Arden Environmental Engineering, Inc.
3550 Lexington Ave. North, Suite 102, Shoreview, MN 55126
(651) 484-5415, Fax (651) 484-5568

February 11, 1999

Richard Newquist
Project Manager
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155-4194

RE: Yocum Jordan Site, MPCA leak # 11991

Dear Richard:

This is the submittal of MPCA Fact sheet 3.24 " Remedial Investigation Report Form." This fact sheet is provided to meet the requirements of Fact sheet 3.3.

The information in this report documents the well and system construction for the free product recovery system. It is not intended to be a complete remedial investigation report, as the remedial investigation is a future phase of this project.

Additionally, you may be interested to know that as of January 28, 1999, we have recovered product as follows:

Free Product Recovery System		
Date	Product	
12/14/98	505	
12/18/98	475	
12/22/98	50	
12/30/98	294	
1/12/99	353	
1/28/99	393	
Total	2070	gallons
Vacuumed	160	
Grand total	2230	gallons

As of this writing we continue to recover approximately 200 gallons of product per week.

If you have any questions, please call me at (651) 484-5415

Sincerely,

John Mills, P.E.
Arden Environmental Engineering, Inc.

Tanks and Emergency Response Section
Minnesota Pollution Control Agency

Remedial Investigation Report Form

Fact Sheet #3.24
January 1997

This form must be completed for all sites in which a remedial investigation (RI) is conducted--this includes either a *Limited Site Investigation (LSI)* or a *full RI*. Completing this form will provide the MPCA with the minimum amount of information necessary for a *full RI*. Additional information should be included if deemed important for making a site cleanup decision. If the consultant has concluded that a *LSI* is applicable to this site, Section 6 and Section 7 may be deleted from this report.

Refer to Minnesota Pollution Control Agency (MPCA) fact sheet #3.1, "Leaking Underground Storage Tank Investigation and Cleanup Policy" for guidance for the overall objectives of an RI and other MPCA fact sheets regarding investigations.

When a tank has been excavated, refer to fact sheets #3.6, "Excavtion of Petroleum Contaminated Soil" and #3.7, "Excavation Report Worksheet for Petroleum Release Sites" for reporting requirements.

If free product is discovered the initial reporting should be done in accordance with fact sheet #3.3 "Free Product: Evaluation and Recovery" and factsheet #3.4, "Free Product Recovery Report Worksheet."

Leak Number: LEAK0000011991 Date: December 21, 1998

Responsible Party: Yocum Oil Company R.P. phone #: (651) 739-9141

Facility Name: Jordan Texaco

Facility Address: 255 Triangle Lane City: Jordan

County: Scott Zip Code: 55352

Location of site: LAT: 44° 40'15" LONG: 93° 38' 30" Circle one: (UTM) State

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Section 1: Emergency and High Priority Sites

1. Is an existing drinking water well impacted? YES (NO)

2. Are there existing vapor impacts? YES (NO)

3. Is there an existing surface water impact as indicated by 1) a product sheen on the surface water or 2) a product sheen or volatile organic compounds in the part per million (ppm) range in ground water in a well located close to the surface water. YES (NO)

4. Has the release occurred in the last 30 days? (YES) NO

5. Has free product been detected at the site? (YES) NO

6. Is sand or gravel aquifer impacted which is tapped by water wells within or potentially within 500 feet from the edge of the plume **or** does impacted soil overlie a karsted limestone or fractured bedrock? If yes, explain: YES (NO)

If you answered *YES* to any of questions 1 through 6 above describe below the actions taken to date to reduce or eliminate the risk posed by the release.

Two monitoring wells were placed in the zone of most likely highest free product concentration. Free product has been removed in two phases. In the first phase, a vacuum truck was used twice per week to remove product directly from the wells. This truck was employed until a dedicated free product removal system could be installed. The free product removal system became operational on December 2, 1998, and is still removing free product. Details of the quantity of free product removed is contained in fact sheet 3.4 (attached). These actions were taken in consultation with Rick Newquist at MPCA and an Emergency Bid Waiver was issued for the work.

Section 2: Site and Release Information

2.1 Describe the land use and pertinent geographic features within 1,000 feet of the site.

Site is located at the intersection of Highway 169 and State Highway 252. Based on information obtained from a UST site located across Triangle Lane from the site, groundwater in the area flows to the Northwest, towards the Minnesota River, approximately 1 ½ miles away. From the leak site, groundwater therefore flows directly under Highway 169. Across 169 from the site is an open field, with the nearest structure located approximately ¼ mile away.

To the southeast of the property, in the assumed upgradient direction, are a NAPA parts store with an existing UST leak (11718), a McDonalds, a car repair facility, and a bar/pizza restaurant (without a basement).

To the east of the property (in an assumed cross-gradient direction), along Highway 169 is a liquor store, a Dairy Queen and a used car sales business.

To the west of the property (in an assumed cross-gradient direction), on the other side of Highway 252, is a (Ford) New Car sales dealership. On the opposite side of the dealership is a wetland.

Soil encountered at the site is primarily glaciated sand covered with approximately two feet of organic loam (peat) Surface terrain at the site is primarily flat. Approximately ¼ mile to the east is Sand Creek, which flows to the Minnesota River. Approximately 1/8 mile to the west is a wetland.

Table 1.

Provide the following for <u>all</u> tanks that have been at the site:

Tank #	UST or AST	Capacity	Contents	Age	Status*	Condition
1	UST	6000	Super	1995	Currently Used	STIP3
2	UST	6000	MidGrade	1995	Currently Used	STIP3
3	UST	12000	Unleaded	1995	Currently Used	STIP3
4	UST	12000	Unleaded	1995	Currently Used	STIP3

*Indicate: *removed (date), abandoned in place (date), or currently used*
Notes:

2.2 Describe the status of the other components of the tank system(s), (i.e., piping and dispensers) for those tanks listed above.

All components of the system were installed using new equipment in 1995. All components conform to EPA 1998 standards. Piping is double wall construction with leak detectors. Spill containment is FRP plastic, with spill and leak detection.

2.3 Identify and describe the source or suspected source(s) of the release.

A rubber seal used in the spill containment system, to seal the electrical conduit powering the pumps, was cracked or torn presumably from ground movement. When product began accumulating inside the sump from a leak in the pipe connection, it exited the sump through the torn boot. Product never accumulated enough in the sump to trip the sensor because it exited through the torn boot.

2.4 What was the volume of the release? (if known): _approximately 4000____gallons

2.5 When did the release occur? (if known): _It was a continual release from approximately early September until October 26, 1998

Section 3: Excavated Soil Information

3.1 Was soil excavated for off-site treatment? Yes (No)

If *YES* then complete the fact sheet #3.7 "Excavation Report Worksheet for Petroleum Release Sites" and include it as an appendix.

Date excavated: _____

Volume removed: _____cubic yards

3.2 Indicate soil treatment type:

____ land treatment
____ thermal treatment
____ composting/biopiling
____ other (_____)
Name and location of treatment facility:
_____
_____

Section 4: Extent and Magnitude of Soil Contamination

4.1 Were soil borings conducted in or immediately adjacent to all likely source areas (e.g., underground storage tank basins, above ground storage tank areas, piping, dispensers, remote fill pipes, known spill areas)? (*YES*) *NO*

4.2 To adequately define the vertical extent of contamination soil borings should be completed at least five feet below the water table or ten feet below the deepest measurable (field screening and visual observation) contamination, whichever is deeper. Were all soil borings completed to the required depth? (*YES*) *NO*

4.3 To adequately evaluate site stratigraphy at least one boring should be completed 20 feet below the water table, unless a confining layer is present. Was this done? *YES* (*NO*)

If you answered *NO* to any of the three previous questions, explain why the borings were not conducted in the required locations or to the required depths (see fact sheet #3.19, "Soil and Ground Water Investigations Performed During Remedial Investigations" regarding exceptions and MPCA approval for depth of drilling):

Purpose of investigation performed to date has been to respond to free product release issues.

4.4 Indicate the drilling method: __X__ hollow-stem auger
____ sonic drilling
____ push probes
____ other (_____.
Note: contact MPCA staff hydro before use of flight augers)

Table 2.

Complete the following table indicating bag headspace results (in ppm) for soil samples from soil borings.

ASTM soil classification	Depth (ft)	Soil Boring 1	2	3	4	5	6	7	8	9
SW	0-2	261								
SP-SC	0-2		0	220	0					
SW	2-4	2000+								
SP-SC	2-4		4.8	0	0					
SW	4-6	1000								
OL	4-6		2000+		700					
SP-SC	4-6			20						
SW	6-8	360								
CH	6-9		2000+		2000+					
SP-SC	6-9			28						
SW	8-10	1600								
SP	9-10		2000+ Water		2000+ Water					
OL	9-10			0						
SW	10-12	705								
SP-SM	10-12		2000+		2000+					
OL	10-13			0						
SW	12-14	265 Water			2000+					
SW	13-14			0						
SP-SM	14-16	250								
SW	14-16			0	2000+					
SW	16-18				2000+					

Notes:(type of PID/FID)
Mini-Rae

Note: SB-4 became MW-3. (SB-1 is MW-1, SB-2 is MW-2)

Table 3.

Indicate the laboratory analytical results for soil samples in mg/kg.

Well/Boring, Depth(ft)	Date Analyzed	Benzene	Toluene	Ethylbenzene	Xylene	GRO	DRO
MW-1 2 - 4	11/3/98	<0.43	<1.5	<1.5	<2.9	<3.3	
MW-1 12 - 14	11/3/98	0.089	0.15	<0.14	<0.27	<1.9	
MW-2 4 - 6	11/3/98	0.37	0.44	<0.16	0.32	4.9	
MW-2 8 - 10	11/3/98	190	620	140	650	5,500	
SB-3 12 - 14	11/3/98	<0.055	<0.19	<0.20	<0.37	<2.6	
MW-3 6 - 8	11/3/98	2.3	3.1	0.25	1.3	20	

Notes:(use less than symbols to show detection limits)

Table 4.

Indicate other notable contaminants (either petroleum or non-petroleum derived) detected in soil samples. Indicate contaminant and list in reported units mg/kg.

Well/Boring, Depth (ft)	Date Analyzed						

Notes:

4.5 If any non-petroleum compounds were detected list them below and identify possible sources of these compounds.

4.6 Describe the vertical and horizontal extent and magnitude of soil contamination.

The purpose of this phase of the investigation is to perform emergency free product recovery. A determination of the extent of soil contamination was not performed.

