

UNDERGROUND STORAGE
TANK ASSESSMENT
LEAK #00001080

GEORGE'S PHILLIPS 66 STATION
809 SELBY AVENUE
ST. PAUL, MINNESOTA

RECEIVED

APR 12 1990

MPCA, HAZARDOUS
WASTE DIVISION

Prepared for:

Fuel Oil Service Co., Inc.
290 Atwater Street
St. Paul, Minnesota 55155

Prepared by:

DPRA Incorporated
E-1500 First National Bank Building
332 Minnesota Street
St. Paul, Minnesota 55101

April 1990

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CUSTODYS

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1.0 INTRODUCTION

1.1 Purpose

DPRA Incorporated was contracted by Fuel Oil Service Co., Inc. to perform an underground storage tank (UST) assessment at George's Phillips 66 Station located at 809 Selby Avenue in St. Paul, Minnesota. The purpose of the UST assessment was to document the extent of hydrocarbon contamination while excavating three gasoline USTs for upgrading.

1.2 Scope of Services

The scope of services performed at this site consisted of the following:

1. Observe the removal of one 4,000 gallon and two 3,000 gallon gasoline USTs.
2. Document the condition of the USTs and surrounding soils during the removal process for the presence of hydrocarbon contamination.
3. Collect five representative soil samples, one sample beneath each UST, one from the bottom of the excavation and one from the stockpiled soils and submit them for chemical analysis of benzene, ethylbenzene, toluene and xylenes (BETX) including methyl tertiary butyl ether (MTBE), total hydrocarbons and lead.
4. Document the treatment of petroleum contaminated soil from the UST area.
5. Prepare a UST Assessment Report which satisfies the Minnesota Pollution Control Agency's (MPCA's) Petroleum Tank Release (PTR) Investigation Report.

2.0 BACKGROUND INFORMATION

2.1 Site Location

George's Phillips 66 Station is located in the northeast corner of the intersection of Fisk Street and Selby Avenue in St. Paul, Minnesota (Figure 1). The property is located in the northwest quarter of the northeast quarter of Section 2, Township 28 North (T28N), Range 23 West (R23W), in Ramsey County, Minnesota.

2.2 Site Ownership

The property is owned by Fuel Oil Service Company, Inc. with Mr. Stephen R. Dahl as the Vice President. The site was built in the fall of 1959 as a retail gasoline and service station for Phillips Petroleum Company. On March 11, 1986 Fuel Oil Service Company, Inc. purchased the property and continues to operate the facility as a retail gasoline and service station.

The contact person for George's Phillips 66 is:

Mr. Stephen R. Dahl
Vice President
Fuel Oil Services Co., Inc.
290 Atwater Street
St. Paul, MN 55155
(612) 488-7201

2.3 Site Description

Figure 2 contains a scaled map showing all pertinent site features. The site is bounded by Fisk Street to the west, residential property to the east and north and Selby Avenue to the south.

The locations of municipal, industrial and private wells known within approximately a one mile radius of the site is shown in Figure 3. Copies of the well logs, obtained from the Minnesota Geological Survey (MGS) are contained in Appendix A.

The water well logs and information obtained by the MGS 1979 Geologic and Hydrologic Map Series MAP I-1157, indicate that unconsolidated Pleistocene deposits near the site are approximately 40 feet thick and overlie the shale bedrock of the Decorah Formation and/or the Platteville limestone. The wells were completed at depths of 337 feet to 602 feet and utilize various aquifers from the Platteville down to the Jordan.

Regional hydrology is controlled by the Mississippi River which lies approximately 1 3/4 miles to the southeast.

2.4 Underground Storage Tank Information

All three gasoline USTs (Figure 2), one 4,000-gallon (Tank 3) and two 3,000-gallon (Tanks 1 and 2), were installed in 1959 according to the MPCA UST Notification Form dated March 26, 1986 (Appendix B). Tanks 1 and 2 were siphoned together. Tank designation numbers shown on Figure 2 coincide with those used on the MPCA UST Notification Form.

On May 8, 1989 all three gasoline USTs on site were removed and two new 8,000-gallon STi-P3 gasoline USTs were installed. The removal and replacement of the USTs is documented on the UST Removal Information Form (Appendix B) and in Section 2.6.

The tanks were of unlined, painted steel construction with steel/iron piping and submersible pumps. No leak detection systems or secondary containment devices were used for the three gasoline USTs.

A complete history of the tanks' contents is unavailable. However, according to the MPCA UST Notification Form dated March 26, 1986 (Appendix B), the 4,000-gallon UST contained regular (leaded) gasoline and the two 3,000-gallon USTs contained unleaded gasoline. Information specific to each UST is shown in Table 1.

2.5 Petroleum Release Information

There has been no documented uncontrolled releases of petroleum products at this facility known to Fuel Oil Services Company, Inc. since they became the owner.

2.6 Physical Condition of USTs

All three gasoline USTs on site were removed by Minnesota Petroleum Services, Inc. of Minneapolis, Minnesota on May 8, 1989 and transported to Determans Welding and Tank Service, Inc., in Fridley, Minnesota. Warzyn was on site to document the condition of the USTs and surrounding soil. All the gasoline tanks exhibited signs of some external corrosion and pitting with no holes or cracks observed. A summary of the soil screening results is presented in Section 3.4.1 and the analytical results in Section 3.4.2.

Approximately 250 cubic yards of contaminated soil was excavated and temporarily stockpiled on site and the excavation backfilled with clean fill. After receiving MPCA approval, the stockpiled soils were transported to and treated at C. S. McCrossan Construction, Inc. in Maple Grove, Minnesota. The MPCA's letter of approval is contained in Appendix C.

The following independent observers were present during some or all of the tank and soil removal operation:

Warzyn Engineering, Inc.
Minneapolis, Minnesota

2.7 UST Integrity Testing

On August 25, 1988 the three gasoline UST and associated lines were tested for integrity (Ainlay Tank Testing System) by Soiltest Environmental Division. The 4,000 leaded gasoline tank (Tank 3) and product lines for Tanks 1, 2 and 3 passed the test; however, Tanks 1 and 2 (3,000-gallon unleaded gasoline tanks) failed, showing a leak rate of 0.17 gallons per hour. The tank testing system results are included in Appendix D.

2.8 Previous Reports

There is no record of a previous report documented for this site.

3.0 PROJECT RESULTS

3.1 Summary of Project Activities

On May 8, 1989 Warzyn was on site to observe the removal of one 4,000-gallon and two 3,000-gallon USTs. Representative soil samples were screened with a photoionization detector (PID) and collected from beneath each UST and from the stockpiled soils and chemically analyzed.

The MPCA was notified on May 8, 1989 that a petroleum release had occurred on site.

3.2 Site Geology

Review of the MGS water well construction logs (Appendix A) and soils from the UST excavation indicate the soils on site consist of approximately nine feet of silty sand with gravel fill and subsequently clean sand with a little gravel.

3.3 Site Hydrology

Groundwater was not encountered during the UST excavation; however, according to water well construction logs obtained by the MGS (Appendix A), static water elevations on site are believed to be 140 to 200 feet below ground surface with a southeasterly flow direction.

3.4 UST Removal

3.4.1 Screening for Contaminants

During the excavation of the USTs, excavated soils were screened with a HNU Model 101 photoionization detector equipped with a 10.2 eV lamp and calibrated for direct readings in parts per million (ppm) volume/volume of benzene. PID readings from the

excavation (Table 2) ranged from no detect to over 250 ppm above background readings of 0.0 ppm. The highest PID readings were recorded at approximately three feet below the surface in the silty sand with gravel fill near the fill pipe of Tank 1 at 250 ppm. PID readings decreased with depth down to the bottom of the tanks with no detects to detects of 0.6 ppm recorded. PID readings on the walls of the excavation ranged from no detect to detects of 30 ppm. Possible undermining of the station to the south and the asphalt drive to the west prevented further excavation.

3.4.2 Chemical Analysis

Five representative soil samples were collected: one sample beneath Tank 1 (SS-1), one beneath Tank 2 (SS-2), one beneath Tank 3 (SS-3), one from the bottom of the excavation at 12 feet below the surface (SS-4), and one from the stockpiled soils (SS-5). Soil samples from beneath the USTs and the bottom of the excavation were chemically analyzed for BETX including MTBE and for total hydrocarbons with no detects recorded (Table 3). The stockpiled soils were chemically analyzed for BETX including MTBE and for total hydrocarbons and lead (Table 3) with detects of BETX compounds ranging from below the method detection limit of 0.25 ppm to 17.9 ppm and lead at 26.2 ppm. Unknown compounds having the same eluting range as gasoline was detected in the stockpiled soils at 209 ppm. The analytical results and chain-of-custody are contained in Appendix E.

4.0 DISCUSSION AND CONCLUSIONS

Soil conditions observed and analyzed suggests that a hydrocarbon release has occurred on site due to loose bung fittings, a defective or damaged fillpipe, and/or overfills. The data also indicates that the remedial measures to date (UST replacement and soil removal) has mitigated the source of the hydrocarbon release. Soil samples collected beneath each UST and the bottom of the excavation (12-feet below the surface) indicate no contamination remains in the soils.

Based on information from the MGS the groundwater flow direction on site is to the south-southeast. The depth to static water elevations indicate, no industrial, private or municipal water wells currently being used should be impacted.


There has been no known incidences of petroleum vapors or seepage into basements or subsurface utility structures within the site area.

5.0 RECOMMENDATIONS


DPPRA recommends no further action be done on site at this time. The remedial measures conducted to date (removal of the UST's and contaminated soils) has mitigated the hydrocarbon release. Samples from the bottom of the tank excavation indicated that no petroleum contamination exists below the new tanks.

6.0 STANDARD OF CARE

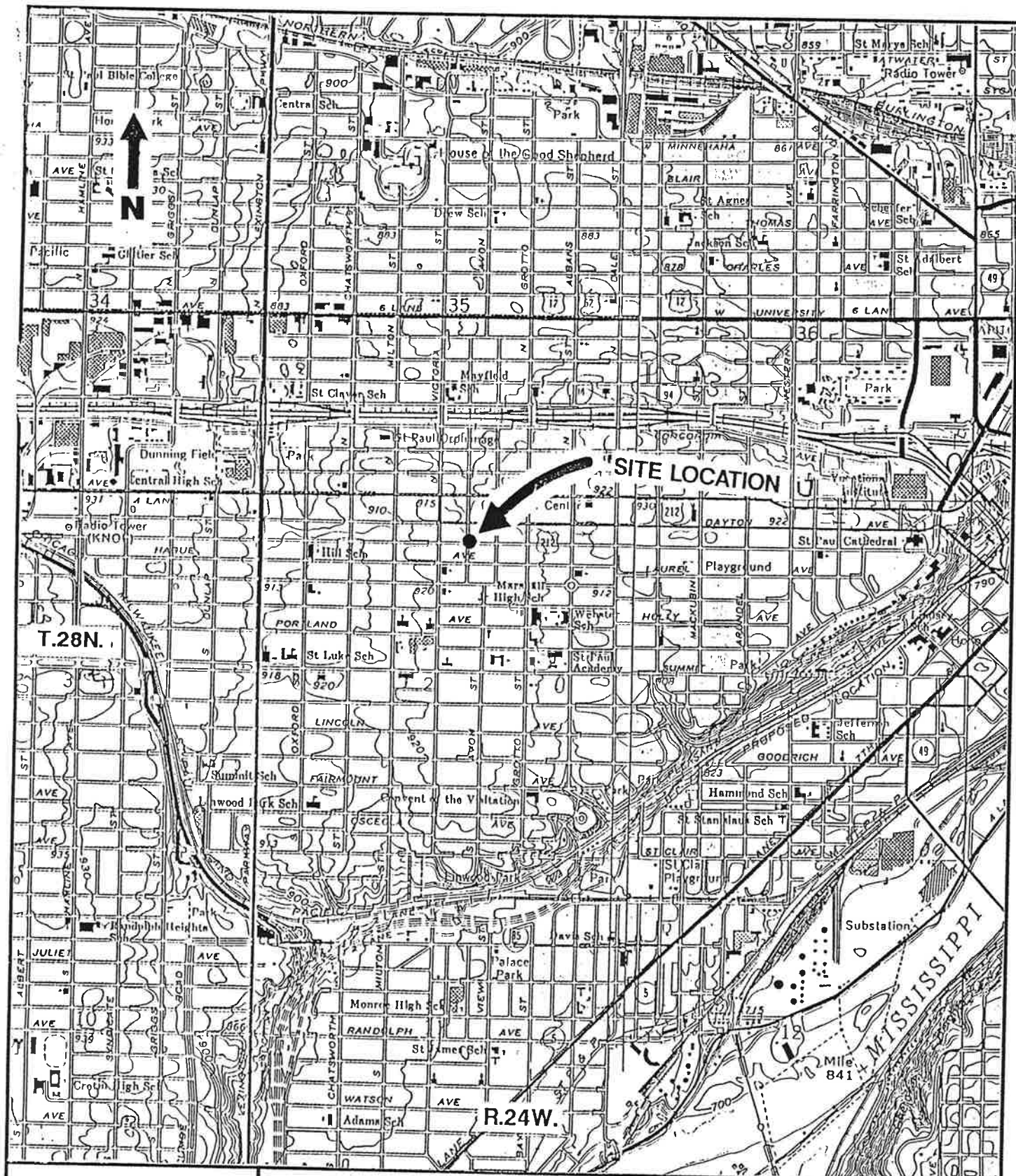
The recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted geologic, hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.



Rebecca A. Gulden (Written by)
Project Environmental Geologist



Martin D. Bonnell, P.E. (Reviewed by)
Senior Environmental Engineer



Scale:

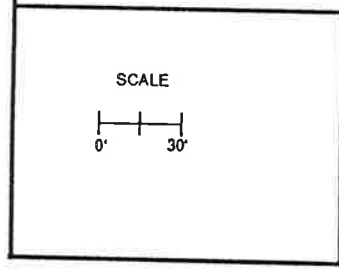
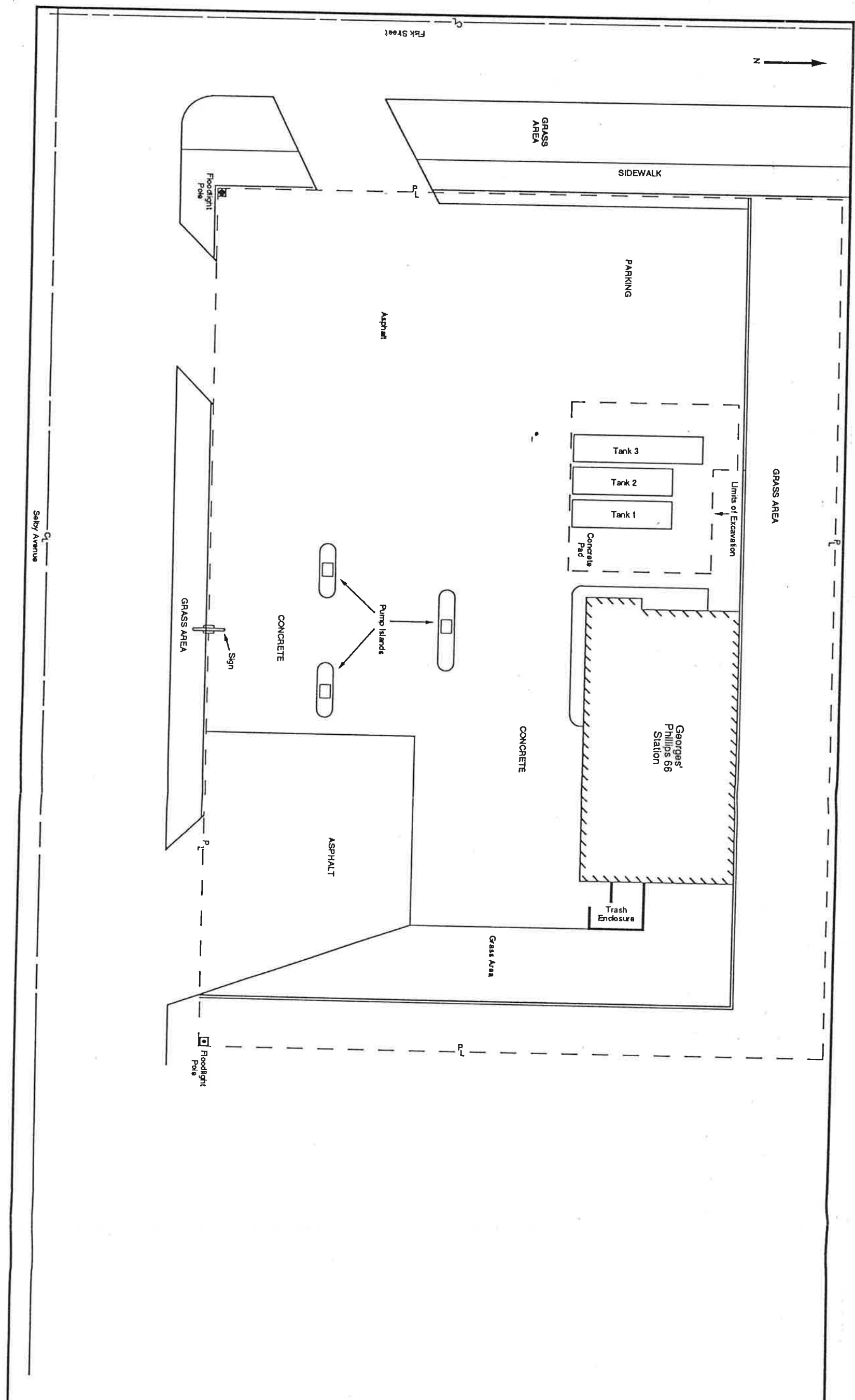
1" = 2000'

FIGURE 1
SITE LOCATION MAP

Georges' Phillips 66
809 Selby Avenue
St. Paul, Minnesota



Project Number: 5192.001



TANK DESIGNATION AND CONTENTS

- 1 - 3,000 GALLON UNLEADED GASOLINE
- 2 - 3,000 GALLON UNLEADED GASOLINE
- 3 - 4,000 GALLON LEADED GASOLINE (REGULAR)

NOTE: Approximate Utility Locations, Call Utilities Before Any Underground Work is Started.

FIGURE 2
EXCAVATION SITE MAP

Georges' Phillips 66
 809 Selby Avenue
 St. Paul, Minnesota

Project Number 5192.001



Scale:

1" = 2000'

FIGURE 3
WATER WELL LOCATION MAP

Georges' Phillips 66
809 Selby Avenue
St. Paul, Minnesota



Project Number: 5192.001

TABLE 1

George's Phillips 66
809 Selby Avenue
St. Paul, Minnesota

UNDERGROUND STORAGE TANK INFORMATION

<u>Tank No.</u>	<u>Capacity (gallons)</u>	<u>Construction</u>	<u>Contents</u>
1	3,000	Steel	Unleaded gasoline
2	3,000	Steel	Unleaded gasoline
3	4,000	Steel	Leaded (regular) gasoline

TABLE 2

George's Phillips 66
 809 Selby Avenue
 St. Paul, Minnesota

PID MEASUREMENTS IN UST EXCAVATION

Sample	Location	Depth ----feet--	PID Reading ----- ppm-----	Background Reading
SS-1	Beneath Tank 1	9.0	0.6	0.0
SS-2	Beneath Tank 2	9.0	0.0 - 0.2	0.0
Screen 1	Near Fill Pipe of Tank 3	3.0	250	0.0
SS-3	Beneath Tank 3	9.0	0.4 - 0.6	0.0
Screen 2	East Wall	0-12	23 - 30	0.0
Screen 3	North Wall	0-12	0.0 - 0.8	0.0
Screen 4	West Wall	0-12	0.0 - 0.6	0.0
Screen 5	South Wall	0-12	0.0 - 20	0.0
SS-4	Bottom of Excavation	12	0.0	0.0
SS-5	Stockpiled soils	---	50 - 250	0.0

ppm = parts per million

TABLE 3

ANALYTICAL RESULTS - SOILS

George's Phillips 66
809 Selby Avenue
St. Paul, Minnesota

Soil Sample	Date Sampled	Sample Location	Ethyl				Lead	Total Hydrocarbons as Gasoline
			Benzene	Benzene	Toluene	Xylenes		
			ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	
SS-1	5/08/89	Beneath Tank 1	X	X	X	X	NA	
SS-2	5/08/89	Beneath Tank 2	X	X	X	X	NA	
SS-3	5/08/89	Beneath Tank 3	X	X	X	X	NA	
SS-4	5/08/89	Bottom of Excavation	X	X	X	X	NA	
SS-5	5/08/89	Stockpile	X	BMDL	BMDL	17900	26.2	
							X (1)	

NA = Not Analyzed

X = Analyzed, but not detected

ug/kg = micrograms per kilogram (ppb = parts per billion)

mg/kg = milligrams per kilogram (ppm = parts per million)

(1) = Unknown Hydrocarbon Having the Same Eluting Range as Gasoline at 209 ppm

See Attached Results (Appendix E) for Method, Detection, Limit, Etc.

APPENDIX A
WATER WELL LOGS

KEYS WELL DRILLING COMPANY

WATER PRODUCERS

SAINT PAUL, MINNESOTA

28-23-2

dbbaed

910±5

SPW

NOTE TO REMIND

Owner Uptown Theatre Date Completed _____
 Location Grand & Oxford, St. Paul Driller ?
 Well No. 1 Size 10" x 8" Total Depth 359' 6" Type Shakopee
103-B

DRILLERS LOG

WELL MATERIALS

0' to 134'	drift to pump base	PLTS DIST	130'	of 10"	diameter of Outer Casing
' to ' 13'	from ground level		207'	of 10"	diameter of Open Hole
134' to 152'	lime	OPVL 1/768 LMSN	317'	of 8"	diameter of Inner Casing
152' to 197'	sandrock - shale	74C SNPS, SHLE	64'	of 8"	diameter of Open Hole
197' to 225'	sandrock	OSTP SNPS			Bottom seal to _____ Mix grout _____ (yds.) (Sacks)
225' to 233'	sandrock - shale	SNDS, SHLE			" diameter _____ Screen
233' to 282'	sandrock	SNDS			
282' to 327'	shale	SHLE			
327' to 394'	Shakopee	OPDC - DLMT			

RECORD OF TEST PUMPING

Static Water Level 137 ft. from _____
 _____ GPM _____ D.D. _____ Hours
 _____ GPM _____ D.D. _____ Hours
 _____ GPM _____ D.D. _____ Hours
 _____ GPM _____ D.D. _____ Hours

Aquifer OPDC-OPDC

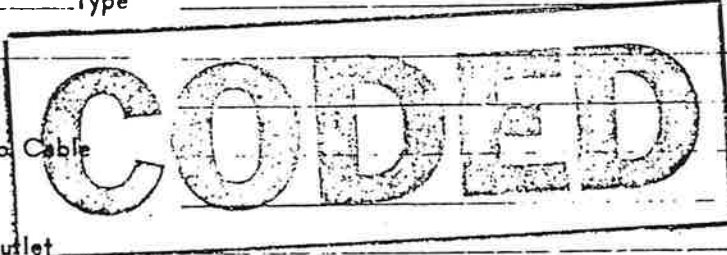
Remarks: Originally a 100' setting for 200 GPM - 25#
Discharge 216 ICH

PERMANENT PUMP DATA

Mfg Worthington Type _____ Serial No. _____
 Capacity 200 GPM 218' TDH
 Motor Make ? Type VHS
25 H.P. 220 Volts 3 Ph. 1760 RPM
120 ft. 6 in Col. pipe 1 1/2 in. Shaft
6 1/2" ft. 8 in Bowls _____ Stages _____ Type _____
20 ft. _____ in suction pipe & _____

It was lowered to 160' and 3 stages added for 200 GPM and 218' ICH

186 1/2" ft. Total Length of Pump
 _____ ft. _____ in. drop pipe & _____ No. Cable
 _____ ft. _____ in. air line
 _____ in. Pitless _____ ft. bury _____ in outlet



* oil lub pump

WELL LOG

920

Geologic Formations Kind, Color, Hard or Soft	Thickness of Formation	Depth in Feet		Casing Diam.	Water Conditions Found
		From	To		
Glacial drift	PLTS	DREFT	0	40	882 10" casing to 40'
Sticky shale ? <i>Decomp</i>	CDGR	SHLE	40	123	G&D 880 (83) 922 40 882
Platteville Limerock	OPVL	LWST	123	155	799 797 (42)
Shale <i>Glenwood</i>	OGWD	SHLE	155	165	922 123 799
White St. Peter Sandrock	CDGR	SNDS	165	275	757 755 (150)
Dark St. Peter Sandrock	CDGR	SNDS	275	315	922 165 757
<i>Shakespeare</i> Shale dolomite	CPDC	DLMT	315	390	605 (75)
Jordan Sandrock	CJDW	SNDS	390	470	530 (80) <i>top of</i> <i>No! not Jordan</i>
					315 390 165 165 757 757
					910 390 520
					<i>Aquifer OPVL-CJD.</i>

Indicate Size, Type, & Location of Any Screens, Gravel Packs, Grouting, or Other Development

I hereby certify that, to the best of my knowledge, the data presented in this statement is a true and correct representation of conditions encountered in the construction of this well.

Dated at _____ this _____ day of _____, 19__.

(Firm Name) Max Remmer Well Co
By BA L + J T 3-9-60

Title _____

File No. 96
Well No. 28.23.2aaa

WELL LOG STATEMENT

MAIL REPORT PROMPTLY TO DIRECTOR, DIVISION OF WATERS, STATE OFFICE BLDG., ST. PAUL 1, MINN.

well #2

Location of Well Dale Theater, 637 Selby Ave., St. Paul

Locate Well on Plat of Section

St. Paul N. Q

Ramsey
County City or Town

28-23-2
acaded

Sec. _____
Twp. _____
Range _____

Describe Further by Lot, Block, Nearest Highway, Street and Number

9415
922

Drilled for: Dale Theater

Driller Max Renner Well Co.

Address 637 Selby Ave., St. Paul

Address 103-B

Date of Completion 1936

REPORT OF FINAL PUMPING TEST

Date of Test _____

Site _____
Upland, Valley, Hillside, Etc.

Duration of Test _____ Hrs. _____ Min.

Type of Well _____
Dug, Driven, Bored, Drilled

Rate of Pumping _____ GPM

Drill Rig Used _____
Solid Tool, Jet, Rotary

Static Water Level 198 Ft. (722)

Diameter: Top 10" Bottom _____

Water Level While Pumping _____ Ft.

Depth of Well 407'

Drawdown _____ Ft.

Ground Elevation 920
Sea Level Datum or Give Distance Above

Time Required for Recovery _____
Expected Average Yield _____ Gal. per day

or Below R. R., Highway, Lake, Etc.

If Other Tests were Made, Give Details on Another Sheet.

Height of Casing Above Ground _____

Were Measurements Made of Effect on Other Nearby Wells During Test? Give Details.

Quality of Water _____
(Hard or Soft, Fresh or Salty, Etc.)

Temperature of Water _____

Was Laboratory Analysis Made? _____

For What Purpose Will Water Be Used? _____

Is Well Pumped? _____ Pump Capacity _____ GPM

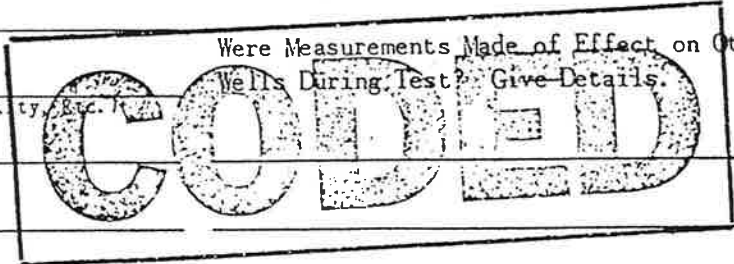
Was Well Sealed on Completion? _____

Does Well Overflow Without Pumping? _____
Yes or No

Natural Flow _____ GPM

What Pressure, or Head, at Ground Level? _____

Principal Aquifer Penetrated _____



WELL RECORD

KEYS WELL DRILLING COMPANY

WATER PRODUCERS

SANIT PAUL, MINNESOTA

29-23-35

daaaac

±5

895 IS

7

SPW

103-B

27-27

Franklin Ave

Date Completed May 1935

Date & University, St. Paul

Driller W. C. Keys

Well No. 1 Size 8" Total Depth 398' Type Shakopee

DRILLERS LOG

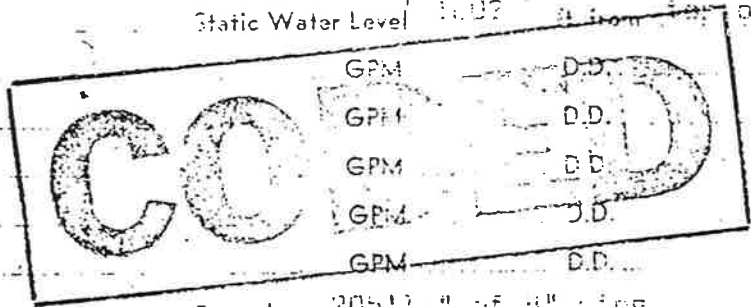
WELL MATERIALS

Telescoping

0	54	gravel, sand & stones	98	GRVL, SAND, ROCK	10	" diameter of Outer Casing	NOTE IN CHECKS
54	72	red clay, sand, gravel mix	200	CLAY, SAND, GRVL	10	" diameter of Open Hole	
72	94	hardpan, few streaks sand	206	HDPW, SAND	8	" diameter of Inner Casing (92-296)	
94	97-6	soapstone ODCR SHLE				" diameter of Open Hole	
97-6	131	limerock OPVL LMST				bottom seal to	Mix grout (yds.) (Sacks)
131	291	sandrock OSTP SANDS				" diameter	Screen
291	398	shakopee dolomite OPDC DLMT					

RECORD OF TEST PUMPING

to	to	Static Water Level	of pipe
to	to	GPM	D.D. Hours
to	to	GPM	D.D. Hours
to	to	GPM	D.D. Hours
to	to	GPM	D.D. Hours
to	to	GPM	D.D. Hours



Remarks: 205' 1/2" of 8" pipe 10" R & L nipple

PERMANENT PUMP DATA

Mfg. Cook Type turb Serial No. _____

Capacity 200 GPM 335 TDH

Motor Make _____ Type _____

25 H.P. 220 Volts 3 Ph. 1760 RPM

150 ft. 5 in Col. pipe in. Shaft

ft. 8 in Bowls 16 Stages Type _____

10 ft. 5 in suction pipe & _____

ft. Total Length of Pump _____

ft. in. drop pipe & No. Cable _____

ft. in. air line _____

in. Pitless ft. bury in outlet _____

Sept., 1963 - pull pump and reset

Aquifer - OSTP - OPDC

50198

ST. PAUL WEST QUAD
P. 27, SD

WELL RECORD

DOT-128

36
SPW
OK

KEYS WELL DRILLING COMPANY

RAMSEY CO.
29-23-35
ADDDAD
Elev. 890±5

WATER PRODUCERS
SAINT PAUL, MINNESOTA

103-B

NOW THE BELMONT-615 UNIV.

Owner Silver Stripe Bar 225-0829 Date Completed July, 1997

Location 618 University Avenue Driller _____

Well No. 1 Size 8" x 6" Total Depth 337' Type Shakopee

DRILLERS LOG

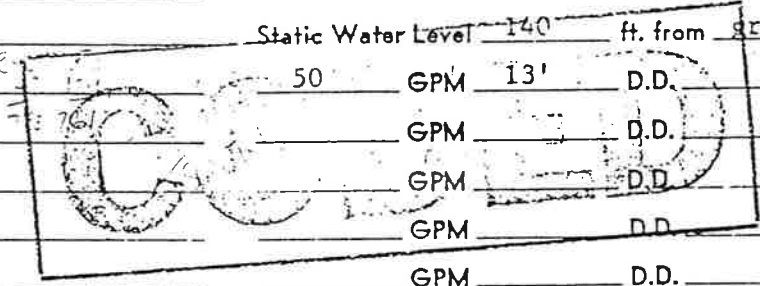
0'	to	66'	Sand & gravel	} PCTS
66'	to	92'	Clay & stones	
92'	to	96'	Shale ODCR SHLE 7/798	
96'	to	129'	Limerock OPVL LMSV 7/798	
129'	to	142'	Shaley sandrock OGSP SHLE, SVDS	
142'	to	290'	St. Peter Sandrock OSTP SVDS	
290'	to	337'	Dolomite OPDC DLMT	

WELL MATERIALS

96'	of	8"	diameter of Outer Casing
194'	of	8"	diameter of Open Hole
290'	of	6"	diameter of Inner Casing
47'	of	6"	diameter of Open Hole
	to		Mix grout _____ (yds.) (Sacks)
			" diameter _____ Screen

RECORD OF TEST PUMPING

	Static Water Level	140	ft. from	ground level	
		50	GPM	13'	D.D. Hours
			GPM		D.D. Hours
			GPM		D.D. Hours
			GPM		D.D. Hours
			GPM		D.D. Hours



Remarks: _____

PERMANENT PUMP DATA

Mfg. F/M Type _____ Serial No. _____
 Capacity 50 GPM 60' TDH _____
 Motor Make _____ Type _____
7 1/2 H.P. 220 Volts 3 Ph. 1750 RPM
 _____ ft. 4 in Col. pipe _____ in. Shaft
 _____ ft. _____ in Bowls _____ Stages _____ Type _____
 _____ ft. _____ in suction pipe & _____
 _____ ft. Total Length of Pump
 _____ ft. _____ in. drop pipe & _____ No. Cable
 _____ ft. _____ in. air line
 _____ in. Pitless _____ ft. bury _____ in outlet

Aquifer OPDC-OPDC

490
129
761

103-B

20
CPW

KEYS WELL DRILLING COMPANY

WATER PRODUCERS

29-23-35
adcccc
885±5

SAINT PAUL, MINNESOTA

Snow Flake Dairy

Owner Consumer Milk Company Date Completed 1923

Location 500 No. Groton St. Paul Driller Keys

Well No. 1 Size 10" x 8" Total Depth 475' Type Shakopee-Jordan

DRILLERS LOG (Estimated)

0 to 8	pit	PIT	PIT
8 to 60	drift	PLTS	DIPT
60 to 90	Plattville	OPVL	LMST
90 to 255	St. Peter	OSTP	SNDS
255 to 390	Shakopee	OPDC	DLMT
390 to 475	Jordan	CJDN	SNDS

WELL MATERIALS

60'	of	10"	diameter of Outer Casing
143'	of	10"	diameter of Open Hole
150'	of	8"	diameter of Inner Casing
225'	of	8"	diameter of Open Hole
390 to 475'	Mix grout		(yds) (Sacks)
			diameter Screen

RECORD OF TEST PUMPING

Static Water Level 885 ft. from surface

CO	GPM	D.D.	Hours
	GPM	D.D.	Hours
	GPM	D.D.	Hours
	GPM	D.D.	Hours
	GPM	D.D.	Hours

*885
390
495*

Remarks: ...

PERMANENT PUMP DATA

Mfg. Panama Type turb Serial No. ...

Capacity 100 GPM 270 TDH

Motor Make ... Type ...

10 H.P. 220 Volts 3 Ph. 1760 RPM

160 ft. 5 in. C.I. pipe 1 1/8 in. Shaft

8 ft. in. Bowls 12 Stages Type ...

10 ft. 1 1/2 in. suction pipe & ...

... ft. Total Length of Pump

... ft. in. drop pipe & ... No. Cable

... ft. in. air line

... ft. Pitless ... ft. bury ... in. outlet

Aquifer OPDC-CJDN

200196*

RAMSEY CO.
29-23-34
DCLABB
Elev. 932±5

103-B

DOT-141

SPW

P. 35, 4A

St. Paul.	Reform School Well.	935	97
Mo. Concordia College	275 Syndicate Av. N.		
Elev. 935		St	
48 Drift	0-48	PLTS	DRFT
7 Salina	48-55	} ODCR	LMSN
82 Arcorah	55-137		SHLE
28.5 Plattinb	137-165.5	OPVL	LMSN
5 glenwood	165.5-170.5	OGWD	SHLE
77.2 St. Peter.	170.5-247.67	OSTP	SAVS

OK

Ref. MGS. Final R

CODED
Also, P. 304 Well
359 45.256

No aquifer

KEYS WELL DRILLING COMPANY

WATER PRODUCERS
SAINT PAUL, MINNESOTA

29-23-34
dbbdbc

930±5

103-B

Owner Brown & Bigelow Date Completed _____
 Location University & Hamline, St. Paul Driller _____
 Well No. _____ Size _____ Total Depth 602' Type _____

DRILLERS LOG

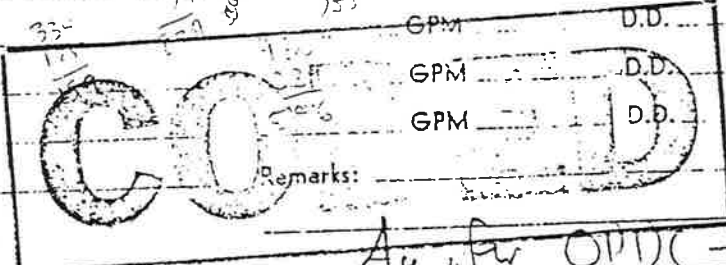
Depth (ft)	Material	Notes	WELL MATERIALS
0' to 17'	Pit	PIT PIT	' of _____ " diameter of Outer Casing
17' to 51'	Sand and gravel	PLTS SAND, GRVL	' of _____ " diameter of Open Hole
51' to 140'	Lime	ODCR LMST, SHLE 7/879	' of _____ " diameter of Inner Casing
140' to 175'	Lime	OPVL LMST 7/790	' of _____ " diameter of Open Hole
175' to 334'	Sandrock	OSTP SNDS 7/735	' to _____ Mix grout _____ (yds.) (Sacks)
334' to 462'	Shakopee	OPDC DLMT 7/596	' " diameter _____ Screen
462' to 556'	Jordan	CJDN SNDS	
556' to 602'	Shale	CSTL SHLE	

RECORD OF TEST PUMPING

Depth (ft)	Static Water Level	GPM	D.D.	Hours
_____	_____	930	_____	_____
_____	_____	175	_____	_____
_____	_____	755	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

PERMANENT PUMP DATA

Mfg _____ Type _____ Serial No. _____
 Capacity _____ GPM _____ TDH _____
 Motor Make _____ Type _____
 H. P. _____ Volts _____ Ph. _____ RPM _____
 ft. _____ in Col. pipe _____ in. Shaft _____
 ft. _____ in Bows _____ Stages _____ Type _____
 ft. _____ in suction pipe & _____
 ft. Total Length of Pump _____
 ft. _____ in. drop pipe & _____ No. Cable _____
 ft. _____ in. air line _____
 in. Pitless _____ ft. bury _____ in outlet _____



Remarks: Aquifer OPDC - CJDN

Note in remarks
well cased into OPDC

of Sect 31, Twp 21 N, R. 10 W
Randy Co

29/23-34 d 66

ADP
1963

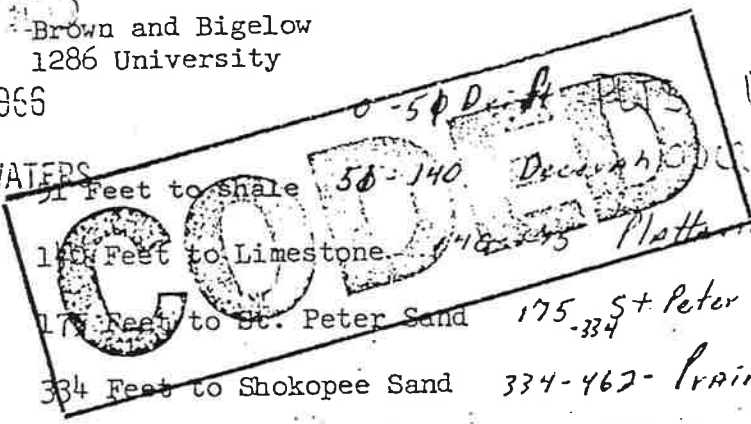
WELL LOG

RECEIVED

Brown and Bigelow
1286 University

JAN 12 1966

DIVISION OF WATERS



Date		1/12/66	
Time		10:00 AM	
Location		29/23-34 d 66	
Well No.		1286	
Driller		Brown and Bigelow	
Casing		12"	
M. S. No.		1286	
Remarks		D. sh, Decatur, Plattville, St. Peter, Shokopee, Jordan	
Signature		[Signature]	

- 51 Feet to shale *0-50 D. sh*
- 148 Feet to Limestone *50-140 Decatur*
- 175 Feet to St. Peter Sand *175-334 St. Peter*
- 334 Feet to Shokopee Sand *334-462 Prairie du Chien*
- 462 Feet to ~~Gardon~~ Sand *462-604 Jordan*
- 604 Feet to Bottom - Jordan Sand Rock

DNFT
SHLE

OSTP SWS

Originally drilled by McCarthy Well Company in 1935. Cased and cemented into Shokopee limerock 12" casing. Well continued to approximately 602 Feet penetrating Jordan Sand Rock.

A. O. Beisang
A. O. Beisang

AOB:tic

2001-13 *

WELL RECORD

KEYS WELL DRILLING COMPANY

WATER PRODUCERS

SAINT PAUL, MINNESOTA

29-23-34

dadaad

890's

21
SAW
103-B

Owner Keys Well Drilling Company

Date Completed 1938

Location 413 No. Lexington Parkway, St. Paul

Driller

Well No. 1 Size 12"

Total Depth 536'8"

Type St. Peter

DRILLERS LOG

0' to 91' Sand & gravel } PLTS SAND, GRVL
91' to 111' Hardpan } HDPN
111' to 130' Limerock } T1779 OPVL LMST
130' to 133'8" Soapstone } OGWD SHLE
133'8" to 148'8" St. Peter Sandrock } OSTP SANDS

WELL MATERIALS

5'6" of 12" I.D. diameter of Outer Casing
107'6 1/2" of 12 1/2" diameter of Open Hole
36' of 12" diameter of Open Hole
" of " diameter of Inner Casing
" of " diameter of Open Hole
" to " Mix grout (yds.) (Sacks)
" diameter Screen

RECORD OF TEST PUMPING

Static Water Level 91 ft. from Top of pipe

Table with columns for GPM, D.D., and Hours. Includes handwritten note '148'8" to 127'8"'. A large arrow points from this area to the 'PERMANENT PUMP DATA' section.

Remarks: Well in shop yard.

Pipe - 1'10" above ground

PERMANENT PUMP DATA

Mfg. Type Serial No.
Capacity GPM TDH
Motor Make Type
H. P. Volts Ph. RPM
ft. in Col. pipe in. Shaft
ft. in Bows Stages Type
ft. in suction pipe &
ft. Total Length of Pump
ft. in. drop pipe & No. Cable
ft. in. air line
in. Pitless ft. bury in outlet

427'5" - 501'11" Jordan Sandrock
501'11" - 536'8" Shale

Aquifer OPVL - CJDN

29-23-34

dabacb

905±5

WELL RECORD

103-B

35
SPW

KEYS WELL DRILLING COMPANY

WATER PRODUCERS

SAINT PAUL, MINNESOTA

200192

Owner Prom Ballroom Date Completed January, 1941

Location University & Dunlap, St. Paul Driller Royce Johnson

Well No. _____ Size 12" x 10" Total Depth 515'6" Type Shakopee-Jordan

DRILLERS LOG

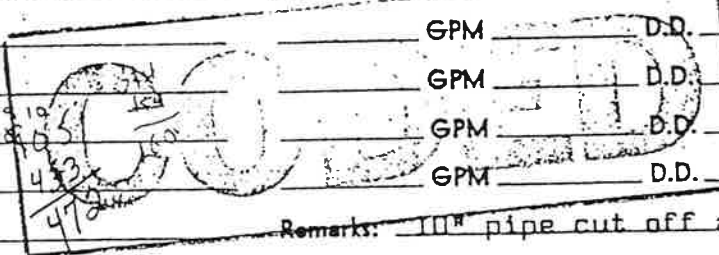
WELL MATERIALS

Telescoping

0'	to	2'	platform	108'	of	12"	diameter of Outer Casing	(121'6" - 131'6")
2'	to	13'6"	(pipe 1' above ground) pit to top of pipe	PIT PIT 203'6"	of	12"	diameter of Open Hole	
13'6"	to	83'	sand and gravel	PLTS SAND, OPVL 214'	of	10"	diameter of Inner Casing	(110' - 118'5")
83'	to	128'	sandy clay & rocks	CLAY, ROCK 181'6"	of	10"	diameter of Open Hole	
128'	to	154'	limerock	OPVL LMST 324'	to	320'	Mix grout 1:1	(yds.) (Sacks) seal only
154'	to	156'	soapstone	OG-WD SHLE	"	"	diameter	Screen
156'	to	315'-6"	St. Peter sandrock	OPDC DMST SANDS	RECORD OF TEST PUMPING			
315'-6"	to	435'	Shakopee	OPDC DMST	Static Water Level	136'	ft. from top of 12" pipe	
435'	to	513'-6"	Jordan sandrock	CJDN SANDS	no test	GPM	D.D.	Hours

RECORD OF TEST PUMPING

GPM	D.D.	Hours
no test		



Remarks: 10" pipe cut off and lead packer seal to 12" pipe at 110'

PERMANENT PUMP DATA

Mfg. F/M Type turb. Serial No. _____
 Capacity 400 GPM 291 TDH _____
 Motor Make F & M Type VHS
40 H.P. 220 Volts 3 Ph. 1800 RPM
150 ft. in Col. pipe - 3/8 in. Shaft
6 ft. 10 In Bowls 8 Stages enclosed type
20 ft. 7"00 in suction pipe & _____
176 ft. Total Length of Pump
 _____ ft. in. drop pipe & _____ No. Cable
 _____ ft. in. air line
 _____ in. Pitless _____ ft. bury _____ in outlet

1944 - Install a 6" liner from 280'3" to 343'7" to make additional seal at bottom of 10" liner - with lead packer seals and 6 sax cement. Also added 19'10" of 10" pipe.

Aquifer: OPDC - CJDN

APPENDIX B

**MPCA UNDERGROUND STORAGE TANK
NOTIFICATION FORM
AND
MPCA UNDERGROUND STORAGE TANK
REMOVAL INFORMATION FORM**



Minnesota Pollution Control Agency
Solid and Hazardous Waste Division
1935 West County Road B2
Roseville, Minnesota 55113

**UNDERGROUND STORAGE TANK
NOTIFICATION FORM**

(Read instructions on reverse side)

EPA Use

MPCA Use

Transaction Type(s)

- A.
- Notification
 - Change in Status
 - Data Correction

Type of Installation; if federal facility, give GSA#; if industry, give SIC code.

- B.
- Bulk Storage
 - Service Station
 - Utility
 - Industry
 - Agricultural
 - Residential
 - Government
 - Other (Specify) _____
- GSA/SIC _____

C. Name of Installation

Street Address

City

County

Zip Code

Phone (include area code)

Township

Range

Section

Quarter

Quarter

Quarter

Quarter

D. Name of Owner (Corporation, Individual, or Agency)

Mailing Address

City

State

Zip Code

Name of Emergency Contact (if different from owner)

Owner Phone (include area code)

Emergency Phone (include area code)

E. Use code numbers listed on reverse side for items marked with *

1. Action*	2. Tank Number	3. Status*	4. Date Installed, Repaired, or Reconditioned (mm/dd/yy)	5. Date Last Used (mm/dd/yy)	6. Capacity (gallons)	7. Type*	8. Internal Protection*	9. External Protection*	10. Secondary Containment*	11. Piping Type*	12. Dispenser Type*	13. Substance Stored*	(Specify)	14. Quantity Left Stored (gallons)
1	1	1	5 9	1 1 1	3 0 0 0	2	1	4	5	1	1	1	1	1 1 1 1
1	2	3	5 9	1 1 1	3 0 0 0	2	1	4	5	1	1	1	1	1 1 1 1
1	3	3	5 9	1 1 1	4 0 0 0	2	1	4	5	1	1	1	1	1 1 1 1

15. