



**LIMITED SITE INVESTIGATION REPORT**

**COOPERATIVE SERVICES  
HIGHWAY 75  
HUMBOLDT, MINNESOTA**

**MPCA PETROLEUM RELEASE #8669**

*Rec'd  
8-27-98*

**PREPARED FOR:**

**HARLEN IVERSON, MANAGER  
COOPERATIVE SERVICES  
PO BOX 549  
HALLOCK, MINNESOTA 56728**

**PREPARED BY :**

***GREAT PLAINS ENVIRONMENTAL*  
1301 40<sup>TH</sup> STREET NW  
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**AUGUST 20, 1998**

Box 2706  
1301 40th Street NW  
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701/277-1612



**Tanks and Emergency Response Section**  
**Minnesota Pollution Control Agency**

## Limited Site Investigation Report Form

Fact Sheet #3.24

April 1996

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.

Refer to MPCA fact sheet #3.19 "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: LEAK0008669

Date: Reported on July 2, 1997

Responsible Party: Cooperative Services  
Facility Name: Cooperative Services  
Facility Address: Highway 75  
City: Humboldt  
County: Kitson

R.P. Phone #: (218) 843-2695  
Address: PO Box 549  
City: Hallock, MN  
Zip Code: 56728  
R.P. Contact: Mr. Harlen Iverson

Location of site: Lat: W 97 degrees 06 minutes

Long: N 48 degrees 55 minutes

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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 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 1000 feet of the site.

The Cooperative Services Facility is located along US Highway 75 in Humboldt, MN. (Figures #1 & #2). The topography of the project site is generally flat, and is located near the residential area in Humboldt. No surface water is located within 1,000 feet of the release site. No existing water supply wells were discovered in the City of Humboldt. The potable water supply is pumped into Humboldt from wells approximately 30 miles southeast.

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

Tank #	UST or AST	Capacity (gallons)	Contents	Age (yrs)	Status*	Condition
001	UST	1,000	Gasoline	>20	Removed	Poor; Severe Pitting & Small Holes
002	UST	1,000	Diesel	>20	Removed	Fair; Minor Surface Pitting
003	UST	3,000	Compartment	1996	Existing	Good

Notes: A copy of the Excavation Report for release site has been included as Appendix A.

(Table #1)

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 product and vent lines were removed during the excavation of the two USTs. *Figure #3 and #4* illustrate the current and previous utilization of the release site.

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

During the Limited Site Investigation, Great Plains Environmental was informed of a previously reported release site (MPCA Leak #: 5361) across Highway 75 to the west of the current release site. MPCA Leak # 5361 remains open due to significant free product remaining in Monitoring Well #2. However, Monitoring Well #3 is the nearest well to the current release site (Leak #: 8669) and is illustrated in *Figure #5-#7*.

According to the Remedial Investigation report for Leak # 5361, minimal levels of Benzene and Toluene were discovered in Monitoring Well #3 during 3 of the 12 sampling events. However, the levels discovered were below the Health Risk Limits (HRLs). The last two sampling events did not detect any petroleum constituents in Monitoring Well #3. Thus Monitoring Well #3 has not been impacted by the current release site (Leak #: 8669). The last sampling event conducted for Leak # 5361 was conducted in December of 1995.

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

Great Plains Environmental suggests the primary source of the petroleum release was associated with the obvious holes discovered in the bottom quadrant of Tank #1.

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

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:

NA  
NA

3.2 Indicate soil treatment type:

land treatment  
 thermal treatment  
 composting/biopiling  
 other ( )

Name and location of treatment facility:

NA

## 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., UST basins, AST 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*
- 4.4** Indicate the drilling method: Geoprobe Borings

### Jar Headspace Results - Table #2

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

**OL/OH = Organic soil**  
**CL = Lean clays, lean clays w/sand, lean clays w/gravel, sandy lean clays**  
**CH = Fat clays, fat clays w/sand, fat clays w/gravel, sandy fat clays**  
**SL = Silty sands**  
**ML = Silt, silt with sand, silty with gravel, sandy silt, sandy silt with gravel**

ASTM soil classification	Depth (ft)	Geoprobe Borings							
		1	2	3	4	5	6	7	8
OL/OH	0-2.5	0	0	0	0	0	0	0	0
CL	2.5-5	120	19	0	184	0	0	420	0
CL	5-7.5	345	62	0	530	0	0	400	0
CL	7.5-10	417	739	0	450	0	0	420	0
CL	10 - 12.5'	410	20	0	230	0	0	415	0
CL	12.5 - 15'	300	0	0	60	0	44	0	0
CL	15- 17.5'	350	0	0	0	0	45	0	0
CH	17.5- 20'	0	0	0	0	NA	NA	0	NA
CH	20-25'	0	NA	NA	NA	NA	NA	0	NA

*Notes:* The jar headspace results, listed above, were screened with an H-Nu HW 101 photoionization detector (PID) which was equipped with a 10.2 eV lamp. The boring log sheets have been included in *Appendix D*.

(Table #2)

## Laboratory Results - Soils

Indicate the laboratory analytical results for soil samples in parts per million (mg/kg).

Well/Boring, Depth(ft)	Date Analyzed	Benzene	Toluene	Ethyl benzene	Xylene	GRO	DRO
GP #1 (7.5')	12/27/97	20	170	<0.1	220	18,000	1,500
GP #2 (7.5')	12/27/97	0.16	6.2	0.38	8.6	330	110
GP #3 (12')	12/27/97	<0.10	<0.10	<0.10	<0.10	<10	<3.0
GP #4 (5')	12/27/97	51	260	72	430	3,200	130
GP #5 (7.5')	12/27/97	<0.10	<0.10	<0.10	<0.10	<10	<3.0
GP #6 (7.5')	12/27/97	<0.10	<0.10	<0.10	<0.10	<10	<3.0
GP #7 (7.5')	12/27/97	200	78	<0.10	250	11,000	320
GP #8 (7.5')	12/27/97	<0.10	<0.10	<0.10	<0.10	<10	<3.0

Notes: A copy of the Northeast Technical Laboratory results are included in *Appendix B*.

(Table #3)

- 4.5 If any non-petroleum compounds were detected list them below and identify possible sources of these compounds.  
No non-petroleum compounds were detected.

- 4.6 Describe the vertical and horizontal extent and magnitude of soil contamination.  
The estimated horizontal extent of the soil and groundwater contamination extends approximately 75 feet west to east and 70 feet north to south (*Figure #6*). The vertical extent of the petroleum contamination ranges in thickness from 7.5 to 10 feet (*Figure #7*). The average depth of the petroleum contamination is estimated at 7.5 feet with a maximum depth extending to approximately 15 feet below grade.

## Section 5: Aquifer Characteristics/Ground Water Contamination Assessment

- 5.1 Indicate the hydraulic conductivity and the method used to determine it. Attach all supporting information for the determination in the Methodologies appendix:

Permeability test  
Hazen approximation from grain-size distribution  
1.0 x 10(-9) to 1.0 x 10(-6) cm/sec Estimated Hydraulic Conductivity according to C. W. Fetter - Applied Hydrogeology - 2<sup>nd</sup> Edition

Since the Hazen approximation from grain size distribution only applies to sandy soils with a grain size between 0.1 and 3.0 millimeters, the hydraulic conductivity was estimated from data obtained from C. W. Fetter - Applied Hydrogeology - 2<sup>nd</sup> Edition.

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 : **No groundwater was encountered at the release site.**

less than 10 feet  
between 10 and 20 feet  
greater than 20 feet

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

**The underlying geologic layers, in general, are silty clays from 2.5 to 25 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  $1 \times 10^{-2}$  cm/sec and a minimum thickness of 10 feet.
- The water bearing unit has a hydraulic conductivity between  $1 \times 10^{-4}$  cm/sec and  $1 \times 10^{-2}$  cm/sec and a minimum thickness of 20 feet.
- The water bearing unit has a hydraulic conductivity less than  $1 \times 10^{-4}$  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.

**According to Mr. Brad Hemmes, City Clerk, the city of Humboldt is supplied by a rural water system. The potable water is piped in from wells approximately 30 miles southeast of Humboldt. According to Mr. Hemmes, no wells currently exist within the city of Humboldt, because of the high salt content in the water.**

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

**No, an aquifer was not discovered during the Limited Site Investigation.**



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

	GEOPROBE BORINGS							
Water level (ft)	1	2	3	4	5	6	7	8
	10'*	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes: \* = Perched water within UST BASIN  
(Table #4)

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.

Soil Boring Groundwater Laboratory Results -

No groundwater was encountered during the Limited Site Investigation, except for Geoprobe #1 which was perched water within the UST Basin.

Other Notable Contaminants -

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).

No other contaminants other than petroleum related compounds were discovered during the Limited Site Investigation.

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

Does not apply.

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?  
  
Groundwater was not encountered during the Limited Site Investigation.

**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.

**During the Limited Site Investigation, Great Plains Environmental did not encounter any groundwater at the release site. There was no evidence of a seasonal high groundwater table.**

**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**

**According to the County Well Index and Mr. Brad Hemmes, City Clerk, there are no public or private wells in the area of Humboldt. In my professional opinion, there is no risk to a resource aquifer, because there is not a resource aquifer in the area of Humbolt.**

## Section 6: Well Receptor Information/Assessment

Include in the appendices of this report:

- 1) Well logs
- 2) A Map showing ½ mile radius, 500 foot radius, water supply wells, other potential petroleum sources, and addresses for properties within 500 feet.

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 :

According to Mr. Brad Hemmes, Humboldt City Clerk, and the County Well Index information, there are no water supply wells located within the city of Humboldt. However, Great Plains Environmental did include County Well Information and a map for three test wells which were capped soon after drilling (*Appendix E*). According to the County Well Index and Mr. Hemmes, the three wells were capped after being drilled.

Mr. Brad Hemmes also informed Great Plains Environmental, the drinking water supply is piped in from wells approximately 30 miles southeast of Humboldt.

6.1 Is municipal water available in the area?

YES  
NO

There are no municipal wells in the City of Humboldt. Humboldt is supplied by a rural water system which has wells approximately 30 miles away.

6.2 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

6.3 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.)

Great Plains Environmental suggests the threat to potential groundwater receptors is minimal. This decision is based on the following parameters :

- The absence of water supply wells within one mile of the release site.
- The low hydraulic conductivity values associated with the native silty clays.

6.4 Are there any plans for groundwater development in the impacted aquifer within one half mile of the site, or one mile down gradient of the site if the aquifer is fractured? Please give the name, title and phone number of the person that was contacted for this information. YES  
NO

Name : Mr. Brad Hemmes  
Title : City Clerk  
Phone : (218) 843-2652

According to Mr. Hemmes, the City of Humboldt has no future plans to install or develop any water supply wells within the City of Humboldt.

### Section 7: Surface Water Risk Assessment

7.1 Are there any surface waters or wetlands located within ¼ mile of the site? YES  
NO  
If YES, indicate its name:

7.2 If surface water is present down gradient of the site, is there a clean down gradient soil boring or monitoring well located between the site and the surface water? YES  
NO

### Section 8 : Vapor Risk Assessment/Survey

8.1 Is there a history of vapor impacts in the vicinity of the site ? YES  
NO  
If YES, describe:

8.2 Is there any indication that free product or highly contaminated groundwater may be traveling off site within the utility corridors? If YES, have they been investigated with borings or push probes? YES  
NO

8.3 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.

Great Plains Environmental suggests the risk associated with vapor accumulation/migration within the vicinity of the site is minimal. This decision is based on the following parameters :

- The electrical line and the telephone line are the only utilities in the area of the contaminant plume. However, both utility corridors are above the level of the contaminant plume and are back filled with clay. There is a minimal chance for vapor migration through these utility corridors (Figure #7).

- The city of Humboldt does not have a sanitary or storm sewer system.
- The depth of the local utility lines have been detailed below :
  - Electrical line - buried 2 feet in clay
  - Telephone - buried 3 feet in original soil

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.

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

Notes :

8.4 Describe and interpret the results of the vapor survey.

The only utility lines in the vicinity are the telephone and electrical lines which are both above the contaminant plume. The locations of the utility lines are illustrated in *Figure #3-#7*.

The results of the current vapor survey did not indicate a possible threat to the local utility lines or structures located within a 500 radius of the release site.

## Section 9 : Discussion

9.1 Discuss the risks associated with the remaining soil contamination?

Although the soil contamination still remains onsite, Great Plains Environmental suggests the current risks associated with the release is minimal. This decision is based on the following:

- The utility corridors have not been impacted by the petroleum impacted soils.
- The absence of a resource aquifer in the area of Humboldt.
- The absence of water supply wells in the city of Humboldt.
- The minimal hydraulic conductivity values associated with the silty clays.

9.2 Discuss the risks associated with the impacted ground water?

Great Plains Environmental did not encounter any groundwater at the release site.

9.3 Discuss other concerns not mentioned above:

Any development of the property within the area of impacted soil may pose as a risk for vapor accumulation in buildings/structures.

## Section 10 : 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.

**According to MPCCA guidelines, Great Plains Environmental's recommendation for site closure is reinforced by the following information :**

- The absence of water supply wells within the city of Humboldt.
- The absence of a resource aquifer in the area of Humboldt.
- The minimal risk associated with the local utility lines and basements located within the general vicinity of the contaminant plume.
- The minimal hydraulic conductivity values associated with the silty clays.

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

**Not recommended**

If active cleanup is proposed then MPCCA staff will review this remedial investigation 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.

**No active cleanup recommended for this petroleum release site.**

**Section 11 : 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:

Rex Honeyman  
Environmental Geologist

Signature:



Date signed:

8/20/98

Company and mailing address:

**Great Plains Environmental**  
**1301 40<sup>TH</sup> Street NW**  
**Fargo, ND 58102**

Phone:

(701) 277-1612

Fax:

(701) 281-9770

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 Greater Minnesota 1-800-657-3864.

## Section 12 : Required Figures

Indicate attached figures :

- Figure #1 & #2** Release site location diagrams
- Figure #3** 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.
- Figures #3, #4, #5, & #6:** 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 #7:** Geologic Cross Section ( A to A' )
- Figure #3, #4, #5, & #6:** Utility Site Plot Plan

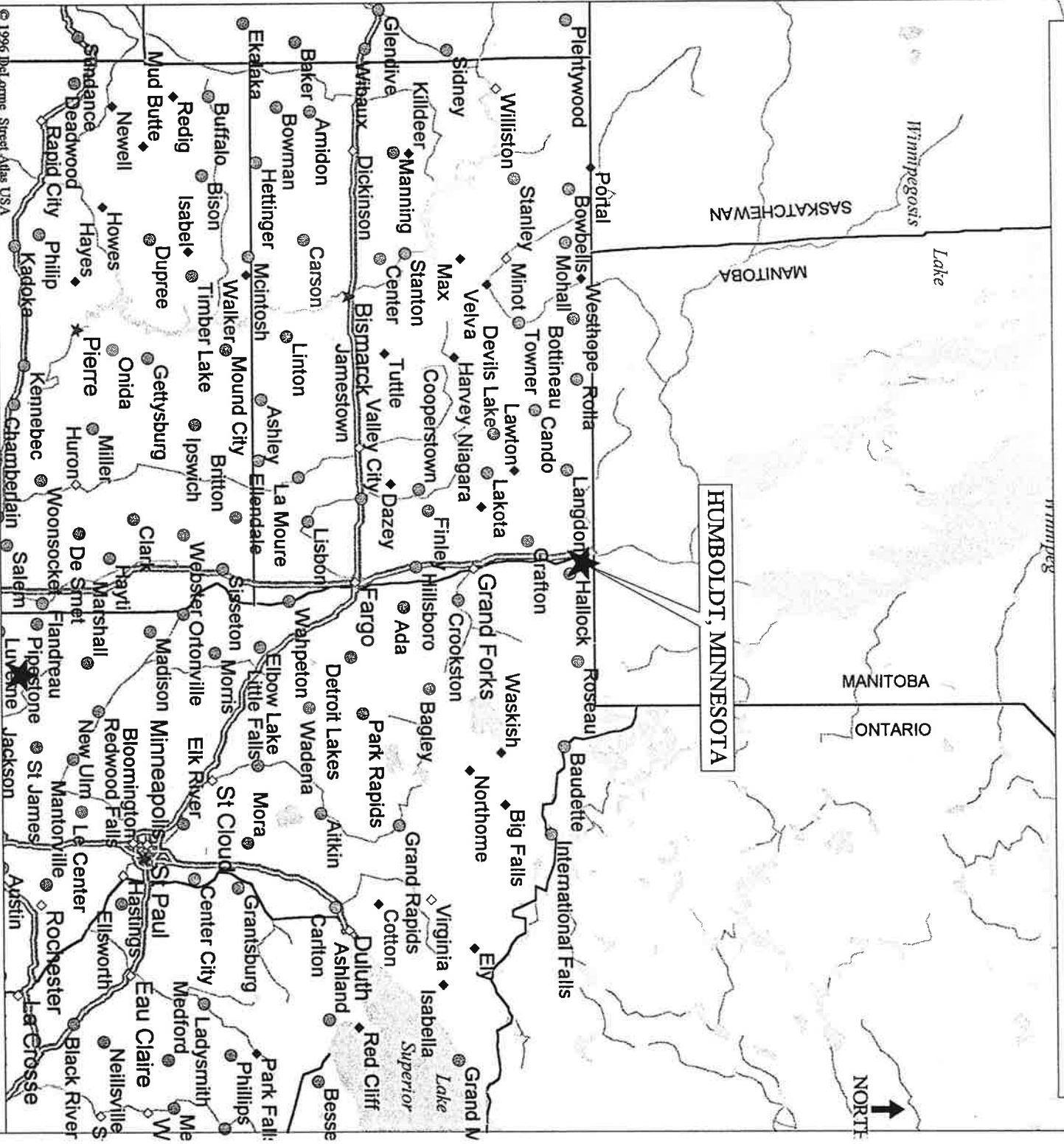
## Section 13 : Appendices

Indicate attached appendices.

