

#8845

Leaksite ID# 8845
CHALE OIL CO
Site Name

Tank Facility ID 54132
CHALE OIL
Responsible Party

LEAKSITE REMARKS

10/10/95 RHN: Release report to MPCA from Ty Fugiseth @ WSN; 3 gas USTs removed; 550, 1000, & 500-gallon. Ages 13-39 years. Holes and pitted. No contaminated soil has been removed. 200 + vapors @ 9'. Unknown if ground water has been impacted. Ground water estimated at 9'. Native soil is clay. Site is on city water.
10/31/95 RHN: Standard letter sent.

11/22/95 MDN: Received call from Lucille Chale. She was responding to the standard letter. They are currently getting bids and planning on going forward with the investigation. SHE was concerned whether she needed to send something in writing. I said that she was welcome to, and to direct it to Rick Newquist.

11/29/95 RHN: Returned call from Lucille Chale @ Chales Oil & Service Company; General discussion about site.

11/18/96 RHN: Rec. LSI requesting closure from Ty Fuglseth @ WSN request -ing closure.

11/21/96 RHN: Phone call from Ty @ WSN; Ty will be faxing me the boring log for B-4. It is missing from the report.

11/22/96 RHN: Rec. boring log fax from Ty.

1/27/97: SCT-Reviewed rept. This appears to be a "non-resource" aquifer. The risk to receptors is low. The area is served by the Kitson County water system - water comes from Lake Bronson, about 30 miles to the east There is a large diameter seepage well on site which is no longer being used. It was sampled once and found to be clean. Nevertheless, abandonment of this well would reduce the remaining risk to the site and allow for site closure. I relayed this info to Tye Fugelseth, WSN (218-281-6545).

1/30/97 RHN: RMM Letter to typing.

1/31/97 RHN: Rec. letter from Ty Fuglseth @ WSN which summarizes his conversation with SCT.

2/06/97 RHN: RMM Letter sent requesting that they abandon the on-site seepage well to receive file closure.

01/07/98 LC CSR Inadequate sent to Commerce. Reduced for failure to have tank and piping leak detection.

1/14/98 RHN: I called Ty Fuglseth @ WSN concerning abandonment of the seepage well. Ty explained that Wayne Chale had the well abandoned. Wayne did not have an invoice for the abandonment so he did not apply for reimbursement. I requested a letter from Wayne Chale stating that the well was abandoned and who abandoned the well before we will close the file.



Minnesota Pollution Control Agency

March 13, 1998

Mr. Wayne Chale
Chale Oil Company
Box 113
St. Vincent, Minnesota 56755

RE: Petroleum Tank Release Site File Closure
Site: Chale Oil Company, Highway 75 and Highway 171, St. Vincent
Site ID#: LEAK00008845

Dear Mr. Chale:

We are pleased to let you know that the Minnesota Pollution Control Agency (MPCA) Tanks and Emergency Response Section (TERS) staff has determined that your investigation and/or cleanup has adequately addressed the petroleum tank release at the site listed above. Based on the information provided, the TERS staff has closed the release site file.

Closure of the file means that the TERS staff does not require any additional investigation and/or cleanup work at this time or in the foreseeable future. Please be aware that file closure does not necessarily mean that all petroleum contamination has been removed from this site. However, the TERS staff has concluded that any remaining contamination, if present, does not appear to pose a threat to public health or the environment.

The MPCA reserves the right to reopen this file and to require additional investigation and/or cleanup work if new information or changing regulatory requirements make additional work necessary. If you or other parties discover additional contamination (either petroleum or nonpetroleum) that was not previously reported to the MPCA, Minnesota law requires that the MPCA be immediately notified.

You should understand that this letter does not release any party from liability for the petroleum contamination under Minn. Stat. ch. 115C (Supp. 1997) or any other applicable state or federal law. In addition, this letter does not release any party from liability for nonpetroleum contamination, if present, under Minn. Stat. ch. 115B (1996), the Minnesota Superfund Law.

Mr. Wayne Chale

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March 13, 1998

Because you performed the requested work, the state may reimburse you for a major portion of your costs. The Petroleum Tank Release Cleanup Act establishes a fund which may provide partial reimbursement for petroleum tank release cleanup costs. This fund is administered by the Department of Commerce Petro Board. Specific eligibility rules are available from the Petro Board at 612/297-1119 or 612/297-4203.

If future development of this property or the surrounding area is planned, it should be assumed that petroleum contamination may still be present. If petroleum contamination is encountered during future development work, the MPCA staff should be notified immediately.

For specific information regarding petroleum contamination that may remain at this leak site, please call the TERS File Request Program at 612/297-8499. The MPCA fact sheet #3.35 *Leak/Spill and Underground Storage Tank File Request Form* (April 1997) must be completed prior to arranging a time for file review.

Thank you for your response to this petroleum tank release and for your cooperation with the MPCA to protect public health and the environment. If you have any questions regarding this letter, please call me at 612/297-8583 or the site hydrogeologist, Stephen Thompson, at 612/297-8603

Sincerely,

Jim Head

Richard Newquist
Project Manager
Cleanup Unit I

Tanks and Emergency Response Section

Jim Hesch

Stephen Thompson
Hydrogeologist
Cleanup Unit I

Tanks and Emergency Response Section

RHN:SCT:lh

cc: Bette Twamley, City Clerk, St. Vincent

Gary Rice, Kittson County Solid Waste Officer

Ty Fuglseth, Widseth Smith Nolting, Baxter

Minnesota Department of Commerce, Petrofund Staff

LIMITED SITE INVESTIGATION REPORT

MPCA LEAK No. 8845

RECEIVED
NOV 15 1996
MPCA, HAZARDOUS
WASTE DIVISION

CHALE OIL COMPANY

Highway 171 & Highway 75
St. Vincent, Minnesota 56755

Prepared for:

Mr. Wayne Chale
Chale Oil Company
Highway 171 & Highway 75
St. Vincent, MN 56755

OCTOBER 1996

WSN NO. 260B379

STANDARD OF CARE


LIMITED SITE INVESTIGATION REPORT

Chale Oil Company


MPCA LEAK No. 8845

The report was prepared following Minnesota Pollution Control Agency (MPCA) guidance materials for excavation of petroleum contaminated soils, laboratory analysis, field screening methods, groundwater monitoring protocols, and petroleum tank release reports. The conclusions are based on field observations, field screening results, and laboratory analytical reports as presented in the report. Recommendations follow MPCA guidance and represent the professional opinions of Widseth Smith Nolting (WSN) staff. These opinions were arrived at with currently accepted geologic, hydrogeologic, and engineering practices at this time and location. The report was prepared or reviewed by a certified or registered WSN professional with a background in engineering, environmental, and/or the natural sciences.

This report was prepared by:



Ty Fugseth, P.G.
Geologist
Date 11-8-96

Reviewed By:


Gregory W. Smith, P.G.
Geological Engineer
Date 11-8-96

Remedial 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. If the consultant has concluded that a *Limited Site Investigation* is applicable to this site, Section 6 and Section 7 may be deleted from this report.

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: LEAK #0000 8845 Date: 9-15-96

Responsible Party: Chale Oil Company R.P. phone #: (218) 823-6661

Facility Name: Chale Oil Company, St. Vincent, Minnesota

Facility Address: Hwy. 75 & Hwy. 171 City: St. Vincent

County: Kittson Zip Code: 56755

Location of site: LAT: 48° 58' 21" N LONG: 97° 11' 57" W Circle one: UTM/State

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Chale Oil Company

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Appendix B	Laboratory Analytical Results
Appendix C	Methods and Procedures
Appendix D	Boring Logs
Appendix E	Water Supply Well Geologic Logs
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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 a 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 Chale Oil site contains a one story, service station building, a quonset storage building, and a newly constructed pole shed storage building (see Figure 2A). Approximately 75 feet west of the service station structure lies U.S. Highway 75. The area between the highway and the structures is characterized by a ditch, grassy areas, and gravel drive areas (see Figure 2A). A concrete pad is present around the pump islands. The remaining areas to the north, south, and east are grass covered.

The site is bordered on the east by a Burlington Northern Railway and on the west and south by U.S. Highway 75. Immediately to the north of the subject site is the Humboldt-St. Vincent Elevator and agricultural fields. Agricultural fields are also found immediately to the west and south of the subject site, across U.S. Highway 75. The entire region surrounding the subject site is developed for agricultural use. The closest residence is located over one-quarter mile from the Chale Oil site. The town of St. Vincent is located one mile west of the Chale Oil site.

The Chale Oil site lies in a topographically uneventful region characterized by flat terrain. A gentle westerly slope of approximately 10 feet per mile is common to the west of the subject site. To the east and south, the terrain has little to no relief for several miles. The site lies at an approximate elevation of 795 feet above mean sea level. The Red River of the North lies approximately one mile to the west-southwest of the subject site. Several small ponds are located within one-half mile and Lake Stella approximately two-thirds mile from the subject site.

Table 1.

