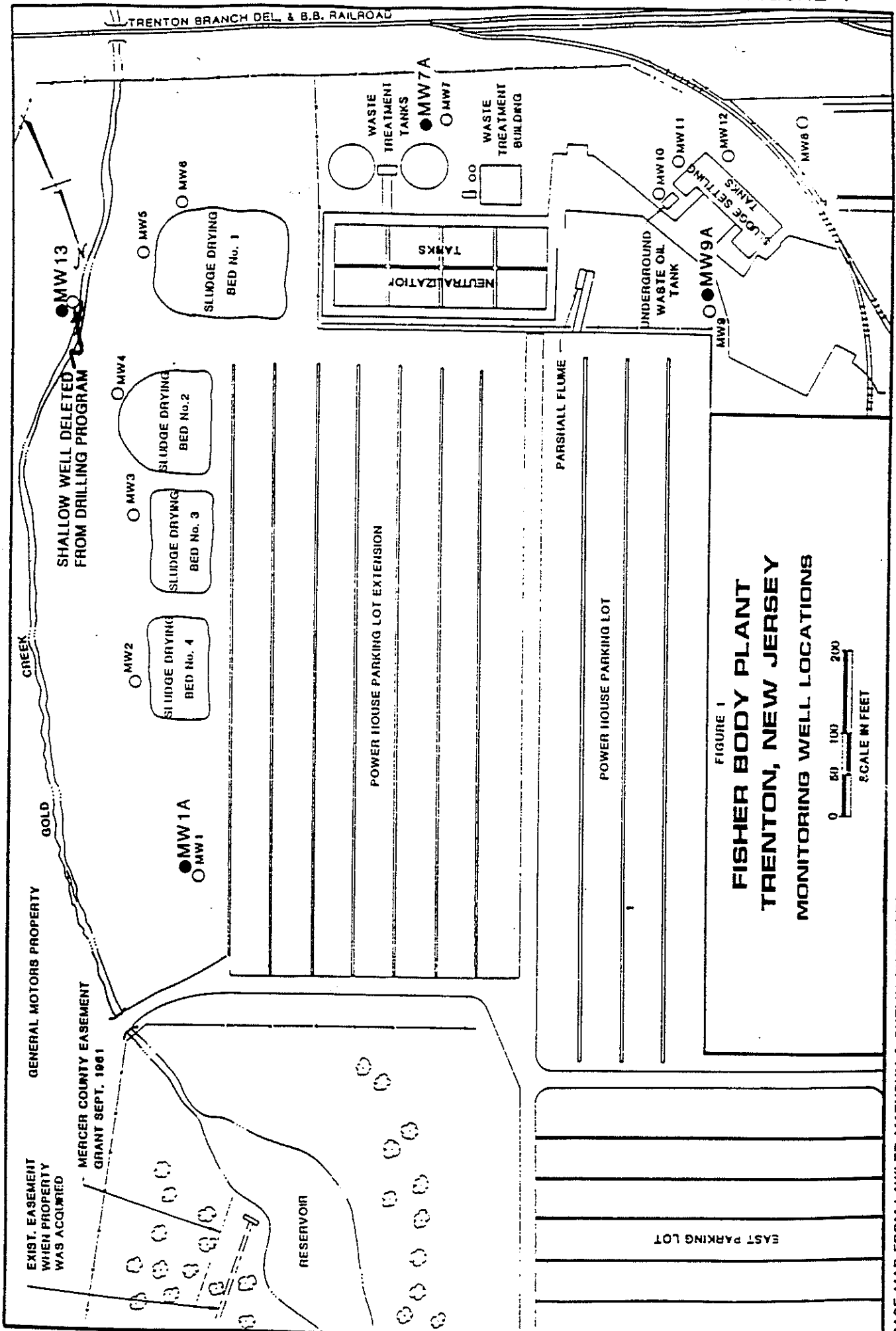
Based on background information provided by General Motors indicating the possible existence of volatile organic constituents in the underlying soils, O'Brien & Gere recommended the use of half face respirators during the initial drilling of MW7A. To install the surface casing, a 10-inch downhole hammer was advanced into the overburden. Refusal was encountered at a depth of approximately 4 feet. At the instruction of General Motors the hole was abandoned and moved to a new location immediately adjacent to the original well bore. The 10-inch diameter downhole hammer was advanced through the overburden material which consisted of red to brown silty soil and fill material. The fill material included wood, plastic debris, car parts (window molding), etc. The Tip II photoionization unit was used to periodically monitor the concentrations of volatile organic constituents in and around the well bore and the work area. Volatile organics concentrations of approximately 10 ppm above background were observed in the well bore during drilling from 0-10 feet. No detection was observed in the drillers' working space. At a depth of approximately 20 feet from the surface organic vapor concentrations were observed at the wellhead at 60 ppm, with a detection of less than 2 ppm around drillers working space. At this depth, the material encountered consisted of weathered sandstone fragments, red/brown silt with a trace of clay and gravel. At a depth of 25 feet, water was encountered at the top of the competent rock surface. A blown yield of approximately 36 gpm was measured. The rock cuttings at this depth consisted of red to gray sandstone and siltstone. The 10-inch hole was advanced to 35 feet where 6-inch steel casing was grouted into place using the same procedures aforementioned. The casing was allowed to cure overnight.