- Appendix A** Excavation Report
- 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** Soil Boring Log Sheets
- Appendix E** Ground Water Receptor Survey Information



# CITY LOCATION



Mag 6 00

Thu Aug 06 11:15 1998

Scale 1:5,600,000 (at center)

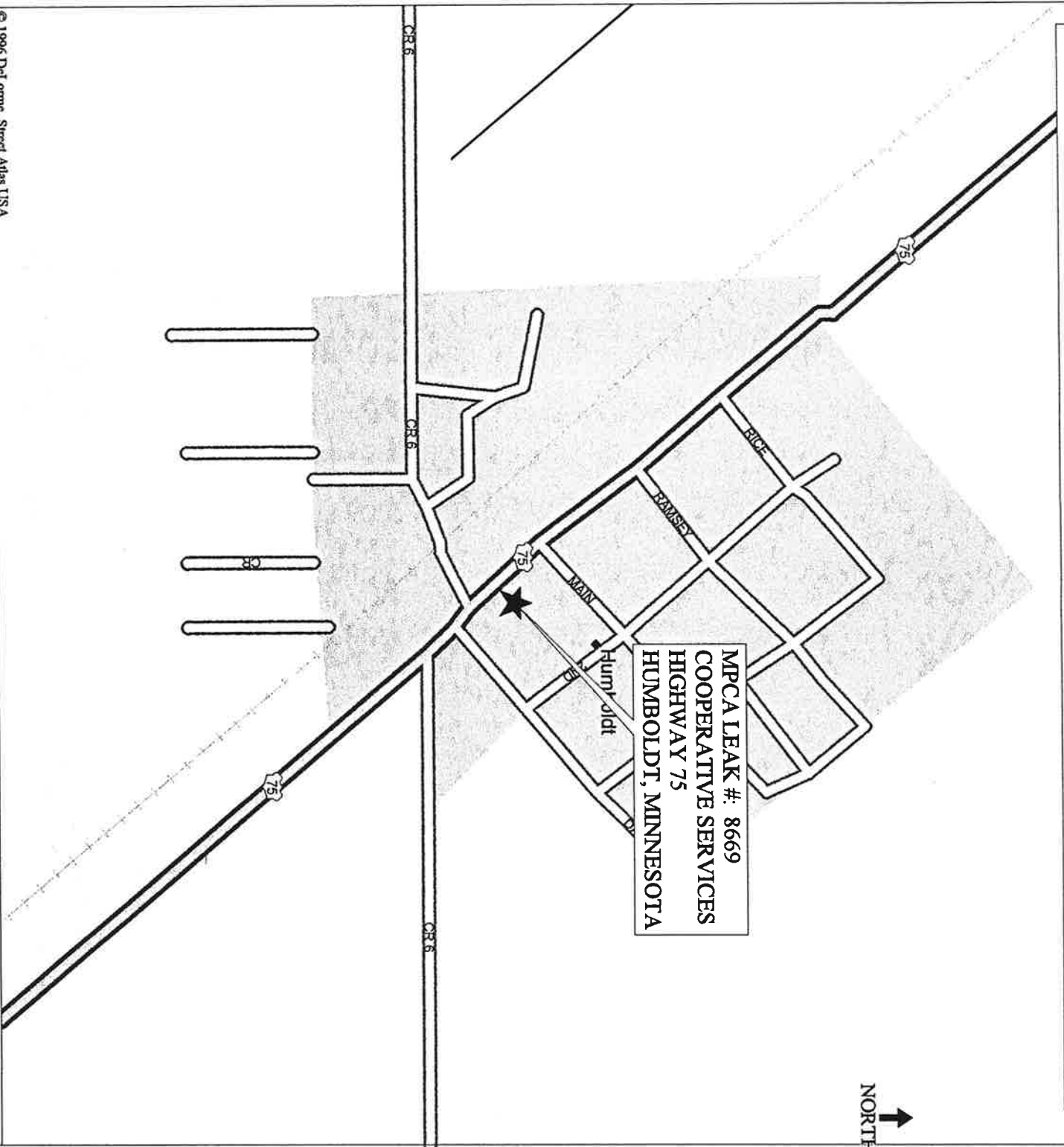
100 Miles

200 KM

- Interstate/Limited Access
- Land
- Small Town
- County Seat
- State Capital
- Water
- Large City
- City
- River/Canal
- State Boundary
- National Boundary

# SITE LOCATION

MPCA LEAK #: 8669  
COOPERATIVE SERVICES  
HIGHWAY 75  
HUMBOLDT, MINNESOTA



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Mag 16,00

Thu Aug 06 11:20 1998

Scale 1:5,469 (at center)

500 Feet

200 Meters

-  Local Road
-  Major Connector
-  US Highway
-  Railroad
-  Small Town
-  Airfield
-  Population Center



**MPCA EXCAVATION REPORT  
COOPERATIVE SERVICES  
MPCA LEAK #8669**

**HIGHWAY #75  
HUMBOLT, MN 56731**

**PREPARED FOR :**

**MR. HARLEN IVERSON, MANAGER  
COOPERATIVE SERVICES  
PO BOX 549  
HALLOCK, MN 56728**

**PREPARED BY :**

**GREAT PLAINS ENVIRONMENTAL  
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FARGO, ND 58102**

**AUGUST 28, 1996**

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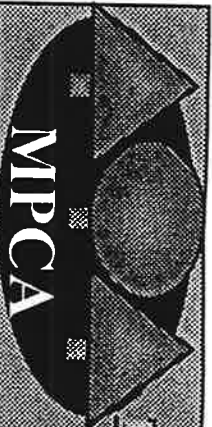
BACKGROUND INFORMATION	PART I
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### APPENDICES

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Tanks and Emergency Response Section  
Minnesota Pollution Control Agency

## EXCAVATION REPORT WORKSHEET FOR PETROLEUM RELEASE SITES

Fact Sheet #3.7

April 1996

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 : **Cooperative Services**
- Street: **PO Box 549**  
City, Zip: **Humbolt, MN 56731**  
County: **Kittson**
- MPCA Site ID#: **LEAK#8669**
- B. Tank Owner/Operator:  
**Mr. Harlen Iverson**
- Mailing Address:  
Street/Box: **PO Box #549**  
City, Zip: **Hallock, MN 56728**  
Telephone: **(218) 843-2695**
- C. Excavating Contractor:  
**O'Day Equipment**
- Contact: **Mr. Glenn Little**  
Telephone: **(701) 282-9260**
- Tank Contractor Certification Number:  
**#0023**
- D. Consultant:  
**Great Plains Environmental**
- Contact: **Mr. Rex Honeyman**  
Street/Box: **1301 40<sup>th</sup> Street NW**  
City, Zip: **Fargo, ND 58102**  
Telephone: **(701) 277-1612**
- E. Others on-site during site work (e.g., fire marshal, local officials, MPCA staff, etc.):  
**None**

Note: If person other than tank owner and/or operator is conducting the cleanup, provide name, address, and relationship to site on a separate attached sheet.

Cooperative Services is conducting the cleanup.

**PART II: DATES**

A. Date release reported to MPCA :

July 2, 1997

B. Dates site work performed (tanks removed, soil excavation, soil borings, etc.):

Work Performed

Date

Removed one 1,000 gallon Gasoline UST  
Removed one 1,000 gallon Diesel UST

July 1, 1997  
July 1, 1997

**PART III: SITE AND RELEASE INFORMATION**

A. Describe the land use and pertinent geographic features within 1000 feet of the site.  
(i.e. residential property, industrial, wetlands, etc.)

The gasoline release site is located along Minnesota Highway #75 in the town of Humbolt, MN (*Figure #1*). The site is bordered on the north and east by residential property and commercial property on the south and west. The topography is relatively flat with a seasonally high groundwater table.

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
001	UST	1,000	Gas	>20	Removed	Poor; Severe Pitting & Small Holes
002	UST	1,000	Diesel	>20	Removed	Fair; Minor Surface Pitting
003	UST	3,000	Compartment	New	Installed 1997	Good

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

A diagram detailing the location of each UST has been plotted on the site plot plan included as *Figure #2*

(Table #1)

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

The product and vent lines appeared to be in good condition with no obvious signs of leaking. The product lines were capped off and left in place. The vent lines were disconnected and removed.

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

The suspected source of the gasoline release was directly associated to the holes located along the bottom quadrant of the UST. The suspected source of the diesel release could have been associated with either overflowing of the UST or possibly leaking product lines.

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. Rural water which is supplied from Lake Bronson

#### PART IV: EXCAVATION INFORMATION

A. Dimensions of excavation: Length 16' Width 14' Depth 7' (Average depth)

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):  
According to MPCA guidelines, a Limited Site Investigation has to be performed due to the contact between the contaminated soil and the groundwater. Thus, Great Plains Environmental did not delegate the removal of any contaminated soil during the excavation of the USTs.

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?  
One new 3,000 gallon compartment UST was installed at the subject site, however, the new UST was installed in a new UST basin which was in a different location (Figure #2). Therefore, Great Plains Environmental did not delegate the removal of any contaminated soil in order to facilitate the installation of the new UST.

F. Was ground water encountered or was there evidence of a seasonally high ground water table? (yes/no) At what depth?

Yes, groundwater was encountered during the excavation of the USTs along the bottom of the basin which was approximately 7 feet. Based on the site investigation and the mottling of the soil, Great Plains Environmental suggests the depth to groundwater fluctuates between 4 to 8 feet.

G. If ground water was not encountered during the excavation, what is the expected depth of ground water?

**Great Plains Environmental suggests the petroleum release site has a seasonally high groundwater table which is 4 to 8 feet below grade.**

H. If a soil boring was required (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.

**No soil borings were installed during the removal of the USTs, however, soil borings and/or Geoprobos will be required during the Limited Site Investigation (LSI) in order to define the horizontal and vertical extent of the petroleum contamination.**

I. If no soil boring was required, explain.

**No soil borings were installed during the removal of the USTs, however, soil borings and/or Geoprobos will be required during the Limited Site Investigation (LSI) in order to define the horizontal and vertical extent of the petroleum contamination.**

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.

**During the excavation of the USTs, Great Plains Environmental did discover contaminated soil in contact with the groundwater and a product sheen on the sidewalls and bottom of the excavation. However, no measurable free product was encountered during the excavation of the USTs.**

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

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

**A new 3,000 gallon compartment UST was installed on the site, however, the new UST was installed in a different basin/location.**

**The city of Humbolt utilizes a rural water supply which is transported from Lake Bronson, Minnesota**



**PART V: SAMPLING INFORMATION**

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

Soil samples were screened on site utilizing jar headspace procedures according to MPCA guidelines. The soil samples were screened with an H-Nu HW 101 photoionization detector (PID), which was equipped with a 10.2 eV lamp and calibrated to 100 ppm Isobutylene.

B. List all soil vapor headspace analysis results. Indicate all sampling locations using sample codes (with sampling depths in parentheses) :

R = Removed soil sample  
 S = Soil sample, not removed  
 WS = West sidewall  
 ES = East sidewall  
 SS = South sidewall  
 NS = North sidewall  
 CS = Contaminated sample  
 B = Bottom sample

Sample Code	Soil Type	Reading <u>ppm</u>	Sample Code	Soil Type	Reading <u>ppm</u>
S-1 (3')	Brn sand	450	S-6 (3')	Brn sand	600
S-1 (6')	Brn sand	400	S-6 (6')	Brn sand	475
S-1 (8')	Brn clays	310	S-6 (8')	Brn clays	400
S-2 (4')	Brn sand	700			
S-2 (6')	Brn sand	560	B-1 (7')	Clays	550
S-2 (8')	Brn clays	300	WS (6')	Clays	300
S-3 (4')	Brn sand	800	ES (6')	Clays	220
S-3 (7')	Brn sand	610	NS (6')	Clays	300
S-3 (8')	Brn clays	400	SS (6')	Clays	375
S-4 (3')	Brn sand	750	CS (5')	Clays	350
S-4 (6')	Brn sand	500	B-2 (7')	Clays	500
S-4 (8')	Brn clays	275			
S-5 (3')	Brn sand	620			
S-5 (6')	Brn sand	500	<u>Lab Samples</u>		
S-5 (8')	Brn clays	300	SS#1	Clays	550
			SS#1	Clays	600

**= Soil samples collected for laboratory analysis**

**A diagram of the PDD soil sampling locations has been included as Figure #3**

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

According to MPCA guidelines for gasoline & diesel UST's, analytical soil samples were collected and analyzed for :

- Gasoline Range Organics (GRO)
- Diesel Range Organics (DRO)
- Benzene, Toluene, Ethyl Benzene, Xylene (BTEX)
- Methyl Tertiary Butyl Ether (MTBE)

D. List below all soil sample analytical results from bottom and sidewall samples (i.e., soils left in place when excavation is complete :

SS#1 = Bottom sample collected beneath the 1,000 gallon gasoline UST  
 SS#2 = Bottom sample collected beneath the 1,000 gallon diesel UST  
 WWS#1 = Great Plains Environmental also collected one groundwater sample with the contaminated UST basin.

Sample Code	GRO/DRO	Benzene ppm	Ethyl-benzene ppm	Toluene ppm	Xylene ppm	MTBE ppm	Lead ppm
SS#1(7')	8,300/ 5,000	50.0	170.0	360.0	710.0	<0.25	NA
SS#2(7')	3,000/ 1,600	11.0	36.0	89.0	310.0	<0.025	NA
WWS#1	58 ppm/ NA	14.0	1.90	17.0	11.0	<0.130	NA

Notes :

Each of the laboratory results have been converted and reported in parts per million (ppm)

A copy of the analytical soil samples and the associated chain of custody has been included in *Appendix A*.

NA = Not Analyzed

A laboratory sampling site plot plan has been included as *Figure #4*

The laboratory samples were analyzed by Legend Technical Services of St. Paul, MN (612) 642-1150.

## PART VI: FIGURES

Attach the following figures to this report:

### Figure

### Contents

#### *Figure #1*

Site location map.

#### *Figure #2,#3, & #4*

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), (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.

It is Great Plains Environmental's professional opinion that a Limited Site Investigation (LSI) is required for Leak #8669 according to current MPCA guidelines.

This decision is based on :

- The contact between the contaminated soil and the seasonally high groundwater.
- The high concentrations of Gasoline Range Organics, Diesel Range Organics, and BTEX detected in the soil and groundwater.
- An unknown volume of petroleum impacted soil remains on the release site.

**PART VIII: SOIL TREATMENT INFORMATION**

A. Soil treatment method used (thermal, land application, composting, other). If you choose "other" specify treatment method:

**No soil was removed or treated from the release site.**

B. Location of treatment site/facility: **Doesn't Apply**

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):

**Doesn't Apply**

D. Identify the location of stockpiled contaminated soil:

**Doesn't Apply**

**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 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:

**Rex Honeyman,**  
*Environmental Geologist*



8/28/96

Company and mailing address:

*Great Plains Environmental*  
1301 40<sup>th</sup> Street NW  
Fargo, ND 58012

Phone:

(701) 277-1612

Fax:

(701) 281-9770

If additional investigation is not required at the site, please mail this form and all necessary attachments into the MPCA Project Manager. If additional investigation is required at the site, include this form as an appendix to the "Remedial Investigation Report Form."