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

Tank #	UST or AST	Capacity (gallons)	Contents	Age	Status*	Condition
1	UST	1,000	Gasoline	≈ 35 yrs.	Removed (10-10-95)	Rust pitted; small holes
2	UST	500	Gasoline	≈ 35 yrs.	Removed (10-10-95)	Rust pitted; small holes
3	UST	500	Gasoline	≈ 35 yrs.	Removed (10-10-95)	Rust pitted; small holes
4	UST	1,000	Gasoline	New	In Use (10-10-95)	New; excellent

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

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 pumps for the removed tanks were left in place and are currently in service for the dispensing of gasoline from the new tank. The old lines were removed and replaced by new lines.

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

The expected source of the release is the tanks. The tanks were rust pitted and small holes were observed in the tanks. The dispensers and associated product lines under the dispensers could also be a source area, because high contamination levels were detected in a boring located near the pump island. Also, because the tanks were not covered with a concrete pad, it is possible that some of the contamination is the result of over filling of the tanks and subsequent seepage into the ground.

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

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

Section 3: Excavated Soil Information

3.1 Was soil excavated for off-site treatment? YES NO

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

Date excavated: _____

Volume removed: _____ cubic yards

3.2 Indicate soil treatment type:

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

Section 4: Extent and Magnitude of Soil Contamination

4.1 Were soil borings conducted in or immediately adjacent to all likely source areas (e.g., 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
NO *
Are we not post

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

The blue clay encountered at a depth of 16 feet below land surface (BLS) in SB-1 is regarded as a confining layer.

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

4.4 Indicate the drilling method: X hollow-stem auger
_____ sonic drilling
_____ push probes
X other (Hand Augers)
Note: contact MPCCA staff hydro before use of flight augers)

call to the type Fugelseth - PID meter was not operating correctly and gave readings that were too high. Analytical sampling showed levels in same location, Table 2. to be lower.

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

ASTM soil classification	Depth (ft)	Soil Boring					
		1	2	3	4	5	6
Silty Clay	4'-6'	320	160	200	60	60	55
Silty Clay	10'-12'	168	40	200	60	60	60
Silty Clay	14'-16'	NS	30	98	60	20	29
Clay	16'-18'	14	NS	NS	NS	NS	NS
Clay	22'-24'	84	NS	NS	NS	NS	NS

Notes: (type of PID/FID) HNU PID

NS = Not sampled at this depth interval

ASTM soil classification	Depth (ft)	Soil Boring					
		7	8	9	10		
Silty Clay	4'	0	0	0	0		
Silty Clay	7'	0	0	0	0		
Silty Clay	10'	0	0	0	0		

Notes: (type of PID/FID) HNU PID

Table 3.

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

Well/Boring, Depth(ft)	Date Analyzed	Benzene	Toluene	Ethylbenzene	Xylene	GRO	DRO
SB-1 (16'-18')	6/3-4/96	<0.20	0.41	<0.20	<0.50	<3.0	-
SB-1 (22'-24')	6/3-4/96	<0.20	0.34	<0.20	<0.50	<3.0	-
SB-2 (14'-16')	6/3-4/96	<0.20	0.38	<0.20	<0.50	<3.0	-
SB-5 (10'-12')	6/3-4/96	<0.20	0.27	<0.20	<0.50	<3.0	-
T-1	10/13/95	3.9	1.0	1.2	2.4	65	-
T-2	10/13/95	8.0	3.7	4.0	11	220	-
T-3	10/13/95	7.8	3.2	4.7	11	310	-

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

--- = Not analyzed

T-1, T-2, and T-3 represent samples collected under the tanks during excavation.

Table 4.

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

Well/Boring Depth (ft)	Date Analyzed													

Notes:

Well/Boring Depth (ft)	Date Analyzed													

Notes:

4.5 If any non-petroleum compounds were detected list them below and identify possible sources of these compounds. **None Detected**

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

The vertical extent of soil contamination appears to be limited to a depth of less than 16 feet below land surface (BLS). Soil boring SB-1, was advanced to a depth of 22 to 24 feet BLS to define the vertical extent of contamination. Soil samples from 16 to 18 feet BLS and 22 to 24 feet BLS were collected from SB-1 for laboratory analysis of TPH-GRO and BTEX constituents. As indicated in Table 3, all parameters analyzed, except toluene, were below detectable limits (BDL) in both samples. Because toluene was detected at very low levels in all of the soil samples with all other constituents below detectable limits, it is believed to be from laboratory contamination. A vertical extent soil sample was collected from SB-2 at a depth of 14 to 16 feet BLS and SB-5 at a depth of 10 to 12 feet BLS and analyzed for TPH-GRO and BTEX constituents. As indicated in Table 3, all contaminants, except toluene, were below detectable limits.

The horizontal extent of soil contamination, based on organic vapor measurements, can be defined by borings SB-10, SB-7, SB-5, SB-8, SB-9, and SB-6 (see Figures 2B and 2C). Because one of the borings, SB-5, registered organic vapors as high as 60 parts per million (ppm), a sample was collected at a depth of 10 to 12 feet BLS and sent to the laboratory for confirmation. As indicated in Table 3, SB-5 (10'-12') was below detectable limits for all constituents analyzed, except toluene. As above, the toluene is believed to be a laboratory contaminant. It is believed these organic vapor readings were in part the result of water vapor effects. The horizontal extent, as defined above, is confirmed by groundwater analyses from the same borings.

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:

<u>9.25 x 10⁻⁵-2.31 x 10⁻⁷</u> cm/sec	<u>XX</u>	estimate from reference
	<u> </u>	slug test
	<u> </u>	permeability test
	<u> </u>	Hazen approximation from grain-size distribution

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: ****The impacted unit is not considered an aquifer.**

<u> </u>	less than 10 feet
<u> </u>	between 10 and 20 feet
<u> </u>	20 feet or greater

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

MGS publications indicate that the region is located in the Glacial Lake Agassiz Physiographic Area. This area is characterized by clays and silts deposited in Glacial Lake Agassiz. These clays can be over 150 feet thick and overlie sandy and silty tills over 150 feet thick. Below the tills, Cretaceous and Ordovician sedimentary rocks are present at thickness over 300 feet. Quartz syenite bedrock is present below the sedimentary rocks at an approximate depth of 500 feet BLS.

Boring logs from the site indicate that silty clay is present in the upper 15 to 16 feet of the profile. Below 16 feet, a stiff, blue clay is present. The thickness of the blue clay layer is unknown at the subject site, but a well construction log for a well located approximately one-half mile to the southwest indicates a compact clay layer of approximately 112 feet thick. Assuming the compact clay is the same unit as the blue clay layer, it would indicate the blue clay layer is regionally extensive. The boring logs and geologic well records are included in this report as Appendix D and E, respectively.

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

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

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

5.5 If other water supplies are available, explain.
The site is supplied by the North Kitson Rural Water System.

5.6 Are there any other reasons the impacted aquifer should not be considered a resource aquifer? No.

Table 5.

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

Water Level Depth (feet)	1	2	3	4	5	6	7	8	9	10
	2.2	2.0	2.5	1.8	1.5	2.6	3.1	5.3	4.3	4.5

Notes: The above water levels may not represent the normal water level because of flooding and high water conditions observed this spring.

5.7 Is contaminated soil in contact with ground water? YES NO
If YES or if ground water contamination appears likely then complete tables 6 and 7 below.

Table 6.

Indicate the laboratory analytical results for water samples collected from the borings, temporary wells or push probes. *Contaminant concentrations reported in mg/l or parts per million.*

Well/Boring Number	Date Analyzed	Benzene	Toluene	Ethylbenzene	Xylene	GRO	DRO
SB-1	6/3-4/96	2.4	0.18	0.32	1.0	11	--
SB-3	6/3/96	4.8	0.22	0.32	0.54	12	--
SB-4	6/3/96	0.013	0.017	0.024	0.038	0.83	--
SB-6	6/3/96	<0.0040	<0.0040	<0.0040	<0.010	<0.040	--
SB-7	8/20/96	<0.0040	<0.0040	<0.0040	<0.010	<0.040	--
SB-8	8/20/96	<0.0040	<0.0040	<0.0040	<0.010	<0.040	--
SB-9	8/20/96	<0.0040	<0.0040	<0.0040	<0.010	<0.040	--
SB-10	8/20/96	<0.0040	<0.0040	<0.0040	<0.010	0.065	--
Water well	6/4/96	<0.005	<0.005	<0.005	<0.005	<0.20	--

Notes:

-- = Not tested for this parameter

Table 7.

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

Well/Boring Number	Date Analyzed						

Notes:

5.8 If any non-petroleum compounds were detected list them below and indicate whether they exceed the HRLs. Also, identify possible sources of these compounds. No compounds detected.

5.9 If contaminated soil is not in contact with ground water, what is _____ feet 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?

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.

No visual evidence of a fluctuating or seasonally high water table was present.