A six inch diameter downhole hammer was lowered through the existing casing. The well was blown dry, and water did not re-enter the borehole, indicating that the water encountered at approximately 25 feet was cased off. The 6-inch hole was advanced to a depth of 40 feet. Drill cuttings were dominated by red/brown to gray sandstone. Water was intercepted at a joint or fracture zone at 39 feet. Following drilling, the well was developed by air surging through the downhole drill pipe and hammer. The blown yield of the well was approximately 15 GPM. Development continued for 35 minutes. Sandstone wash was continually blown from the well bore during well development. Following development, a cement pad and diversion apron was placed around the monitoring well and a locking cap was affixed to the well casing.

Shallow Overburden Well

The original scope of services included a shallow overburden monitoring well to be installed adjacent to Monitoring Well 13. Because ground water was not encountered in Well 13 until the well bore was through the overburden material and into bedrock, General Motors decided to eliminate the overburden monitoring well from the program. The New Jersey Department of Environmental Protection approved this program modification.

FIGURE 1



Appendices



Mail to

Water Allocation

CN 029

Trenton, N.J. 08625

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
TRENTON, N.J.

PERMIT TO DRILL WELL

Permit No. 27-34-3-3

VALID ONLY AFTER APPROVAL BY THE D.E.P.

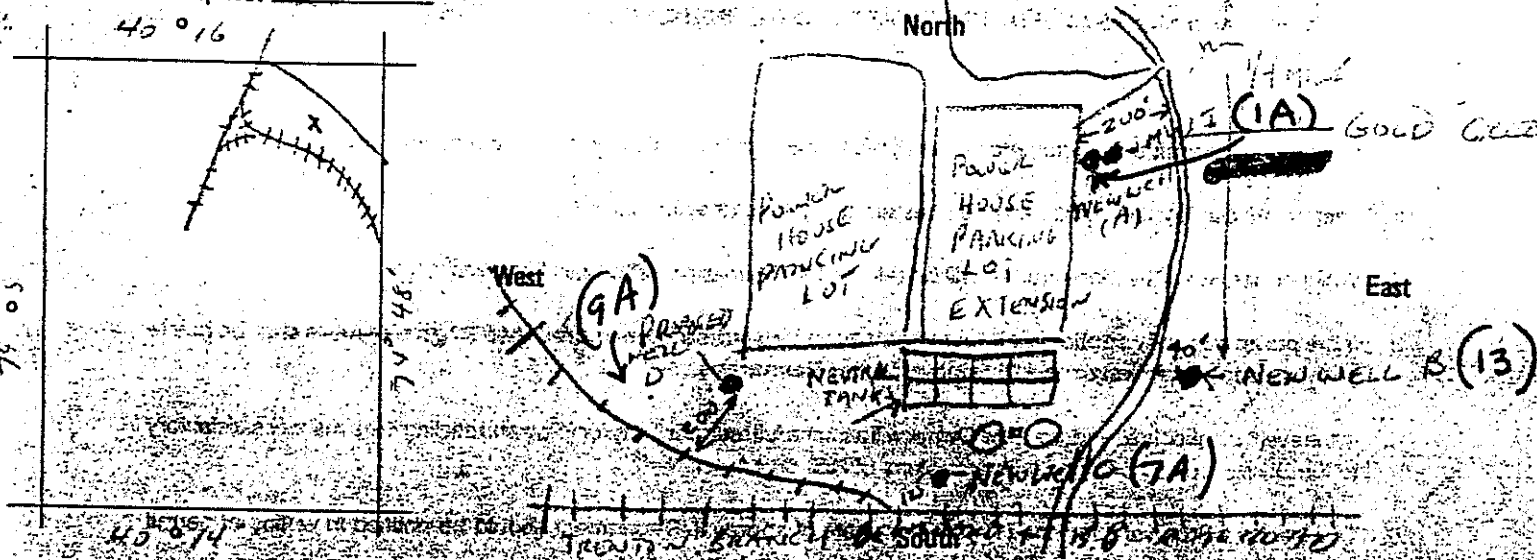
COORD #: 27-34-3-3Owner FISHER LUMBER DIV - G.M.C.Driller SHAWNEE SOUTHERN CORP.Address 1440 PARKWAY AVEAddress High 31TRENTON, N.J.Name of Facility SAFETY VALVEAddress "

Diameter of Well	6	Inches	Proposed Depth of Well	50	Feet
Proposed Capacity of Pump	GPM (cable-tool, rotary, etc.)				
Use of Well (See Reverse)	MONITORING (4)				

LOCATION OF WELL 4 WELLS -

Lot #	Block #	Municipality	County
1	343	WEST TRENTON	MERCER

Draw sketch showing distance and relations of well site to nearest public roads, streets, septic systems, etc.

State Atlas Map No. 27

SEE REVERSE SIDE for IMPORTANT PROVISIONS AND REGULATIONS pertaining to this permit. APPROVAL of this permit is made SUBJECT TO acceptance of and compliance with the following ADDITIONAL CONDITIONS:

- ☐ Pinelands - Well must be drilled over 100' deep or a clay layer at least 4' in thickness must be encountered.
- ☐ It is necessary that Geophysical Logs of this well be made. Permanent pumping equipment SHALL NOT be installed until such logs are made.
- ☐ Authorization by rule under N.J.A.C. 7:14A-1 et seq.
- ☐ Samples of cuttings required every _____ feet or change in material.
- ☐ The results of a volatile organic scan must be obtained prior to using the water and submitted to _____.
- ☐ Domestic Potable Water Supply - The service line for water from the public community water supply system shall be turned off at the curb cock, and the meter shall be removed by the water purveyor.
- ☐ Domestic Irrigation Supply - No piping from the well for which the permit applies shall enter any building.
- ☐ Industrial/Commercial Supply - A physical connection permit shall be obtained pursuant to the provisions of N.J.A.C. 7:10-10-1 et seq., and a vigorous cross connections control program shall be instituted and maintained within the premises.
- ☐ Heat Pump Wells - Wells must be 50 feet apart and the water must be returned to the same aquifer as the production well.
- ☐

This Space for Approval Stamp

WELL PERMIT APPROVAL
Dept. of Environmental Protection
Water Resources/Water Allocation

APR 11 1988

In compliance with R.S. 58:4A-14, application is made for a permit to drill a well as described above.

Date April 6, 1988Signature of Owner [Signature]

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 27-096023
APPLICATION NO. _____
COUNTY MERCER
COORD. _____

WELL RECORD

1. OWNER Fisher Guide Div. ADDRESS 1440 PARKWAY AVE TRENTON NJ
Owner's Well No. 9A SURFACE ELEVATION _____ Feet
(Above mean sea level)
2. LOCATION SAME AS ABOVE
3. DATE COMPLETED APR 14, 1988 DRILLER Samuel Stoffoff Co. - DENNIS WE
4. DIAMETER: Top 6 inches Bottom 6 inches TOTAL DEPTH 40 Feet
5. CASING: Type STEEL Diameter 6 inches Length 33 Feet
6. SCREEN: Type _____ Size of Opening _____ Diameter _____ inches Length _____ Feet
- Range in Depth { Top _____ Feet
Bottom _____ Feet
- Geologic Formation _____
- Tail Piece: Diameter _____ inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
Water rises to _____ Feet above surface
8. RECORD OF TEST: Date APR 14, 1988 Yield 20 Gallons per minute
Static water level before pumping _____ Feet below surface
Pumping level 40 feet below surface after 1 hours pumping
Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
How pumped AIR How measured WIRED
Observed effect on nearby wells _____
9. PERMANENT PUMPING EQUIPMENT:
Type _____ Mfrs. Name _____
Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ inches
10. USED FOR MONITORING AMOUNT { Average _____ Gallons Daily
Maximum _____ Gallons Daily
11. QUALITY OF WATER _____ Sample: Yes _____ No _____
Taste _____ Odor _____ Color _____ Temp. _____ OF.
12. LOG ON BACK OF SHEET Are samples available? _____
(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA SAMUEL STOFFOFF CO INC REMINGTON NJ
14. DATA OBTAINED BY Richard W. Hoff Date May 10, 1988

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

0-20 SAND + GRAVEL
10-27 YELLOW SANDSTONE
27-40 SHALE

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. D69618-1
APPLICATION NO. _____
COUNTY MIDDLESEX
COORD. _____

WELL RECORD

1. OWNER Fisher Guide Div. - GAC ADDRESS 1440 MAXWELL AVE, TRENTON, NJ
Owner's Well No. 13 SURFACE ELEVATION _____ Feet
(Above mean sea level)
2. LOCATION SAME
3. DATE COMPLETED April 14, 1988 DRILLER Samuel Stothoff
4. DIAMETER: Top 6 inches Bottom _____ inches TOTAL DEPTH 40 Feet
5. CASING: Type STEEL Diameter 6 inches Length 14 Feet
6. SCREEN: Type _____ Size of Opening _____ Diameter _____ inches Length _____ Feet
- Range in Depth { Top _____ Feet
Bottom _____ Feet
- Geologic Formation _____
- Tail Piece: Diameter _____ inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
Water rises to _____ Feet above surface
8. RECORD OF TEST: Date April 14, 1988 Yield 2 Gallons per minute
Static water level before pumping _____ Feet below surface
Pumping level 40 feet below surface after 1 hours pumping
Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
How pumped AIR How measured WIRED
Observed effect on nearby wells NOT OBSERVED
9. PERMANENT PUMPING EQUIPMENT:
Type _____ Mfrs. Name _____
Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ inches
10. USED FOR MONITORING AMOUNT { Average _____ Gallons Daily
Maximum _____ Gallons Daily
11. QUALITY OF WATER _____ Sample: Yes _____ No _____
Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG OTHER SIDE Are samples available? _____
(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA SAMUEL STOTHOFF CO INC
14. DATA OBTAINED BY Richard W. Stothoff Date MAY 10, 1988

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

8-4 SOIL
4-40 SHALE

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 27-09619-0
APPLICATION NO. _____
COUNTY MERLER
COORD. _____

WELL RECORD

1. OWNER Fisher Guide Inc. ADDRESS 1440 PARKWAY AVE TRENTON NJ
Owner's Well No. TA- SURFACE ELEVATION _____ Feet
(Above mean sea level)
2. LOCATION SAME
3. DATE COMPLETED APR 14, 1988 DRILLER Samuel Stonoff 77 - DENNIS WEN
4. DIAMETER: Top 6 inches Bottom 6 inches TOTAL DEPTH 40 Feet
5. CASING: Type STEEL Diameter 6 inches Length 37 Feet
6. SCREEN: Type _____ Size of Opening _____ Diameter _____ inches Length _____ Feet
- Range in Depth { Top _____ Feet
Bottom _____ Feet
- Geologic Formation _____
- Tail Piece: Diameter _____ inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
Water rises to _____ Feet above surface
8. RECORD OF TEST: Date APR 14, 1988 Yield 40± Gallons per minute
Static water level before pumping _____ Feet below surface
Pumping level 40 feet below surface after 1 hours pumping
Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
How pumped AIR How measured WIEN
Observed effect on nearby wells NOT OBSERVED
9. PERMANENT PUMPING EQUIPMENT:
Type _____ Mfrs. Name _____
Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ inches
10. USED FOR MONITORING AMOUNT { Average _____ Gallons Daily
Maximum _____ Gallons Daily
11. QUALITY OF WATER _____ Sample: Yes _____ No _____
Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG OTHER SIDE Are samples available? _____
(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA SAMUEL STONOFF CO INC FLEMINGTON NJ
14. DATA OBTAINED BY Robert W. [Signature] Date MAY 10, 1988