**NOTE :** SINCE THIS SITE OWNER HAS ELECTED TO SUBMIT THE RELEASE INFORMATION INTO THE MPCA VOLUNTARY PETROLEUM INVESTIGATION AND CLEANUP (VIC) PROGRAM, GREAT PLAINS ENVIRONMENTAL WILL SUBMIT A COPY OF THE EXCAVATION REPORT TO THE FOLLOWING :

Ms. Laurie Kania  
Minnesota Pollution Control Agency  
520 Lafayette Road  
St. Paul, MN 55155  
(612) 297-8600

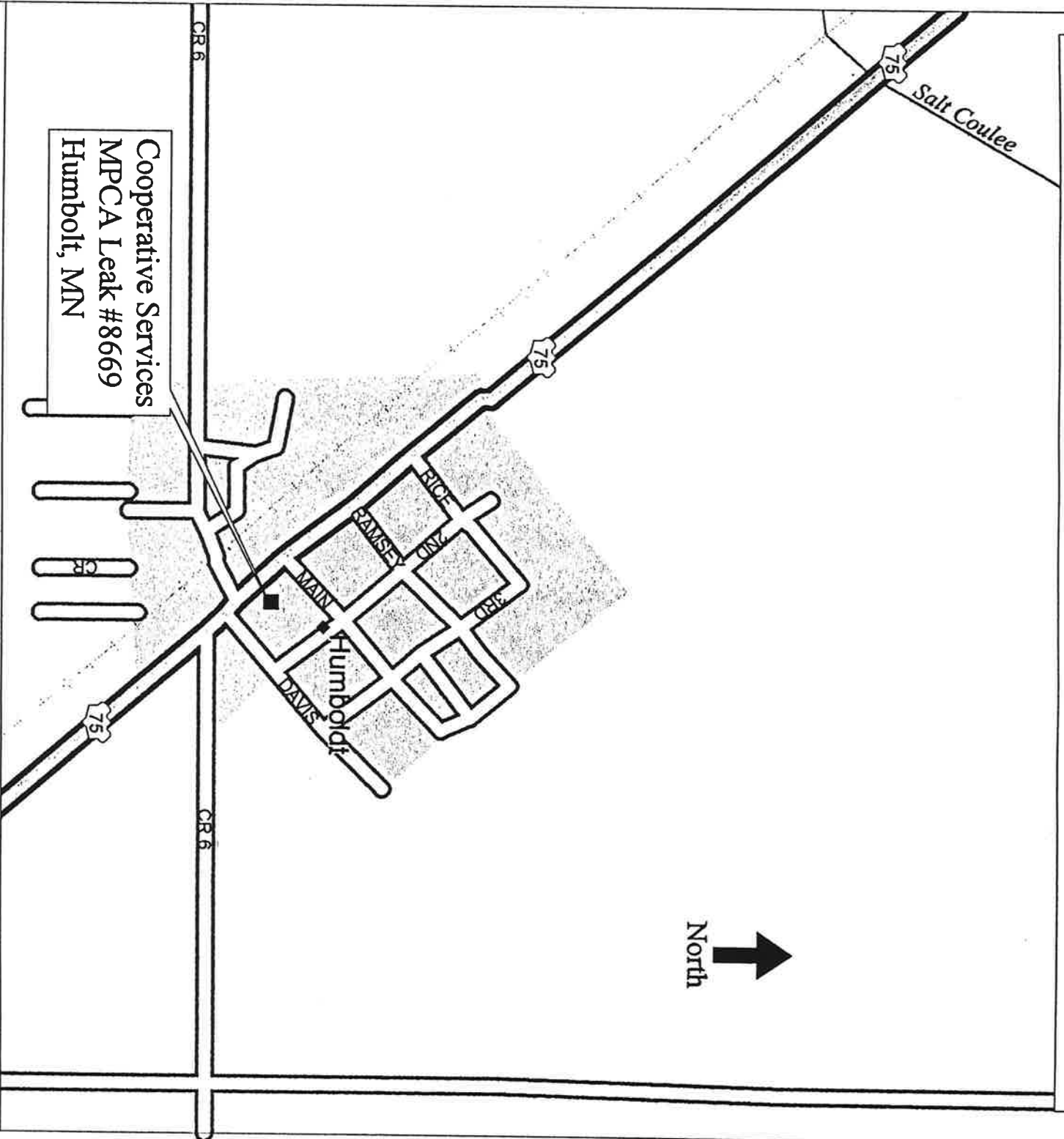
Note, Great Plains Environmental recommends additional investigation for this specific petroleum release site according to the MPCA format for Limited Site Investigations (LSI).



## FIGURE #1

Box 2706  
1301 40th Street NW  
Fargo, North Dakota 58108  
701/277-1612

# MPCA Leak #8669



Mag 15:00

Wed Aug 27 16:36 1997

Scale 1:7,812 (at center)

500 Feet

200 Meters

- Local Road
- Major Connector
- US Highway
- Railroad
- ◆ Small Town
- Population Center
- Intermittent River

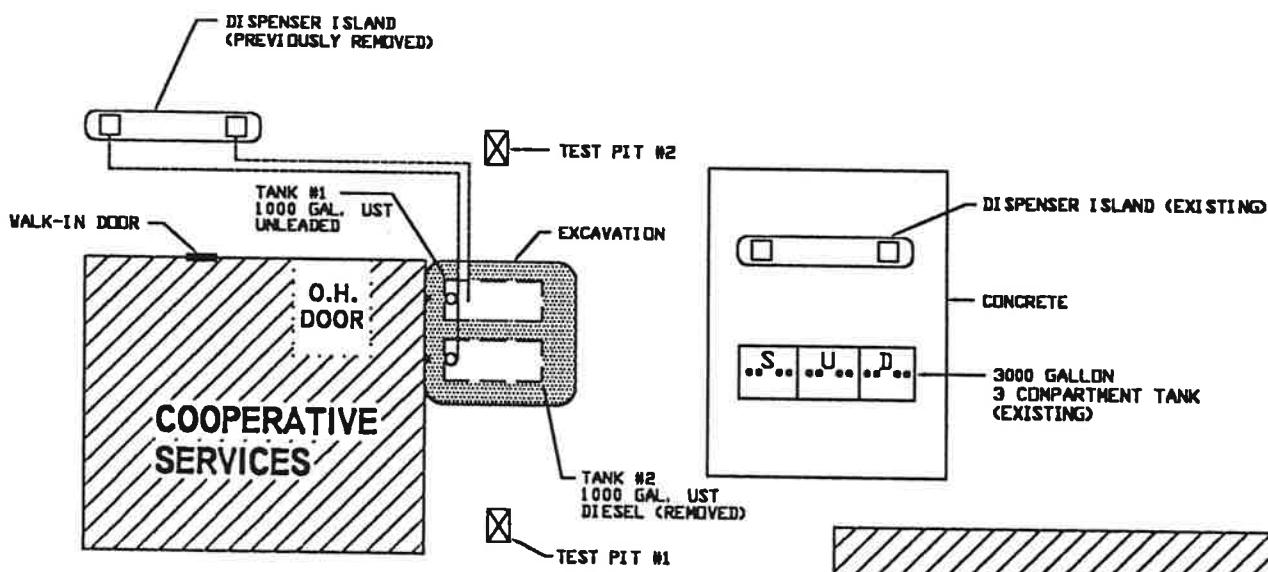
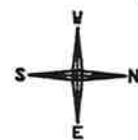


**FIGURE #2**

Box 2706  
1301 40th Street NW  
Fargo, North Dakota 58108  
701/277-1612



HIGHWAY 75



**COOPERATIVE SERVICES**  
HUMBOLT, MN  
EXCAVATION SITE PLOT PLAN  
GREAT PLAINS ENVIRONMENTAL  
JULY 1, 1997



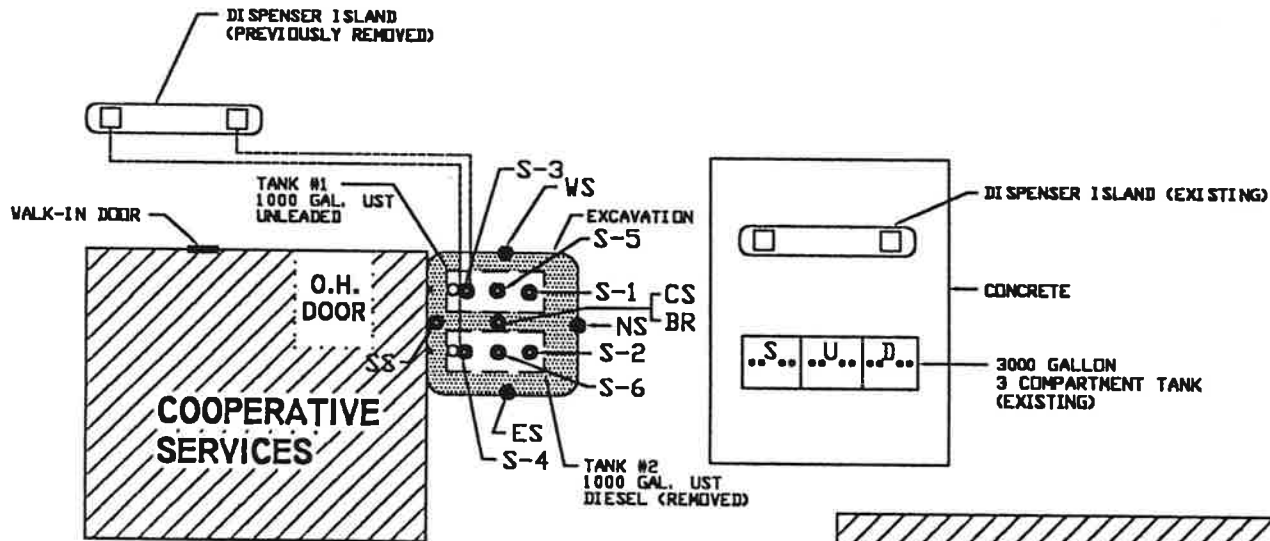
SCALE: 1" = 20'



**FIGURE #3**

Box 2706  
1301 40th Street NW  
Fargo, North Dakota 58108  
701/277-1612

HIGHWAY 75



**COOPERATIVE SERVICES**  
HUMBOLT, MN  
PID SITE PLOT PLAN  
GREAT PLAINS ENVIRONMENTAL  
JULY 1, 1997



SCALE: 1" = 20'

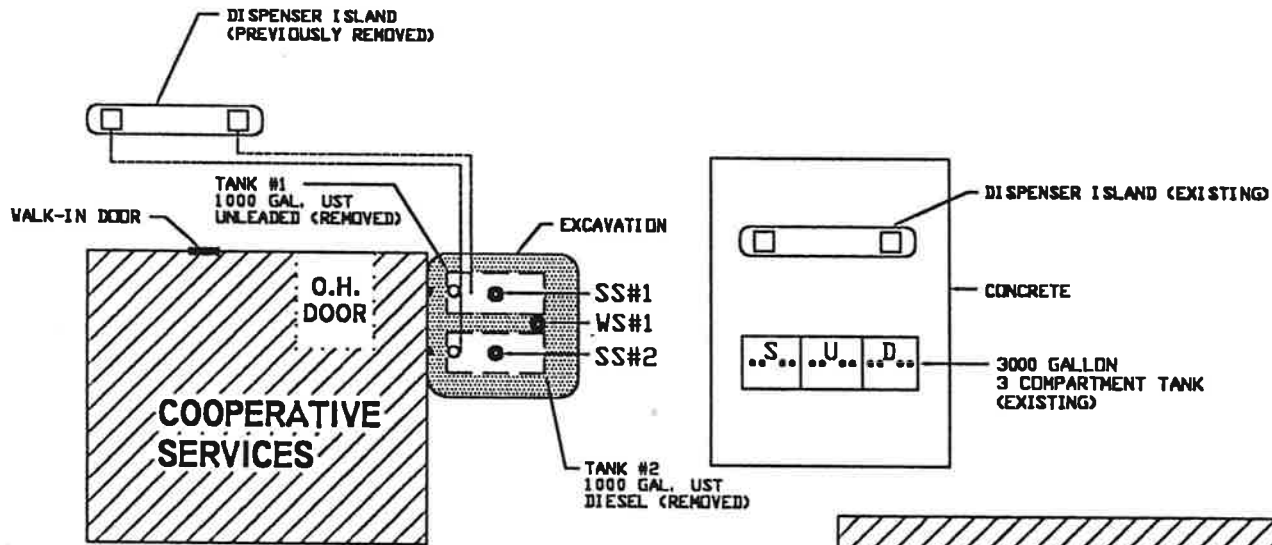




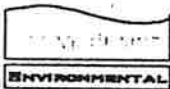
## FIGURE #4

Box 2706  
1301 40th Street NW  
Fargo, North Dakota 58108  
701/277-1612

HIGHWAY 75

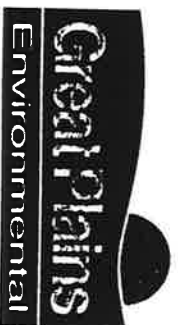


**COOPERATIVE SERVICES**  
HUMBOLT, MN  
LABORATORY SITE PLOT PLAN  
*GREAT PLAINS ENVIRONMENTAL*  
JULY 1, 1997



SCALE: 1" = 20'

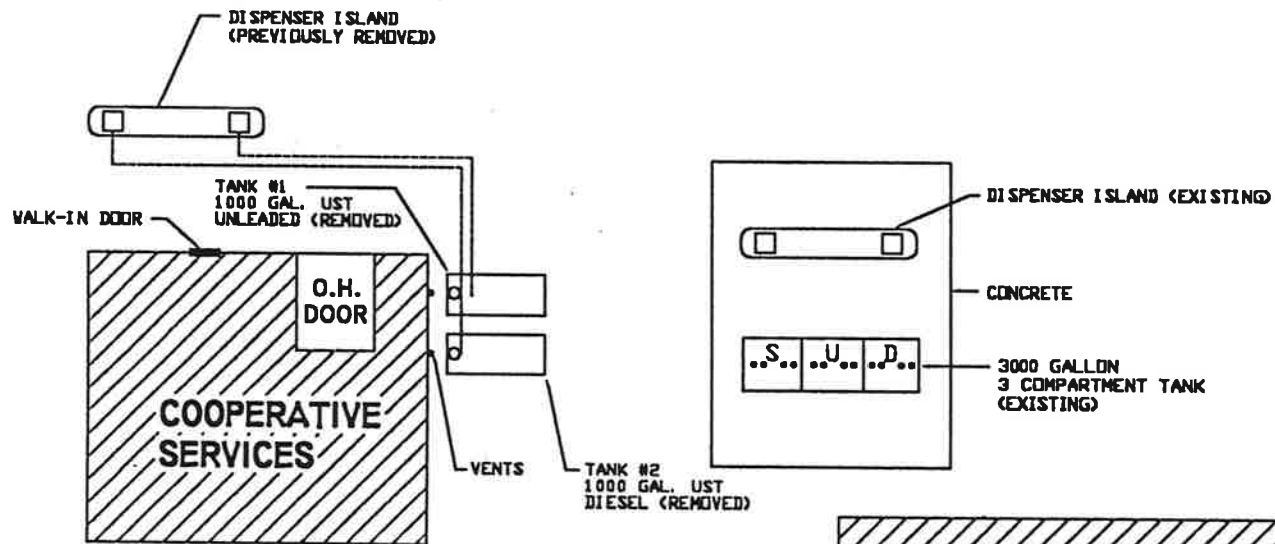




## FIGURE #5

Box 2706  
1301 40th Street NW  
Fargo, North Dakota 58108  
701.277-1612

HIGHWAY 75



**COOPERATIVE SERVICES**  
HUMBOLT, MN  
CURRENT SITE PLOT PLAN  
GREAT PLAINS ENVIRONMENTAL  
JULY 1, 1997



SCALE: 1" = 20'



## APPENDIX A

Box 2706  
1301 40th Street NW  
Fargo, North Dakota 58108  
701/277-1612



July 15, 1997

# L E G E N D

T E C H N I C A L S E R V I C E S , I N C .

**Report to:** Mr. Rex Honeyman  
Great Plains Environmental  
1301 40th St. NW  
Fargo, North Dakota 58102

**Client Project:** Farmers COOP-Humbolt, Minnesota

**Methodology:**  
Wisconsin Modified GRO  
Wisconsin Modified DRO

**LEGEND Project No.** 97-2220

**Date Sampled:** 7/01/97

**Date Received:** 7/03/97

LEGEND No.	97-83223	97-83224		97-83225			
Parameter	SS #1 (7) (mg/kg)	SS #2 (7) (mg/kg)	Method Blank (mg/kg)	PQL (mg/kg)	WS #1 (ug/L)	Method Blank (ug/L)	PQL (ug/L)
GRO	8,300	3,000	< 5.0	5.0	58,000	< 100	100
MTBE	< 0.25	< 0.025	< 0.025	0.025	< 130	< 5.0	5.0
Benzene	50	11	< 0.025	0.025	14,000	< 1.0	1.0
Toluene	360	89	< 0.025	0.025	17,000	< 1.0	1.0
Ethyl benzene	170	36	< 0.025	0.025	1,900	< 1.0	1.0
Total xylenes	710	310	< 0.025	0.025	11,000	< 1.0	1.0
Surrogate Recovery	107	93.9	93.7	---	82.3	90.2	---
Date Analyzed	7/07/97 7/09/97	7/07/97 7/08/97	7/07/97	---	7/07/97 7/08/97	7/07/97	---
Diesel range organics	5,000*	1,600*	< 8.0	8.0	NA	NA	---
Date Preserved	7/03/97	7/03/97	----	----	----	----	----
Date Extracted	7/07/97	7/07/97	7/07/97	----	----	----	----
Date Analyzed	7/09/97 7/12/97	7/09/97 7/12/97	7/07/97	----	----	----	----
Solids (percent)	94	93	100	----	----	----	----

\* = The sample contains compounds more volatile than DRO.

< = Less than the number shown

mg/kg is equal to parts-per-million

ug/L is equivalent to parts-per-billion

PQL = Practical quantitation limit

NA = Not analyzed for this parameter

  
Chris Chapman  
Project Manager

  
Chris Bremer  
Laboratory Manager

INDOOR ENVIRONMENTAL QUALITY AND LABORATORY SERVICES

775 Vandalia Street

St. Paul, MN 55114

"An Equal Opportunity Employer"

tel 612.642.1150

fax 612.642.1239

**LEGEND TECHNICAL SERVICES, INC.**

775 Vandalia Street, St. Paul, MN 55114 - Telephone: 612/642-1150 Fax: 612/642-1239

**CHAIN-OF-CUSTODY RECORD**

Fargo Legend

Client Name: <u>Great Plains Environmental</u>	Laboratory Project No.: <u>97-2220</u>	Analysis/# of Containers:					
Report To: <u>Great Plains Environmental</u>	Turnaround Time:	P R E A D I N G F I E L D	D O	G P O	B T E	M T B E	M i s t w
Attn: <u>Rex Honeyman</u>	<input checked="" type="checkbox"/> Normal Date Needed: _____						
Sampled By: <u>Rex Honeyman</u>	<input type="checkbox"/> Rush Date Needed: _____						
Project No.: <u>Farmers Coop Humbolt, MN</u>	Condition Received:						
	<input type="checkbox"/> Received on Ice						

Item No.	Field ID No.	Sample Description	Collection		Sample Matrix	Lab ID No.						
			Date	Time								
1	SS#1(7')	Soil Sample #1 (7')	7/2/97		Soil	83223	425	α	α	α	α	X
2	SS#2(7')	Soil Sample #2 (7')	↓		Soil	83224	450	α	α	α	α	X
3	WS#1	Water Sample #1	↓		Water	83225		α	α	α		
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												

Transfer No.	Item No.	Relinquished By	Accepted By	Date	Time	Comments
1		<u>Rex Honeyman</u>	<u>Robert Dulles</u>	7/2/97	8:30	P.O. # 101288
2				7/3/97	1:45	
3						Please Return All
4						GPE Coolers ASAP



## APPENDIX B

Box 2706  
1301 40th Street NW  
Fargo, North Dakota 58108  
701/277-1612



# Minnesota Pollution Control Agency

520 Lafayette Road North  
Saint Paul, Minnesota 55155-4194

April 1996

## Voluntary Petroleum Investigation and Cleanup Program

### Fact Sheet 5.1

Properties that are contaminated with chemicals present a special set of problems for those wanting to purchase, sell or develop them. The Voluntary Petroleum Investigation and Cleanup (VPIC) Program is one of several programs within the Minnesota Pollution Control Agency (MPCA) designed to help people address these problems. The VPIC Program's purpose is to provide the technical assistance and liability protection necessary to facilitate petroleum contamination investigation and cleanups, and property transfers and developments.

Many of the problems faced by property owners, purchasers, developers or their lenders, can be simplified and overcome through participation in the VPIC Program. The VPIC process can also provide the information needed to make sensible financial decisions about transferring or developing petroleum-contaminated property. The services available through the VPIC program are outlined below.

#### Technical Assistance

##### Review of Petroleum Contamination Investigations and Cleanups

The transfer, development or financing of property with petroleum contamination originating from an on-site storage tank often hinges on MPCA approval of the investigation and corrective actions required under the Petroleum Tank Release Cleanup Act (Minn. Stat. 115C). Because time is often of the essence, the VPIC program offers an expedited review of the reports required for these leak sites. In general, VPIC staff will respond to requests within 30 days from the receipt of a report. For many properties, the quicker review can lead to quicker corrective-action approval and/or file closure.

VPIC staff can also review the investigation and corrective actions for petroleum contamination that *did not* originate from a storage tank on the property.

VPIC staff will close the site file when they conclude that the investigation and/or cleanup has adequately addressed the contamination. Obtaining

file closure can be vital to the future sale of ~~petroleum-contaminated property.~~

##### Review of Development Response Action Plans

Even after cleanup or file closure, many properties still have some contamination remaining. In cases where contaminated soil or water might be encountered, property owners or developers need to include provisions — called “response actions” — in development plans, for the proper management of contaminated soil or water in the event they are detected. And for some properties, it is also wise to develop precautionary measures to prevent further spreading of the contamination and/or to prevent vapors from entering buildings or utility access shafts.

Parties can get MPCA approval of their proposed response actions through the VPIC program. By obtaining VPIC approval of development plans, property owners, purchasers, developers and their lenders can be reasonably confident that they know what will be required should contamination be uncovered. Getting approval can also allow you to take advantage of cost-saving measures when appropriate, such as using contaminated soil on-site.

#### Liability Assurance Letters

Lenders, mortgagors and purchasers often require some type of documentation showing the lack of responsibility for contamination at a property. VPIC staff can issue several types of letters that confirm this. These letters also cover successive purchasers of the property, as long as they were not in some way responsible or involved with the original release.

**Leak Site Tank Removal Verification Letter:** This letter verifies the removal of the storage tank(s) which caused the petroleum contamination. It states that the property was the site of a petroleum release and that the prospective buyer or lender (and in some cases, the current owner) will not be a responsible party for the release due to the fact that the tank(s) from which the release occurred have been removed.

**Leak Site File Closure Confirmation Letter:** This letter confirms the status of a closed leak site and can serve as a way to add information to the site file after the file has been closed. The letter states that a petroleum storage tank release occurred at the property, and the file closure status is still valid.

**Off-Site Tank Release Determination Letter:** This letter provides a means to show non-responsibility for petroleum contamination. The letter identifies the source of the contamination and states that the owner of the affected property is not a responsible party for the contamination. To obtain this letter, information is needed to show that there is no on-site source of the contamination and that the contamination migrated to the property from an off-site tank.

**General Liability Letter:** This letter states the definition of a “responsible party” in accordance with Minn. Stat. 115C and special provisions of the statute as it relates to mortgagors. In short, it states that if a person comes into possession of property after the tanks have been removed, that person is not a responsible party and cannot be

ordered to take corrective action under this statute. This is a standardized letter and makes no site-specific references.

### Application and Billing

To request any of the VPIC services, complete and submit the form titled “Application/ Request for Assistance,” which is available by calling one of the numbers listed below. In accordance with state law, the applicant will be billed for the time spent by staff to provide the requested service(s). The fee is \$60.00 per hour. This fee is not considered an eligible expense for reimbursement under Petrofund. The money collected is deposited into the Minnesota Environmental Fund and used to offset the program costs.

The total cost for VPIC staff review for a given site has been largely dependent on the severity of the contamination, the complexity of the site and the quality of work provided to the VPIC staff. The average total cost for sites enrolled in VPIC for review has been less than \$600 per site, but some site reviews have exceeded \$1,000. The average total cost for sites enrolled in VPIC to obtain liability assurance letters has been much less.

### Other MPCA Property Transfer Assistance Programs

Other programs have been established within the MPCA to assist persons involved with the transfer or development of contaminated properties. The Voluntary Investigation and Cleanup (VIC) Program offers similar services for properties which have been contaminated with non-petroleum pollutants, such as solvents or metals. The File Evaluation Program uses MPCA databases to determine if a property or surrounding properties have been the site of actual or potential contaminant releases.

A fee is charged for the services available through each of these programs.

### For More Information

For more information regarding the VPIC Program or petroleum-contaminated property transfer and



**Voluntary Petroleum Investigation and Cleanup Program — page 3**  
development, call Laurie Kania at (612) 297-8600 or  
Bassou Oulgout at (612) 297-8597.

If you are considering the transfer or development of property contaminated with chemicals other than petroleum, you may be interested in the services available through the MPCA's Voluntary Investigation and Cleanup (VIC) Program. This program is similar to the VPIC Program, but deals with sites contaminated with solvents, acids, heavy metals, etc. For more information about the services offered through this program, call the MPCA at (612) 296-6300 and ask for a member of the VIC staff.

For more information regarding the File Evaluation Program, call Carole Nelson at (612) 297-1796.

If calling from outside the metropolitan area, the MPCA can be reached toll free at (800) 657-3864.





"Solutions for Technical Concerns"

## MOBILE LABORATORY ANALYTICAL REPORT

Client: Great Plains Environmental NTS #: 4442.11  
Contact: Leilyn Honeyman  
Site: Humboldt, MN  
Date: 22Dec97  
Chemist: Pat Wodarz  
Parameters: BTEX/GRO  
Method: Modified EPA 5030/8020/8015  
Soil samples are methanol preserved prior to analysis. Soil results are wet weight basis.

### Analytical Results

Sample Description	Dilution Factor	Benzene	Toluene	Ethyl		Total		GRO
				Benzene	Xylenes	Xylenes	GRO	
Soil Matrix		mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
GP-1 7.5 ft.	1.7	20	170	<0.1	220	1800C	1800C	
GP-2 7.5 ft.	1	0.16	6.2	0.38	8.6	330	330	
GP-3 12 ft.	1	<0.10	<0.10	<0.10	<0.10	<10	<10	
GP-4 5 ft.	1	51	260	72	430	3200	3200	
GP-5 7.5 ft.	1	<0.10	<0.10	<0.10	<0.10	<10	<10	
GP-6 7.5 ft.	1	<0.10	<0.10	<0.10	<0.10	<10	<10	
GP-7 7.5 ft.	1	200	78	<0.10	250	1100C	1100C	
GP-8 7.5 ft.	1	<0.10	<0.10	<0.10	<0.10	<10	<10	

QC Reviewed:

Less than values indicate that a contaminant was either detected below the reporting limit or not at all in the sample.

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**Northeast Technical Services, Inc.**

**CHAIN OF CUSTODY RECORD**

Client Name, Address, Phone <i>GREAT PLAINS ENV.</i>			Verbal Results To: <i>REX</i>							Type/# of Containers VOC GENERAL METALS NUTRIENTS GRO/PVOC DRO						Comments:		
Samplers:  Samples Shipped/Received By: <input type="checkbox"/> Air <input type="checkbox"/> In Person <input type="checkbox"/> Fed. Ex. <input type="checkbox"/> Other			Report To:															
Project #/Department #			Copy of Report To:															
Log-In #	Sample #	Sample Description	Collection		Sample Matrix		Type		Field Filtered		VOC	GENERAL	METALS	NUTRIENTS	GRO/PVOC	DRO	Analysis/Remarks	
			Date	Time	Liq.	Sol.	Grab	Comp	Yes	No								
1	1	GP3 12FT	12-22	11:45		X								X				
2	2	GP2 7.5FT	12-22	12:30		X								X				
3	3	GP1 7.5FT	12-22	12:35		X								X				
4	4	GP4 5FT	12-22	2:30		X								X				
5	5	GP5 7.5FT	12-22	3:30		X								X				
6	6	GP6 7.5FT	12-22	4:00		X								X				
7	7	GP7 7.5FT	12-22	4:30		X								X				
8	8	GP8 7.5FT	12-22	5:00		X								X				
Relinquished By:			Date	Time	Received By:			Relinquished By:			Date	Time	Received By:					
Relinquished By:			Date	Time	Received By:			Relinquished By:			Date	Time	Received By:					
Relinquished By:			Date	Time	Received For Laboratory By:				Date	Time	Temperature upon receipt:							

White Copy - Client

Canary Copy - Laboratory



# Northeast Technical Services, Inc.

315 Chestnut Street, P. O. BOX 1142, VIRGINIA, MINNESOTA 55792, (218) 741-4290

## Analytical Report

Lab Number: 97-17536 Date Collected: 12/22/97  
Sample Description GP-1 7.5' Date Received: 12/24/97  
Cooperative Services  
Great Plains Environmental Date DRO Extracted: 12/26/97  
Date DRO Analyzed: 01/19/98  
NTS Project #: 4442.11 Date Reported: 01/20/98  
Matrix: Soil Moisture: 25

Parameter	Units	DF	Result	RL	MDL
Diesel Range Organics (DRO)	mg/Kg	19	1500	190	3.0

GRO/DRO analyzed according to Wisconsin DNR GRO and DRO Methods.  
BTEX analyzed in accordance to EPA 5030/8020.

MDL = Method Detection Limit

RL = Reporting Limit (Practical quantitation limit)

JR = Value reported is above the MDL but below the RL

DF = Dilution Factor

Report approved by:



Analytical Chemist

Northeast Technical Services, Inc., makes no warranty except that the analysis has been made upon the samples received in accordance with generally accepted testing laboratory principles and practices. The results of the analysis may not be characteristic of the whole from which the sample was taken. This warranty is in lieu of all other warranties, either expressed or implied.

# Northeast Technical Services, Inc.

315 Chestnut Street, P.O. BOX 1142, VIRGINIA, MINNESOTA 55792, (218) 741-4290

## Analytical Report

Lab Number: 97-17537 Date Collected: 12/22/97  
Sample Description GP-2 7.5' Date Received: 12/24/97  
Cooperative Services  
Great Plains Environmental  
Date DRO Extracted: 12/26/97  
Date DRO Analyzed: 01/19/98  
NTS Project #: 4442.11 Date Reported: 01/20/98  
Matrix: Soil Moisture: 24

Parameter	Units	DF	Result	RL	MDL
Diesel Range Organics (DRO)	mg/Kg	1.0	110	10	3.0

GRO/DRO analyzed according to Wisconsin DNR GRO and DRO Methods.

BTEX analyzed in accordance to EPA 5030/8020.

MDL = Method Detection Limit

RL = Reporting Limit (Practical quantitation limit)

JR = Value reported is above the MDL but below the RL

DF = Dilution Factor

Report approved by:



Analytical Chemist

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# Northeast Technical Services, Inc.

315 Chestnut Street, P. O. BOX 1142, VIRGINIA, MINNESOTA 55792, (218) 741-4290

## Analytical Report

Lab Number: 97-17538 Date Collected: 12/22/97  
Sample Description GP-3 12' Date Received: 12/24/97  
Cooperative Services  
Great Plains Environmental Date DRO Extracted: 12/26/97  
Date DRO Analyzed: 01/20/98  
NTS Project #: 4442.11 Date Reported: 01/20/98  
Matrix: Soil Moisture: 29

Parameter	Units	DF	Result	RL	MDL
Diesel Range Organics (DRO)	mg/Kg	1.0	< 3.0	10	3.0

GRO/DRO analyzed according to Wisconsin DNR GRO and DRO Methods.

BTEX analyzed in accordance to EPA 5030/8020.

MDL = Method Detection Limit

RL = Reporting Limit (Practical quantitation limit)

JR = Value reported is above the MDL but below the RL

DF = Dilution Factor

Report approved by:



Analytical Chemist

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# Northeast Technical Services, Inc.

315 Chestnut Street, P. O. BOX 1142, VIRGINIA, MINNESOTA 55792, (218) 741-4290

## Analytical Report

Lab Number: 97-17539 Date Collected: 12/22/97  
Sample Description GP-4 5' Date Received: 12/24/97  
Cooperative Services  
Great Plains Environmental Date DRO Extracted: 12/26/97  
Date DRO Analyzed: 01/20/98  
NTS Project #: 4442.11 Date Reported: 01/20/98  
Matrix: Soil Moisture: 26

Parameter	Units	DF	Result	RL	MDL
Diesel Range Organics (DRO)	mg/Kg	1.0	130	10	3.0

GRO/DRO analyzed according to Wisconsin DNR GRO and DRO Methods.

BTEX analyzed in accordance to EPA 5030/8020.

MDL = Method Detection Limit

RL = Reporting Limit (Practical quantitation limit)

JR = Value reported is above the MDL but below the RL

DF = Dilution Factor

Report approved by:



Analytical Chemist

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# Northeast Technical Services, Inc.

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## Analytical Report

Lab Number:	97-17540	Date Collected:	12/22/97
Sample Description	GP-5 7.5'	Date Received:	12/24/97
Cooperative Services			
Great Plains Environmental			
NTS Project #:	4442.11	Date DRO Extracted:	12/26/97
Matrix:	Soil	Date DRO Analyzed:	01/20/98
		Date Reported:	01/20/98
		Moisture:	24

Parameter	Units	DF	Result	RL	MDL
Diesel Range Organics (DRO)	mg/Kg	1.0	< 3.0	10	3.0

GRO/DRO analyzed according to Wisconsin DNR GRO and DRO Methods.

BTEX analyzed in accordance to EPA 5030/8020.

MDL = Method Detection Limit

RL = Reporting Limit (Practical quantitation limit)

JR = Value reported is above the MDL but below the RL

DF = Dilution Factor

Report approved by:



Analytical Chemist

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# Northeast Technical Services, Inc.

315 Chestnut Street, P.O. BOX 1142, VIRGINIA, MINNESOTA 55792, (218) 741-4290

## Analytical Report

Lab Number: 97-17541 Date Collected: 12/22/97  
Sample Description GP-6 7.5' Date Received: 12/24/97  
Cooperative Services  
Great Plains Environmental  
Date DRO Extracted: 12/26/97  
Date DRO Analyzed: 01/20/98  
NTS Project #: 4442.11 Date Reported: 01/20/98  
Matrix: Soil Moisture: 25

Parameter	Units	DF	Result	RL	MDL
Diesel Range Organics (DRO)	mg/Kg	1.0	< 3.0	10	3.0

GRO/DRO analyzed according to Wisconsin DNR GRO and DRO Methods.

BTEX analyzed in accordance to EPA 5030/8020.

MDL = Method Detection Limit

RL = Reporting Limit (Practical quantitation limit)

JR = Value reported is above the MDL but below the RL

DF = Dilution Factor

Report approved by:



Analytical Chemist

Northeast Technical Services, Inc., makes no warranty except that the analysis has been made upon the samples received in accordance with generally accepted testing laboratory principles and practices. The results of the analysis may not be characteristic of the whole from which the sample was taken. This warranty is in lieu of all other warranties, either expressed or implied.

# Northeast Technical Services, Inc.

315 Chestnut Street, P.O. BOX 1142, VIRGINIA, MINNESOTA 55792, (218) 741-4290

## Analytical Report

Lab Number: 97-17542 Date Collected: 12/22/97  
Sample Description GP-7 7.5' Date Received: 12/24/97  
Cooperative Services  
Great Plains Environmental Date DRO Extracted: 12/26/97  
Date DRO Analyzed: 01/20/98  
NTS Project #: 4442.11 Date Reported: 01/20/98  
Matrix: Soil Moisture: 26

Parameter	Units	DF	Result	RL	MDL
Diesel Range Organics (DRO)	mg/Kg	4.3	320	43	3.0

GRO/DRO analyzed according to Wisconsin DNR GRO and DRO Methods.  
BTEX analyzed in accordance to EPA 5030/8020.

MDL = Method Detection Limit

RL = Reporting Limit (Practical quantitation limit)

IR = Value reported is above the MDL but below the RL

DF = Dilution Factor

Report approved by:



Analytical Chemist

Northeast Technical Services, Inc., makes no warranty except that the analysis has been made upon the samples received in accordance with generally accepted testing laboratory principles and practices. The results of the analysis may not be characteristic of the whole from which the sample was taken. This warranty is in lieu of all other warranties, either expressed or implied.

# Northeast Technical Services, Inc.

315 Chestnut Street, P.O. BOX 1142, VIRGINIA, MINNESOTA 55792, (218) 741-4290

## Analytical Report

Lab Number: 97-17543 Date Collected: 12/22/97  
Sample Description GP-8 7.5' Date Received: 12/24/97  
Cooperative Services  
Great Plains Environmental Date DRO Extracted: 12/26/97  
Date DRO Analyzed: 01/20/98  
NTS Project #: 4442.11 Date Reported: 01/20/98  
Matrix: Soil Moisture: 25

Parameter	Units	DF	Result	RL	MDL
Diesel Range Organics (DRO)	mg/Kg	1.0	< 3.0	10	3.0

GRO/DRO analyzed according to Wisconsin DNR GRO and DRO Methods.

BTEX analyzed in accordance to EPA 5030/8020.

MDL = Method Detection Limit

RL = Reporting Limit (Practical quantitation limit)

JR = Value reported is above the MDL but below the RL

DF = Dilution Factor

Report approved by:



Analytical Chemist

Northeast Technical Services, Inc., makes no warranty except that the analysis has been made upon the samples received in accordance with generally accepted testing laboratory principles and practices. The results of the analysis may not be characteristic of the whole from which the sample was taken. This warranty is in lieu of all other warranties, either expressed or implied.





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 VIRGINIA, MINNESOTA 55792  
 218-741-4290 \* FAX 218-741-4291

**Northeast Technical Services, Inc.**

**CHAIN OF CUSTODY RECORD**

Client Name, Address, Phone Great Plains Environmental 1301 40th St NW Fargo, ND 58102			Verbal Results To: <i>N/A</i>							Type/# of Containers					Comments: <i>Return Cooler ASAP</i>
Samplers: <i>Rex Horneman</i>			Report To: <i>Rex Horneman</i> <i>Great Plains Environmental</i> <i>1301 40th St NW</i> <i>Fargo, ND 58102</i>							V	G	M	N	G	
Samples Shipped/Received By: ___ Air ___ In Person ___ Fed. Ex. <input checked="" type="checkbox"/> Other <i>Spec del</i>			Copy of Report To: <i>Spec del</i>							O	E	E	T	R	R
Project #/Department # <i>Cooperative Services P.O. # 10/448 442.11</i>			Collection		Sample Matrix		Type		Field Filtered		Analysis/Remarks				
Log-In #	Sample #	Sample Description	Date	Time	Liq.	Sol.	Grab	Comp	Yes	No					
17536	GP#1(7.5')	Geoprobe #1(7.5')	12/22/97				X						X	<i>DRD Moisture</i>	
17537	GP#2(7.5')	Geoprobe #2(7.5')											X		
17538	GP#3(7.5')	Geoprobe #3(7.5')											X		
17539	GP#4(7.5')	Geoprobe #4(7.5')											X		
17540	GP#5(7.5')	Geoprobe #5(7.5')											X		
17541	GP#6(7.5')	Geoprobe #6(7.5')											X		
17542	GP#7(7.5')	Geoprobe #7(7.5')											X		
17543	GP#8(7.5')	Geoprobe #8(7.5')											X		
Relinquished By: <i>[Signature]</i>		Date	Time	Received By:			Relinquished By:		Date	Time	Received By:				
Relinquished By:		Date	Time	Received By:			Relinquished By:		Date	Time	Received By:				
Relinquished By:		Date	Time	Received For Laboratory By: <i>T. Zelenyuk</i>			Date	Time	Temperature upon receipt: <i>Rec'd on Dec</i>						

White Copy - Client

Canary Copy - Laboratory



**Tanks and Emergency Response Section**  
Minnesota Pollution Control Agency

## **Soil and Ground Water Investigations Performed During Remedial Investigations**

Fact Sheet #3.19

April 1996

This fact sheet provides guidance on the soil investigation and ground water contamination assessment components of the remedial investigation (RI). Two types of RIs are used to evaluate petroleum contamination plumes: *limited site investigations (LSIs)* and *full RIs*.

The purpose of a limited site investigation is to quickly evaluate the likely level of risk associated with a petroleum release site, and to identify those low risk sites that do not require further investigation or remedial actions. The LSI has five main components:

- soil contamination assessment,
- ground water contamination assessment,
- water well survey,
- vapor risk assessment and
- surface water contamination assessment.

Only the soil and ground water contamination assessment components are discussed in this fact sheet. Guidance on risk assessment is provided in fact sheet #3.20 "Risk Assessment Procedures at Petroleum Release Sites."

A full RI is different from a LSI in that it requires additional hydrogeologic information, including ground water monitoring data taken over a period of time. Also, full RIs should include an assessment of natural biodegradation (see fact sheet #3.21, "Assessment of Natural Biodegradation at Petroleum Release Sites").

- Vertical definition

Drill soil borings to five feet below the water table or, if contamination extends below the water table, to ten feet below the deepest measurable contamination. If the water table is very deep at your site and you have drilled 20 feet below the deepest measurable contamination (in the unsaturated zone), call the MPCCA staff for approval to discontinue drilling deeper. If bedrock is encountered, contact the MPCCA staff to discuss how to proceed; bedrock monitoring wells might be required.

In order to evaluate site stratigraphy, complete at least one soil boring to 20 feet below the water table or to 20 feet below the deepest measurable contamination. Locate the soil boring near the suspected point of release, but not within a free product area. If confining units are an issue, complete the boring in an uncontaminated area. If additional site stratigraphy data is available, the MPCCA staff may waive this requirement with prior approval.

- Utility Backfill Investigation

In situations where underground utilities (sanitary and storm sewer lines, water mains) intercept either the impacted soil or contaminated ground water, hand-driven or hand-augured soil borings should be advanced in the utility backfills to investigate the potential for preferential migration of free product and contaminated ground water. This information is critically important when sediments of low permeability (e.g. clay) occur in the near subsurface. The MPCCA recommends that the locations and depths of underground utilities at and near the site be determined prior to site work.

### C. Sampling

- Organic vapor sampling

Collect and evaluate soil samples for organic vapors at least every five feet in "uncontaminated" horizons, at changes in material, and at least every 2.5 feet in contaminated horizons. Screening should be done in accordance with Part I of fact sheet #3.22 "Soil Sample Collection and Analysis Procedures."

- Laboratory analysis sampling

Collect soil samples for analysis at the zone of maximum organic vapor concentration and the water table interface or (if ground water not encountered) at the terminus of the boring, unless MPCCA staff specifically approve other sampling guidelines. If soil contamination extends below the water table, continue to collect soil samples in the saturated zone that exhibit the highest field instrument reading. If the entire boring appears uncontaminated based on field screening, collect only one soil sample at the water table interface or at the terminus of the boring. Refer to fact sheet #3.22 "Soil Sample Collection and Analysis Procedures."

- Water levels

Identify and measure the water level in all borings. Inspect soils for evidence of a fluctuating water table and a seasonal high water table (i.e., mottling). If soil borings in silt or clay appear unsaturated, leave a minimum of one boring open at least 12 hours to confirm that ground water has not been encountered.

- Free product  
Assess soil borings for the presence of free product. If free product is present, notify MPCA project staff within 24 hours. If product thickness exceeds 0.1 feet, begin interim product recovery. Refer to fact sheet #3.3 "Free Product: Evaluation and Recovery."
- Grain size  
In order to estimate hydraulic conductivity, sediment samples should be collected for grain size analysis. Collect and analyze a minimum of three soil samples from different locations/horizons which appear to have high permeability. If a wide range of aquifer materials are present, samples should be collected from areas of primary ground water flow. At sites underlain by a thick sequence of clays, contact the MPCA staff to discuss whether a grain size analysis is necessary. Note: If it is clear that monitoring wells need to be installed, grain size analysis may not be necessary because more representative estimates of hydraulic conductivity can be gained using other methods (e.g. slug tests, etc.).

#### **D. Resource aquifer determination**

A resource aquifer is defined as either a hydrogeologic unit capable of sustaining at least a five gallon per minute (gpm) yield to a well or the only viable water supply source in the area. Data collected from the LSI will determine if a resource aquifer is present in the impacted area. All bedrock units, excepting the Decorah Shale, Glenwood Formation, St. Lawrence Formation, and the Eau Clair Formation are considered resource aquifers.

For non-bedrock sites, a resource aquifer is determined from hydraulic conductivity and aquifer unit thickness values. Determine the hydraulic conductivity from slug tests, permeability tests, or a Hazen approximation from a grain size distribution if the predominant soil grain size is in the fine sand to gravel range.

For waterbearing units with a hydraulic conductivity of  $1 \times 10^{-2}$  cm/s or greater, the minimum thickness for a resource aquifer is 10 feet. For units with a hydraulic conductivity in the  $10^{-3}$  cm/s range, the minimum thickness is 20 feet. Any unit with a hydraulic conductivity less than  $1 \times 10^{-4}$  cm/s is not considered a resource aquifer unless no other viable water supply source is available. In other words, any waterbearing unit may be considered a resource aquifer if it is the only economically feasible water supply available.

When evaluating a site, consider the potential for a non-resource waterbearing units to increase in thickness and/or conductivity off-site. This may result in a direct hydraulic connection to a resource aquifer with the potential for contaminant migration, and would affect a site cleanup decision.

## **II. GROUND WATER CONTAMINATION ASSESSMENT**

### **A. Limited Site Investigations**

At sites where contaminated soil is in contact with ground water, or ground water contamination appears likely, a ground water contamination assessment is necessary as part of the LSI in order to determine if additional remedial investigation is necessary. If contamination levels in a resource

aquifer are found to be above MDH Health Risk Limits (HRLs), a full RI will be required. The minimum requirement of a LSI ground water assessment include the following:

- Collect ground water samples from temporary monitoring wells (push probes or hollow stem augers). Analyze for the appropriate parameters (see fact sheet #3.23 "Ground Water Sample Collection and Analysis Procedures"). Collect and analyze ground water samples from the "worst case" temporary well and a sufficient number of other points to document contaminant concentrations and distribution at the site.

### **B. Full Remedial Investigations**

Because monitoring data over a period of time and other hydrogeologic information will be required, monitoring wells will be needed if a full RI is performed. Following is guidance for the placement, completion and evaluation of data from monitoring wells. Guidance for assessment of natural biodegradation is found in fact sheet #3.21 "Assessment of Natural Biodegradation at Petroleum Release Sites").

#### **Monitoring well placement**

##### Worst case monitoring wells.

A monitoring well should be completed in or immediately adjacent to all likely source areas (e.g., UST basins, AST areas, lines, pump islands, remote fill pipes, known spill areas).

- Lateral and down gradient monitoring wells

Monitoring wells should be placed lateral to and down gradient from the source area(s) such that they define the margins of the contamination plume.

- Off site monitoring wells.

If difficulty is encountered in securing access to off site monitoring well locations, contact the MPCCA project manager for assistance. However, prior to contacting the MPCCA, a minimum of two written attempts should be made to secure access.

- Deep wells - vertical definition of ground water contamination

A deep monitoring well may be required if soil borings show that petroleum contamination, as measured with your field instrument, occurs at a depth greater than five feet below the water table. Before a deep well is installed, contact the MPCCA project hydrogeologist for guidance on its necessity and placement. Be prepared to discuss site stratigraphy and potential receptors during this call.

Deep monitoring wells should be installed at sites where nearby receptors may be at risk or where site conditions indicate the likelihood of downward migration of contaminants.

If the deep well indicates that contamination is present at depth in the aquifer or in deeper aquifers, additional deep wells will be required, as necessary, to define the full extent of the contamination plume and determine flow direction and velocity.

## Screen placement

- Water table monitoring wells should be installed so the screen is intersected by the water table. Exceptions to this should be documented and justified in the RI report.
- Deep monitoring well screens will not intersect the water table. Screen placement in deep wells depends on the purpose of the well. If the well is installed to check for a vertical gradient, the top of the screen should be at least twenty feet below the bottom of the water table monitoring wells at your site. If the well is installed to monitor water quality in a lower, confined aquifer, the screen should be placed entirely within that aquifer.
- At sites where geologic conditions are such that it is difficult to determine the depth of the water table, the following procedures should be followed during well construction:
  - \* The borehole for the monitoring well should remain open at least 24 hours to allow water level stabilization.
  - \* A slightly longer well screen (15-20 feet) should be installed to compensate for water table fluctuations.
- Phased well installation may be appropriate. This allows for determination of the approximate water table depth in one or two wells, and then the remaining wells could be installed with proper screen placement.

## Monitoring well construction

- Well construction must be completed in accordance with the MDH water well construction code and must be permitted by the MDH.
- All monitoring well materials should be properly cleaned prior to installation.
- In general, avoid the use of liquid drilling fluids. However, they may be approved by the MPCA on a site-specific basis.
- Properly develop all wells to ensure adequate hydraulic connection with the aquifer and to remove any drilling fluid if used. Document the development procedures and results.

Complete as-built monitoring well construction diagrams for every monitoring well constructed. The minimum information required includes, but is not limited to:

1. Diagram of major well features (borehole annulus, screen, casing/riser, sand pack, pack seal, grout, surface seal, protective casing, etc.)
2. Depth from ground surface to all major well features.
3. Well screen slot size.
4. Sand pack size.
5. Inner diameters of riser, screen, protective casing, and borehole.
6. Well construction materials.
7. Unique well number and project identification number.
8. Date well begun and completed.
9. Driller and consultant names.
10. Elevation of ground surface and riser.

## **Sampling frequency**

- As a general guideline, a Remedial Investigation Report Form should be submitted after two quarterly rounds of ground water sampling. Ground water monitoring should continue from all monitoring wells on a quarterly schedule until site closure is granted or a new schedule is approved by the MPCA site hydrogeologist.

Upon request, this document can be made available in other formats, including Braille, large print and audio tape.  
TTY users call 612/2282-5332 or Greater Minnesota 1-800-657-3864 (voice/TTY).

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



1301 40th Street NW  
 P.O. Box 2706  
 Fargo, ND 58108  
 (701) 277-1612

# GPE TEST BORING LOG

Job # 16298 Vertical Scale 1/4" = 1' Boring # GP #1 Date 12/22/97  
 Project Cooperative Services, Box 549, Hallock, MN 56728

Depth In Feet	Description of Materials	Geologic Origin	Sample Date			Petroleum Vapor Analysis (ppm)
			WL	N	NO TYPE	
	Gravel					
	Brown Sand and Gravel					120
	Gray Silty Clay Stained					345
	Gray Silty Clay Stained					417
10	Gray Silty Clay Stained					410
	Gray Silty Clay Stained					300
	Gray Silty Clay Stained					350
	Brown Silty Clay					0
20	Brown Silty Clay					0
	Brown Silty Clay					0
	Brown Silty Clay					0
30						
40						

**Water Level Measurements**

Date	Time	Water Level	Cave-In Depth
12/22/97	12:00	10'	

Drilling Contractor NTS  
 Time Started 11:00  
 Time Finished 11:45  
 Method of Drilling Geoprobe  
 Crew Chief Tate Antonovich





1301 40th Street NW  
 P.O. Box 2706  
 Fargo, ND 58108  
 (701) 277-1612

# GPE TEST BORING LOG

GPE Test Bore Log deep

Job # 16298 Vertical Scale 1/4" = 1' Boring # GP #2 Date 12/22/97  
 Project Cooperative Services, Box 549, Hallock, MN 56728

Depth In Feet	Description of Materials	Geologic Origin	Sample Date				Petroleum Vapor Analysis (PPM)
			WL	N	NO	TYPE	
	Gravel						
	Black Silty Clay						19
	Gray Silty Clay Stained						62
	Gray Silty Clay Stained						739
10	Brown Silty Clay w/Rust Mottling						20
	Brown Silty Clay w/Rust Mottling						0
	Brown Silty Clay						0
	Brown Silty Clay						0
	Brown Silty Clay						0
20	Brown Silty Clay						0
30							
40							
Surface Elevation <u>                    </u>							

**Water Level Measurements**

Date	Time	Water Level	Cave-In Depth
12/22/97		N/A	

Drilling Contractor NTS  
 Time Started 11:45  
 Time Finished 12:30  
 Method of Drilling Geoprobe  
 Crew Chief Tate Antonovich



1301 40th Street NW  
 P.O. Box 2706  
 Fargo, ND 58108  
 (701) 277-1612

# GPE TEST BORING LOG

Job # 16298 Vertical Scale 1/4" = 1' Boring # GP #3 Date 12/22/97  
 Project Cooperative Services, Box 549, Hallock, MN 56728

Depth In Feet	Description of Materials	Geologic Origin	Sample Date			Petroleum Vapor Analysis (PPM)
			WL	N	NO	
0	Gravel					
0	Brown Silty Clay			1		0
0	Brown Silty Clay			2		0
0	Brown Silty Clay			3		0
0	Brown Silty Clay			4		0
0	Brown Silty Clay			5		0
0	Brown Silty Clay			6		0
0	Brown Silty Clay			7		0
0	Brown Silty Clay			8		0
10						
20						
30						
40						

Water Level Measurements			
Date	Time	Water Level	Cave-In Depth
12/22/97		N/A	

Drilling Contractor NTS  
 Time Started 12:30  
 Time Finished 13:15  
 Method of Drilling Geoprobe  
 Crew Chief Tate Antonovich



1301 40th Street NW  
 P.O. Box 2706  
 Fargo, ND 58108  
 (701) 277-1612

# GPE TEST BORING LOG

Job # 16298 Vertical Scale 1/4" = 1' Boring # GP #4 Date 12/22/97  
 Project Cooperative Services, Box 549, Hallock, MN 56728

Depth In Feet	Description of Materials ↙ Surface Elevation <input type="text"/>	Geologic Origin	Sample Date				Petroleum Vapor Analysis (ppm)
			WL	N	NO	TYPE	
10	Gravel						
	Black Silty Clay			1		184	
	Gray Silty Clay w/Rust Mottling (stained)			2		530	
	Gray Silty Clay (stained)			3		450	
	Gray Silty Clay (stained)			4		230	
	Brown Silty Clay			5		60	
	Brown Silty Clay			6		0	
	Brown Silty Clay			7		0	
	Brown Silty Clay			8		0	
	Brown Silty Clay			9		0	
	Brown Silty Clay			10		0	
40							
30							
20							
10							
Water Level Measurements Date: <u>12/22/97</u> Time: <u></u> Water Level: <u>N/A</u> Cave-In Depth: <u></u>							
Drilling Contractor: <u>NTS</u> Time Started: <u>13:30</u> Time Finished: <u>14:30</u> Method of Drilling: <u>Geoprobe</u> Crew Chief: <u>Tate Antonovich</u>							



1301 40th Street NW  
 P.O. Box 2706  
 Fargo, ND 58108  
 (701) 277-1612

# GPE TEST BORING LOG

Job # 16298 Vertical Scale 1/4" = 1' Boring # GP #5 Date 12/22/97  
 Project Cooperative Services, Box 549, Hallock, MN 56728

Depth In Feet	Description of Materials	Geologic Origin	Sample Date			Petroleum Vapor Analysis (PPM)
			WL	N	NO TYPE	
	Gravel ↙ Surface Elevation <input type="text"/>					
	Black Silty Clay			1		0
	Black Silty Clay			2		0
	Brown Silty Clay w/Rust Mottling			3		0
	Brown Silty Clay w/Rust Mottling			4		0
	Brown Silty Clay w/Rust Mottling			5		0
	Brown Silty Clay			6		0
10						
20						
30						
40						

**Water Level Measurements**

Date	Time	Water Level	Cave-In Depth
12/22/97		N/A	

Drilling Contractor NTS  
 Time Started 14:30  
 Time Finished 15:15  
 Method of Drilling Geoprobe  
 Crew Chief Tate Antonovich



1301 40th Street NW  
 P.O. Box 2706  
 Fargo, ND 58108  
 (701) 277-1612

# GPE TEST BORING LOG

Job # 16298 Vertical Scale 1/4" = 1' Boring # GP #6 Date 12/22/97  
 Project Cooperative Services, Box 549, Hallock, MN 56728

Depth In Feet	Description of Materials	Geologic Origin	Sample Date				Petroleum Vapor Analysis (PPM)
			WL	N	NO	TYPE	
0	Grass						
0	Black Silty Clay			1			0
0	Brown Silty Clay w/Rust Mottling			2			0
0	Brown Silty Clay w/Rust Mottling			3			0
0	Brown Silty Clay w/Rust Mottling			4			0
0	Brown Silty Clay			5			0
0	Brown Silty Clay			6			0
10							
20							
30							
40							

**Water Level Measurements**

Date	Time	Water Level	Cave-In Depth
12/22/97		N/A	

Drilling Contractor NTS  
 Time Started 15:30  
 Time Finished 16:00  
 Method of Drilling Geoprobe  
 Crew Chief Tate Antonovich



1301 40th Street NW  
 P.O. Box 2706  
 Fargo, ND 58108  
 (701) 277-1612

# GPE TEST BORING LOG

Job # 16298 Vertical Scale 1/4" = 1' Boring # GP #7 Date 12/22/97  
 Project Cooperative Services, Box 549, Hallock, MN 56728

Depth In Feet	Description of Materials	Geologic Origin	Sample Date			Petroleum Vapor Analysis (PPM)
			WL	N	NO TYPE	
	Gravel					
	Gray Silty Clay (stained)			1		420
	Gray Silty Clay (stained)			2		400
	Gray Silty Clay (stained)			3		420
10	Gray Silty Clay (stained)			4		415
	Brown Silty Clay			5		30
	Brown Silty Clay			6		0
	Brown Silty Clay			7		0
	Brown Silty Clay			8		0
20	Brown Silty Clay			9		0
	Brown Silty Clay			10		0
30						
40						

Water Level Measurements			
Date	Time	Water Level	Cave-In Depth
12/22/97		N/A	

Drilling Contractor NTS  
 Time Started 16:15  
 Time Finished 17:00  
 Method of Drilling Geoprobe  
 Crew Chief Tate Antonovich



1301 40th Street NW  
 P.O. Box 2706  
 Fargo, ND 58108  
 (701) 277-1612

# GP TEST BORING LOG

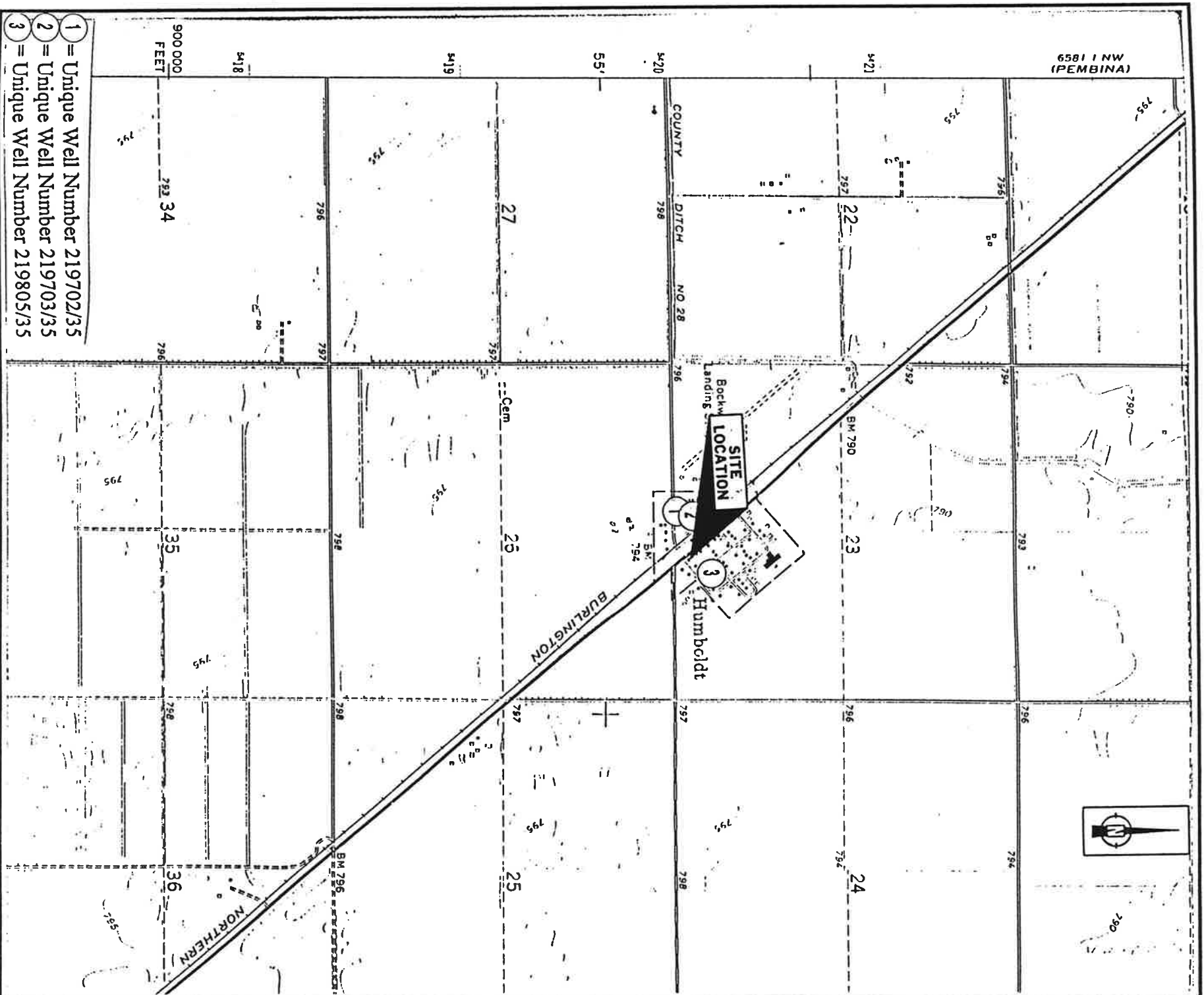
Job # 16298 Vertical Scale 1/4" = 1' Boring # GP #8 Date 12/22/97  
 Project Cooperative Services, Box 549, Hallock, MN 56728

Depth In Feet	Description of Materials	Geologic Origin	Sample Date			Petroleum Vapor Analysis (PPM)
			WL	N	NO	
	Gravel					
	Brown Silty Clay			1		0
	Brown Silty Clay			2		0
	Brown Silty Clay			3		0
	Brown Silty Clay			4		0
	Brown Silty Clay			5		0
	Brown Silty Clay			6		0
10						
20						
30						
40						

**Water Level Measurements**

Date	Time	Water Level	Cave-In Depth
12/22/97		N/A	

Drilling Contractor NTS  
 Time Started 17:00  
 Time Finished 17:45  
 Method of Drilling Geoprobe  
 Crew Chief Tate Antonovich





\*\*\*\*\*  
MINNESOTA COUNTY WELL INDEX.  
\*\*\*\*\*

UN.NO./CO. : 219702/35  
NAME : VALENTINE, D. H.

ENTERED: 1988/04/11  
UPDATED: 1996/04/19

COUNTY : KITTSON USE : TEST/MON. DRILLED: 1984/ /  
T/R/SEC. : 163/50/23CDDCDA DEPTH : 644 FT. DEPTH D: 644 FT.  
ELEVATION: 794 FT.(TOPO ) CASED : FT. GROUT :  
DIAM. : IN. DRL/DS :  
LOC.METH.: : LOC.BY : MGS COORDS.:  
STATUS : ACTIVE WHPA : DNR PA#:

DPTH BDRK: 180 FT. BEDROCK: RED RIVER  
OPEN HOLE: RED RIVER-WINNEPEG  
AQUIFER : MULTIPLE

ADDRESS : , HUMBOLDT , MN CONTACT:  
QUAD(7.5): PEMBINA  
CWI/WL: YES CWI/WC: NO CORE/CTINGS/GP.: CUTTINGS

DATE	NITRATE	BACTERIA	SOURCE	SWL	ELEV	SOURCE
1984/ /				-0	794	

COMMENTS: 3 SEPERATELOGS FOR THIS WELL IN RECORD.  
M.G.S. NO. 01.

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 MINNESOTA COUNTY WELL INDEX/WELL LOG.  
 UN.NO./CO. : 219702/35      NAME : VALENTINE, D. H.

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 WELL CONSTRUCTION.

SCREEN : DATA UNAVAILABLE.

PUMP : DATA UNAVAILABLE.

PUMPAGE TEST: DATA UNAVAILABLE.

-----  
 DRILLER S/GEOLOGIC LOG

DEPTH	DRILLER S DESCRIPTION	COLOR	HARDNESS	[AGE]
INTERVAL	[EL.TOP ] [INTERPRETED LITHOLOGY	[CODE]	[STRATIGRAPHIC UNIT(S)	[AGE]
0	4 SOIL		BLACK	
[ 794]	[SOIL, ORGANIC DEPOSITS	][RUK]	[BLACK	][REC]
4	16 LACUSTRINE CLAY + LIME CONCRETION		GOOD WATER	
[ 790]	[CLAY, LIMONITE, LIMONITE-G]	][LUU]	[CLAY+SAND	][QUA]
16	140 PURER LACUSTRINE CLAY		][QUU][CLAY+SAND	][QUA]
[ 778]	[CLAY			
140	170 PEBBLY BLUE TILL + SALT WATER A B		][TUG][TILL, GRAY	][QUA]
[ 654]	[TILL, TILLITE, PEBBLES			
170	180 FINE SAND + GRAVEL + LIME PEBBLES		][QUU][PLEISTOCENE DEPOSIT	][QUA]
[ 624]	[SAND, GRAVEL, PEBBLES			
180	190 DOLOMITIC LIMESTONE		][ORV][RED RIVER	][ORD]
[ 614]	[LIMESTONE, DOLOMITE			
190	300 DOLOMITIC LIMESTONE POWDER SAMPLE BUFF		][ORV][RED RIVER	][ORD]
[ 604]	[LIMESTONE, DOLOMITE			
300	400 COMPACT FINE-GRAIN LIMESTONE		][ORV][RED RIVER	][ORD]
[ 494]	[LIMESTONE			
400	475 LIMEROCK OR SHALE + QUARTZ GRAINS WHT-RED		][ORV][RED RIVER	][ORD]
[ 394]	[LIMESTONE, SANDSTONE			
475	500 ROUNDED QUARTZ SAND MORE SALT WAT REDDISH		][ORV][RED RIVER	][ORD]
[ 319]	[SANDSTONE			
500	532 ROUNDED SAND EVEN MORE SALT WATER WHITE		][WINNEPEG	][ORD]
[ 294]	[SANDSTONE			
532	546 ROUNDED QUARTZ SANDSTONE		][WINNEPEG	][ORD]
[ 262]	[SANDSTONE			
546	550 SLIPPERY SOAPSTONE SHALE		][WINNEPEG	][ORD]
[ 248]	[SHALE			
550	556 DARK SLIPPERY SOAPSTONE SHALE		][WINNEPEG	][ORD]
[ 244]	[SHALE			
556	560 SLIPPERY SOAPSTONE SHALE		][WINNEPEG	][ORD]
[ 238]	[SHALE			
560	571 SLIPPERY SOAPSTONE SHALE + MINERA BRN-WHT		][WINNEPEG	][ORD]
[ 234]	[SHALE			
571	592 SOAPSTONE + SHALE FRAGMENTS + SAN BRN-GRN		][WINNEPEG	][ORD]
[ 223]	[SHALE			
592	610 SHALE SIMILAR TO THAT IN SOAPSTON GRN-GRY		][WINNEPEG	][ORD]
[ 202]	[SHALE			

610 638 SHALE + GRAYISH QUARTZITE CLASTS GRN-GRY ] [ORD]  
[ 184] [SHALE, QRTZ ] [WIN] [WINNEPEG  
638 639 MICACEOUS QUARTZ SCHIST GRN-GRY  
[ 156] [GREENSTONE ] [PCUU] [PRECAMBRIAN ROCKS UNDIF] [PC ]

MINNESOTA COUNTY WELL INDEX.  
UNIQUE NO.: 219702 (CONTINUED)

639 644 GRANITE  
[ 155 ] [GRANITE

] [PCCR] [PRECAMBRIAN CRYSTALLINE] [PC ]

\*\*\*\*\*  
MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 219703/35  
NAME : JAMES J. HILL

ENTERED: 1988/04/11  
UPDATED: 1991/08/14

COUNTY : KITTSON	USE : TEST/MON.	DRILLED: / /
T/R/SEC. : 163/50/23CDDD	DEPTH : 600 FT.	DEPTH D: 600 FT.
ELEVATION: 794 FT.(TOPO	) CASED : FT.	GROUT :
DIAM. : 3 IN.	DRL/DS :	
STATUS : ACTIVE	WHPA :	DNR PA#:
DPTH BDRK: 62 FT.	BEDROCK: PRECAMBRIAN CRYSTALLINE ROCKS	

ADDRESS : ' , MN  
QUAD(7.5): HUMBOLDT CONTACT:  
CWI/WL: NO CWI/WC: NO CORE/CTINGS/GP.:  
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\*\*\*\*\*  
 MINNESOTA COUNTY WELL INDEX.  
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UN.NO./CO. : 219805/35                    ENTERED: 1993/02/26  
 NAME : A-5                                    UPDATED: 1995/08/22

COUNTY : KITTSON                    USE : TEST/MON.  
 T/R/SEC. : 163/50/23DCDABC        DEPTH : 141 FT.  
 ELEVATION: 795 FT.(TOPO )        CASED : FT.  
 DIAM. : IN.                    DRL/DS : USGS  
 LOC.METH.: INFO.OWNER            LOC.BY : USGS  
 ABANDONED: 1955/ /                UNUSED?:  
 STATUS : SEALED                    WHPA :

DRILLED: 1955/07/21  
 DEPTH D: 141 FT.  
 GROUT :  
 COORDS.:  
 SEALED?:  
 DNR PA#:

OPEN HOLE: SAND+GRAVEL  
 AQUIFER : QUAT. BURIED ARTES. AQUIFER

ADDRESS : , HUMBOLDT , MN            CONTACT:  
 QUAD(7.5): HUMBOLDT                QUAD: CUTTINGS  
 CWI/WL: YES                    CWI/WC: NO                    CORE/CTINGS/GP.: CUTTINGS

DATE	NITRATE	BACTERIA	SOURCE	SWL	ELEV	SOURCE
1955/07/21				-0	795	USGS

COMMENTS: M.G.S. NO. 2251.  
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 MINNESOTA COUNTY WELL INDEX/WELL LOG.  
 UN.NO./CO. : 219805/35      NAME : A-5

GEO.INTRP: MGS      GEOLOGST: EB      METHOD : GEO.STUDY<1:100K

WELL CONSTRUCTION.

	DIAM(IN)	FROM(FT)	TO(FT)	[GROUT-----]	MATERIAL	AMNT	UNITS
DRILL HOLE1:	6		141				
GROUT 1 :					NEAT CMNT	5	SACKS

SCREEN: DATA UNAVAILABLE.

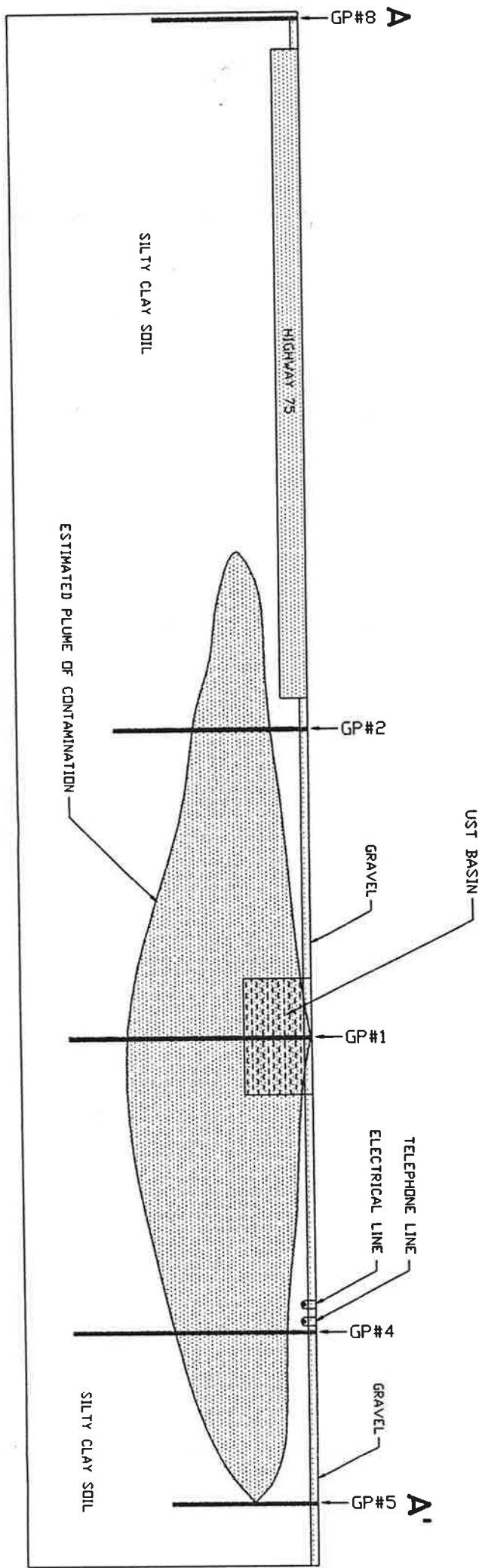
PUMP : DATA UNAVAILABLE.

PUMPAGE TEST(S).  
 STATIC WATER LEVEL: -0 FT.      DATE: 1955/07/21  
 LEVEL(FT)      HOURS      GPM      DRAWDOWN(FT)  
 TEST 1:      -0      100      .0

DRILLER S/GEOLOGIC LOG

DEPTH	INTERVAL	DRILLER S DESCRIPTION	EL.TOP ]	[INTERPRETED LITHOLOGY	[CODE]	COLOR	HARDNESS	[STRATIGRAPHIC UNIT(S)	] [AGE]
0	1	TOPSOIL, CLAYEY, CALCAREOUS				DK BRN			] [REC]
		[795] [SOIL, ORGANIC DEPOSITS, CL]				[RUBB]	[BROWN		] [SOFT
1	15	CLAY-TAN, DK BROWN, DK GRAY-BROWN MIXED							] [QUA]
		[794] [CLAY				[QCUU]	[CLAY		] [QUA]
15	136	CLAY, PLASTIC, FEELS GREASY				GRY-BRN	SOFT		] [QUA]
		[780] [CLAY				[QCUU]	[CLAY		] [QUA]
136	141	FINE TO COARSE SAND, FINE GRAVEL							] [QUA]
		[659] [SAND, GRAVEL				[QHUU]	[SAND+GRAVEL		] [QUA]

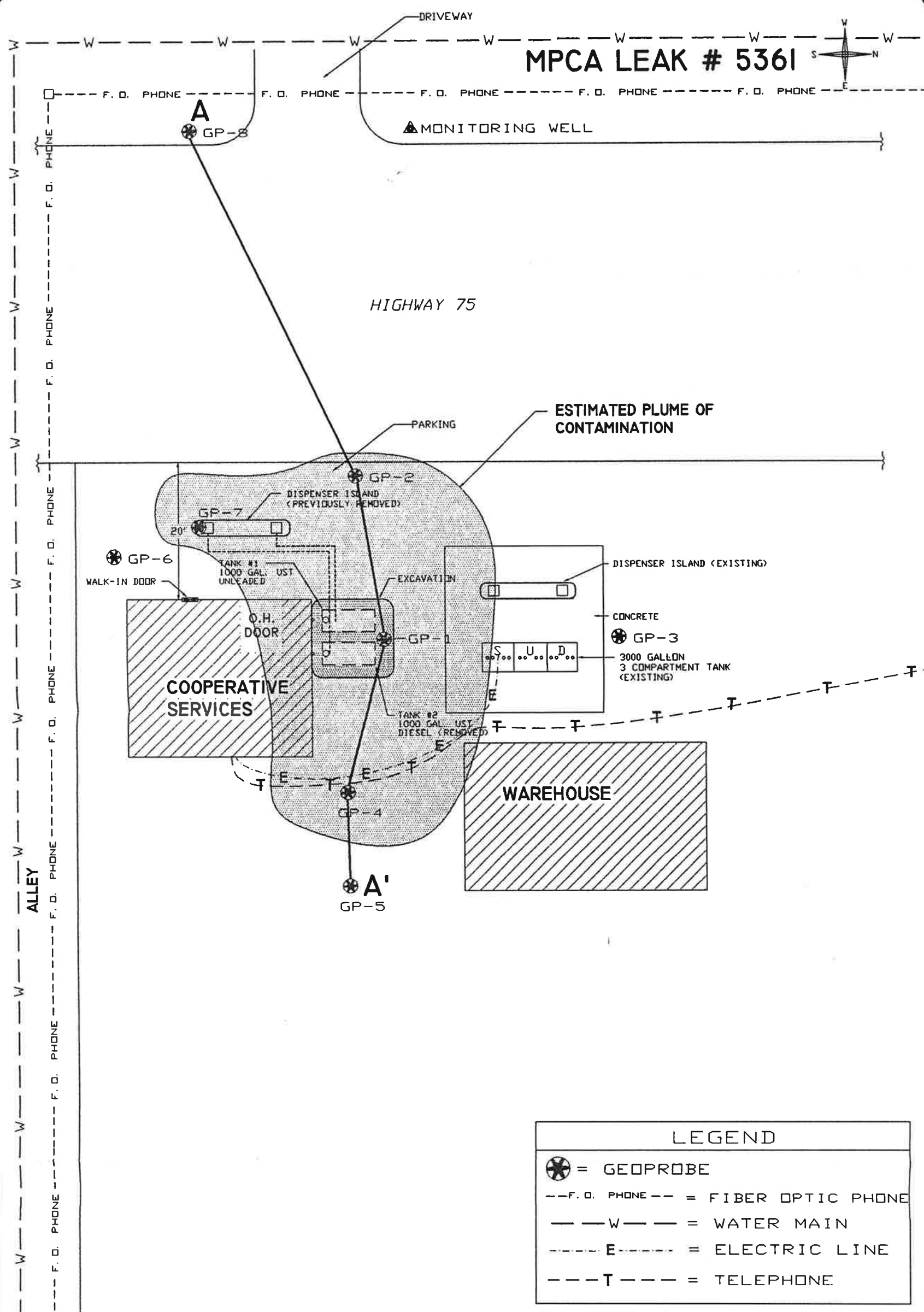
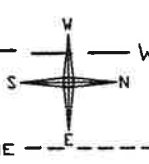
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Customer: COOPERATIVE SERVICES	
Location: HUMBOLDT, MN	
Date: 12/22/98	Scale: 1' = 15'
Drawing #203AGPE	Project # 16298

Description  
GEOLOGIC CROSS SECTION A-A'

# MPCA LEAK # 5361



LEGEND	
	= GEOPROBE
--F. O. PHONE--	= FIBER OPTIC PHONE
---W---	= WATER MAIN
---E---	= ELECTRIC LINE
---T---	= TELEPHONE

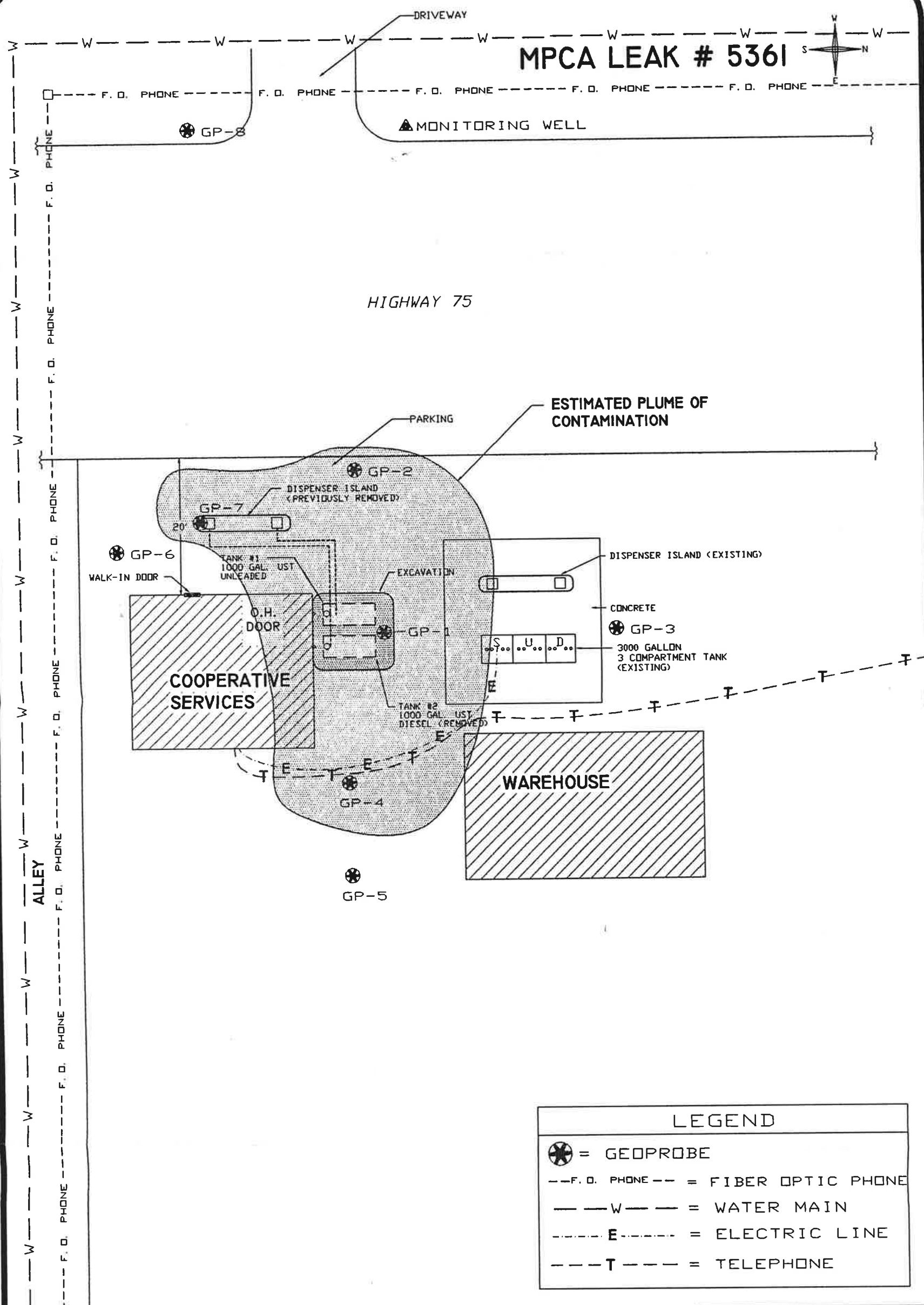
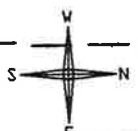


Customer:	COOPERATIVE SERVICES
Location:	HUMBOLDT, MN
Date:	12/22/98
Drawing #	203
Scale:	1" = 20'
Project #	16298

Description  
GEOLOGIC CROSS SECTION A-A'



# MPCA LEAK # 5361



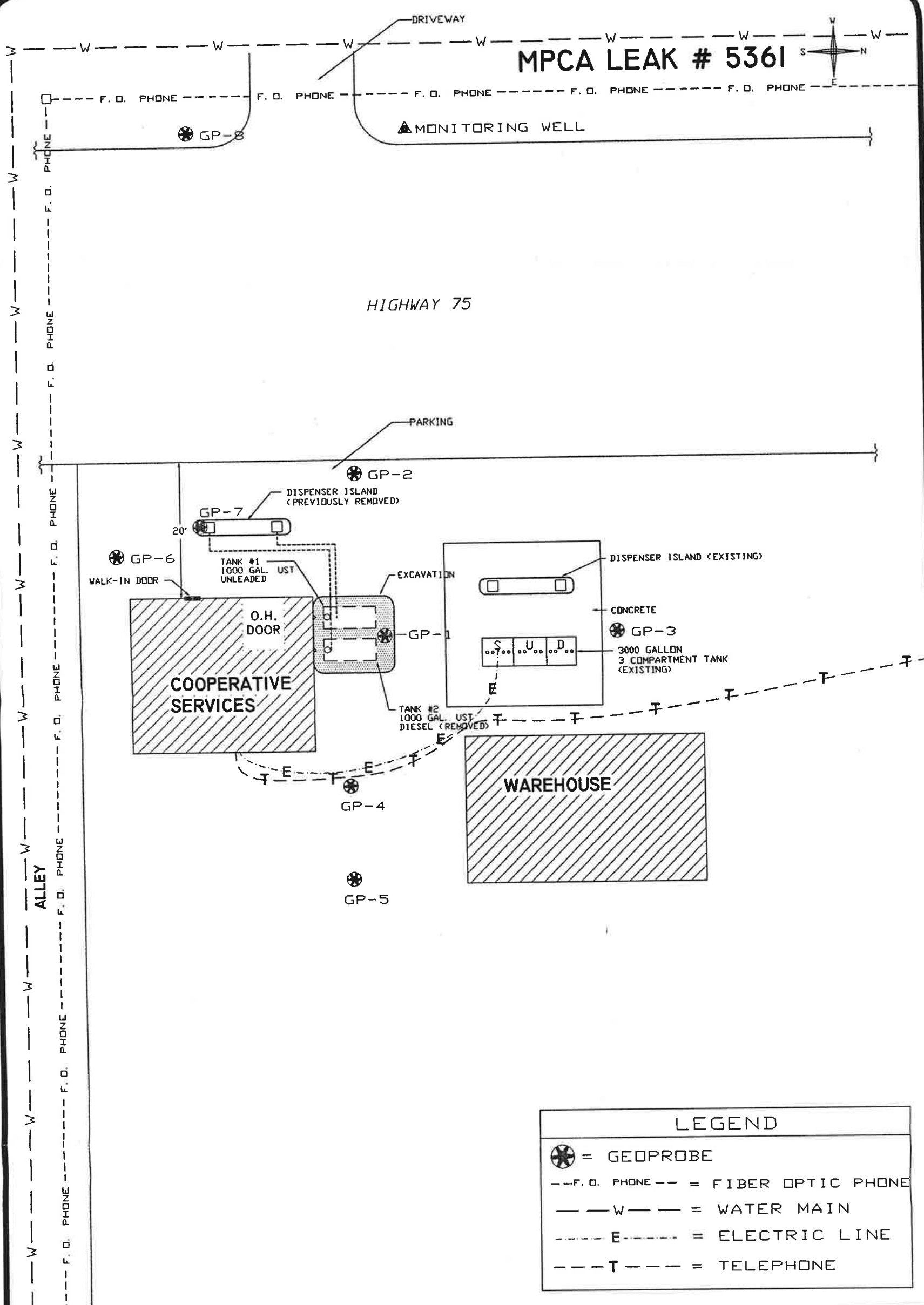
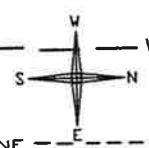
LEGEND	
	= GEOPROBE
--F. O. PHONE--	= FIBER OPTIC PHONE
---W---	= WATER MAIN
---E---	= ELECTRIC LINE
---T---	= TELEPHONE



Customer:	COOPERATIVE SERVICES	
Location:	HUMBOLDT, MN	
Date:	12/22/98	Scale: 1" = 20'
Drawing #	203	Project # 16298

Description  
**ESTIMATED PLUME OF CONTAMINATION**

# MPCA LEAK # 5361

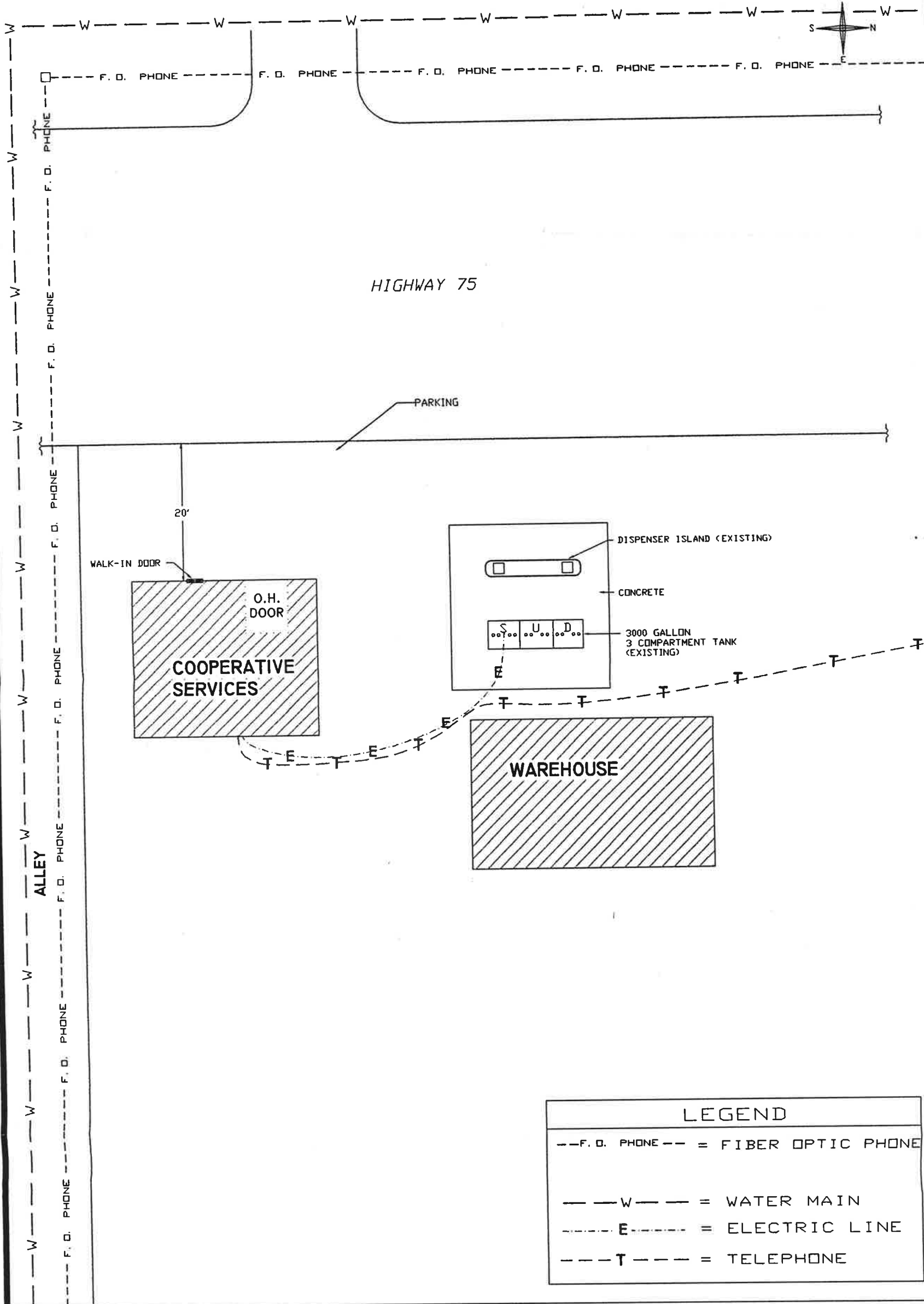
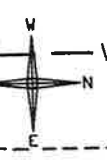


LEGEND	
	= GEOPROBE
---F. O. PHONE---	= FIBER OPTIC PHONE
— W —	= WATER MAIN
--- E ---	= ELECTRIC LINE
--- T ---	= TELEPHONE



Customer:	COOPERATIVE SERVICES	
Location:	HUMBOLDT, MN	
Date:	12/22/98	Scale: 1" = 20'
Drawing #	203	Project # 16298

Description  
**UTILITIES / GEOPROBE PLOT PLAN**

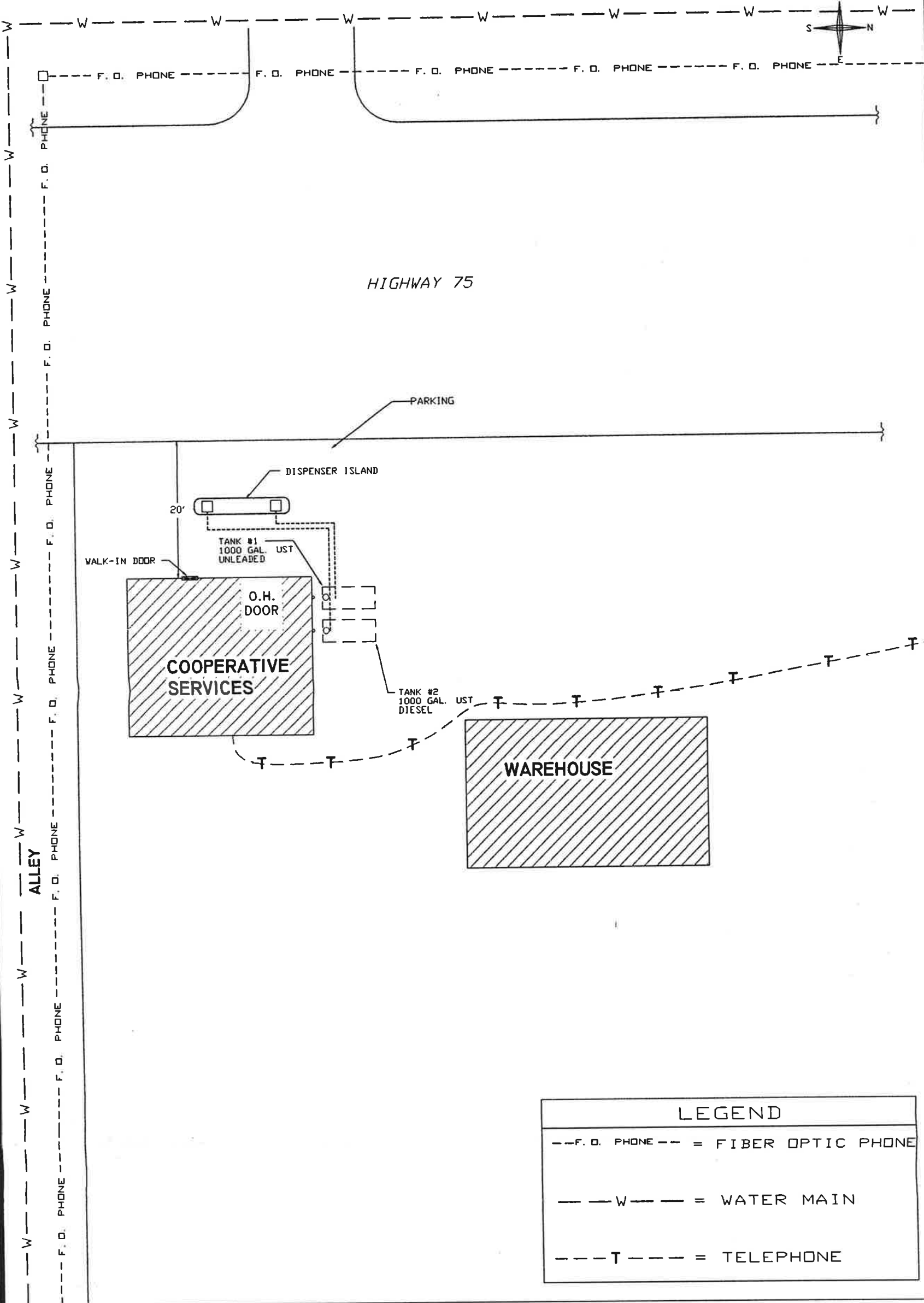
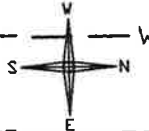


LEGEND	
--F. O. PHONE--	= FIBER OPTIC PHONE
---W---	= WATER MAIN
---E---	= ELECTRIC LINE
---T---	= TELEPHONE



Customer:	<b>COOPERATIVE SERVICES</b>
Location:	<b>HUMBOLDT, MN</b>
Date:	<b>12/22/98</b>
Drawing #	<b>203</b>
Scale:	<b>1" = 20'</b>
Project #	<b>16298</b>

Description  
**CURRENT SITE PLOT PLAN**



LEGEND	
--F. O. PHONE --	= FIBER OPTIC PHONE
---W---	= WATER MAIN
---T---	= TELEPHONE



Customer:	<b>COOPERATIVE SERVICES</b>
Location:	<b>HUMBOLDT, MN</b>
Date: <b>7/01/97</b>	Scale: <b>1" = 20'</b>
Drawing # <b>203</b>	Project # <b>16298</b>

Description  
**PREVIOUS SITE PLOT PLAN**