
**REMEDIAL
INVESTIGATION
REPORT FORM**

FACT SHEET #3.24

**MAYER OIL COMPANY
MAYER, MINNESOTA**

**PROJECT NO.: M7M-049
MPCA LEAK NO.: 10324**

December 10, 1997

Nova 
Environmental Services, Inc.

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MPCA, HAZARDOUS
WASTE DIVISION

**REMEDIAL INVESTIGATION
REPORT FORM
FACT SHEET #3.24
MAYER OIL COMPANY
MAYER, MINNESOTA**

**NOVA PROJECT NO.: M7M-049
MPCA LEAK NO.: 10324**

December 10, 1997

Prepared for:

**MR. RICHARD COHRS
308 ASH AVENUE
MAYER, MINNESOTA**

Prepared by:

**NOVA ENVIRONMENTAL SERVICES, INC.
1107 HAZELTINE BOULEVARD, SUITE 400
CHASKA, MINNESOTA 55318
(612) 448-9393**

SUMMARY

A petroleum release was detected at the Mayer Oil Company in Mayer, Minnesota during the removal of four underground storage tanks (USTs). A 1,000 gallon diesel UST, an 8,000 gallon diesel UST, a 6,000 gallon gasoline UST, and a 2,000 gallon gasoline UST were removed from the site by Boiler Services, Inc. of Fridley, Minnesota on June 10, 1997. The release was attributed to spills or overfills of the 2,000 gallon gasoline UST.

Based on current Minnesota Pollution Control Agency (MPCA) guidance documents, a limited site investigation was required to assess the extent and potential risks associated with the release. The MPCA requires a limited site investigation (LSI) to be performed at sites where contaminated soil remains and ground water is suspected to be impacted. Total Petroleum Hydrocarbons (TPH) as gasoline were detected at a concentration of 34 parts per million (ppm) in the soil sample collected beneath the 2,000 gallon UST. Ground water was not observed in the excavation; however, the depth to the water table was estimated to be 20 to 25 feet below ground surface (BGS). The horizontal and vertical extent of the soil contamination could not be determined at the time of the UST removal project.

As part of the limited site investigation, soil borings were advanced on August 27, 1997. A Geoprobe was used to advance two soil borings through the center of the former tank basin and two soil borings around the former tank basin. Boring depths ranged from 21 to 31 feet. Two soil samples and two ground water samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), gasoline range organic (GRO) compounds and methyl tert butyl ether (MTBE).

A water sample analyzed from boring GP-1 contained low levels of BTEX and GRO compounds. The water sample from GP-2 contained only toluene at a concentration of 0.50 parts per billion (ppb). The concentrations of petroleum compounds detected in the water samples from borings GP-1 and GP-2 were below the Minnesota Department of Health's (MDH's) Health Risk Limits (HRLs). No detectable concentrations of petroleum compounds were detected in the soil samples from borings GP-3 and GP-4.

A potential receptor survey was performed to assess the risks associated with the release. No structures or utilities were identified to be at risks of petroleum vapor impacts. All property owners within 500 feet of the site were contacted to identify potential ground water receptors. One well was identified within 500 feet of the site. This well is the City of Mayer Public Water supply well. This municipal supply well is cased in the Jordan Aquifer, and approximately 200 feet of clay-rich glacial till separate the petroleum contamination from the well intake.

Based on the fact that the petroleum-contaminant levels in the ground water did not exceed established MDH HRLs, and that no receptors of petroleum vapors or impacted ground water were identified, the release does not pose a significant threat to human health or the environment.

The MPCA requires that data obtained during the limited site investigation be presented on MPCA fact sheet #3.24. The following fact sheet/report includes our data and interpretation and requests MPCA site closure.

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, "Excavation 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: LEAK0000 10324

Date: December 5, 1997

Responsible Party: Richard Cohrs

R.P. phone #: (612) 657-2273

Facility Name: Mayer Oil Company

Facility Address: 308 Ash Avenue City: Mayer

County: Carver Zip Code: 55360

Location of site: LAT: 93°54'16" LONG: 44°53'14" Circle one: UTM/State

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Note: Sections 6 and 7 have been omitted because a resource aquifer has not been significantly impacted.

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.

Section 2: Site and Release Information

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

The principal land use is for residential dwellings with some commercial buildings interspersed. The topography is flat to gently rolling and drops off east of the site to a low flat area, which is used as a park.

Table 1.

Provide the following for all tanks that have been at the site:

Tank #	UST or AST	Capacity	Contents	Age	Status*	Condition
1	UST	1,000	Diesel	12 yrs	Removed 6/10/97	Good Condition
2	UST	8,000	Diesel	12 yrs	Removed 6/10/97	Good Condition
3	UST	6,000	Gasoline	12 yrs	Removed 6/10/97	Good Condition
4	UST	2,000	Gasoline	12 yrs	Removed 6/10/97	Good Condition

*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.

The piping and dispensers were removed with the USTs.

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

The release has been attributed to spills and overfills of the 2,000 gallon gasoline UST.

2.4 What was the volume of the release? (if known): Unknown gallons

2.5 When did the release occur? (if known): Unknown

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):

4.4 Indicate the drilling method: 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								
		GP-1	GP-2	GP-3	GP-4	5	6	7	8	9
	4-6	9	ND	9	7					
	9-11	2	9	ND	ND					
	14-16	ND	ND	ND	ND					
	19-21	ND	ND	3	ND					
	24-26	ND								
	29-31	ND								

Notes: (type of PID/FID)

Hnu equipped with a 10.2 eV lamp.

Table 3.

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

Well/Boring, Depth(ft)	Date Analyzed	Benzene	Toluene	Ethylbenzene	Xylene	GRO	MTBE
GP-3 (19-21)	9/9/97	<0.010	<0.0095	<0.020	<0.069	<1.0	<0.018
GP-4 (19-21)	9/9/97	<0.010	<0.0095	<0.020	<0.069	<1.0	<0.018

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.

None

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.

N/A

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

Low level soil contamination was observed in three soil borings at a depth of 4 to 6 feet below ground surface (BGS) and in two soil borings (GP-1 and GP-2) at a depth of 9 to 11 feet BGS. The highest measurable level of contamination was 9 ppm with the HNu PID.

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:

10⁻⁷ 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).

*Reference from . (Freeze and Cherry, 1979, Groundwater, Prentice-Hall, Table 2.2)

*provide author(s), year published, title, publisher and page(s).

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
- 20 feet or greater

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

Evaluation of area well logs revealed that the area is underlain by clay to a depth of approximately 150 to 200 feet. The site boring logs confirmed that clay is present to 31 feet at boring GP-1. The uppermost bedrock is the Jordan sandstone, at a depth of 150 to 200 feet.

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 1×10^{-2} cm/sec and a minimum thickness of 10 feet.
- The water bearing unit has a hydraulic conductivity between 1×10^{-4} cm/sec and 1×10^{-2} cm/sec and a minimum thickness of 20 feet.
- The water bearing unit has a hydraulic conductivity less than 1×10^{-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										

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.

There was a water-bearing sand seam encountered at 25 feet and 20 feet in borings GP-1 and GP-2, respectively.

Table 6.

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

Well/Boring Number	Date Analyzed	Benzene	Toluene	Ethylbenzene	Xylene	GRO	MTBE
GP-1	9/5/97	6.9	0.67	5.6	33	380	<.68
GP-2	9/4/97	<0.47	0.50	<0.33	<1.4	<17	<0.68

Notes:

Units are µg/L or parts per billion (ppb).

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).

None

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.

N/A

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? 0 feet

This distance was based on the low-level impact to groundwater at GP-1.

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.

Mottling was observed in clayey soil samples in all soil borings at depths ranging from approximately 9 to 20 feet below ground surface.

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 petroleum release (i.e., volume, when it occurred, petroleum product). YES NO

Over 100 feet of clay-rich glacial drift separate the impacted soil from the nearest resource aquifer.

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
220954	972	280	202	52	Jordan	M	City of Mayer	400 ft. east

Notes:
 M = Municipal

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 1/2 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.)

The County Well Index (CWI) identified one well within a 500 foot radius of the site. This well is the City of Mayer municipal water supply well. It is cased to 202 feet within the Jordan sandstone. The 202 feet of overlying Quaternary Drift consists of clay-rich glacial till. No other wells were identified within a 500 foot radius of the site and no other municipal or industrial wells were identified within a half-mile radius of the site.

- 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

The City of Mayer intends to install an additional well in the near future.

Greg Kluver Telephone (612) 657-2527

Section 9: Surface Water Risk Assessment

- 9.1 Are there any surface waters or wetlands located within 1/4 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.

Due to the presence of clayey soils, the potential for vapor migration is high. An underground basement/mechanical room for the Mayer Oil Company and a storm sewer grate were accessed for measurement of organic and explosive vapors. An inaccessible utility trench, housing vent and electrical pipes for existing USTs, is in close proximity to the former 2,000 gallon UST.

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
VS-1	11/12/97	0 ppm	0%
VS-2	11/12/97	0 ppm	0%

Notes: See Figure 2 for vapor survey locations.

10.4 Describe and interpret the results of the vapor survey

No organic or explosive vapors were detected during the vapor survey.

Section 11: Discussion

11.1 Discuss the risks associated with the remaining soil contamination?

The only identifiable risk associated with the remaining soil contamination is contact with soil if it were excavated. No significant soil vapor risks were identified.

11.2 Discuss the risks associated with the impacted ground water?

The impacted ground water is in a non-resource aquifer consisting of clayey glacial till with occasional sand seams. The contaminant levels are below MDH HRLs. No risks associated with the impacted ground water were identified.

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

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.

A low level soil impact was observed in the 4 to 6 foot depth at borings GP-1, GP-3, and GP-4 and in the 9 to 11 foot depth at borings GP-1 and GP-2. The impact to ground water is minimal. Ground water contaminant levels are below the MDH HRLs. The remaining soil contamination is not expected to impact the ground water above current levels. No significant risks to human health or the environment have been identified.

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:

- 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.
- 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.
- Figure :* Ground water gradient contour maps (for sites with monitoring wells).
- Figure 3:* Well receptor survey map showing 1/2 mile radius, 500 foot radius, water supply wells, other potential sources of contamination.
- Figure :* Vapor survey map showing utilities and buildings with basements and monitoring locations (if a survey was required).
- Figure :* Geologic cross sections.

Section 14: Appendices

Indicate attached appendices.

- Appendix A* Excavation Report Worksheet for Petroleum Release Sites.
- 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.
- Appendix D* Geologic Logs for Each Well or Boring, Including Well As-Builts on Log.
- Appendix* Well Construction Diagrams and Copies of the Minnesota Department of Health Well Record.
- Appendix E* Copies of Water Supply Well Logs With Legible Unique Numbers.
- Appendix* 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:
<u>Artie Dworak, Project Manager</u>	<u></u>	<u>12 / 10 / 97</u>
_____	_____	<u> / /</u>
_____	_____	<u> / /</u>
_____	_____	<u> / /</u>

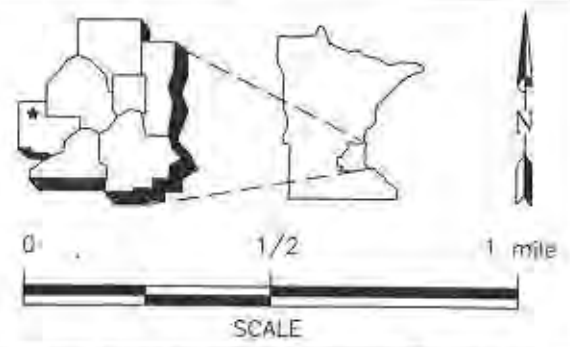
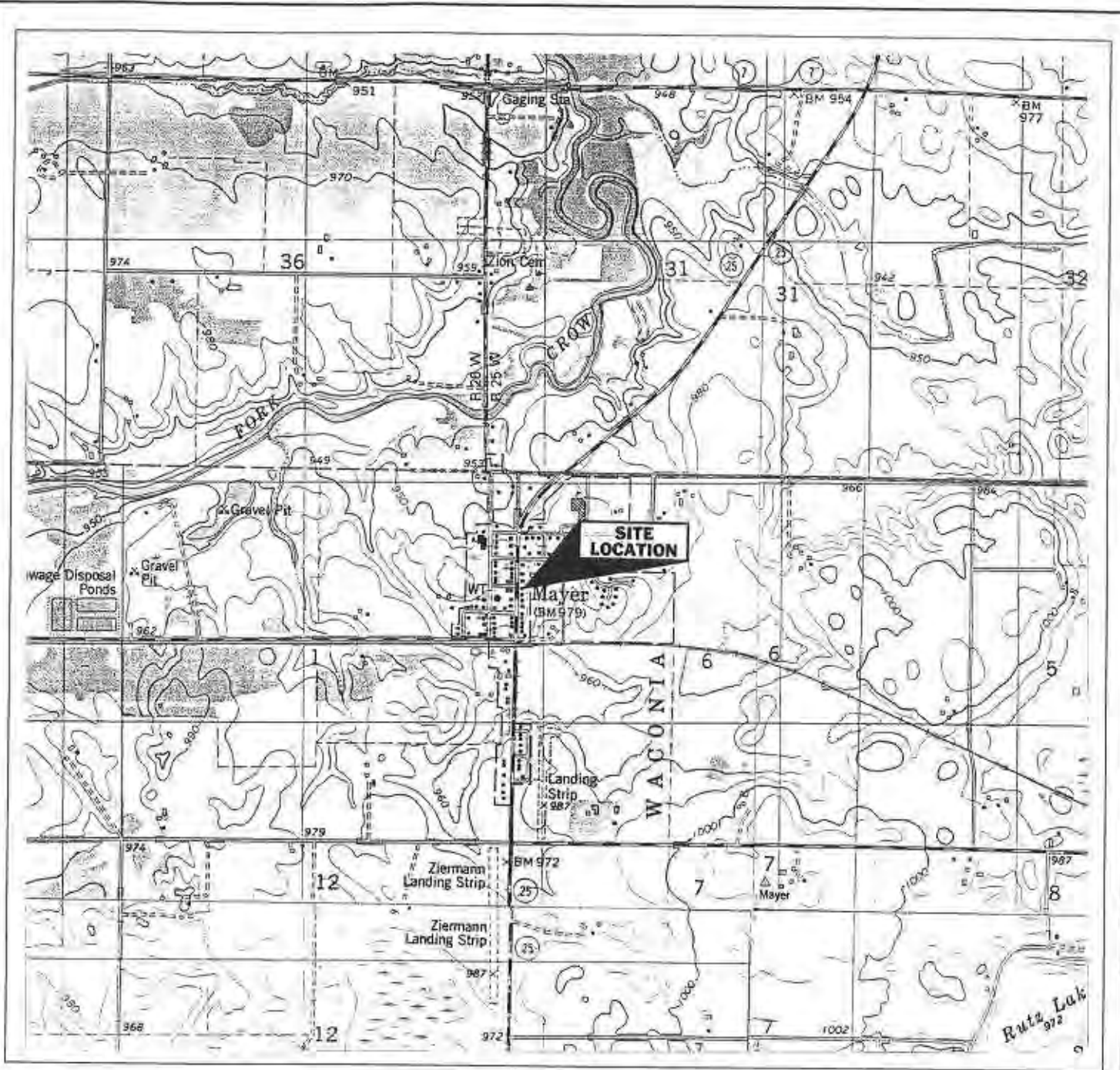
Company and mailing address: Nova Environmental Services, Inc.
1107 Hazeltine Boulevard, Suite 400
Chaska, Minnesota 55318