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

As stated in a previous section, the vertical extent was demonstrated to be less than 16 feet BLS. Also, a thick, tight, blue clay layer exists at a depth of approximately 16 feet BLS and is possibly over 100 feet thick. In addition, based on the groundwater receptor search, the wells in the immediate area are developed at depths greater than 100 feet BLS with clay deposits overlying and confining their screened zones.

Additional Ground Water Investigation

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

Section 6. Extent and Magnitude of Groundwater Contamination

Table 8.

Monitoring well construction.

Well Number	Unique Well Number	Date Installed	Relative Surface Elevation	Riser Height Above Grade	Bottom of Well (Elevation)	Screen Interval (Elev. - Elev.)

Notes: (location and elevation of benchmark)

Table 9.

Water table summary.

Well Number	Date	Depth of Water from Top of Casing	Product Thickness	Depth of Water Below Grade	Relative Groundwater Elevation
MW-1					
MW-2					
MW-3					
MW-4					

Notes: (GW above/below screen, etc.)

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

If YES, which are deep wells?

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

Provide estimates of the following additional aquifer parameters:

Horizontal Gradient (dh/dl): _____

Vertical Gradient (dv/dl): _____

Porosity: _____

Flow direction: _____

Hydraulic Conductivity (K) _____ m/s

Pore velocity: _____ meters/year

Table 10.

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

Indicate the laboratory analytical results for water samples.

Well #	Date	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	GRO	DRO
MW-1								
MW-2								
MW-3								
MW-4								

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

Table 11.

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

Well #	Date Analyzed						

Notes: units

- 6.2** If any non-petroleum compounds were detected list them below and indicate whether they exceed the HRLs. Also, identify possible sources of these compounds. YES NO

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

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

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

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

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

Section 7: Evaluation of natural attenuation

Table 12.

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

Monitoring Well	Temp. °C	pH	Dissolved Oxygen (mg/l)	Nitrate (mg/l)	(Fe II) (mg/l)	(H ₂ S, HS ⁻) (mg/l)
MW-1						
MW-2						
MW-3						
MW-4						

Notes:

- 7.1 Discuss the results of the bioactivity evaluation. Specifically, compare the concentrations of the inorganic parameters inside and outside the plume.
- 7.2 In your judgment, is natural biodegradation occurring at this site? YES NO
Please Explain.

Section 8: Well Receptor Information/Assessment

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

Table 13.

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

Unique Well #	Ground Elevation	Total Depth (ft)	Base of Casing (ft)	Static Elev.	Aquifer	Use	Owner	Distance & Direction from site
219704	790	165	Unk	Flow	Buried Outwash	Ind	Great Northern RR	SW; 3,200 ft.
Unknown #1	795	Unk	Unk	Unk	Unk	Unk	Humboldt/St. Vincent Elevator	N; 400 ft.

Notes: An old seepage well (i.e., water well in Table 6) is located behind the Chale Oil Station. It is constructed of corrugated culvert material and was at one time used for washing and lavatory use. It is no longer in use.

Unk = Unknown; Dom. = Domestic; Mun. = Municipal; Test = Test Well ; Ind = Industry; Pub = Public Supply; Flowing = Flowing

8.1 Is municipal water available in the area?

YES NO

The Chale Oil site is serviced by the North Kittson Rural Water System

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

YES NO

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

Only two wells were found to exist within the 500 foot search radius. The closest well is located behind the Chale Oil station. It is an old, shallow seepage well that was once used to supply wash water for the station sink and toilet. This well is no longer being used. A sample collected from this well for laboratory analysis, registered no detectable contamination. The second well belongs to the Humboldt/St. Vincent Elevator and has not been used for at least 15 years. It was taken out of service when the North Kittson Rural Water System was installed. It is located underneath an addition to the elevator and has not been sealed. Its depth is unknown, but it is expected to be over 100 feet deep to penetrate the tight blue clay layer that appears to be regionally extensive. Because of the nature of the subsurface soils in this region, the relative distance between the Chale Oil site and the elevator, and the magnitude and extent of contamination found at the subject site, the risk to the well and associated aquifer is very low to non-existent. No other wells were identified within a one-half mile radius of the Chale Oil site.

8.4 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

Doris Karol, St. Vincent City Clerk Phone (218) 823-6880

Section 9: Surface Water Risk Assessment

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

If YES, indicate its name:

9.2 If surface water is present 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
N/A

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

Name of receiving water: _____

Plume width, (W): _____ feet

Plume thickness, (H): _____ feet

Hydraulic conductivity, (K): _____ gal/day/ft²

Horizontal gradient, (dh/dl): _____ (unitless)

Discharge, (Q) = H*W*K*(dh/dl)/1440 _____ gal/min

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

Section 11: Discussion

11.1 Discuss the risks associated with the remaining soil contamination?

The risks associated with the remaining soil contamination appear to be very small. Soil contamination levels are low to moderate and no evidence of product saturated soil was found. The soils in the region are clays and silty clays with low permeabilities, thus, inhibiting the migration of contaminants. The contaminant plume also appears to be mostly contained within the property boundaries and above 16 feet BLS.

11.2 Discuss the risks associated with the impacted ground water?

As with the contaminated soil, the risks associated with the impacted groundwater appear to be minimal. Contaminant levels are low to moderate over the site and no evidence of free product was identified. Because of the tight nature of the native clay-rich soils, the groundwater and associated contaminant plume is prevented from migrating any significant distance, horizontally or vertically. The entire region is also underlain by a tight blue clay deposit that acts as an impermeable confining layer to prevent any downward migration of contamination.

The groundwater receptor survey indicated that the closest identified well, located in the rear of the Chale Oil station, is an old seepage well that is no longer used. Also, when this well was used, it supplied only wash water for the sink and toilet. A water sample collected from this well registered no detectable contamination. The next closest well is approximately 400 feet north of the subject site. It has not been used for over 15 years and is expected to be 100 plus feet deep. Also, no surface water receptors were identified. Although the water utility line may be contacted by contaminated groundwater, the levels of contaminants are low enough that vapor buildups are unlikely.

11.3 Discuss other concerns not mentioned above:

Section 10: Vapor Risk Assessment/Survey

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

If YES, describe:

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

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

The potential for vapor migration/accumulation is low. The native subsurface materials are dominated by clay deposits with low permeability and contaminant concentrations are low to moderate. No free product was detected in any of the soil borings and the contaminant plume is mostly restricted to the subject property. No sanitary or storm sewers are present on or around the subject property. Because of the depth of groundwater levels observed during the assessment (i.e., 1.5 to 5.0 feet BLS), it is possible that contaminated groundwater would intersect the utility lines if sufficient eastward horizontal migration occurred. See Figure 2A for the locations and types of utility lines present. But, because contaminant concentrations are low to non-existent on the east side of the property and no free product was detected, vapor buildup is unlikely. Because contaminant levels are also low in the rear of the store (i.e., north side) the potential for vapor build up in the septic system is very low. No basements are present on the subject site or near the site within the outer limits of the contaminant plume.

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

Table 14.

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

10.4 Describe and interpret the results of the vapor survey.

Section 12: Conclusions and Recommendations

Recommendation for site: site closure
 additional vapor monitoring
 additional ground water monitoring
 active cleanup

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

12.0 As stated in Fact Sheet #3.1, Section III, Remedial Investigation, a Limited Site Investigation (LSI) was required at this site because excavation was not performed to address the soil contamination and groundwater was also impacted. During the LSI, the horizontal and vertical extent of soil and groundwater contamination was defined using a series of soil borings and associated soil and groundwater analyses. It was determined that surface waters were not at risk and the potential for vapor buildup is minimal because free product was not encountered. Also, the groundwater receptor survey identified only two wells within a 500 foot radius and no additional wells within approximately one-half mile. The closest well, an old seepage well, is no longer being used, and laboratory results of a water sample confirm this well is not impacted. The other well, located 400 feet from the contaminant plume, is probably over 100 feet deep and protected by thick clay deposits. Therefore, cross-contamination between the impacted units and the closest drinking water aquifer is unlikely. In addition, this well has not been used for over 15 years.

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

No monitoring is recommended.

If active cleanup is proposed then MPCA 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.

NA

Section 13: Required Figures

Indicate attached figures:

- XX *Figure 1*, 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.
- XX *Figure 2*, 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.
- XX *Figure 3*: Well receptor survey map showing ½ mile radius, 500 foot radius, water supply wells, other potential sources of contamination.
- *Figure 4*: Geologic cross sections.
- *Figure 5*: Vapor survey map showing utilities and buildings with basements and monitoring locations (if a survey was required).
- *Figure 6*: Ground water gradient contour maps (for sites with monitoring wells).

Section 14: Appendices

Indicate attached appendices.