Section 5: Aquifer Characteristics/Ground Water Contamination Assessment

5.1 Hydraulic conductivity is used to evaluate risk to present or potential ground water receptors. The level of potential risk determines the level of confidence required of the hydraulic conductivity values. Indicate average hydraulic conductivity and methods used for measurement and estimation.

Measurement
Methods of measuring aquifer parameters are *aquifer* and *permeameter* tests. Aquifer tests such as pumping and slug tests are necessary to evaluate parameters of the actual undisturbed aquifer material. Pumping tests evaluate the largest volume of aquifer material, providing the best measurement of *in situ* aquifer parameters. Slug tests provide *in situ* parameters representing a smaller portion of the aquifer. Permeameter tests are laboratory methods used for the evaluation of discrete samples collected from the aquifer. Permeameter tests require an adequate number of representative field samples, and, inherent sampling and analysis technique limitations must be considered when evaluating results.

Estimation
Methods of estimating hydraulic conductivity may involve grain size analysis or correlating a field description with a reference range of values. As with laboratory measurements, estimation methods require an adequate number of representative field samples. Use the most conservative value of a range when using estimates. If there is any question that sediments may be permeable enough to comprise a resource aquifer, confirm by conducting test(s).

Provide hydraulic conductivity values that support the level of investigation based on risk and remediation potential. Be sure to have tests and estimations performed and analyzed by personnel trained and/or experienced in hydrogeologic investigations. Improperly performed or analyzed tests may be returned as incomplete. Attach all supporting information for the determination in the Methodologies appendix:

___$10 - 10^{-2}$_____ cm/sec

Indicate the measurement or estimation used:
___Pumping test analysis by _____method(s).
___Slug tests by _____method(s).
___Permeability tests by _____method(s).
___Grain-size distribution approximations by _____ method(s).
_X__*Reference from _Freeze and Cherry, 1979, Groundwater, Prentice-Hall, p 29.
*provide author(s), year published, title, publisher and page(s).

- **Conductivity based on standard textbook conductivity of soils from field soil type determination.**
- **Groundwater appears to be at the interface of SP sand (10 - 10^{-2} cm/s) and CH clay (10^{-6} - 10^{-8} cm/s). Investigation to date has not determined the primary layer that the top of the groundwater aquifer resides.**

5.2 Indicate the thickness of the aquifer. If the investigation does not provide enough information to determine the aquifer thickness, assume the aquifer is greater than 20 feet thick:

____ less than 10 feet
____ between 10 and 20 feet
__X__ 20 feet or greater

*** investigation to date does not provide enough information to determine thickness of aquifer, however it appears to be at least 10 feet thick.**

5.3 Describe in detail the geology underlying the site including confining layers, bedrock formations and the lateral extent of these formations:

Unknown

The impacted aquifer or the aquifer that is likely to be impacted at the site is considered a resource aquifer if one of the following situations exist:

- The aquifer is a current water supply source.
- The water bearing unit has a hydraulic conductivity greater than 1 X 10^{-2} cm/sec and a minimum thickness of 10 feet.
- The water bearing unit has a hydraulic conductivity between 1 X 10^{-4} cm/sec and 1 X 10^{-2} cm/sec and a minimum thickness of 20 feet.
- The water bearing unit has a hydraulic conductivity less than 1 X 10^{-4} cm/sec and no other viable source of water supply is available. (*Bedrock may be considered a resource aquifer if it is the only water supply available.)*

5.4 Based on the aquifer characteristics and water supply availability, is the aquifer at the site a resource aquifer? (*YES*) *NO*

5.5 If other water supplies are available, explain.

5.6 Are there any other reasons the impacted aquifer should not be considered a resource aquifer?

Table 5.

Indicate the water level measured in all of the soil borings.

	Soil Boring									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Water level depth, ft	8.45	8.89	10	9.32						

Notes:

5.7 Is contaminated soil in contact with ground water? (*YES*) *NO*

If *YES* or if ground water contamination appears likely then complete tables 6 and 7 below.

Table 6.

Indicate the laboratory analytical results for water samples collected from the borings, temporary wells or push probes.

Well/Boring Number	Date Analyzed	Depth	Benzene	Toluene	Ethylbenzene	Xylene	GRO	DRO
SB-3	11/2/98	12	1.2	4.4	0.94	4.7	40	

Notes:
ug/l
Remainder of soil borings were sampled as monitoring wells, data shown in monitoring well section.

Table 7.

Indicate other notable contaminants (either petroleum or non-petroleum derived) detected in water samples collected from the borings, temporary wells or push probes. Indicate contaminant and report in units of ug/l (ppb).

Well/Boring Number	Date Analyzed						

Notes:

5.8 If any non-petroleum compounds were, detected list them below and indicate whether they exceed the Health Risk Limits (HRLs). Also, identify possible sources of these compounds.

5.9 If contaminated soil is not in contact with ground water, what is the distance separating the deepest contamination from the surface of the water table? Was this distance measured during site activities, referenced from geologic information, or estimated based on professional opinion during a site visit? _____ feet

5.10 Describe observations of any evidence of a fluctuating water table and a seasonal high water table (e.g., mottling). Also, from other sources of information describe the range of natural water table fluctuations in the area.

5.11 In your judgment, is there a sufficient distance separating the petroleum contaminated soil (or an impacted non-resource aquifer) from the underlying resource aquifer to prevent petroleum contamination of the resource aquifer? Please explain in detail. In your explanation consider the data and information of this section as well as the nature of the *YES* (*NO*)

petroleum release (i.e., volume, when it occurred, petroleum product).

Per MPCA definition, groundwater at this site is a resource aquifer.

Additional Ground Water Investigation

Complete **Section 6 and Section 7** only if: *1) a resource aquifer has been impacted at or above Minnesota Department of Health HRLs, 2) a resource aquifer has been impacted below the HRLs, but the levels are likely to reach the HRLs, or 3) there is an insufficient distance separating the petroleum contaminated soil (or an impacted non-resource aquifer) from the underlying resource aquifer.* Regardless of whether you are submitting a *LSI* or a *full RI*, all sections following Section 7 must be completed.

Section 6. Extent and Magnitude of Ground Water Contamination

Table 8.

Monitoring well construction.

Well Number	Unique Well Number	Date Installed	Relative Surface Elevation	Riser Height Above Grade	Bottom of Well (Elevation)	Screen Interval (Elev. - Elev.)
MW-1	616538	11/2/98	749.820	-0.70	727.82	727.82-742.82
MW-2	616539	11/2/98	749.440	-0.77	731.44	731.44-746.44
MW-3	616540	11/2/98	749.040	-0.72	731.04	731.04-746.04

Notes: (location and elevation of benchmark)

Table 9.

Water table summary.

Well Number	Date	Depth of Water from Top of Casing	Product Thickness	Depth of Water Below Grade	Relative Groundwater Elevation
MW-1	11/3/98	8.45		9.15	740.67
MW-2	11/3/98	8.89	1.65	9.66	739.78
MW-3	11/3/98	9.38	1.80	10.10	738.94
MW-4					

Notes: (ground water above/below screen, etc.)

6.1 Were any deep monitoring wells completed at the site? *YES* (*NO*)

If *YES*, which are deep wells?

Before a deep well is installed contact the MPCA project hydrologist for guidance on its necessity and placement. A deep monitoring well may be necessary if: 1)Contamination exist more than 10 feet below the water table or 2) the impacted aquifer is a resource aquifer or is hydraulically connected to a resource aquifer presently utilized by a water supply well located within 500 feet of the site.

Provide estimates of the following additional aquifer parameters:

Horizontal Gradient (dh/dl): _____
Vertical Gradient (dv/dl): _____
Porosity: _____
Flow direction: _____
Hydraulic Conductivity (K) _____ m/s
Pore velocity _____ meters/year

Table 10.

All ground water monitoring data should be collected from a minimum of *two quarterly sampling events*.

Indicate the laboratory analytical results for water samples.

Well #	Date	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	GRO	DRO
MW-1	11/3/98	3,100	3,200	190	1,000	<26	9,200	
MW-2	11/3/98 1.65 FP							
MW-3	11/3/98 1.80 FP							
MW-4								

Notes: (e.g., free product, dry well, units etc.)

Table 11.

Indicate other notable contaminants (either petroleum or non-petroleum derived) detected in water samples.

Well Number	Date Analyzed						

Notes: units

6.2 If any non-petroleum compounds were detected list them below and indicate whether they exceed the HRLs. Also, identify possible sources of these compounds.

6.3 Is there a clean or nearly clean (below HRLs) downgradient monitoring well located along the longitudinal axis of the contaminant plume? (approximately 20 degrees plus or minus the axis) *YES* (*NO*)

6.4 Is there a worst case well completed through the source area of the release? (*YES*) *NO*

If you have answered *NO* to any of the above three questions, please explain why a well was not completed in the required location.

6.5 Provide an estimate of the longitudinal length of the dissolved contaminant plume: _____ feet

6.6 Describe the extent and magnitude of the ground water contamination:

The purpose of this phase of the investigation was to perform emergency free product cleanup. Extent has not been determined.

Section 7: Evaluation of Natural Attenuation

Table 12.

Complete the bio-activity data in the table below. Data should be from two quarterly rounds of sampling. Refer to the fact sheet #3.21, "Assessment of Natural Biodegradation at Petroleum Tank Release Sites," for acceptable methodologies and indicate the chosen method in the Methodologies appendix.

Monitoring Well	Temp. °C	pH	Dissolved oxygen (mg/l)	Nitrate (mg/l)	(Fe II) (mg/l)	(H_2S, HS^-) (mg/l)
MW-1						
MW-2						
MW-3						
MW-4						

Notes:

7.1 Discuss the results of the bio-activity evaluation. Specifically, compare the concentrations of the inorganic parameters inside and outside the plume.

7.2 In your judgment, is natural biodegradation occuring at this site? Please Explain. *YES* *NO*

Section 8: Well Receptor Information/Assessment

Include in the appendices of this report: 1) A list of addresses within 500 feet from the edge of the plume and confirmation of status of water supply from the city utility billing department; 2) well logs; and 3) map showing ½ mile radius, 500 foot radius, water supply wells, other potential petroleum sources, and addresses for properties within 500 feet.

Table 13.

Complete the following table for all water supply wells located within 500 feet of the edge of the plume and any municipal or industrial wells found within ½ mile.