Phone: (612) 448-9393
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FIGURES



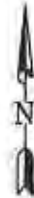
SITE LOCATION MAP
 MAYER OIL COMPANY
 308 ASH STREET
 MAYER, MINNESOTA

M265/M7M-049



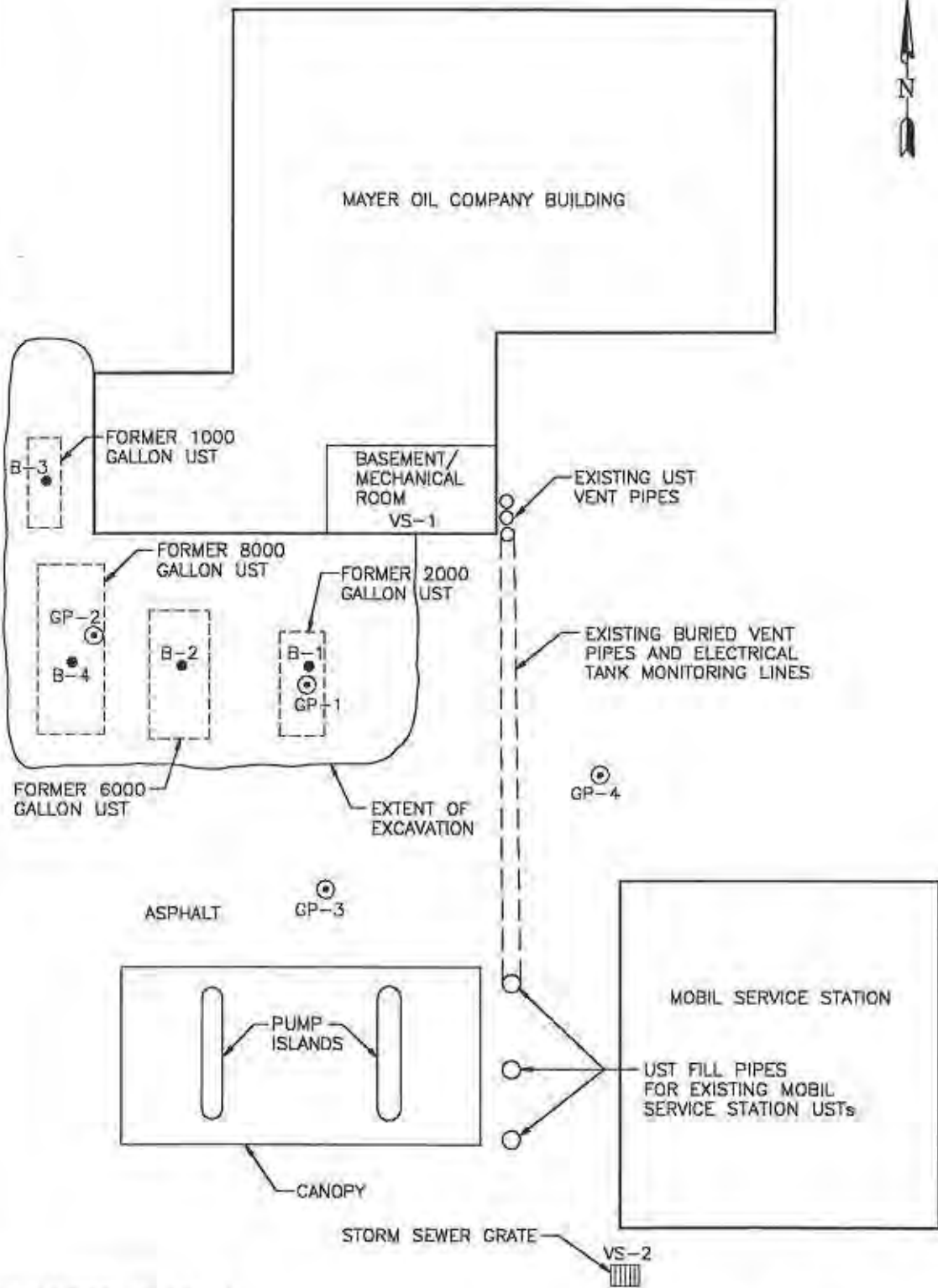
OCT - 97

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MAYER OIL COMPANY BUILDING

ASH STREET

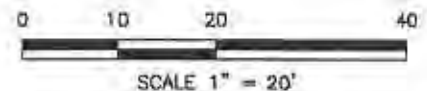


LEGEND

● SOIL SAMPLE LOCATION (6/10/97)

⊙ SOIL BORING LOCATION (8/27/97)

VS-1 VAPOR SURVEY LOCATION

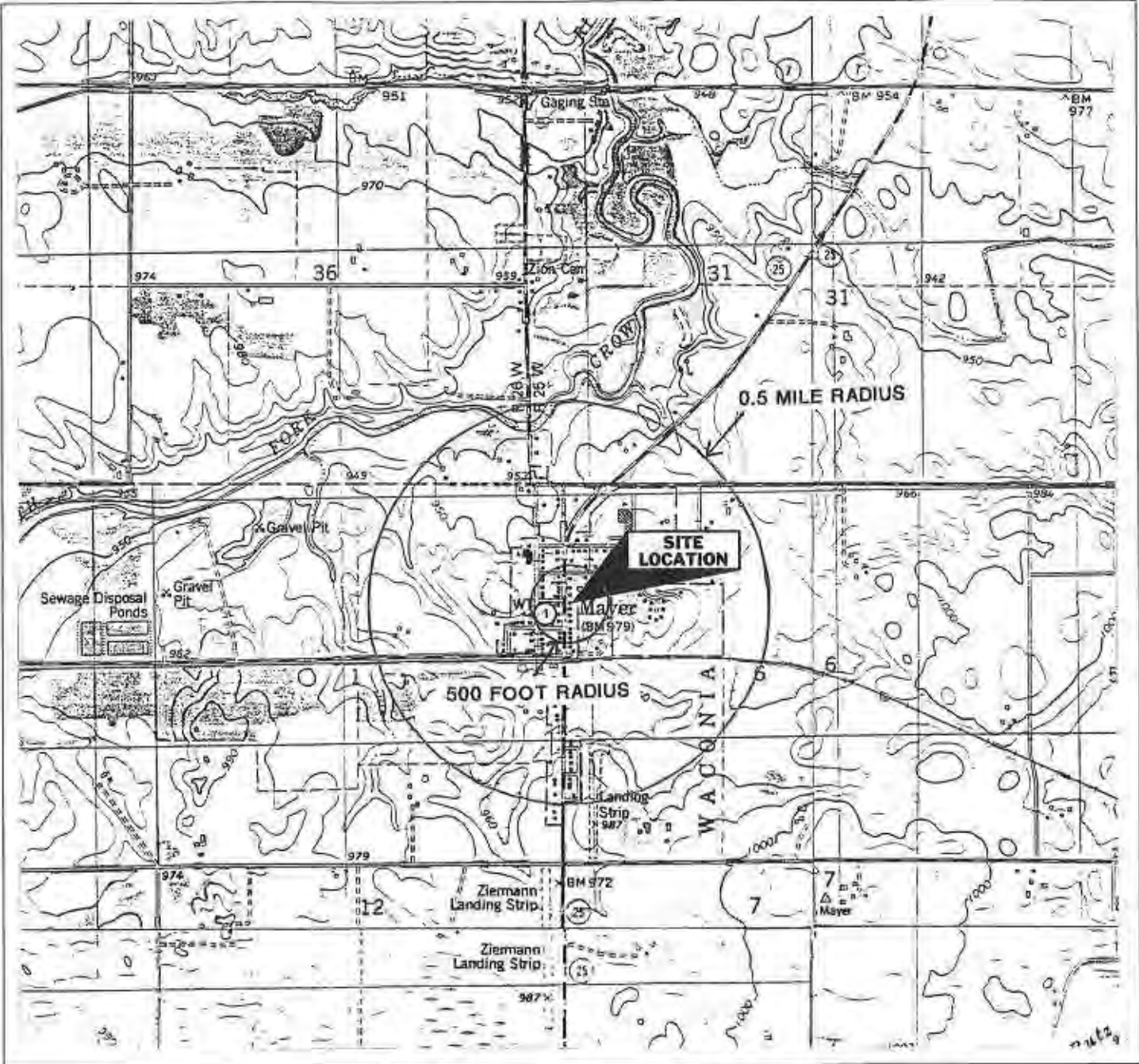


SITE DIAGRAM
MAYER OIL COMPANY
308 ASH STREET
MAYER, MINNESOTA

M265/M7M-049

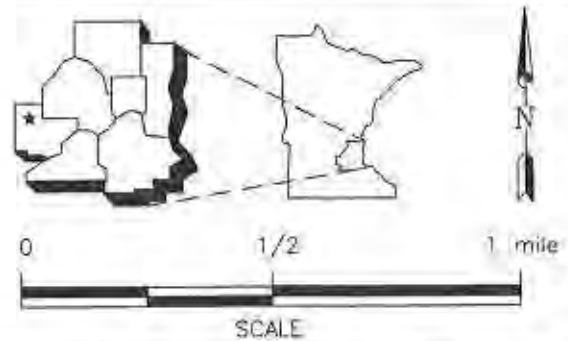


OCT - 97



UNIQUE WELL NUMBER

1 220954



WELL RECEPTOR SURVEY MAP
 MAYER OIL COMPANY
 308 ASH STREET
 MAYER, MINNESOTA

M265/M7M-049

Nova 
 Environmental Services, Inc.

NOV - 97

3

APPENDIX A

EXCAVATION REPORT WORKSHEET –
MPCA FACT SHEET 3.7



Tanks and Emergency Response Section
Minnesota Pollution Control Agency

**EXCAVATION REPORT WORKSHEET FOR
PETROLEUM RELEASE SITES**

Fact Sheet #3.7
April 1997

Complete the information below and submit to the Minnesota Pollution Control Agency (MPCA) Tanks and Emergency Response Section to document excavation and treatment of petroleum contaminated soil. Conduct excavations in accordance with "Excavation of Petroleum Contaminated Soil" (fact sheet #3.6). Please attach any available preliminary site investigation reports to this excavation report.

Attach additional pages if necessary. Please type or print clearly.

The excavation reporting deadline is 10 months from the date of receipt of the standard letter. A shorter deadline may be established by MPCA staff for high priority sites.

PART I: BACKGROUND

A. Site: Mayer Oil Company

Street: 308 Ash Avenue
City, Zip: Mayer 55360
County: Carver

MPCA Site ID#: LEAK0000 10324

B. Tank Owner/Operator: Richard Cohrs

Mailing Address: 308 Ash Avenue

Street/Box:
City, Zip: Mayer, 55360
Telephone: (612) 657-2273

C. Excavating Contractor: Boiler Service, Inc.

Contact: Tom Marchessault
Telephone: (612) 784-8178
Tank Contractor Certification Number: 0012

D. Consultant: None

Contact:
Street/Box:
City, Zip:
Telephone:

Table 1.

B. Provide the following information for all tanks at the site at the time of the release:

Tank #	UST or AST	Capacity (gallons)	Contents (product type)	Age	Status*	Condition of Tank
1	UST	1,000	Diesel	12 yrs	Removed 6/10/97	Good
2	UST	8,000	Diesel	12 yrs	Removed 6/10/97	Good
3	UST	6,000	Gasoline	12 yrs	Removed 6/10/97	Good
4	UST	2,000	Gasoline	12 yrs	Removed 6/10/97	Good

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

Notes:

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

Piping and dispensers were removed along with the tanks.

D. Identify and describe the source or suspected source(s) of the release and how the release was discovered.

Spills and overfills of the 2,000 gallon gasoline UST.

E. What was the volume of the release? (if known): Unknown gallons

F. When did the release occur? (if known): Unknown

G. Describe source of on-site drinking water.

City of Mayer Municipal Water Supply

PART IV: EXCAVATION INFORMATION

- A. Dimensions of excavation: Length 20 feet Width 12 feet Depth 12 feet
- B. Original tank backfill material (sand, gravel, etc.): Sand
- C. Native soil type (clay, sand, etc.): Clay
- D. Quantity of contaminated soil removed for treatment (cubic yards): N/A

[Note: If more than 150 cubic yards removed, please attach copy of written approval from MPCA.]

- E. Were new tanks installed at the site? (yes/no) If yes, how much soil was excavated to accommodate the installation of the new tanks?
-
- F. Was ground water encountered or a suspected perched water layer or was there evidence of a seasonally high ground water table (i.e. mottling)? (yes/no) At what depth?
-
- G. If ground water was not encountered during the excavation, what is the expected depth of ground water? 20 - 25 feet
- H. If a soil boring was required (Additional investigation is required at sites that have visual or other evidence of contamination remaining in the suspected source area, with sandy or silty sand soil [Unified Soil Classification System/American Society for Testing Materials] and where the water table is within 25 feet of the ground surface. See fact sheet #3.6 "Excavation of Petroleum Contaminated Soil," Part VI Additional Investigation.) describe the soil screening and analytical results. Attach the boring logs and laboratory results to this report.
- See RI Report Form, Fact Sheet 3.24.
- I. If no soil boring was required, explain.

- J. If ground water was encountered or if a soil boring was conducted, was there evidence of ground water contamination? (yes/no) Describe this evidence of contamination, e.g., free product (specify thickness), product sheen, ground water in contact with petroleum contaminated soil, water analytical results, etc.

Please see RI Report Form, Fact Sheet 3.24.

[NOTE: If free product was observed, contact MPCA staff immediately as outlined in fact sheet #3.3 "Free Product: Evaluation and Recovery"].

- K. Was bedrock encountered in the excavation? (yes/no) At what depth?

- L. Were other unique conditions associated with this site? (yes/no) If so, explain.

PART V: SAMPLING INFORMATION

- A. Briefly describe the field screening methods used to distinguish contaminated from uncontaminated soil:

Visual and olfactory observations were used by Boiler Service, Inc. to determine that a release had occurred. The laboratory analytical results, for the soil sample collected under each tank, were used by Boiler Service to confirm their field screening procedures.

B. List all soil vapor headspace analysis results. Indicate all sampling locations using sample codes (with sampling depths in parentheses), e.g. R-1 (2 feet), R-2 (10 feet), etc. "R" stands for "removed." Samples collected at different depths at the same location should be labeled R-1A (2 feet), R-1B (4 feet), R-1C (6 feet), etc. If the sample was collected from the sidewall or bottom after excavation was complete, label it S-1 (for sidewall) or B-1 (for "bottom"). Be sure the sample codes correspond with the site map required in part VI, below.

Soil samples were not collected by Boiler Service, Inc. for soil vapor headspace analysis.

Sample Code	Soil Type	Reading ppm	Sample Code	Soil Type	Reading ppm
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

C. Was the "removed soil" placed back into the excavation basin? (yes/no)
If no, please complete Part VIII: Soil Treatment Information section. If yes, a Limited Site Investigation is necessary (see fact sheet #3.19, "Soil and Ground Water Investigations Performed During Remedial Investigations").

D. Briefly describe the soil analytical sampling and handling procedures used:

A grab sample was collected directly below each tank removed. The sampler wore disposable latex gloves and placed the sample directly into containers provided by the analyzing laboratory. The containers were labeled, placed into a cooler with ice, and shipped to Maxim Technologies Inc. under chain of custody.

E. List below all soil sample analytical results from bottom and sidewall samples (i.e., soils left in place when excavation is complete). Code the samples with sampling depths in parentheses as follows: sidewall samples S-1 (8 feet), S-2 (4 feet), etc.; bottom samples B-1 (13 feet), B-2 (14 feet), stockpile samples SP-1, etc. Be sure the sample codes correspond to the site map required in part VI. Do not include analyses from the stockpiled soil.

Sample Code	TPH as Gas ppm	TPH as Diesel ppm	Benzene ppm	Ethylbenzene ppm	Toluene ppm	Xylene Ppm	MTBE ppm	Lead ppm
B-1 (12')	<0.025	==	<0.002	<0.002	<0.002	<0.002	==	==
B-2 (11')	34	==	1.6	0.5	0.5	0.33	==	==
B-3 (9')	==	<4	==	==	==	==	==	==
B-4 (12')	==	<4	==	==	==	==	==	==
_____	_____		_____	_____	_____	_____	_____	_____

NOTE: ATTACH COPIES OF LABORATORY REPORTS AND CHAIN OF CUSTODY FORMS.

See Figure 2 for Sample Locations
 See Appendix B for Laboratory Analytical Report.

PART VI: FIGURES

Attach the following figures to this report:

1. Site location map.
2. Site map(s) drawn to scale illustrating the following:
 - a. Location (or former location) of all present and former tanks, lines, and dispensers;
 - b. Location of other structures (buildings, canopies, etc.);
 - c. Adjacent city, township, or county roadways;
 - d. Final extent and depth of excavation;
 - e. Location of soil screening samples (e.g. R-1), soil analytical samples (e.g., S-1 or B-1), and any soil borings (e.g., SB-1). Also, attach all boring logs.
 - f. North arrow, bar scale and map legend.
 - g. Provide location of any on-site water wells. If on-site water wells exist, please provide well logs and/or construction diagrams.

PART VII: SUMMARY

Briefly summarize evidence indicating whether additional investigation is necessary at the site, as discussed in parts VI and VII of "Excavation of Petroleum Contaminated Soil" (fact sheet #3.6). If no further action is recommended, the MPCA staff will review this report following notification of soil treatment.

A release was confirmed by laboratory analyses of the soil sample collected under the 2,000 gallon gasoline UST. The release was reported to the State Duty Officer on June 11, 1997.

PART VIII: SOIL TREATMENT INFORMATION

- A. Soil treatment method used (thermal, land application, composting, other). If you choose "other" specify treatment method: N/A
- B. Location of treatment site/facility: N/A
- C. Date MPCA approved soil treatment (if thermal treatment was used after May 1, 1991, indicate date that the MPCA permitted thermal treatment facility agreed to accept soil):

N/A

- D. Identify the location of stockpiled contaminated soil: N/A

PART IX: CONSULTANT (OR OTHER) PREPARING THIS REPORT

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 leak site. 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 leak site 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. 7000.0300 (Duty of Candor), and that the responsible person or volunteer may be liable for civil penalties.

Name and Title:	Signature:	Date signed:
<u>Artie Dworak, Project Manager</u>	_____	____/____/____
_____	_____	____/____/____
_____	_____	____/____/____

Company and mailing address: Nova Environmental Services, Inc.
1107 Hazeltine Boulevard, Suite 400
Chaska, Minnesota 55318

Telephone (612) 448-9393

Fax: (612) 448-9572

If additional investigation is not required at the site, please mail this form and all necessary attachments to:

(Project Manager)
Minnesota Pollution Control Agency
Hazardous Waste Division
Tanks and Emergency Response Section
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

If additional investigation is required at the site, include this form as an appendix to the "Remedial Investigation Report Form." **Excavation reports indicating a limited site investigation is necessary will not be reviewed by MPCA staff until the limited site investigation has been completed.**

Upon request, this document can be made available in other formats, including Braille, large print and audio tape. TTY users call 612/282-5332 or 1-800-657-3864 (voice/TTY).

Printed on recycled paper containing at least 10 percent fibers from paper recycled by consumers.

APPENDIX B
LABORATORY ANALYTICAL REPORTS

REPORT OF: CHEMICAL ANALYSIS

PROJECT: BOILER SERVICES INC.

DATE: June 23, 1997

REPORTED TO: Maxim Technologies, Inc.
Attn: Kate Kleiter
662 Cromwell Avenue
St. Paul, MN 55114

LABORATORY NO: 3009713211.G3

Date Received: 6-12-97

Date Sampled: 6-10-97

Authorization: 3009713211.G3

The results of the gasoline analysis are listed in Table 1. The results of the total petroleum hydrocarbons as diesel analysis are listed in Table 2.

TABLE 1
VOLATILE ANALYSIS

Client Sample ID	6,000 Gasoline UST 061097130	2,000 Gas UST 061097430	
Parameter	97-5961	97-5964	<u>PQL</u>
Total Petroleum Hydrocarbons as Gasoline	<25	34,000	25
Benzene	<2.0	1,600	2.0
Toluene	<2.0	500	2.0
Ethylbenzene	<2.0	500	2.0
Xylenes	<2.0	330	2.0
SURROGATE RECOVERY:			
α, α, α -Trifluorotoluene	88%	97%	

All values are in ug/kg. ug/kg is equal to parts per billion (ppb).

PQL - Practical Quantitation Limit

Date Analyzed: 6-12-97

USEPA SW846 Method 8020

Technical Review: SVH



LABORATORY QUALITY CONTROL

ACCURACY DATA

PRECISION DATA

Parameter	Sample #	Matrix Spike Percent Recovery	Matrix Spike Duplicate Percent Recovery	Relative Percent Difference
Benzene	97-5820	91%	86%	4.9%
Toluene	97-5820	98%	93%	5.9%
Ethylbenzene	97-5820	101%	95%	6.4%
Xylene	97-5820	101%	95%	6.4%

TABLE 2
TOTAL PETROLEUM
HYDROCARBONS AS DIESEL ANALYSIS

Sample Identification	Client Sample ID	Total Petroleum Hydrocarbons as Diesel	SURROGATE RECOVERY: Triacotane
97-5962	1,000 Diesel UST, 0610971100	< 4	103%
97-5963	8,000 Diesel UST, 061097230	< 4	99%
PQL		4	

Samples were quantified as #2 diesel fuel.
All values are in mg/kg which is equal to parts per million (ppm).
PQL - Practical Quantitation Limit
Date Extracted: 6-16-97
Date Analyzed: 6-16-97
USGS/California Method

Technical Review: SVH

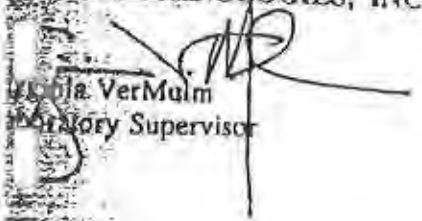
LABORATORY QUALITY CONTROL

ACCURACY DATA

PRECISION DATA

Parameter	Matrix Spike Percent Recovery	Matrix Spike Duplicate Percent Recovery	Relative Percent Difference
PF-D	118%	124%	5.0%
Surrogate Recovery	116%	118%	---

MAXIM TECHNOLOGIES, INC.


Debra VerMalm
Laboratory Supervisor


Dan T. Hanson
Chemistry Manager



CHAIN-OF-CUSTODY RECORD

LAB No. 10809

Boiler Services, INC.
CLIENT NAME
7570 NE Hwy 65
CLIENT ADDRESS (STREET NUMBER, SUITE, ETC.)
FRIDLEY MN 55432
CLIENT ADDRESS (CITY, STATE, ZIP)

Kate
MAXIM CONTACT
MAYER MOBIL
PROJECT NAME
308 Ash Ave, Mayer.
CLIENT P.O. #/PROJECT NO.
3009713211
BILL TO (CO. NAME, ADDRESS)

LAB USE ONLY	
PROJECT	
PRIORITY	
TEMPERATURE OF CONTAINER	
SAMPLE CONDITION	

CLIENT CONTACT/ADDRESS IF DIFFERENT FROM ABOVE: PHONE
Tom Marchessault *[Signature]*
SAMPLED BY: PRINT NAME/SIGNATURE

REPORT TO *Client / Copy to Kate*

MAXIM PROJECT NO.
3009713211 .G3

POSSIBLE HAZARD: YES ___ NO ___ UNKNOWN *[X]* (COMMENT BELOW)
SAMPLE DISPOSAL: RETURN TO CLIENT ___ DISPOSAL BY LAB *[X]*
(ADDITIONAL CHARGES MAY BE ASSESSED)

ANALYSES REQUESTED
<i>THC-G/B/C/X</i>
<i>THC-FO</i>

EXPECTED TURNAROUND TIME
2 weeks.

LAB SAMPLE NO.	ITEM NO.	CLIENT SAMPLE ID.	MATRIX						DATE SAMPLED	TIME SAMPLED	NO. & TYPE OF CONTAINERS
<i>97-5961</i>	1	<i>6000 Gasoline UST</i>	<i>soil</i>	<i>X</i>					<i>6/10/97</i>	<i>1:30 P</i>	<i>4 02 JAR</i>
<i>5962</i>	2	<i>1000 Diesel UST</i>	<i>↓</i>		<i>X</i>				<i>↓</i>	<i>11:00 A</i>	<i>↓</i>
<i>5963</i>	3	<i>8000 Diesel UST</i>	<i>↓</i>		<i>X</i>				<i>↓</i>	<i>2:30 P</i>	<i>↓</i>
<i>5964</i>	4	<i>2000 Gas UST</i>	<i>↓</i>	<i>X</i>					<i>↓</i>	<i>4:30 P</i>	<i>↓</i>
	5										
	6										
	7										
	8										
	9										
	10										

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
<i>[Signature]</i>		<i>Kate Klesler/Max</i>	<i>6/11 11:30 AM</i>			<i>[Signature]</i>	<i>6/12 1995</i>

ADDITIONAL COMMENTS:
@ \$50 / sample.

Interpoll Laboratories, Inc.
4500 Ball Road N.E.
Circle Pines, Minnesota 55014-1819

TEL: (612) 786-6020
FAX: (612) 786-7854

**ANALYTICAL RESULTS
FOR NOVA ENVIRONMENTAL SERVICES, INC.
PROJECT #M7M-049**

Submitted to:

Nova Environmental Services, Inc.
1107 Hazeltine Blvd., Suite 420
Chaska, Minnesota 55318

Attention: Artie Dworak

Respectfully submitted,



David J. Schneider, Manager
Chemistry Department

Laboratory Report #9962
September 10, 1997

PROJECT SUMMARY

The following laboratory report contains the analytical results for three water and two soil samples submitted to Interpoll Laboratories, Inc. (ILI) by Nova Environmental Services, Inc. for Nova's Project #M7M-049. The samples were received on August 28, 1997 according to Interpoll Labs documented sample acceptance procedures and were analyzed for the parameters requested on the Nova Environmental Services Chain-of-Custody forms which accompanied the samples.

<u>Nova Sample Identification</u>	<u>ILI Sample #</u>
GP-1	9962-01
GP-2	9962-02
GP-3 (19-21)	9962-03
GP-4 (19-21)	9962-04
Trip Blank	9962-05

Results for the water samples are reported on an as received basis. Results for the soil sample are reported on a dry weight basis.

Surrogates are reported as percent (%) recovery.

<u>Surrogate</u>	<u>Method</u>	<u>Control Limits</u>
Bromobenzene-PID	SW-846, 8020	80 - 120
Bromobenzene-FID	GRO	80 - 120

DJS/cg

BDL = below detection limit

Invoice Enclosed

Sample Identification: GP-1
Sample Type: Water
Laboratory Log Number: 9962-01

Interpoll Laboratories, Inc.
Laboratory Report #9962
Nova Environmental Services, Inc.

	Target Detection Limit (ug/L)	Analytical Result (ug/L)	Method Blank
EPA Method SW-846, 8020,			
Preparation Date: 9/5/97			
Analysis Date: 9/5/97			
MTBE	0.68	BDL	BDL
Benzene	0.47	6.9	BDL
Toluene	0.50	0.67	BDL
Ethylbenzene	0.33	5.6	BDL
Xylenes	1.4	33	BDL
Wisconsin DNR Method GRO,			
Preparation Date: 9/5/97			
Analysis Date: 9/5/97			
Gasoline range organics	17	380	BDL
Method 8020/GRO Surrogates:			
Bromobenzene (PID)		102%	96.2%
Bromobenzene (FID)		97.0%	95.7%

Sample Identification: GP-2
Sample Type: Water
Laboratory Log Number: 9962-02

Interpoll Laboratories, Inc.
Laboratory Report #9962
Nova Environmental Services, Inc.

	<u>Target Detection Limit (ug/L)</u>	<u>Analytical Result (ug/L)</u>	<u>Method Blank</u>
EPA Method SW-846, 8020,			
Preparation Date: 9/4/97			
Analysis Date: 9/4/97			
MTBE	0.68	BDL	BDL
Benzene	0.47	BDL	BDL
Toluene	0.50	0.50	BDL
Ethylbenzene	0.33	BDL	BDL
Xylenes	1.4	BDL	BDL
Wisconsin DNR Method GRO,			
Preparation Date: 9/4/97			
Analysis Date: 9/4/97			
Gasoline range organics	17	BDL	BDL
Method 8020/GRO Surrogates:			
Bromobenzene (PID)		96.6%	96.2%
Bromobenzene (FID)		94.6%	95.7%

Sample Identification: GP-3 (19-21)
Sample Type: Soil
Laboratory Log Number: 9962-03

Interpoll Laboratories, Inc.
 Laboratory Report #9962
 Nova Environmental Services, Inc.

	Achieved Detection Limit (mg/Kg)	Analytical Result (mg/Kg)	Method Blank
EPA Method 160.3,			
Analysis Date: 8/29/97			
Total solids, %	0.1	84.9	
EPA Method SW-846, 8020,			
Preparation Date: 9/8/97			
Analysis Date: 9/9/97			
MTBE	0.018	BDL	BDL
Benzene	0.010	BDL	BDL
Toluene	0.0095	BDL	BDL
Ethylbenzene	0.020	BDL	BDL
Xylenes	0.069	BDL	BDL
Wisconsin DNR Method GRO,			
Preparation Date: 9/8/97			
Analysis Date: 9/9/97			
Gasoline range organics	1.0	BDL	BDL
Method 8020/GRO Surrogates:			
Bromobenzene (PID)		90.5%	89.6%
Bromobenzene (FID)		93.3%	90.1%

Sample Identification: GP-4 (19-21)
Sample Type: Soil
Laboratory Log Number: 9962-04

Interpoll Laboratories, Inc.
 Laboratory Report #9962
 Nova Environmental Services, Inc.

	Achieved Detection Limit (mg/Kg)	Analytical Result (mg/Kg)	Method Blank
EPA Method 160.3,			
Analysis Date: 8/29/97			
Total solids, %	0.1	85.3	
EPA Method SW-846, 8020,			
Preparation Date: 9/8/97			
Analysis Date: 9/9/97			
MTBE	0.018	BDL	BDL
Benzene	0.010	BDL	BDL
Toluene	0.0095	BDL	BDL
Ethylbenzene	0.020	BDL	BDL
Xylenes	0.069	BDL	BDL
Wisconsin DNR Method GRO,			
Preparation Date: 9/8/97			
Analysis Date: 9/9/97			
Gasoline range organics	1.0	BDL	BDL
Method 8020/GRO Surrogates:			
Bromobenzene (PID)		92.4%	89.6%
Bromobenzene (FID)		92.8%	90.1%

Sample Identification: Trip Blank
Sample Type: Water
Laboratory Log Number: 9962-05

Interpoll Laboratories, Inc.
Laboratory Report #9962
Nova Environmental Services, Inc.

	<u>Target Detection Limit (ug/L)</u>	<u>Analytical Result (ug/L)</u>	<u>Method Blank</u>
EPA Method SW-846, 8020,			
Preparation Date: 9/5/97			
Analysis Date: 9/5/97			
MTBE	0.68	BDL	BDL
Benzene	0.47	BDL	BDL
Toluene	0.50	BDL	BDL
Ethylbenzene	0.33	BDL	BDL
Xylenes	1.4	BDL	BDL
Wisconsin DNR Method GRO,			
Preparation Date: 9/5/97			
Analysis Date: 9/5/97			
Gasoline range organics	17	BDL	BDL
Method 8020/GRO Surrogates:			
Bromobenzene (PID)		98.2%	96.2%
Bromobenzene (FID)		96.4%	95.7%



Minneapolis Office
 1107 Hazeltine Blvd. Ste. 420
 Chaska, MN 55318
 (612) 448-9393
 Fax # 612-448-9572

Chain of Custody Record

Chicago Office
 O'Hare Atrium Office Plaza, Ste 170
 2860 River Road
 Des Plaines, IL 60018
 (312) 803-4510
 Fax # 312-803-0780

Name of Project: *Mayer Oil Company - ISA/RICAD* Project Number: *M7M-049* Project Manager: *Artie Desorak*

Laboratory: *Interpoll Laboratories, Inc*
4500 Ball Road N.E.
Circle Pines, MN 55014-1819 Special Instructions: _____

Sample No.	Date	No. & Vol. of Containers	Sample Location	Requested Analysis			Sample Description / Remarks
				GRC	BTEX	MTBE	
	<i>8-27-97</i>	<i>3-40ml</i>	<i>GP-1</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>Water 9962-01</i>
		<i>2-40ml</i>	<i>GP-2</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>Water -02</i>
		<i>1-2 oz.</i>	<i>GP-3 (19-21)</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>Soil -03</i>
		<i>1-2 oz.</i>	<i>GP-4 (19-21)</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>Soil -04</i>
	<i>↓</i>	<i>2-40ml</i>	<i>Trip Blank</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>Water -05</i>

Sampler (Signature) <i>Artie Desorak</i>	Relinquished By <i>Artie Desorak</i>	Affiliation <i>NOVA</i>	Date <i>8-28-97</i>	Time <i>10:05</i>	Received By <i>Samir R.R.</i>	Affiliation <i>RR</i>	Date <i>8/28</i>	Time <i>10:40</i>
Affiliation <i>NOVA</i>	Relinquished By <i>Courten R.R.</i>	Affiliation <i>RR</i>	Date <i>8-28-97</i>	Time <i>12:30</i>	Received By <i>Styler</i>	Affiliation <i>ILI</i>	Date <i>8/28</i>	Time <i>971230</i>
Date <i>8-28-97</i>	Time <i>←</i>							

APPENDIX C
METHODS AND PROCEDURES

METHODS AND PROCEDURES

SOIL SAMPLING

Soil samples will be obtained using a truck mounted, hydraulically driven Geoprobe sampler. Soil samples will be collected in a 1 inch diameter by 24 inch long sampling probe. The leading end of the soil sampling probe is sealed with a piston while it is pushed or driven to the desired sampling depth. A piston stop pin at the trailing end of the sampling probe is removed by means of extension rods inserted down the inside of the probe rods after the sampler has been driven to the desired sampling depth. The sealing piston is then driven into the sampling probe as it is displaced by soil while the probe is being driven through the sampling depth interval. Soil samples can be collected at specific depth intervals or continuously. Soil samples are collected in plastic liners inside the sampling probe. The liners can then be capped and sent to the laboratory or soil can be removed from the liners and placed in appropriate containers.

GROUND WATER SAMPLING

Ground water samples can be collected using various technologies with the Geoprobe. The most effective method will be used and will depend on site specific factors such as site geology and depth to ground water. Methods used will consist of one or more of the following;

Slotted probe point

A 1 inch diameter by 36 inch long steel slotted probe point is used for this method. The slotted probe point is driven into the water table using hollow probe extensions. Ground water enters the probe point through the slots. An inner tubing or smaller diameter bailer is inserted down the inside diameter of the probe rods to collect a water sample. This method of water sampling works best in sandy soils.

Screen point sampler

The screen point sampler consists of a 0.5 inch diameter by 19 inch long stainless steel screen encased in a perforated stainless steel sleeve. While the screen point sampler is being driven to the desired sampling depth, it is kept sealed by "O" ring connections at the leading and trailing ends of the sampling assembly. The screen section remains totally enclosed in a sheath until it is pushed out into the formation at the desired depth. When the desired sampling depth is reached, the sampler is pulled up 2 feet which disengages the o ring sealed expendable drive point and created an open borehole from which to sample. The screen section is then pushed out into the borehole and water enters the sampler. Water samples can be bailed from the rod bore using tubing or a small bailer.

ORGANIC VAPOR MONITORING

A portion of each sample is field screened for the presence of organic vapors. The field screening procedure consists of placing soil into a quart size self sealing plastic bag, agitating the sample before and after a headspace development period of approximately 10 minutes. After the headspace development, a photoionization detector (PID) probe is inserted into the plastic bag. The maximum needle deflection is recorded as the result. Field screening results are recorded in units of parts per million (ppm) total organic vapors. An HNU P-101 PID equipped with a 10.2 eV lamp is used to field screen soil samples. The PID is calibrated to read total organic vapors referenced to benzene.

APPENDIX D
BORING LOGS

BORING LOG

PROJECT: Mayer Oil Company - ISA 308 Ash Avenue Mayer, Minnesota			DATE: 8/27/97		BORING: GP-1	
Nova Project No.: M7M-049			SURFACE ELEVATION:		SCALE: 1" = 6'	
SAMPLE NO.	DEPTH FEET	ASTM	DESCRIPTION - ASTM D2488	PID ppm	NOTES	
1	5	SW	SILTY SAND, brownish-gray, fine to coarse, wet.	9		
2	10	CL	SANDY CLAY, yellow/brown, some gravel moist, mottling.	2		
3	15	CL	SANDY CLAY, yellow/brown, some gravel moist, mottling.	ND		
4	20	CL	SANDY CLAY, yellow/brown, some gravel moist, mottling. Silty clay, dark gray, trace gravel, moist.	ND		
5	25	SW	SILTY SAND, brown, fine to coarse, WET, some gravel.	ND		
6	30	CL	SILTY SANDY CLAY, dark gray, trace gravel, moist.	ND		
	35		END OF BORING AT 31 FEET.			
	40					

BORING LOG

PROJECT: Mayer Oil Company - ISA 308 Ash Avenue Mayer, Minnesota Nova Project No.: M7M-049		DATE: 8/27/97		BORING: GP-2	
		SURFACE ELEVATION:		SCALE: 1" = 6'	
SAMPLE NO.	DEPTH FEET	ASTM	DESCRIPTION - ASTM D2488	PID ppm	NOTES
1	5	SW	SILTY SAND, brown, fine to medium, trace gravel, some thin layer of clay	ND	
2	10	CL	SANDY CLAY, yellow/brown, trace of gravel, moist.	9	
3	15	CL	SANDY CLAY, yellow/brown, trace of gravel, moist.	ND	
4	20	SP	SAND, brown, fine to medium, wet.	ND	
	25		END OF BORING AT 21 FEET.		
	30				
	35				
	40				

BORING LOG

PROJECT: Mayer Oil Company - ISA 308 Ash Avenue Mayer, Minnesota			DATE: 8/27/97	BORING: GP-3	
Nova Project No.: M7M-049			SURFACE ELEVATION:		SCALE: 1" = 6'
SAMPLE NO.	DEPTH FEET	ASTM	DESCRIPTION - ASTM D2488	PID ppm	NOTES
1	5	SW	SILTY SAND, brown, fine to medium, dry some thin lenses of sandy clay.	9	Slight odor
2	10	CL	SANDY CLAY, yellow/brown, moist, gray mottling.	ND	
3	15	CL	SANDY CLAY, yellow/brown, moist, gray mottling.	ND	
4	20	CL	SANDY CLAY, dark brown to gray, moist gray mottling.	3	
	25		END OF BORING AT 21 FEET.		
	30				
	35				
	40				

BORING LOG

PROJECT: Mayer Oil Company - ISA 308 Ash Avenue Mayer, Minnesota Nova Project No.: M7M-049	DATE: 8/27/97 SURFACE ELEVATION:	BORING: GP-4 SCALE: 1" = 6'
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SAMPLE NO.	DEPTH FEET	ASTM	DESCRIPTION - ASTM D2488	PID ppm	NOTES
1	5	ML	SANDY SILT, tan, few gravel, dry.	7	
2	10		SANDY CLAY, yellow/brown, trace gravel, moist, stiff, mottling.	ND	
3	15		SANDY CLAY, yellow/brown, trace gravel, moist, stiff, mottling.	ND	
4	20		SANDY CLAY, dark gray, trace gravel, moist.	ND	Lab sample
	25		END OF BORING AT 21 FEET.		
	30				
	35				
	40				

APPENDIX E
GROUND WATER RECEPTOR SURVEY WELL LOG