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

SOIL
5 YELLOW SANDSTONE
40 SOFT SHALE

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 27-09620-3
APPLICATION NO. _____
COUNTY Meriden
COORD. _____

WELL RECORD

1. OWNER Fisher Guide Dig. Co. Inc. ADDRESS 1440 PARKWAY ONE TRENTON NJ
Owner's Well No. 7A SURFACE ELEVATION _____ Feet
(Above mean sea level)
2. LOCATION same
3. DATE COMPLETED Apr 14, 1988 DRILLER Samuel Stothoff 22 Dennis Lane
4. DIAMETER: Top 6 inches Bottom 6 inches TOTAL DEPTH 40 Feet
5. CASING: Type STEEL Diameter 6 inches Length 33 Feet
6. SCREEN: Type _____ Size of Opening _____ Diameter _____ inches Length _____ Feet
- Range in Depth { Top _____ Feet
Bottom _____ Feet
- Geologic Formation _____
- Tail Piece: Diameter _____ inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
Water rises to _____ Feet above surface
8. RECORD OF TEST: Date April 14 1988 Yield 15 Gallons per minute
Static water level before pumping _____ Feet below surface
Pumping level 40 feet below surface after 1 hours pumping
Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
How pumped AIR How measured WIER
Observed effect on nearby wells NOT OBSERVED
9. PERMANENT PUMPING EQUIPMENT:
- Type _____ Mfrs. Name _____
- Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
- Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
- Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ inches
10. USED FOR MONITOR AMOUNT { Average _____ Gallons Daily
Maximum _____ Gallons Daily
11. QUALITY OF WATER _____ Sample: Yes _____ No _____
Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG OTHER SIDE Are samples available? _____
(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA SAMUEL STOTHOFF CO INC
14. DATA OBTAINED BY Robert H. [Signature] Date May 10, 1988

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

0-20 GARBAGE

20-27 YELLOW SANDSTONE

27-40 SHALE

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION
(One form must be completed for each well.)

Name of Permittee: Fisher Guide Div. - GMC
Name of Facility: same
Location: 1440 Parkway Trenton, NJ
NJDES Permit No: NJ 0053295

CERTIFICATION

Well Permit Number (As assigned by NJDEP's Well Drilling Permits Section (609-984-6831)):	<u>2 7 -0 9 6 1 9 -0</u>
Owner's Well Number (As shown on the application or plans):	<u>1A</u>
Well Completion Date:	<u>April 27, 1988</u>
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	<u>1.80 Feet</u>
Total Depth of Well (one-hundredth of a foot):	<u>41.53 Feet</u>
Depth to Top of Screen From Top of Casing (one-hundredth of a foot):	<u>---</u>
Screen Length (feet):	<u>---</u>
Screen or Slot Size:	<u>---</u>
Screen or Slot Material:	<u>---</u>
Casing Material: (PVC, Steel or Other-Specify):	<u>Steel</u>
Casing Diameter (inches):	<u>6 inches</u>
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	<u>11.09 Feet</u>
Yield (gallons per minute):	<u>@ 40 GPM</u>
Length of Time Well Pumped or Bailed:	<u>/ Hours 10 Minutes</u>
Lithologic Log: (developed well using air surge)	<u>Attach</u>