Unique Well #	Ground Elevation	Total Depth (ft)	Base of Casing (ft)	Static Elevation	Aquifer	Use	Owner	Distance & Direction from site

Notes:

8.1 Is municipal water available in the area? *YES* *NO*

8.2 Were all property owners within 500 feet of the nearest edge of the contaminant plume successfully contacted to determine if water wells are present? If No, please explain. *YES* *NO*

8.3 Discuss the results of the ground water receptor survey and any analytical results from sampling conducted at nearby water wells. Comment on the risks to water supply wells identified within 500 feet from the edge of the plume as well as the risk posed by or to any municipal or industrial wells found within ½ mile. Specifically indicate whether water supply wells identified utilize the impacted aquifer. (Note: an impacted aquifer separated from another aquifer by a clay lens is not considered a separate aquifer.)

8.4 Are there any plans for ground water development in the impacted aquifer within 1/2 mile of the site, or one mile down gradient of the site if the aquifer is fractured? Please give the name, title and telephone number of the person that was contacted for this information. *YES* *NO*

_____ Telephone_____

Section 9: Surface Water Risk Assessment

9.1 Are there any surface waters or wetlands located within ¼ mile of the site? *YES* *NO*

If *YES*, indicate its name:_____

9.2 If surface water is present downgradient of the site, is there a clean down gradient soil boring or monitoring well located between the site and the surface water? *YES* *NO* *N/A*

If *NO*, we assume that contamination discharges to surface water. Therefore, complete the following information:

Name of receiving water:	_____
Plume width, (W):	_____ feet
Plume thickness, (H):	_____ feet
Hydraulic conductivity, (K):	_____ gal/day/ft^2
Horizontal gradient, (dh/dl):	_____ (unitless)
Discharge, (Q) = H*W*K*(dh/dl)/1440	_____ gal/min

If *YES*, identify them and indicate the distance to these features and discuss the contamination risk potential.

Section 10: Vapor Risk Assessment/Survey

10.1 Is there a history of vapor impacts in the vicinity of the site ? *YES* *NO*

If *YES*, describe:

10.2 Is there any indication that free product or highly contaminated ground water may be traveling offsite within the utility corridors? If YES, have they been investigated with borings or push probes? *YES* *NO*

10.3 Discuss the potential for vapor migration/accumulation near the site. In your discussion consider: Soil types, product type, presence and distribution of free product or high concentrations of dissolved product. Also, compare the depth of contamination with the location of underground utility lines, location and depth of storm and sanitary sewers and location of nearby basements.

If the vapor risk assessment indicated a risk of vapor impacts to buildings or utilities, complete the following table with vapor monitoring data collected. Location numbers should be mapped on an accompanying figure of the surveyed area.

Table 14.

Location #	Date	PID reading (ppm)	Percent of the LEL

Notes:

10.4 Describe and interpret the results of the vapor survey.

Section 11: Discussion

11.1 Discuss the risks associated with the remaining soil contamination?

Additional investigation is required to determine extent of soil contamination

11.2 Discuss the risks associated with the impacted ground water?

Additional investigation is required to determine the extent of contamination and associated risks with the groundwater plume.

11.3 Discuss other concerns not mentioned above:

Section 12: Conclusions and Recommendations

Recommendation for site:

____ site closure
____ additional vapor monitoring
____ additional ground water monitoring
____ active cleanup

Additional investigative work has been proposed and accepted by the MPCA. The purpose of this report is to conform to the requirements of Fact sheet 3.3 and document the work performed to date in placing wells, and a system to collect free product at the site.

The recommendation above should be based on fact sheet #3.1, "Leaking Underground Storage Tank Investigation and Cleanup Policy." Describe below how you applied the policy to support your recommendation.

If additional monitoring is recommended, indicate the proposed monitoring schedule and frequency:

If active cleanup is proposed, then MPCA staff will review this RI report at a higher than normal priority to determine if active cleanup is required. We will respond with either a request for proposal for additional monitoring or a Corrective Action Design report. Please indicate below what cleanup technology you are considering at this time.

Section 13: Required Figures

Indicate attached figures:

__X	*Figure 1, 1a:*	Site location map (*approximate scale is not acceptable) and* a large scale site map show all potential receptors within 300 feet of the site. The large scale site map should show those properties with basements and wells.
__X	*Figure 2, 2a, 2b, etc.:*	One or more site map showing: structures; all past and present petroleum storage tanks, piping, and dispensers; extent of soil excavation; boring and well locations (including any drinking water wells on site); horizontal extent of soil contamination; horizontal extent of ground water contamination; and location of end points for all geologic cross sections.
_X	*Figure 3, 3a:*	Ground water gradient contour maps (for sites with monitoring wells).
____	*Figure 4*	Well receptor survey map showing 1/2 mile radius, 500 foot radius, water supply wells, other potential sources of contamination.
____	*Figure 5:*	Vapor survey map showing utilities and buildings with basements and monitoring locations (if a survey was required).
____	*Figure 6:*	Geologic cross sections.

Section 14: Appendices

Indicate attached appendices.

___	*Appendix A*	Excavation Report Worksheet for Petroleum Release Sites.
X	*Appendix B*	Laboratory Analytical Reports for Soil and Ground Water.
___	*Appendix C*	Methodologies and Procedures, Including Field Screening of Soil, Other Field Analyses, Soil Boring, Soil Sampling, Well Installation, and Water Sampling.
X	*Appendix D*	Geologic Logs for Each Well or Boring, Including Well As-Builts on Log.
X	*Appendix E*	Well Construction Diagrams and Copies of the Minnesota Department of Health Well Record.
___	*Appendix F*	Copies of Water Supply Well Logs With Legible Unique Numbers.
___	*Appendix G*	A List of Addresses Within 500 Feet From the Edge of the Plume and Confirmation of Status of Water Supply From the City Utility Billing department.

Section 15: Consultant (or other) Information

By signing this document, I/we acknowledge that we are submitting this document on behalf of and as agents of the responsible person or volunteer for this leaksite. I/we acknowledge that if information in this document is inaccurate or incomplete, it will delay the completion of remediation and may harm the environment and may result in reduction of reimbursement awards. In addition, I/we acknowledge on behalf of the responsible person or volunteer for this leaksite that if this document is determined to contain a false material statement, representation, or certification, or if it omits material information, the responsible person or volunteer may be found to be in violation of Minn. Stat. § 115.075 (1994) or Minn. Rules 7000.0300 (Duty of Candor), and that the responsible person or volunteer may be liable for civil penalties.

Name and Title:	Signature:	Date signed:
John Mills, PE, Vice President	John Mills	12/21/98
		/ /
		/ /
		/ /

Company and mailing address:

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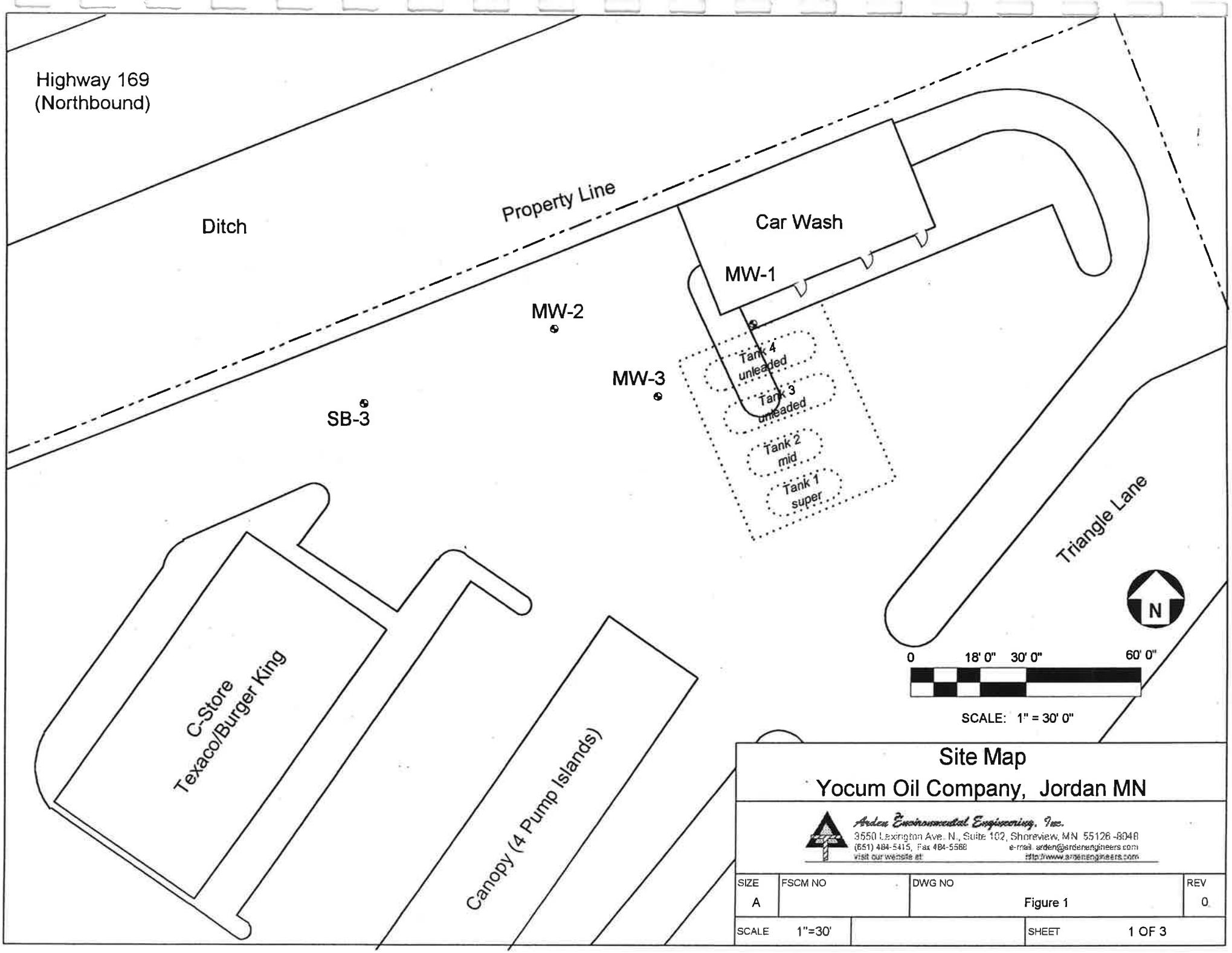

Site Map

Yocum Oil Company, Jordan MN

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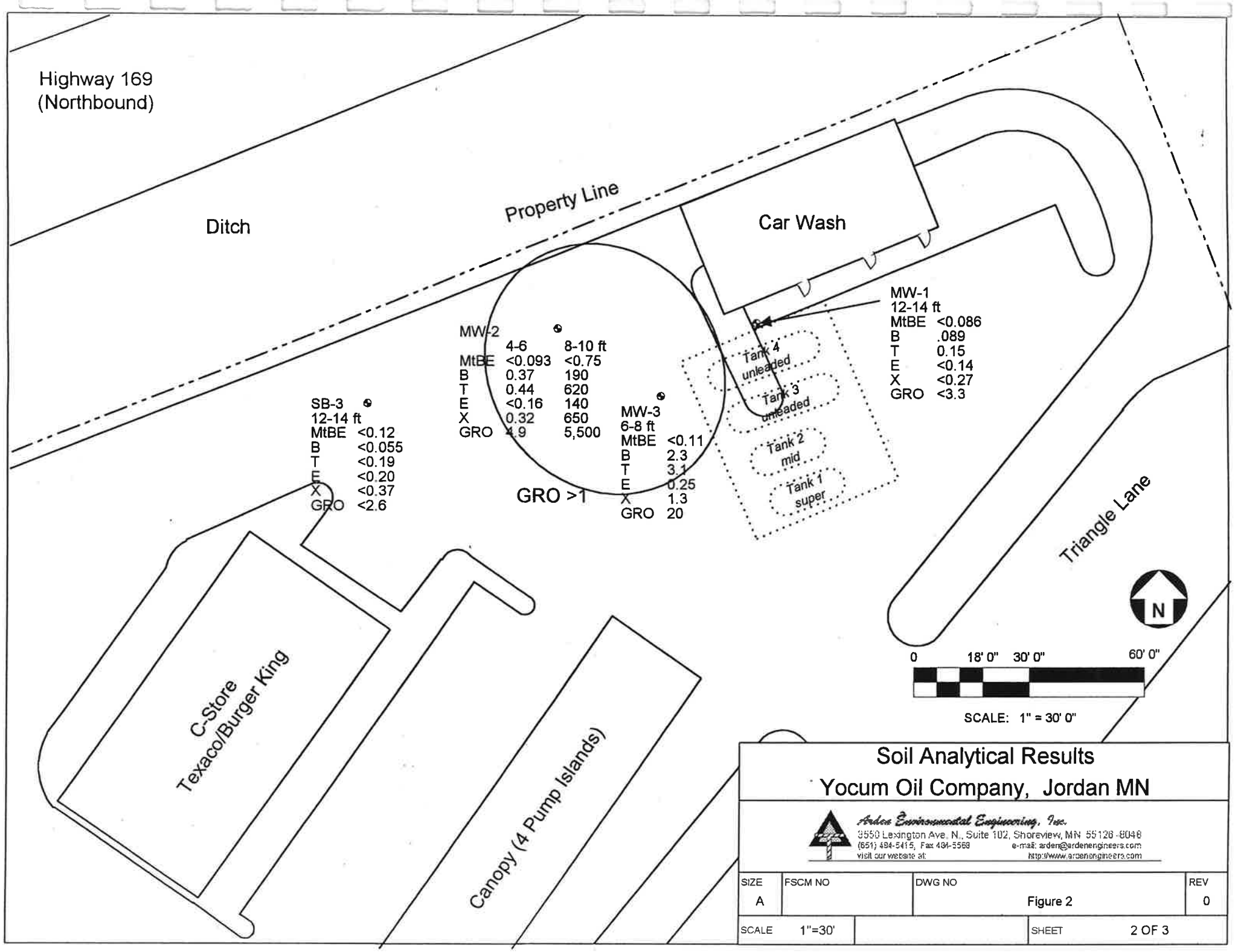
3550 Lexington Ave. N., Suite 102, Shoreview, MN 55126-8048
(651) 484-5415, Fax 484-5568 e-mail: arden@ardenengineers.com
visit our website at http://www.ardenengineers.com

SIZE	FSCM NO	DWG NO	REV
A		Figure 1	0
SCALE 1"=30'		SHEET 1 OF 3	



Soil Analytical Results
Yocum Oil Company, Jordan MN

Arden Environmental Engineering, Inc.
3550 Lexington Ave. N., Suite 102, Shoreview, MN 55126-8048
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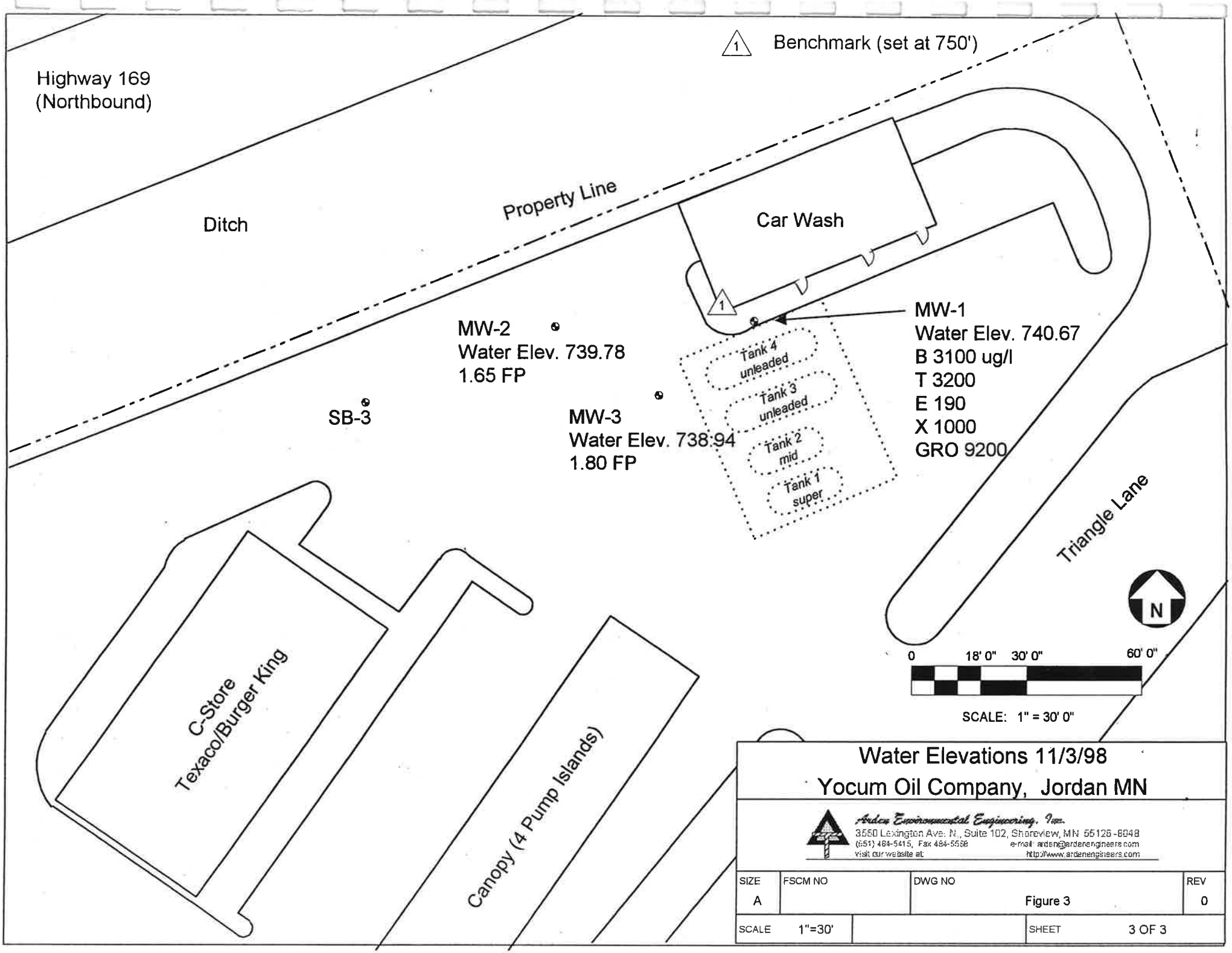
SIZE	FSCM NO	DWG NO	REV
A		Figure 2	0
SCALE 1"=30'		SHEET	2 OF 3



Water Elevations 11/3/98
Yocum Oil Company, Jordan MN

Arden Environmental Engineering, Inc.
3550 Lexington Ave. N., Suite 102, Shoreview, MN 55126-8048
(651) 484-5415, Fax 484-5588 e-mail: arden@ardenengineers.com
visit our website at: http://www.ardenengineers.com

SIZE	FSCM NO	DWG NO	REV
A		Figure 3	0
SCALE 1"=30'		SHEET 3 OF 3	

SPECTRUM LABS INC

301 West County Road E2
New Brighton, MN 55112
(612) 633-0101 FAX (612) 633-1402

CHAIN OF CUSTODY RECORD

Record Number 1078-16.2

Client ARDEN ENVIRONMENTAL ENGRG.
Address
Phone # 651-484-5415
Fax #
Project # YOCUM-JORDAN

Client #
Client Contact John Mills
Spectrum Contact
Spectrum Project #
Client P.O.#
DUE DATE

Preserved Container Type: A None; B HNO_3; C H_2SO_4; D NaOH; E Organics; F Bacteria; G Other

Spectrum Number	COLLECTION DATE	COLLECTION TIME	SAMPLE I.D. / DESCRIPTION	Number of Containers	MATRIX: WATER	MATRIX: SOIL	MATRIX: OTHER	ANALYSIS REQUIRED: BTEX-MtBe-GRO	COMMENTS
			MW-1 2-4	2oz Mech ziplock		X		X	39168
			MW-1 12-14						39169
			MW-2 4-6						39170
			MW-2 8-10	1-2oz					39171
			SB-3 12-14	2oz Mech ziplock					39172
			MW-3 6-8						39173
			SB-3	3 VOA	X				39174

Sampled By:	Date	Time	Relinquished By:	Date:	Time:	Received By Lab:	Date:	Time:	Cooler Temp:
John Mills	11/3/98	17:16	John Mills	11/3/98	8:09A	Gerard Hicks	11/4/98	8:00	
Received By:	**Date**	**Time**	**Relinquished By:**	**Date:**	**Time:**	**Received By:**	**Date:**	**Time:**	**pH:**

Horizon
Laboratories, Inc.

4463 White Bear Parkway, Suite #105 St. Paul, MN. 55110 Tel. (612) 653-3471 Fax (612) 653-3475

LABORATORY REPORT

Client:	Arden Environmental Engineering 3550 Lexington Ave. North, Suite 210 Shoreview, MN 55126	Date Sampled: Date Received: Date Analyzed: Physical State:	11/03/98 11/03/98 11/04/98 - 11/09/98 Soil & Aqueous
Project:	Yocum - Jordan	Report Date: Lab P.N.: Client P.N.:	11/13/98 1078-16.2 NA

Quality Assurance / Quality Control Summary

Parameter (Method)	QC Type	Percent Recovery	Acceptable Range	Relative Percent Difference	Acceptable Range
MtBE (EPA 8020)	M	90	76 - 125	1.8	0 - 20
Benzene (EPA 8020)	M	96	87 - 116	6.4	0 - 20
Toluene (EPA 8020)	M	105	87 - 115	11	0 - 20
Ethylbenzene (EPA 8020)	M	101	84 - 120	6.9	0 - 20
m,p-Xylenes (EPA 8020)	M	106	90 - 120	7.4	0 - 20
o-Xylenes (EPA 8020)	M	102	92 - 115	5.6	0 - 20
GRO (Wis. DNR)	M	107	80 - 120	6.4	0 - 20

M = Matrix Spike / Matrix Spike Duplicate

L = Laboratory Control Sample

Reviewed

Approved

Compounds were identified by column retention time and quantified by peak area of known standards using a Hewlett Packard ChemStation Data System. The samples were received by HORIZON LABORATORIES, INC. and accompanied by the Chain-of-Custody record. The Laboratory Report is the sole property of the client to whom it is addressed. The Laboratory Results are only a part of the Laboratory Report.

Horizon
Laboratories, Inc.

4463 White Bear Parkway, Suite #105 St. Paul, MN. 55110 Tel. (612) 653-3471 Fax (612) 653-3475

LABORATORY RESULTS

Client: Arden Environmental Engineering
3550 Lexington Ave. North, Suite 210
Shoreview, MN 55126

Project: Yocum - Jordan

Date Sampled: 11/03/98
Date Analyzed: 11/06/98 - 11/09/98
Physical State: Soil

Report Date: 11/13/98
Lab P.N.: 1078-16.2
Client P.N.: NA

Sample I.D.	MtBE mg/kg EPA 8020	Benzene mg/kg EPA 8020	Toluene mg/kg EPA 8020	Ethyl-benzene mg/kg EPA 8020	Total, Xylenes mg/kg EPA 8020	GRO mg/kg Wis. DNR	% Moisture
MW-1 2-4	< 0.92	< 0.43	< 1.5	< 1.5	< 2.9	< 3.3	4.7
MW-1 12-14	< 0.086	0.089	0.15	< 0.14	< 0.27	< 1.9	9.4
MW-2 4-6	< 0.093	0.37	0.44	< 0.16	0.32	4.9	13
MW-2 8-10	< 0.75	190	620	140	650	5,500	NA
SB-3 12-14	< 0.12	< 0.055	< 0.19	< 0.20	< 0.37	< 2.6	19
MW-3 6-8	< 0.11	2.3	3.1	0.25	1.3	20	18
PQL, mg/kg	0.0015	0.00070	0.0025	0.0025	0.0047	3.3	
MDL, mg/kg	0.00030	0.00014	0.00049	0.00050	0.00093	0.65	

NA; Moisture sample not available

MDL; Method Detection Limit for undiluted samples.

PQL; Practical Quantitation Limit for undiluted samples.

GRO; Gasoline Range Organics

MtBE; Methyl tert-Butyl Ether

All results are in mg/kg which is equal to parts-per-million (ppm) and are based on a "dry weight" basis.

The Laboratory Results are only a part of the Laboratory Report.

Horizon
Laboratories, Inc.

4463 White Bear Parkway, Suite #105 *St. Paul, MN. 55110* *Tel. (612) 653-3471* *Fax (612) 653-3475*

LABORATORY RESULTS

Client: Arden Environmental Engineering
3550 Lexington Ave. North, Suite 210
Shoreview, MN 55126

Project: Yocum - Jordan

Date Sampled: 11/02/98
Date Analyzed: 11/04/98
Physical State: Aqueous

Report Date: 11/13/98
Lab P.N.: 1078-16.2
Client P.N.: NA

Sample I.D.	MtBE µg/l EPA 8020	Benzene µg/l EPA 8020	Toluene µg/l EPA 8020	Ethyl-benzene µg/l EPA 8020	Total, Xylenes µg/l EPA 8020	GRO µg/l Wis. DNR
SB-3	< 1.1	1.2	4.4	0.94	4.7	40
PQL, µg/l	1.1	0.60	1.5	0.55	2.7	22
MDL, µg/l	0.21	0.12	0.25	0.11	0.53	4.3

PQL; Practical Quantitation Limit
MDL; Method Detection Limit
GRO; Gasoline Range Organics
MtBE; Methyl tert-Butyl Ether
All results are in µg/l which is equal to parts-per-billion (ppb).
The Laboratory Results are only a part of the Laboratory Report.

SPECTRUM LABS INC
301 West County Road E2
New Brighton, MN 55112
(612) 633-0101 FAX (612) 633-1402

CHAIN OF CUSTODY RECORD

Record Number 1078-17

Client ARDEN ENVIRONMENTAL
Address
Phone #
Fax #
Project # YOCUM - JORDAN

Client #
Client Contact
Spectrum Contact
Spectrum Project #
Client P.O.#
DUE DATE

Preserved Container Type: A None; B HNO_3; C H_2SO_4; D NaOH; E Organics; F Bacteria; G Other

Spectrum Number	COLLECTION DATE	COLLECTION TIME	SAMPLE I.D. / DESCRIPTION	Number of Containers	MATRIX: WATER	MATRIX: SOIL	MATRIX: OTHER	ANALYSIS REQUIRED: BTEX-MTBE-GRO	COMMENTS
	11/3/98	17:16	MW-1	3 VOA	X			X	39216

Sampled By:	Date	Time	Relinquished By:	Date:	Time:	Received By Lab:	Date:	Time:	Cooler Temp:
John Mills	11/3/98		John Mills	11/4	1315	[signature]	11/4/98	1115	ONICE
Received By:	**Date**	**Time**	**Relinquished By:**	**Date:**	**Time:**	**Received By:**	**Date:**	**Time:**	**pH:**

Horizon
Laboratories, Inc.

4463 White Bear Parkway, Suite #105 *St. Paul, MN. 55110* *Tel. (612) 653-3471* *Fax (612) 653-3475*

LABORATORY REPORT

Client: Arden Environmental Engineering
3550 Lexington Ave. North, Suite 210
Shoreview, MN 55126

Project: Yocum - Jordan

Date Sampled: 11/03/98
Date Received: 11/04/98
Date Analyzed: 11/11/98
Physical State: Aqueous

Report Date: 11/17/98
Lab P.N.: 1078-17
Client P.N.: NA

Quality Assurance / Quality Control Summary

Parameter (Method)	QC Type	Percent Recovery	Acceptable Range	Relative Percent Difference	Acceptable Range
MtBE (EPA 8020)	M	97	67 - 116	6.5	0 - 35
Benzene (EPA 8020)	M	101	81 - 108	4.6	0 - 13
Toluene (EPA 8020)	M	103	82 - 108	4.7	0 - 11
Ethylbenzene (EPA 8020)	M	101	81 - 110	5.1	0 - 12
m,p-Xylenes (EPA 8020)	M	104	83 - 113	5.3	0 - 12
o-Xylenes (EPA 8020)	M	101	82 - 109	5.7	0 - 12
GRO (Wis. DNR)	M	100	80 - 120	5.8	0 - 20

M = Matrix Spike / Matrix Spike Duplicate

L = Laboratory Control Sample

Reviewed

Approved

Compounds were identified by column retention time and quantified by peak area of known standards using a Hewlett Packard ChemStation Data System. The samples were received by HORIZON LABORATORIES, INC. and accompanied by the Chain-of-Custody record. The Laboratory Report is the sole property of the client to whom it is addressed. The Laboratory Results are only a part of the Laboratory Report.

Horizon
Laboratories, Inc.

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LABORATORY RESULTS

Client: Arden Environmental Engineering
3550 Lexington Ave. North, Suite 210
Shoreview, MN 55126

Project: Yocum - Jordan

Date Sampled: 11/03/98
Date Analyzed: 11/11/98
Physical State: Aqueous

Report Date: 11/17/98
Lab P.N.: 1078-17
Client P.N.: NA

Sample I.D.	MtBE µg/l EPA 8020	Benzene µg/l EPA 8020	Toluene µg/l EPA 8020	Ethyl-benzene µg/l EPA 8020	Total, Xylenes µg/l EPA 8020	GRO µg/l Wis. DNR
MW-1	< 26	3,100	3,200	190	1,000	9,200
PQL, µg/l	1.1	0.60	1.5	0.55	2.7	22
MDL, µg/l	0.21	0.12	0.25	0.11	0.53	4.3

PQL; Practical Quantitation Limit for undiluted samples.

MDL; Method Detection Limit for undiluted samples.

GRO; Gasoline Range Organics

MtBE; Methyl tert-Butyl Ether

All results are in µg/l which is equal to parts-per-billion (ppb).

The Laboratory Results are only a part of the Laboratory Report.

MPCA Leak No:	Arden Project No:	Boring No:	Page
11991	81020	**MW-1**	1 of 1

Site Name/Address:	Boring Location:	Date:
Yocum Texaco 255 Triangle Lane Jordan, MN	4' E and 7' N of SW Corner of Car Wash	11/3/98

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (ft)	Detailed Soil and Rock Description	Natural Moisture Content	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
					Brown Sand (Granular fill)			261	
2-4			SM	4				2000+	
								1000	
				8				360	
								1600	
				12		▼		705	
12-14								265	
			SP	16	Gravel/Silty Sand			250	
				20					
					Bottom of well completed at 22'				

Note: Stratification Lines are approximate; in-situ transition between soil types may be gradual

▼ Groundwater Data Depth while drilling

▽ Depth after drilling

Auger Depth

Rotary Depth

Driller Company: Boart

Rig:

Soils Logged by: JBM

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Suite 102
Shoreview MN 55126
www.ardenengineers.com

MPCA Leak No:	Arden Project No:	Boring No:	Page
11991	81020	**MW-2**	1 of 1

Site Name/Address:	Boring Location:	Date:
Yocum Texaco 255 Triangle Lane Jordan, MN	41' N and 15' W of SW Corner of Car Wash	11/3/98

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (ft)	Detailed Soil and Rock Description	Natural Moisture Content	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
					Brown Silty Sand (fill)			0	
			SM	4				4.8	
			Pt		Black Organic Loam			2000+	
4-6			CH		Gray Clay	▼		2000+	Free Product 1.55 ft thick
				8					
					Sand/Gravel			2000+	
				12					
			SP						
				16					
					Bottom of well completed at 18'				
				20					

Note: Stratification Lines are approximate; in-situ transition between soil types may be gradual

▼ Groundwater Data Depth while drilling

▽ Depth after drilling

Auger Depth		Rig:	
Rotary Depth			
Driller Company	Boart	Soils Logged by:	JBM

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www.ardenengineers.com

MPCA Leak No:	Arden Project No:	Boring No:	Page
11991	81020	**SB-3**	1 of 1

Site Name/Address:	Boring Location:	Date:
Yocum Texaco 255 Triangle Lane Jordan, MN	101' W and 15' N of SW Corner of Car Wash	11/3/98

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (ft)	Detailed Soil and Rock Description	Natural Moisture Content	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
					Brown Silty Sand (fill)			220	
			SM	4				0	
								20	
				8				28	
			Pt		Black Organic Loam			0	
				12				0	
12-14						▼		0	
			SP		Sand/Gravel			0	
				16	EOB 16'				
				20					

Note: Stratification Lines are approximate; in-situ transition between soil types may be gradual

▼ Groundwater Data Depth while drilling

▽ Depth after drilling

Auger Depth		Rig:
Rotary Depth		
Driller Company	Boart	Soils Logged by: JBM

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Shoreview MN 55126
www.ardenengineers.com

MPCA Leak No:	Arden Project No:	Boring No:	Page
11991	81020	**MW-3**	1 of 1

Site Name/Address:	Boring Location:	Date:
Yocum Texaco 255 Triangle Lane Jordan, MN	27' S and 36' W of SW Corner of Car Wash	11/3/98

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (ft)	Detailed Soil and Rock Description	Natural Moisture Content	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
			SM		Brown Silty Sand (fill)			0	
				4				0	
			Pt		Black Organic Loam			700	
6-8			CH	8	Gray Clay	▼		2000+	Free Product 1.83 thick
								2000+	
				12				2000+	
			SP		Sand/Gravel			2000+	
				16					
				20	Bottom of well completed at 18'				

Note: Stratification Lines are approximate; in-situ transition between soil types may be gradual

▼ Groundwater Data Depth while drilling

▽ Depth after drilling

Auger Depth	Rig:
Rotary Depth	
Driller Company: Boart	Soils Logged by: JBM

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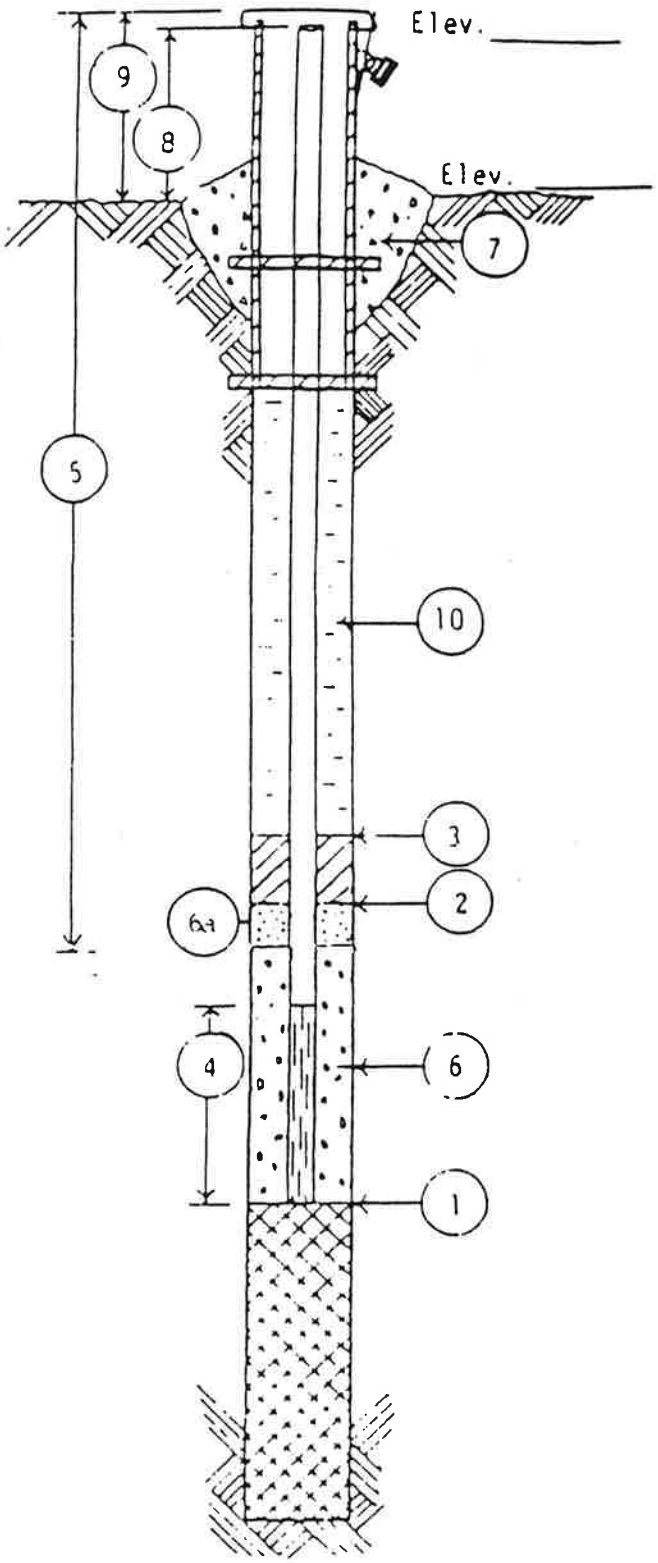
WELL DETAIL INFORMATION SHEET

BOART LONGYEAR



JOB NO. 3411-2162

BORING NO. MW-1

DATE 11-2-98

CHIEF John Einum

LOCATION Jordan, MN

All depth measurments of well detail assumed to be from ground surface unless otherwise indicated.

(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 22.0 FEET.

(2) DEPTH OF BOTTOM OF SEAL (IF INSTALLED) 4.0 FEET.

(3) DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.

(4) ~~LENGTH~~ OF WELL SCREEN PVC WELL SCREEN (Sch 40/Sch 80), OR STAINLESS STEEL 15.0 FEET. (Circle One)

(5) TOTAL LENGTH OF PIPE 7.0 FEET @ 2 IN. DIAMETER.

(6) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 sand.

(6a) LENGTH OF FINE SAND - FEET.

(7) CONCRETE CAP, YES NO (Circle One)

(8) HEIGHT OF WELL CASING ABOVE GROUND flush FEET.

(9) PROTECTIVE CASING? YES NO (Circle One)
HEIGHT ABOVE GROUND flush FEET.
LOCKING CAP? YES NO (Circle One)
BUMPER POST? YES NO (Circle One)

(10) TYPE OF BACKFILL: concrete

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

BOART LONGYEAR — FIELD BORING LOG

Sheet 1 of 1

For Arden Environmental

Job No. 3411-2162-

Location Jordan, MN Elev.

Boring No. MW-1

GROUND WATER				
	While drilling		Time after drilling	
	Before casing removal		Depth to water	
	After casing removal		Depth to cave-in	

Start 11-2-98
Unit 810
Chief JE

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS
1	M	3	7			
		7	6	1.0	14	SAND w/Rocks & Gravel, Brown
2	M	22	20			
		14	14	1.0	34	
3	M	12	13			
		18	40	1.0	31	
4	M	42	48			
		51	60	.8	99	
5	M	36	39			
		49	57	1.5	88	
6	M	41	50			
		52	56	.5	102	
7	W	17	17			
		15	14	1.5	33	
8	W	35	25			
		24	31	1.0	49	

E.O.B. 23.0'

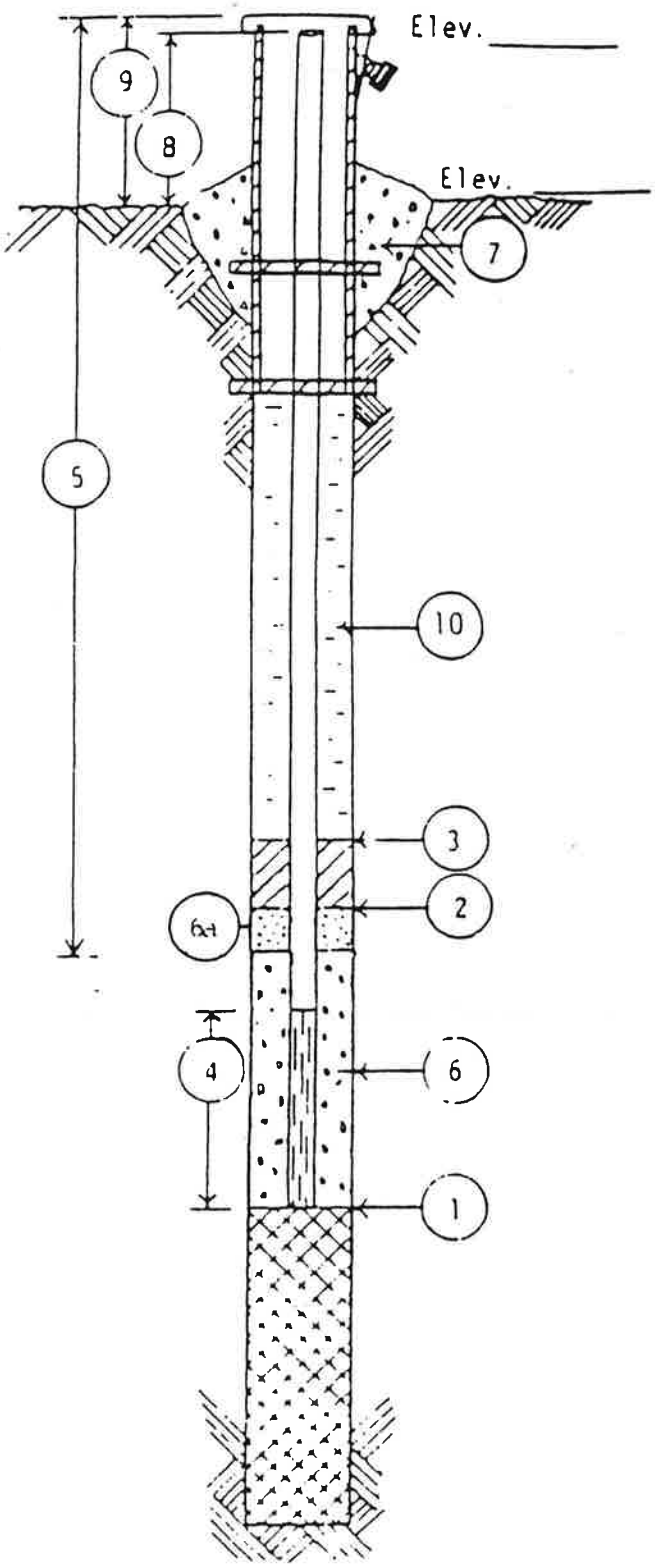
Well Set @22.0'

Casing/Probe	2"
Weight	140#
Drop	30"

Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
			4¼	HSA

WELL DETAIL INFORMATION SHEET

BOART LONGYEAR



JOB NO. 3411-2162

BORING NO. MW-2

DATE 11-2-98

CHIEF John Einum

LOCATION Jordan, MN

All depth measurments of well detail assumed to be from ground surface unless otherwise indicated.

(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 18.0 FEET.

(2) DEPTH OF BOTTOM OF SEAL (IF INSTALLED) 2.5 FEET.

(3) DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.

(4) ~~LENGTH OF~~ WELL SCREEN PVC WELL SCREEN (Sch 40/~~Sch~~ 80), OR STAINLESS STEEL 15.0 FEET. (Circle One)

(5) TOTAL LENGTH OF PIPE 3.0 FEET @ 2 IN. DIAMETER.

(6) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 sand.

(6a) LENGTH OF FINE SAND - FEET.

(7) CONCRETE CAP, (YES) NO (Circle One)

(8) HEIGHT OF WELL CASING ABOVE GROUND flush FEET.

(9) PROTECTIVE CASING? (YES) NO (Circle One)
HEIGHT ABOVE ~~GROUND~~ flush FEET.
LOCKING CAP? (YES) NO (Circle One)
BUMPER POST? YES (NO) (Circle One)

(10) TYPE OF BACKFILL: _____

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

BOART LONGYEAR — FIELD BORING LOG

Sheet 1 of 1

For Arden Environmental

Job No. 3411-2162

Location Jordan, MN Elev.

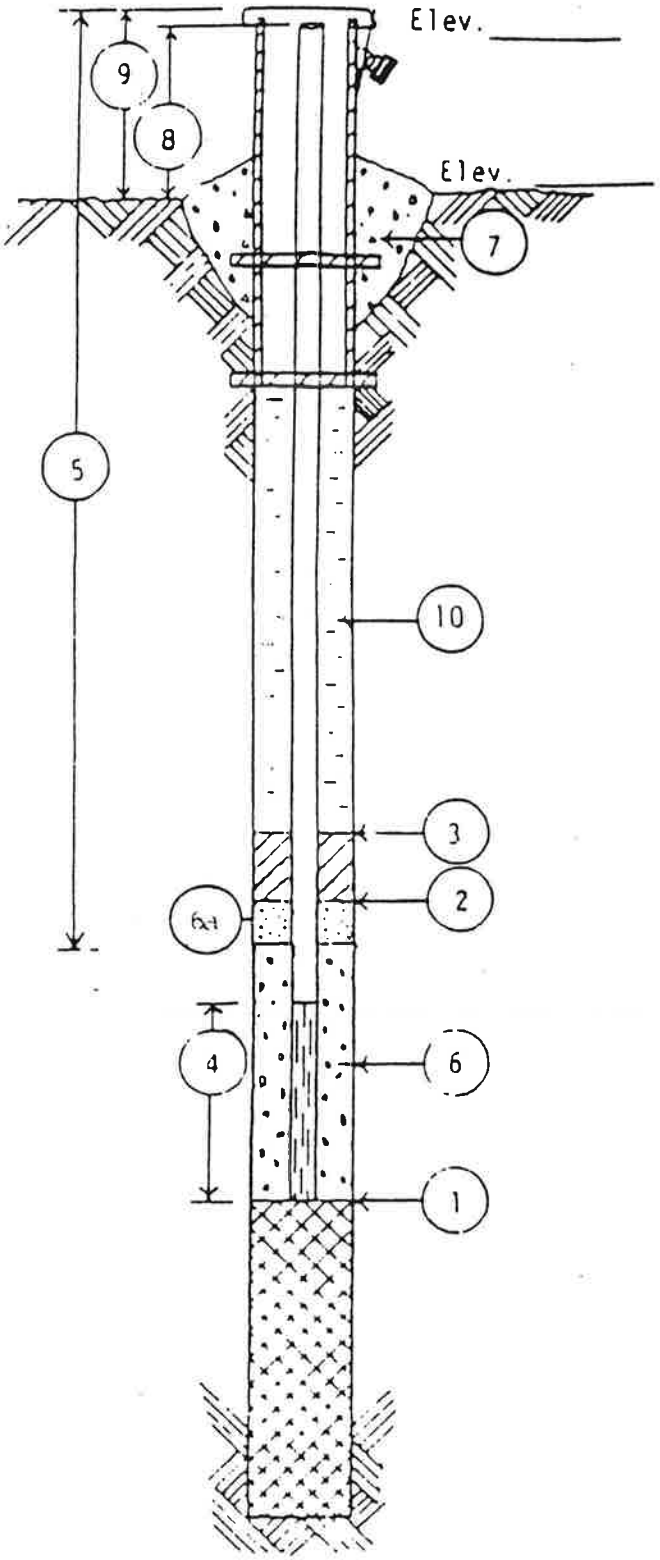
Boring No. MW-2

GROUND WATER				Start	11-2-98
	While drilling		Time after drilling	Unit	810
	Before casing removal		Depth to water	Chief	JE
	After casing removal		Depth to cave-in		

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Casing/Probe 2" Weight 140# Drop 30"	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
1	M	13	17								4¼	HSA
		19	25	1.0	26	SAND w/Rocks & Gravel						
2	M	23	32									
		38	29	1.0	70							
3	M	13	16			4.0'						
		18	19	1.5	34	Silty SAND, Black						
4	M	3	7			6.0'						
		7	10	1.5	14	CLAY, Gray						
5	W	11	16			8.0'						
		18	21	1.5	34	SAND w/Rocks & Gravel						
6	W	16	15									
		16	19	1.5	31							
						E.O.B. 19.0'						
						Well Set @18.0'						

WELL DETAIL INFORMATION SHEET

BOART LONGYEAR



JOB NO. 3411-2162

BORING NO. MW-3

DATE 11-2-98

CHIEF John Einum

LOCATION Jordan, MN

All depth measurments of well detail assumed to be from ground surface unless otherwise indicated.

(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 18.0 FEET.

(2) DEPTH OF BOTTOM OF SEAL (IF INSTALLED) 2.5 FEET.

(3) DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.

(4) ~~LENGTH~~ OF WELL SCREEN PVC WELL SCREEN (Sch 40/Sch 80), OR STAINLESS STEEL 15.0 FEET. (Circle One)

(5) TOTAL LENGTH OF PIPE 3.0 FEET @ 2 IN. DIAMETER.

(6) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE #30 sand.

(6a) LENGTH OF FINE SAND - FEET.

(7) CONCRETE CAP, (YES) NO (Circle One)

(8) HEIGHT OF WELL CASING ABOVE GROUND flush FEET.

(9) PROTECTIVE CASING? (YES) NO (Circle One)
HEIGHT ABOVE GROUND flush FEET.
LOCKING CAP? (YES) NO (Circle One)
BUMPER POST? YES (NO) (Circle One)

(10) TYPE OF BACKFILL: concrete

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

BOART LONGYEAR — FIELD BORING LOG

Sheet 1 of 1

For Arden Environmental

Job No. 3411-2162

Location Jordan, MN Elev.

Boring No. MW-3

GROUND WATER: While drilling ____ Time after drilling ____ ____
Before casing removal ____ Depth to water ____ ____
After casing removal ____ Depth to cave-in ____ ____

Start 11-2-98
Unit 810
Chief JE

Casing/Probe 2"
Weight 140#
Drop 30"

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
1	M	10	17			SAND w/Rocks & Gravel					4¼ HSA
		17	22	1.5	34						
2	M	23	20			3.0'					
		18	26	1.7	38	Sandy Silty CLAY, Black					
3	M	3	3			5.0'					
		4	3	2.0	7	Silty CLAY, Gray 6.0'					
4	W	8	11								
		11	16	.5	22	SAND w/Rocks & Gravel					
5	W	15	15								
		19	26	.5	34						
6	W	14	19								
		19	23	.5	38						
7	W	10	10								
		13	11	2.0	23						
8	W	13	16								
		18	18	2.0	34						
						E.O.B. 19.0'					
						Well Set @18.0'					

5 10 15 20 25 30 35 40 45 50

BOART LONGYEAR — FIELD BORING LOG

Sheet 1 of 1

For Arden Environmental

Job No. 3411-2162

Location Jordan, MN Elev.

Boring No. SB-3

GROUND WATER: While drilling ____ Time after drilling ____ ____
Before casing removal ____ Depth to water ____ ____
After casing removal ____ Depth to cave-in ____ ____

Start 11-2-98
Unit 810
Chief JE

Casing/Probe 2"
Weight 140#
Drop 30"

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
											4¼HSA
1	M	15	18								
		18	24	1.0	36	SAND w/Rock & Gravel					
2	M	21	24								
		24	22	1.5	48						
3	M	19	31								
		37	39	1.5	68						
4	M	14	20								
		17	21	1.0	37	8.0'					
5	M	12	16			Silty SAND, Gray					
		16	15	1.8	32						
6	M	9	11								
		11	12	1.5	22						
7	W	11	12			13.0'					
		12	15	1.5	24	SAND w/Rock & Gravel					
8	W	8	10								
		10	10	1.0	20	E.O.B. 16.0'					

5 10 15 20 25 30 35 40 45 50

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 616538

WELL LOCATION

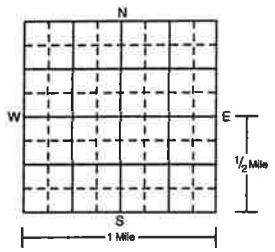
County Name: Scott

Township Name	Township No.	Range No.	Section No.	Fraction
SanFrancisco	114N	23W	19	SW NE NW

House Number, Street Name, City, and Zip Code of Well Location: 255 Triangle La, Jordan

or Fire Number:

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



see attached

PROPERTY OWNER'S NAME: Yocum Oil

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

2719 Stillwater Road
Maplewood, MN

WELL OWNER'S NAME: SAME

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

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
sand/rocks/grvl	brn	m	0	23

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

3411-2162
MW-1

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY

616538

WELL DEPTH (completed): 22.0 ft. | Date Work Completed: 11-2-98

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

DRILLING FLUID: none

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

USE: ☐ Domestic ☐ Irrigation ☐ Test Well ☒ 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	HOLE DIAM.
2 in. to 12 ft.	7 lbs./ft.	5/8 in. to 23 ft.
_____ in. to _____ ft.	_____ lbs./ft.	_____ in. to _____ ft.
_____ in. to _____ ft.	_____ lbs./ft.	_____ in. to _____ ft.

SCREEN: yes
Make: Johnson
Type: pvc | Diam.: 2"
Slot/Gauze: .010 | Length: 10.0
Set between: 12 ft. and 22 ft. FITTINGS: _____

OPEN HOLE from _____ ft. to _____ ft.

STATIC WATER LEVEL: 12.0 ft. ☒ below ☐ above land surface Date measured 11-2-98

PUMPING LEVEL (below land surface): na 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 2.0 ft. _____ ☐ yds. ☐ bags
from _____ to _____ ft. _____ ☐ yds. ☐ bags
from _____ to _____ ft. _____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION
unknown 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

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.

Boart Longyear — 49653
Licensee Business Name — *Lic. or Reg. No.*

John Einum — 11-2-98
Authorized Representative Signature — *Date*

Mark Malmen — 12-1-98
Name of Driller — *Date*

HE-01205-06 (Rev. 9/97)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 616539

WELL LOCATION

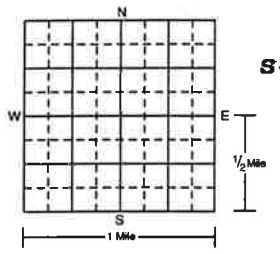
County Name: Scott

Township Name	Township No.	Range No.	Section No.	Fraction
SanFrancisco	114N	23W	19	SW, NE NW,

House Number, Street Name, City, and Zip Code of Well Location: 255 Triangle La, Jordan

or Fire Number:

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



see attached

PROPERTY OWNER'S NAME

Yocum Oil

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

2719 Stillwater Rd
Maplewood, MN

WELL OWNER'S NAME

same

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

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
sand/rocks/grvl		m	0	4
silty sand	blk	m	4	6
clay	gray	m	6	8
sand/rocks/grvl		m	8	19

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

3411-2162
MW-2

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY

616539

WELL DEPTH (completed): 18.0 ft.

Date Work Completed: 11-2-98

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
☐ Test Well ☐ Noncommunity PWS ☐ Remedial
☐ Dewatering ☐ _____

CASING
☐ Steel ☒ Threaded ☐ Welded
☒ Plastic ☐ _____

Drive Shoe? ☐ Yes ☒ No

HOLE DIAM.

CASING DIAMETER / WEIGHT

2 in. to 8 ft.	7/5/8 lbs./ft.	____ in. to 19 ft.
____ in. to ____ ft.	____ lbs./ft.	____ in. to ____ ft.
____ in. to ____ ft.	____ lbs./ft.	____ in. to ____ ft.

SCREEN: yes
Make: Johnson
Type: pvc
Diam.: 2"
Slot/Gauze: .010
Length: 10.0
Set between 8 ft. and 18 ft. FITTINGS: _____

OPEN HOLE
from _____ ft. to _____ ft.

STATIC WATER LEVEL
8.0 ft. ☒ below ☐ above land surface Date measured 11-2-98

PUMPING LEVEL (below land surface)
na 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 2.0 ft.	_____	☐ yds. ☐ bags
from _____ to _____ ft.	_____	☐ yds. ☐ bags
from _____ to _____ ft.	_____	☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION
unknown 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

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.

Boart Longyear — 49653
Licensee Business Name — *Lic. or Reg. No.*

Mark Smalen — 12-1-98
Authorized Representative Signature — *Date*

John Einum — 11-2-98
Name of Driller — *Date*

HE-01205-06 (Rev. 9/97)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO. 616540

WELL LOCATION

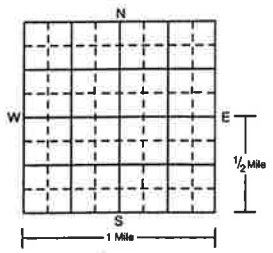
County Name: Scott

Township Name	Township No.	Range No.	Section No.	Fraction
SanFrancisco	114N	23W	19	SW¼ NE NW¼

House Number, Street Name, City, and Zip Code of Well Location: 255 Triangle La, Jordan

or Fire Number:

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



see attached

PROPERTY OWNER'S NAME: Yocum Oil

Property owner's mailing address if different than well location address indicated above.
2719 Stillwater Rd
Maplewood, MN

WELL OWNER'S NAME: same

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

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
sand/rocks/grvl		m	0	3
sandy silty clay	blk	m	3	5
silty clay		m	5	6
sand/rocks/grvl		m	6	19

Use a second sheet, if needed

REMARKS, ELEVATION, SOURCE OF DATA, etc.

3411-2162
MW-3

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY 616540

WELL DEPTH (completed): XXXXX 18.0 ft. Date Work Completed: 11-2-98

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

DRILLING FLUID: none

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

USE: ☐ Domestic ☐ Irrigation ☐ Test Well ☒ 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 8 ft.	_____ lbs./ft.	7 5/8 in. to 19 ft.
_____ in. to _____ ft.	_____ lbs./ft.	_____ in. to _____ ft.
_____ in. to _____ ft.	_____ lbs./ft.	_____ in. to _____ ft.

SCREEN: yes
Make: Johnson
Type: pvc
Slot/Gauze: .010
Set between: 8 ft. and 18 ft.

OPEN HOLE from _____ ft. to _____ ft.
Diam. 2"
Length 10.0
FITTINGS: _____

STATIC WATER LEVEL: 6.0 ft. ☒ below ☐ above land surface Date measured 11-2-98

PUMPING LEVEL (below land surface): na 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 2.0 ft. _____ ☐ yds. ☐ bags
from _____ to _____ ft. _____ ☐ yds. ☐ bags
from _____ to _____ ft. _____ ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION
unknown 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

WELL CONTRACTOR CERTIFICATION

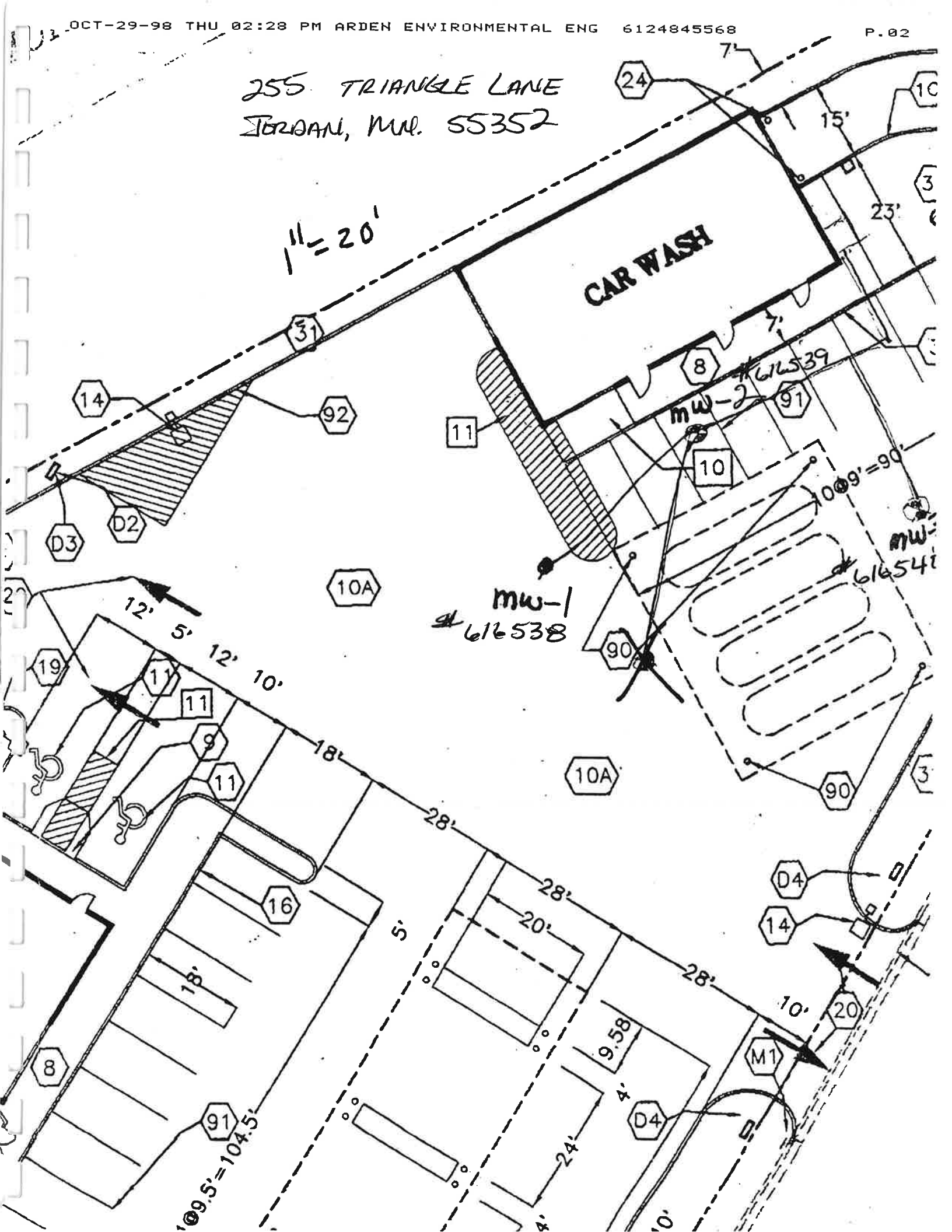
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Boart Longyear — 49653
Licensee Business Name — *Lic. or Reg. No.*

Mark Smalley — 12-1-98
Authorized Representative Signature — *Date*

John Einum — 11-2-98
Name of Driller — *Date*

HE-01205-06 (Rev. 9/97)


255 TRIANGLE LANE
JORDAN, MN. 55352
1" = 20'
CAR WASH
MW-1
#616538
MW-2
#616539
MW-
#61654
7'
15'
23'
12'
5'
12'
10'
18'
28'
28'
28'
20'
5'
18'
9.58
4'
24'
10'
10@9.5'=104.5'
10@9'=90'
24
31
14
92
D3
D2
11
8
91
10
90
10A
19
9
16
D4
20
M1