<u>XX</u>	<i>Appendix A</i>	Excavation Report Worksheet for Petroleum Release Sites.
<u>XX</u>	<i>Appendix B</i>	Laboratory analytical reports for soil and ground water.
<u>XX</u>	<i>Appendix C</i>	Methodologies and procedures, including field screening of soil, other field analyses, soil boring, soil sampling, well installation, and water sampling.
<u>XX</u>	<i>Appendix D</i>	Geologic logs for each well or boring using attached template.
<u>XX</u>	<i>Appendix E</i>	Copies of water supply well logs with legible unique numbers.
<u>XX</u>	<i>Appendix F</i>	A list of addresses within 500 feet from the edge of the plume and confirmation of status of water supply from the city utility billing department.
—	<i>Appendix G</i>	Well construction diagrams and copies of the Minnesota Department of Health Well Record using attached template.

Section 15: Consultant (or other) information

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

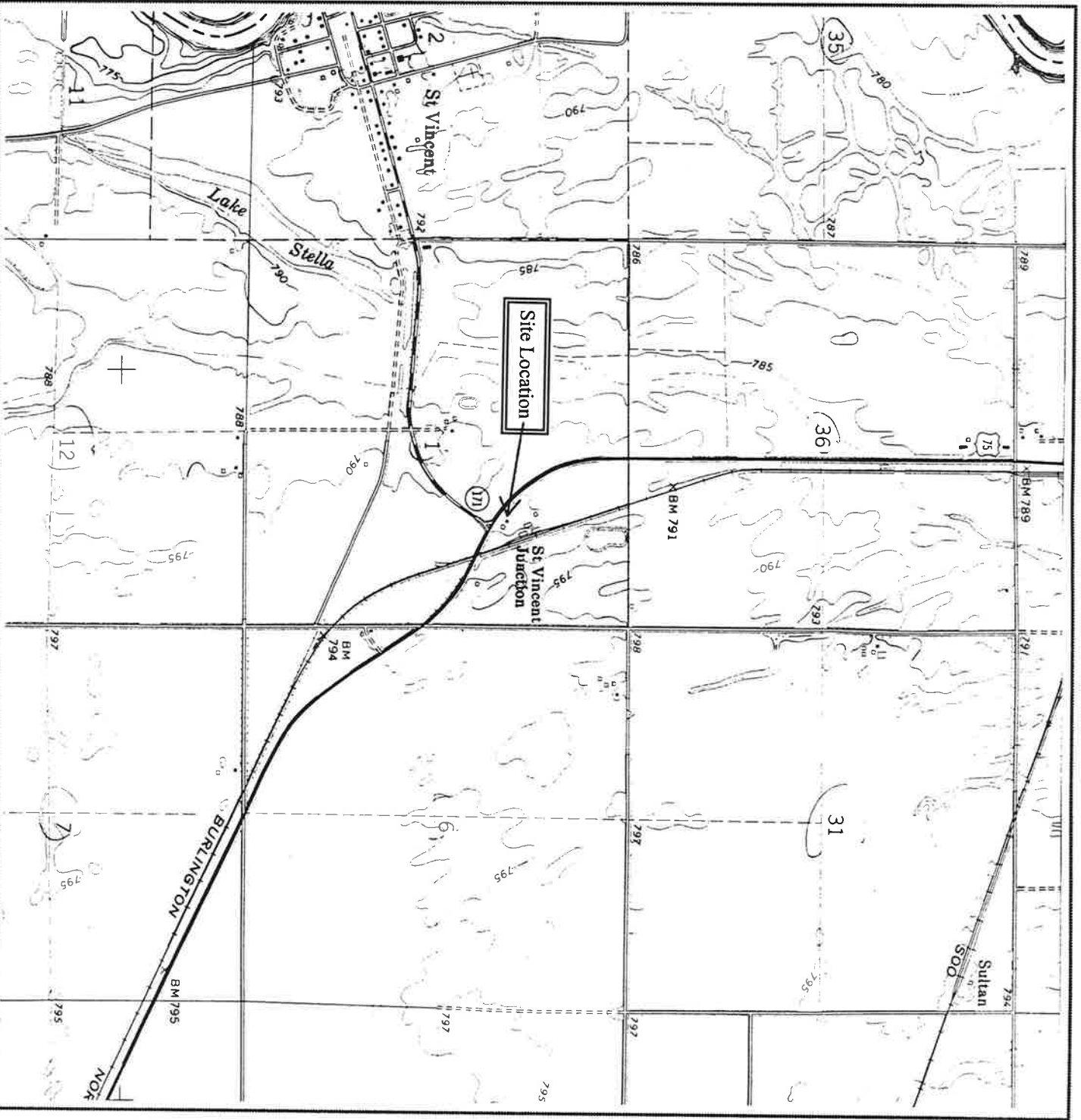
Name and Title:	Signature:	Date signed:
Ty Fuglseth, P.G.		11/18/96
Gregory W. Smith, P.G.		11/12/96
_____	_____	1/1
_____	_____	1/1

Company and mailing address: Widseth Smith Nolting
216 South Main Street
P.O. Box 458
Crookston, MN 56716

Phone: (218) 281-6522
Fax: (218) 281-6545

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.

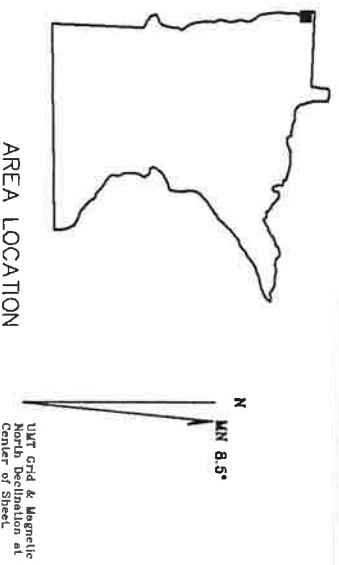
FIGURES



U.S.G.S. QUADRANGLE MAP: Pembina, MN-ND
 PUBLISHED: 1972
 PHOTOREVISED: N/A



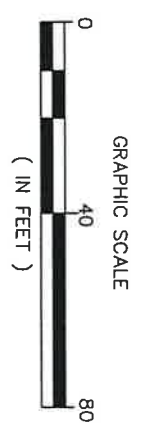
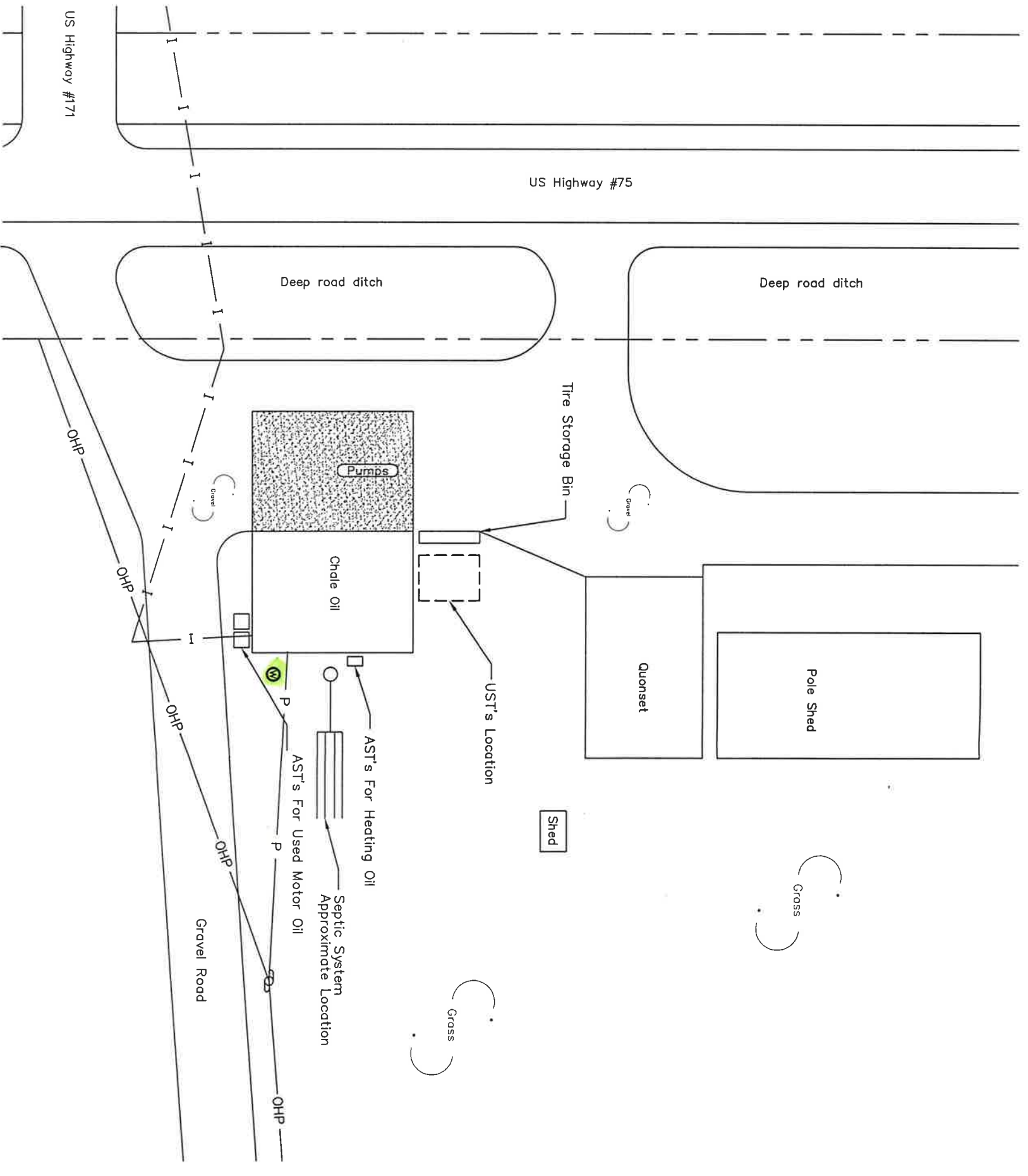
AREA LOCATION



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 AND PROJECT MANAGERS
 CROOKSTON BRAINERD ALEXANDRIA
 218-281-6522 218-829-5117 612-762-8149

SITE LOCATION MAP
 Chale Oil Company
 St. Vincent, Minnesota

Figure 1
 July 1996



LEGEND:

	CONCRETE
	Water Well (Not Used)
	UNDERGROUND PHONE
	SANITARY SEWER
	WATERMAIN
	OVERHEAD POWER
	POWER POLE

Note: Location of structures and utilities are approximate. Verify utilities before starting any subsurface work.

Figure 2A

Site Map

Chale Oil Company
St. Vincent, Minnesota

260B379/SITE September 1996

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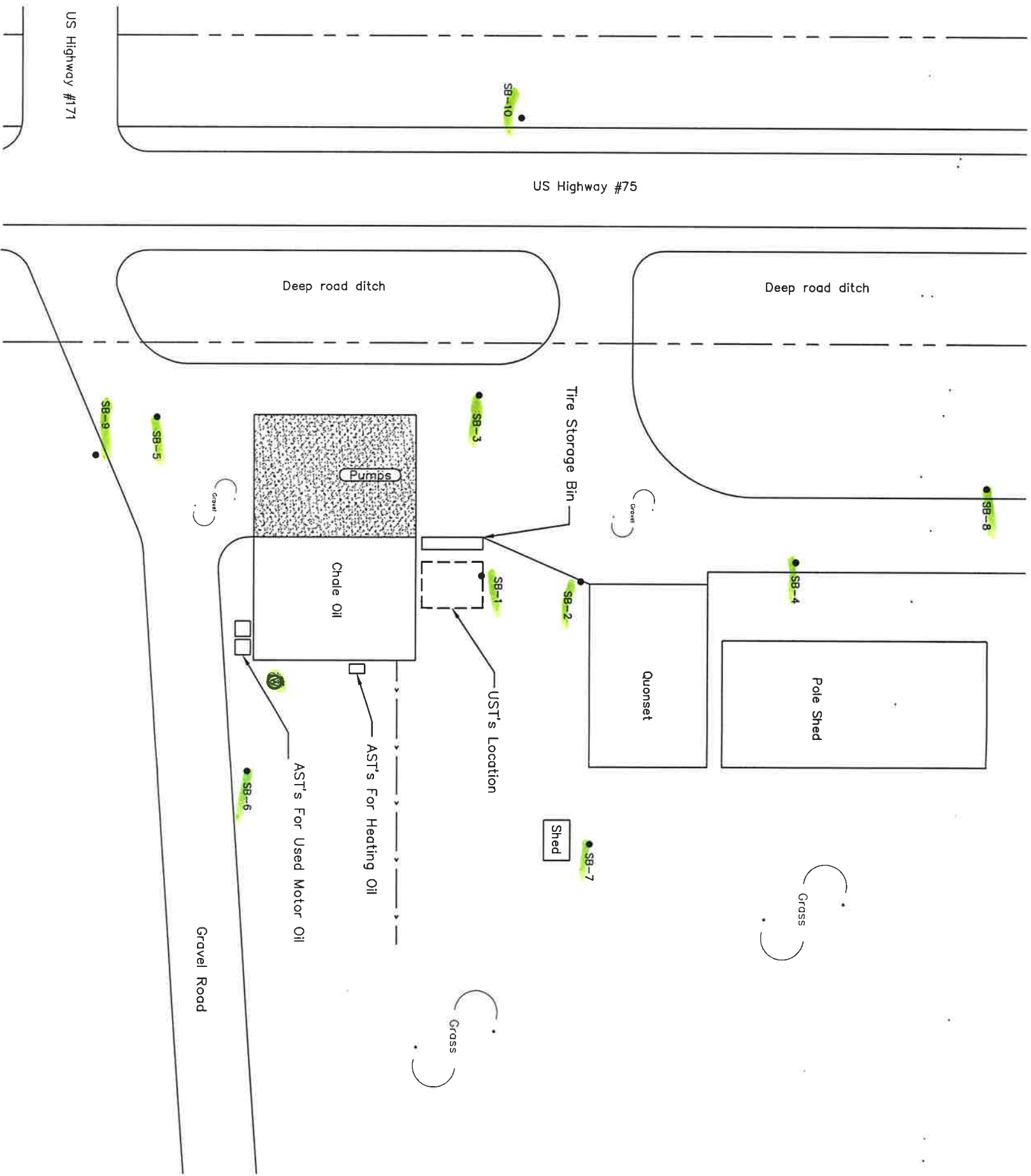


Figure 2B




Soil Boring Location Map

Chale Oil Company
St. Vincent, Minnesota

260B379/SITE September 1996

Note: Location of structures and utilities are approximate.
Verify utilities before starting any subsurface work.

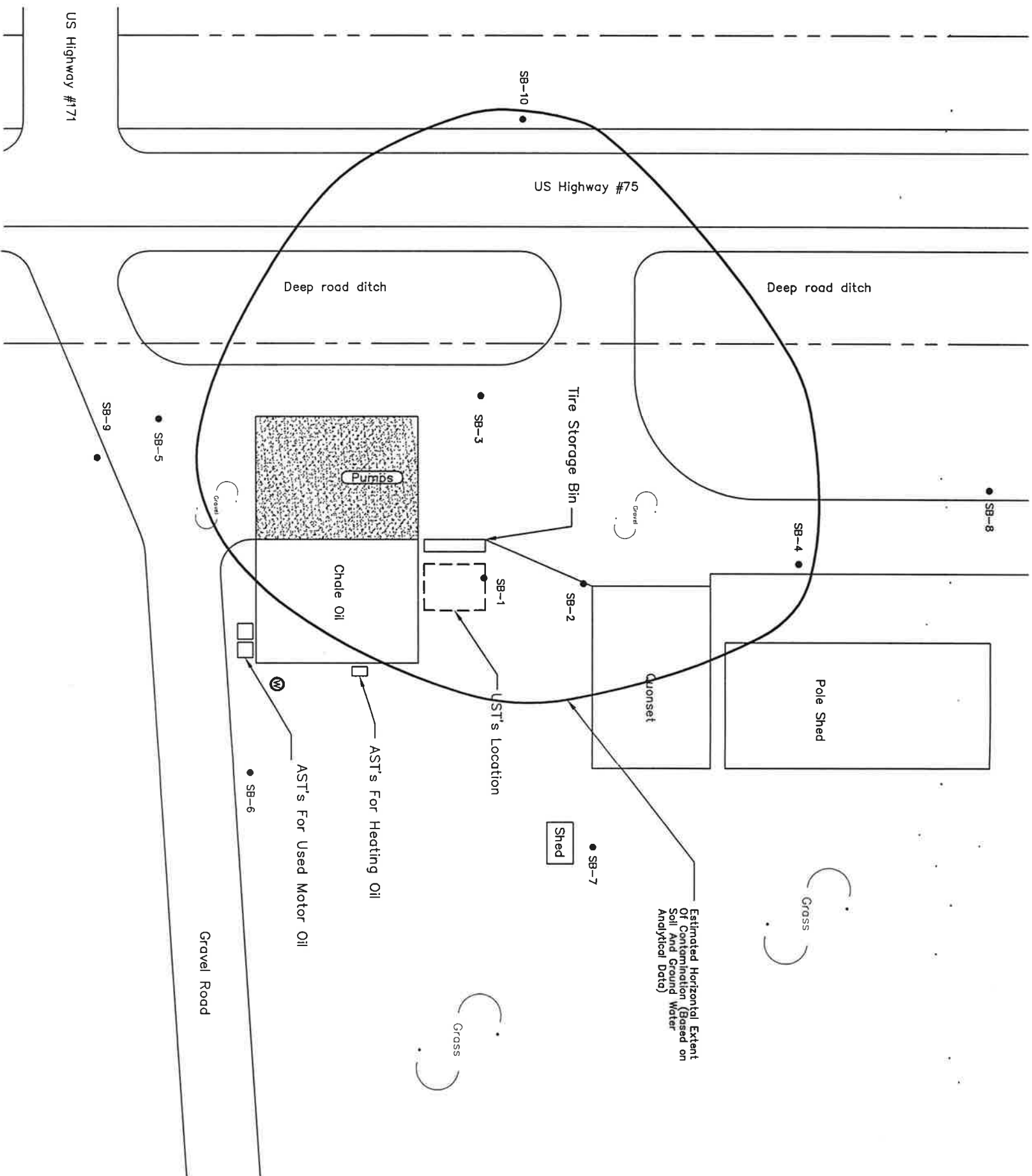
LEGEND:

-  CONCRETE
-  Water Well (Not Used)
-  SOIL BORING



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Estimated Horizontal Extent
Of Contamination (Based on
Soil And Ground Water
Analytical Data)



LEGEND:

	CONCRETE
	Water Well (Not Used)
	SOIL BORING

Note: Location of structures and utilities are approximate.
Verify utilities before starting any subsurface work.

Figure 2C

Estimated Horizontal Extent of Soil
And Ground Water Contamination

Chale Oil Company
St. Vincent, Minnesota

260B379/SITE September 1996

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Log Of Test Borings



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Project Number 260B379
 Project Name Chale Oil Company
 Location St Vincent, Minnesota
 Boring Number SB-1 Surface Elevation 99.12

Start Date: 5/21/96 Time: 0900

Completion Date: 5/21/96 Time: 1010

Description

Grass

FILL

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)
HSA						
0810	SS	24	M	320	SP	5
0810	SS	24	M W	168	SP	10
0935	SS	24	M	14	CH	15
0945	SS	24	M	84	CH	20
						25
						30

UNWEATHERED LACUSTRINE, Blue-Gray, Soft CLAY

End of Boring at 24'

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-In Depth	Water Level	Drilling Method	Probe
5/21/96	1000	22-24	22	22	2.2	Backfill Method	Bentonite
						Field Representative	DS

Log Of Test Borings



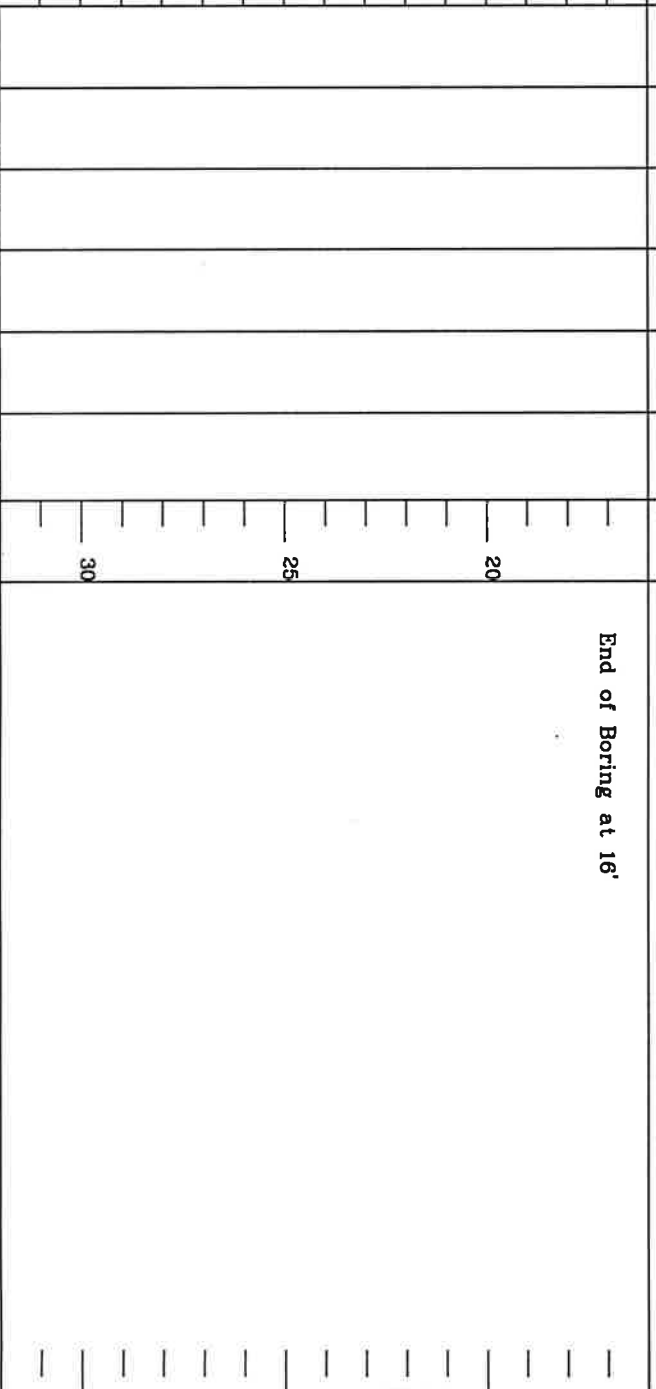
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Project Number 260B379
 Project Name Chale Oil Company
 Location St Vincent, Minnesota
 Boring Number SB-2 Surface Elevation 99.20

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)	Start Date: 5/21/96 Time: 1015 Completion Date: 5/21/96 Time: 1100
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HSA							Gravel WEATHERED LACUSTRINE, BROWN, SILTY CLAY WITH SOME GRAVEL, SOFT
1035	SS	24	M	160	CL	5	Petroleum odor

1040	SS	24	M W	40	CL	10	
1050	SS	24	M	30	CL	15	



Water Level Measurements (feet)						Drilling Method	Probe
Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level	Backfill Method	Bentonite
5/21/96	1100	14-16	0	4	2.0	Field Representative	DS

Log Of Test Borings



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Project Number 260B379
 Project Name Chale Oil Company
 Location St Vincent, Minnesota
 Boring Number SB-3 Surface Elevation 99.52

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)	Description
1145	SS	24	M	200	CL	5	Petroleum odor
1155	SS	24	$\frac{M}{W}$	200	CL	10	Petroleum odor
1205	SS	24	M	98	CL	15	End of Boring at 16'
						20	
						25	
						30	

Water Level Measurements (feet)						Drilling Method	Probe
Date	Time	Sample Depth	Casing Depth	Cave-In Depth	Water Level	Backfill Method	Bentonite
5/21/96	1230	14-16	0	3	2.5	Field Representative	DS

Log Of Test Borings



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 AND PROJECT MANAGERS
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Project Number 260B379
 Project Name Chale Oil Company
 Location St Vincent, Minnesota
 Boring Number SB-5 Surface Elevation 99.96

Start Date: 5/21/96 Time: 1515
 Completion Date: 5/21/96 Time: 1545

Gravel
 WEATHERED LACUSTRINE, BROWN, SILTY CLAY WITH
 SOME GRAVEL, SOFT

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)	Description	
HSA								
1520	SS	24	M	60	CL	5		
1530	SS	24	M W	60	CL	10		
1540	SS	24	M	20	CL	15		
						20		
						25		
						30		
End of Boring at 24'								

Water Level Measurements (feet)						Drilling Method	Probe
Date	Time	Sample Depth	Casing Depth	Cave-In Depth	Water Level	Beckfill Method	Bentonite
5/21/96	1630	14-16	0	1.5	1.5	Field Representative	DS

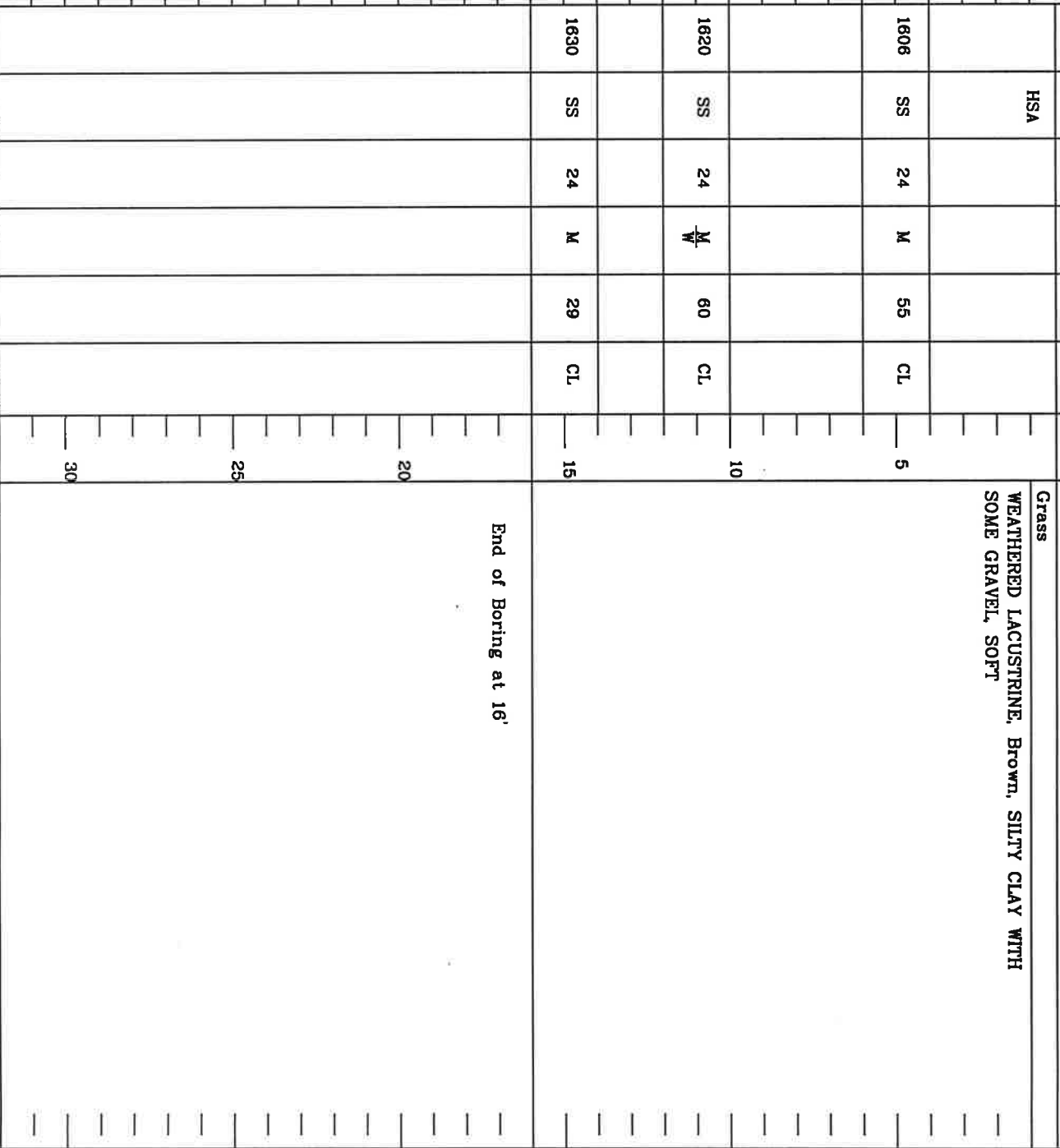
Log Of Test Borings



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Project Number 260B379
 Project Name Chale Oil Company
 Location St Vincent, Minnesota
 Boring Number SB-6 Surface Elevation 99.52

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)	Description
1608	SS	24	M	55	CL	5	Grass WEATHERED LACUSTRINE, Brown, SILTY CLAY WITH SOME GRAVEL, SOFT
1620	SS	24	M ^W	60	CL	10	
1630	SS	24	M	29	CL	15	
						16'	



Water Level Measurements (feet)						Drilling Method	Probe
Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level		
5/21/96	1700	14-16	0	3	2.6	Backfill Method	Bentonite
						Field Representative	DS

Log Of Test Borings



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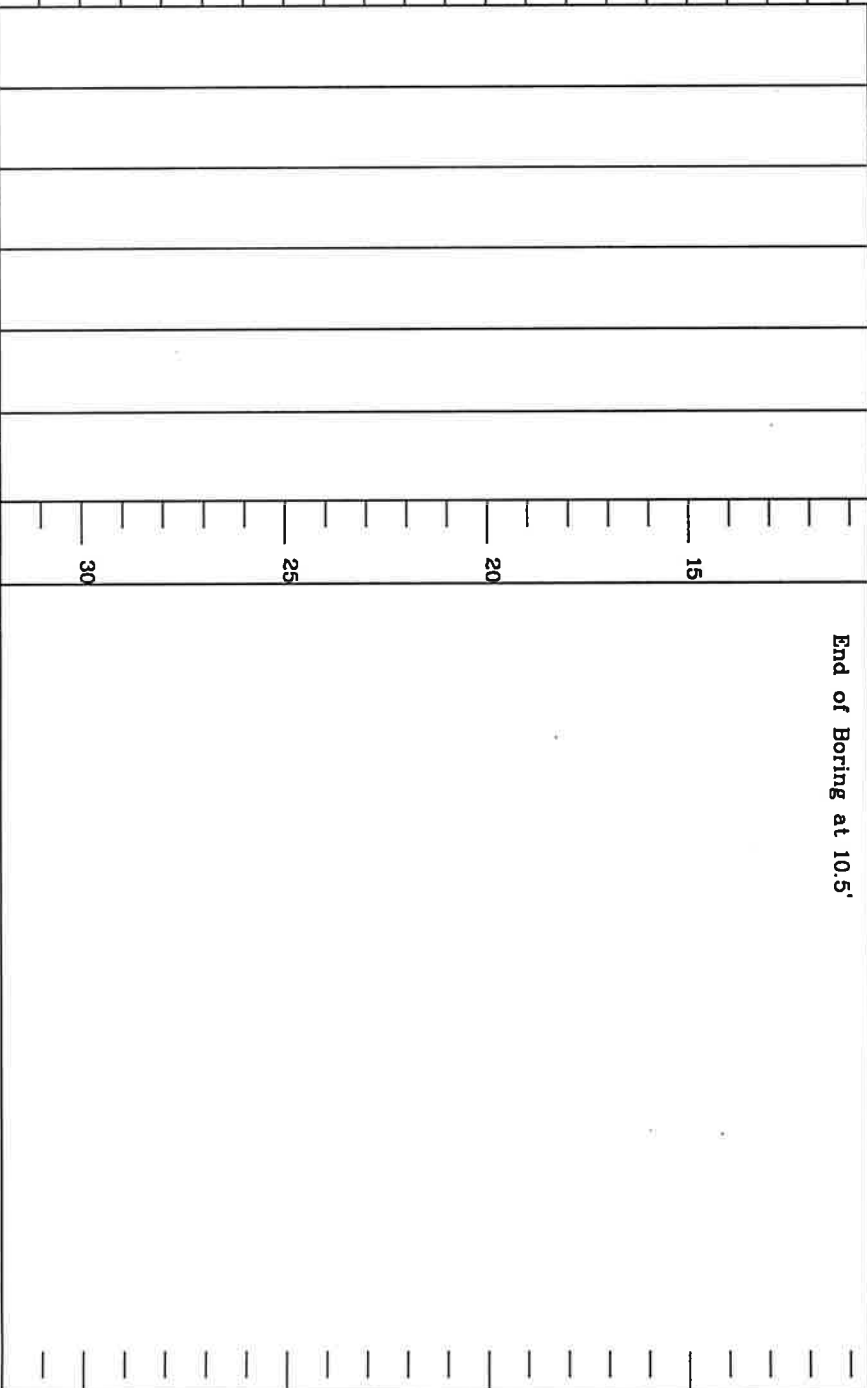
Project Number 260B379
 Project Name Chale Oil Company
 Location St Vincent, Minnesota
 Boring Number SB-7 Surface Elevation 99.0

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)	Start Date: 9/15/96 Time: 0930 Completion Date: 9/15/96 Time: 1500
							Description

1000	HA	6	M	0	CL	5	Gravel WEATHERED LACUSTRINE, Brown, SILTY CLAY WITH SOME GRAVEL, SOFT

1020	HA	6	M	0	CL		End of Boring at 10.5'

1040	HA	6	W	0	CL	10	End of Boring at 10.5'



Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level	Drilling Method	Hand Auger
9/15/96	1050	10.5	0	10.5	6.5	Backfill Method	Cuttings
9/15/96	1530	10.5	0	10.5	3.1	Field Representative	TF

Log Of Test Borings



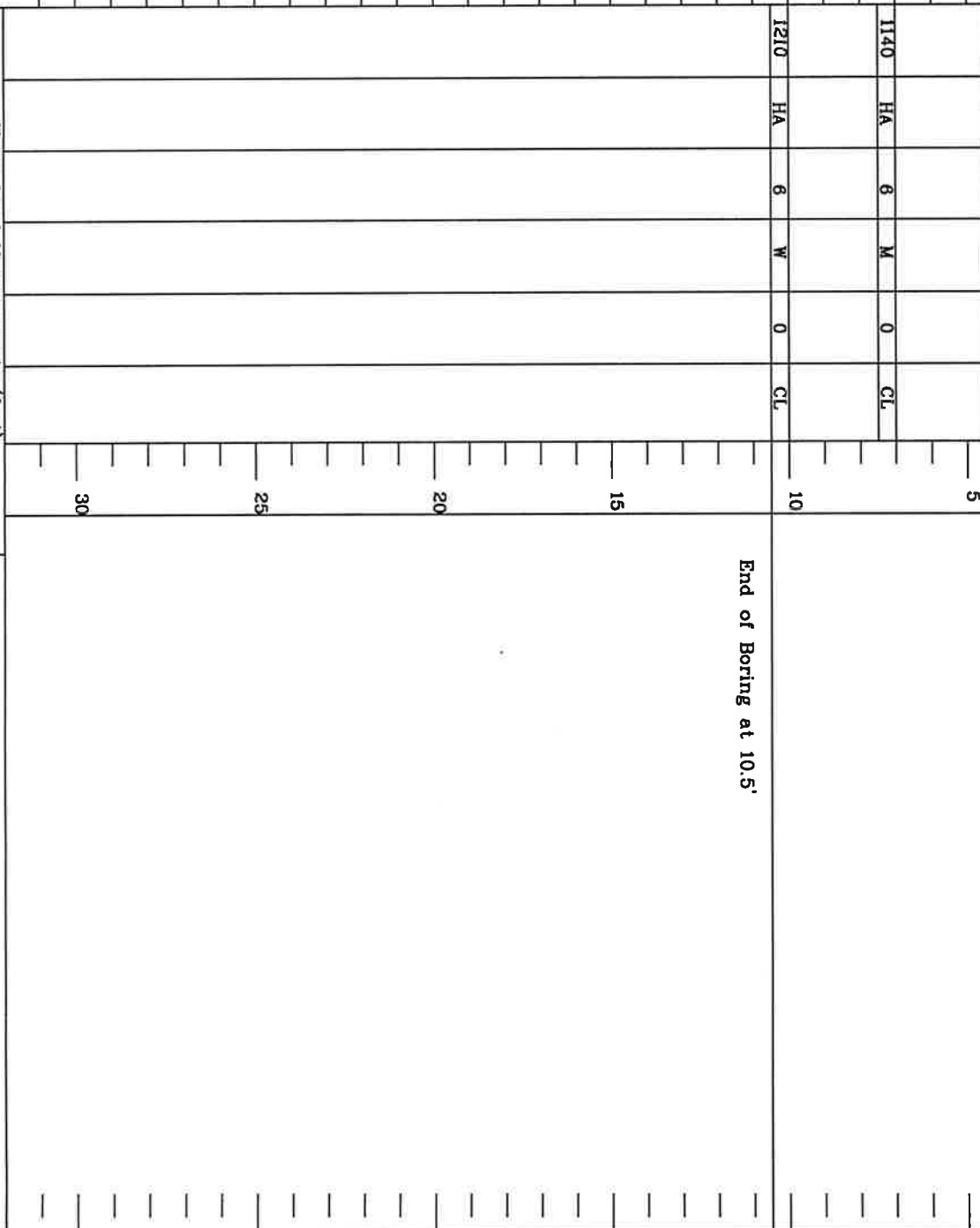
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 612-762-8149 218-829-5117 218-281-6282

Project Number 260B379
 Project Name Chale Oil Company
 Location St Vincent, Minnesota
 Boring Number SB-8 Surface Elevation 99.23

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)	Start Date: 9/15/96 Time: 0930 Completion Date: 9/15/96 Time: 1500	Description
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1120	HA	6	M	0	CL	5	Gravel WEATHERED LACUSTRINE, BROWN, SILTY CLAY WITH SOME GRAVEL
1140	HA	6	M	0	CL		
1210	HA	6	W	0	CL	10	

End of Boring at 10.5'



Water Level Measurements (feet)					
Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
9/15/96	1220	10.5	0	10.5	7.3
9/15/96	1530	10.5	0	10.5	5.3

Drilling Method Hand Auger
 Backfill Method Cuttings
 Field Representative TF

Log Of Test Borings



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Project Number **260B379**
 Project Name **Chale Oil Company**
 Location **St Vincent, Minnesota**
 Boring Number **SB-9** Surface Elevation **98.95**

Sample # and Time Sample Type Recovery (inches) Moisture PID Readings (ppm) U.S.C.S. Symbol Depth (feet) Description

1300	HA	6	M	0	CL	5	Gravel WEATHERED LACUSTRINE, BROWN, SILTY CLAY WITH SOME GRAVEL	
1320	HA	6	M	0	CL			
1340	HA	6	W	0	CL	10		
							End of Boring at 10.5'	
							30	
							25	
							20	
							15	
							10	

Water Level Measurements (feet)						Drilling Method	Hand Auger
Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level		
9/15/96	1350	10.5	0	10.5	5.9	Backfill Method	Cuttings
9/15/96	1530	10.5	0	10.5	4.3	Field Representative	TF

**WIDSETH
SMITH
NOLTING**

2000 Industrial Park Rd S P. O. Box 2720 Barden, MN 56425
Phone: 218-829-5117 Fax: 218-829-2517

FAX

Date: 11/22/96

File #: 260B379

To: Rick Newquist
(612) 297-8676

From: Doug Scultz

of pages, including cover sheet: 2

Subject: Leak #8845 Chale Oil - RI

This Boring Log is missing from the report.

Log Of Test Borings

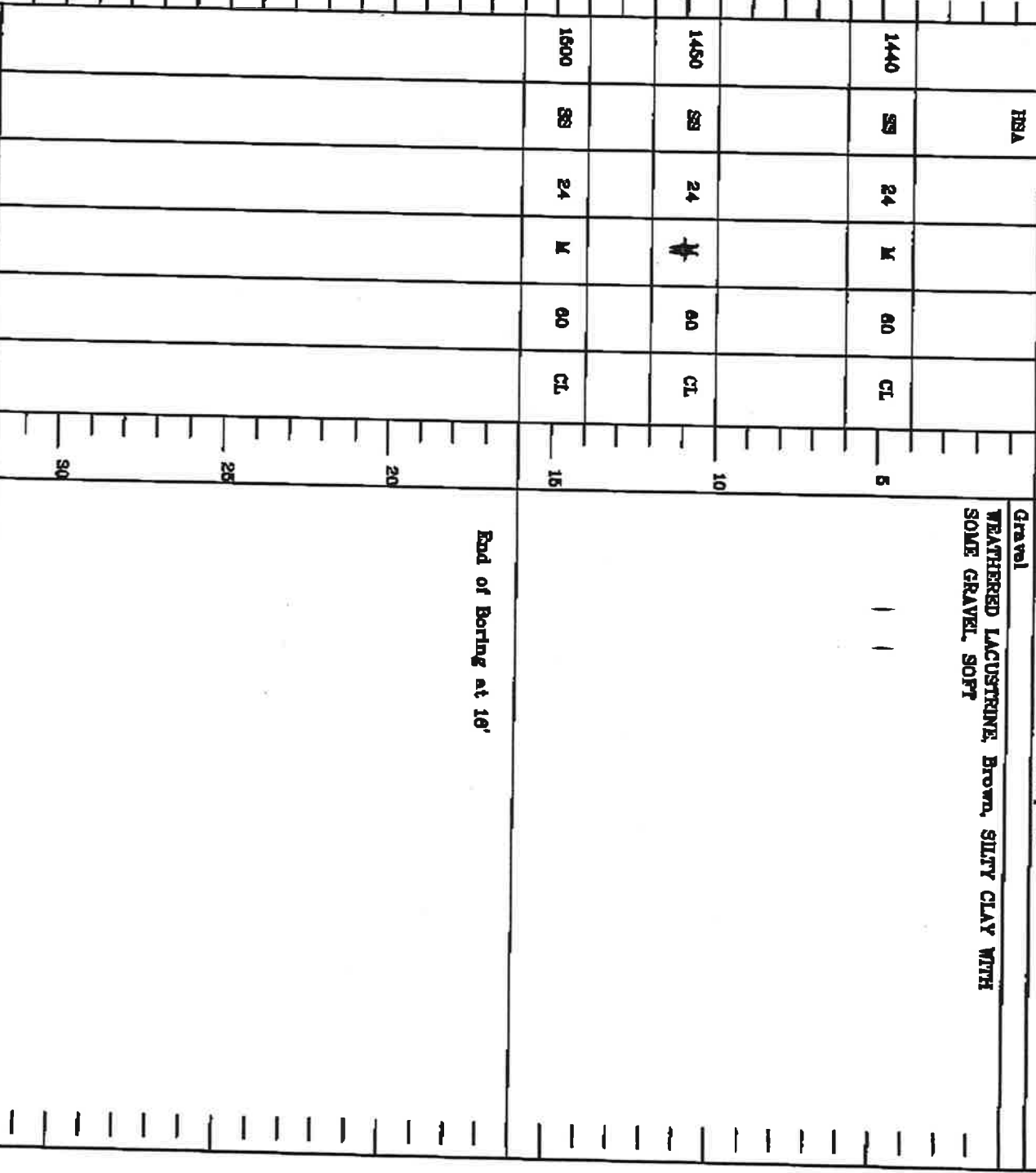


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 ENGINEERING ARCHITECTURE LAND SURVEYORS
 AND PROJECT MANAGERS
 ALUMINUM PAPERERS
 515-744-8100 515-744-8117 515-744-4552

Project Number: 2903879
 Project Name: Chale Oil Company
 Location: St Vincent, Minnesota
 Boring Number: SB-4
 Surface Elevation 99.66

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)	Description
	HSA						Gravel
							WEATHERED LACUSTRINE, BROWN, SILTY CLAY WITH SOME GRAVEL, SOFT
1440	SS	24	M	60	CL	5	
1450	SS	24	M	60	CL	10	
1600	SS	24	M	60	CL	16	

End of Boring at 16'



Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-In Depth	Water Level	Drilling Method	Probe
6/21/96	1630	14-16	0	2.5	1.6	Bentonite Method	Bentonite
						Field Representative	DS