Authentication

I certify under penalty of law that, where applicable, I meet the requirements as specified on the reverse of this page, that I have personally examined and am familiar with the information submitted in this document and all attachments, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Richard H. Stothoff
Name (Type or Print)


Signature

NJ Master Well Driller 1085
Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative

Name (Type or Print)

Signature

Title

Date

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Fisher Guide Div. - GMC
Name of Facility: same
Location: 1440 Parkway Trenton, NJ
NJPOES Permit No: NJ 0053295

CERTIFICATION

Well Permit Number (As assigned by NJDEP's Well Drilling Permits Section (609-984-6831)):	<u>2</u> <u>7</u> <u>-0</u> <u>9</u> <u>6</u> <u>2</u> <u>0</u> <u>-3</u>
Owner's Well Number (As shown on the application or plans):	<u>7A</u>
Well Completion Date:	<u>April-28, 1988</u>
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	<u>2.05 Feet</u>
Total Depth of Well (one-hundredth of a foot):	<u>41.78 Feet</u>
Depth to Top of Screen From Top of Casing (one-hundredth of a foot):	<u>---</u>
Screen Length (feet):	<u>---</u>
Screen or Slot Size:	<u>---</u>
Screen or Slot Material:	<u>---</u>
Casing Material: (PVC, Steel or Other-Specify):	<u>Steel</u>
Casing Diameter (inches):	<u>6 inches</u>
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	<u>14.41 Feet</u>
Yield (gallons per minute):	<u>@ 15 GPM</u>
Length of Time Well Pumped or Bailed:	<u>/ Hours 35 Minutes</u>
Lithologic Log: (developed well using air surge)	<u>Attach</u>

Authentication

I certify under penalty of law that, where applicable, I meet the requirements as specified on the reverse of this page, that I have personally examined and am familiar with the information submitted in this document and all attachments, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Richard H. Stothoff

Name (Type or Print)

Signature

NJ Master Well Driller 1085

Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative

Name (Type or Print)

Signature

Title

100

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Fisher Guide Div. - GMC
Name of Facility: same
Location: 1440 Parkway Trenton NJ
NJDES Permit No: NJ 0053205

CERTIFICATION

Well Permit Number (As assigned by NJDEP's Well Drilling Permits Section (609-984-6831)):	2 7 - 0 9 6 1 7 - 3
Owner's Well Number (As shown on the application or plans):	9A
Well Completion Date:	April 27, 1988
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	2.32 Feet
Total Depth of Well (one-hundredth of a foot):	42.31 Feet
Depth to Top of Screen From Top of Casing (one-hundredth of a foot):	---
Screen Length (feet):	---
Screen or Slot Size:	---
Screen or Slot Material:	---
Casing Material: (PVC, Steel or Other-Specify):	Steel
Casing Diameter (inches):	6 inches
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	17.90 Feet
Yield (gallons per minute):	@ 20 GPM
Length of Time Well Pumped or Bailed:	/ Hours 20 Minutes
Lithologic Log: (developed well using air surge)	Attach

Authentication

I certify under penalty of law that, where applicable, I meet the requirements as specified on the reverse of this page, that I have personally examined and am familiar with the information submitted in this document and all attachments, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Richard H. Stothoff
Name (Type or Print)

Signature

NJ Master Well Driller 1085
Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative

Name (Type or Print)

Signature

Title

Date _____

(One form must be completed for each well.)

Name of Facility: same

Location: 1440 Parkway Trenton, NJ

NJPOES Permit No: NJ 0053295

Well Permit Number (As assigned by NJDEP's Well Drilling Permits Section (609-984-6831)):

2 7 - 0 9 6 1 8 - 1

13

April 27, 1988

Well Completion Date:

Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):

2.14 Feet

Total Depth of Well (one-hundredth of a foot):

41.63 Feet

Depth to Top of Screen From Top of Casing
(one-hundredth of a foot):

Screen Length (feet):

Screen or Slot Size:

Screen or Slot Material:

Casing Material: (PVC, Steel or Other-Specify):

Steel

Casing Diameter (inches):

6 inches

Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):

4.39 Feet

Yield (gallons per minute):

Q 3 GPM

Length of Time Well Pumped or Bailed:

Hours 45 Minutes

Lithologic Log: (developed well using air surge)

Attach

I certify under penalty of law that, where applicable, I meet the requirements as specified on the reverse of this page, that I have personally examined and am familiar with the information submitted in this document and all attachments, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Name (Type or Print)

Signature _____

Certification or License No.

Seal

Name (Type or Print)

Signature

Title

Date _____

DRILLING ADMINISTRATION

Well MW 9A

Well Contractor: STOTHOFF COMPANY

Address: Flemington, New Jersey

Phone: (201) 782-2116

Name of Driller: Dennis Wene

Helper(s) Jim

Rig: Number

Make

Reich

Model T-650-W

Bar

Length: 20'

Reference Point: Grd

Casing & Grouting Summary

(Amounts, Lengths, diameters)

Set 6" steel casing to 35', used 12 bags of cement on 4/26, used 4 additional bags on 4/27, grouted using pressure grouting system.

Diary of Drilling

Date	Time	What Was Done & (Problems if Any)	Drilling Log
4/26	9:00	- 0-13' went through an overburden zone of red brown silt with some sand - slight hydrocarbon odor. Used a Tip II Photo-ionizer to detect Volatile Organics (calibrated for Benzene) - not functioning properly - low battery signal.	GRD.
		- 13'-23' grey white to brown sand/silt/cobbles trace clay. Predominantly coarse grained. Suspected weathered sandstone, however, tried to set casing and casing pushed through water at 18' (detectable hydrocarbon odor in water). Pulled casing and continued drilling.	10' 10" DIA
	10:00	- Casing pulled - red-brown weathered shale plugged in tip of casing (rk).	13' LITHOLOGY C
		- rk starts at 23' (red shale) argillaceous drilled to 33' set 6" casing. 10" hole continues from 0-33'.	7' WATER (FIRST)
	11:00	- Grouting casing (top shale weathered oxidation staining noted on surfaces of shale).	20'
4/27	11:20	Set-up on well	23' BEDROCK
		- Blew water out of casing, well blew dry (water was entering at overburden - rk interface which was cased off).	30'
	11:50	Drilling down (red sandstone/shale units intermixed)	33' 6" CASING
	12:00	water at 37' (fine grained red sandstone)	16" DIA
	12:20	Down at 40' blowing out well (developing). Blown yield @ 20 gpm. Well not clearing immediately, picking up sandstone wash 6" hole 33'-40' water cleared 5 vols blown slight hydrocarbon odor in water.	37' WATER IN C
	12:30	Done placing cement diversion apron around well casing.	40' TD 40'
		Cuttings:	
		Geologist: Chris R. Young	50'
		Other Persons on Site:	

DRILLING ADMINISTRATION

Well MW 13

Well Contractor: Stottoff Drilling Co.	
Address: Flemington, New Jersey	Phone: (201) 782-2116
Name of Driller: Dennis Wene	Helper(s) Jim
Rig: Number	Make Reich Model T-650-W Bar Length: 20'
Reference Point: Grd	
Casing & Grouting Summary (Amounts, Lengths, diameters) 23' of steel casing set. 9 bags of cement grout.	

Diary of Drilling

Date	Time	What Was Done & (Problems if Any)	Drilling Log
4/26	3:20	0-3' Red silt with shale and sandstone fragments. 3-7' Greater % fragments coming up suspect weathered rock. 7'-11' Rock appears to be firming 11' competent rock, red argillaceous shale (no odor in sediments). 16 1/2' Water (rose in casing to @ 3' below surface).	GRD. 
	3:40	Grouting.	
	4:45	Done grouting.	
4/27	8:00	Blew well out "dry". Casing cased off water (at overburden rock interface). Drilling through both sandstone and shale units. 37'-39' , Soft drilling water encountered. Drilling to 40'. 40' TD No odor in water or soil noted	10'  11' COMPETENT RK 11'  16 1/2' 10" DIA. WATER DETEC 20'  21' SET 6" STEEL C
	9:00	Blowing well Flow 2.5 gpm.	
	9:20	Flow 3 gpm.	
	9:45	Well water clear - Done developing.	
		Cuttings:	30'  37' WATER DETEC 40' TD 40' 
		Geologist: Chris R. Young Other Persons on Site:	50' 

DRILLING ADMINISTRATION

Well MW 1A

Well Contractor: STOTHOFF DRILLING CO.

Address: Flemington, NJ

Phone: (201) 782-2116

Name of Driller: Dennis Wene

Helper(s) Jim

Rig: Number

Make Reich

Model T-650-W

Bar

Length: 20'

Reference Point: Grd

Casing & Grouting Summary Used 9 bags of grout and 35' of 6" casing
(Amounts, Lengths, diameters) 4/27 3 additional bags of grout (cement)

Diary of Drilling

Date	Time	What Was Done & (Problems if Any)	Drilling Log
4/26	1:00	0-8' cindery fill material w/wood fragments, shale fragments and various other material. Grading into a red sand and silt and orange silt and clay soil zone (also containing wood frags. etc.) 8' hit rock weathered sandstone fragments coming up. Very soft from 8-20'. Abundant silt coming up with sandstone fragments. (Weathered rock) 20' hit water (no odor in water). 23' Rock firmed up slightly (shaley) 28' Firm shale with silty sediment and some clay coming up in drill cuttings. 33' Set casing in rock to 33' took weight of rig. Rock appears competent.	GRD. 10" DIA FULL OVERBUR 10' 20' FIRST WT 23' COMPETENT 30' 33' SET 6" CASING 40' TD 40'
	1:45	Setting up to grout at 33'.	
	2:20	Finished grouting.	
	2:25	Steam cleaning.	
4/27	10:30	10" hole to 33' (no odor in soil or water noted) Well did not appear to blow dry (indicating water is in the shallower fractures of the rock). More sandstone than shale fairly weathered (soft), large quantity of water. Approximately 40 gpm. Cuttings indicate red to grey fine grained sandstone and shale. Possibly in a vertical fracture as indicated by the large volume of water. Blew for 10 minutes on well and flooded the area. Greater than 5 vols purged water cleared.	30' 33' SET 6" CASING 40' TD 40'
	11:00	Steam cleaning	
	11:06	TD 40' 10" hole to 33' 6" hole 33'-40'	
	11:15	Finished off cement pad and diversion Apron.	
		Cuttings:	
		Geologist: Chris R. Young Other Persons on Site:	50'

DRILLING ADMINISTRATION

Well 7A

Well Contractor: STOTHOFF DRILLING CO.

Address: Flemington, NJ

Phone: (201) 782-2116

Name of Driller: Dennis Wene

Helper(s) Jim

Rig: Number

Make Reich

Model T-650-W

Bar

Length: 20'

Reference Point: GRO

Casing & Grouting Summary (Amounts, Lengths, diameters) Set casing at 35' (38' of 6" steel casing). 15 bags of cement - 3 additional bags of cement 4/28/88.

Diary of Drilling

Date	Time	What Was Done & (Problems if Any)	Drilling Log
4/27	1:45	10" hole to 6' on something hard moved off initial location 10" hole 0-20' appears to be all fill material w/10-20' having the highest volatile organic readings on the Tip II Photo Ionizer. Fill included wood fragments, plastic, car parts, etc. 20' started into a weathered sandstone unit with sandstone fragments, brown to red brown silt and sand, and a trace of clay coming up. Some cobble material also noted. 25' hit water and competent rock (water at the rock interface). Rock is red to grey sand stone. A large volume of water being blown from hole.	
	3:00	35' Done drilling setting casing.	
	4:00	Done grouting well.	
4/28	8:15	Drilling down to 40' fracture zone at 39' (water). Prior to this fracture well blew dry therefore the water encountered on 4/27 was cased off and is suspected to be all from the bedrock interface.	
	8:25	Blowing well 15 gpm.	
	8:45	Blowing well 15 gpm.	
	9:00	Water in well bore clear stopped blowing well.	
	9:00	Finished off cement diversion apron around well casing.	
		Cuttings:	
		Geologist: Chris R. Young Other Persons on Site:	

4/

C

C

C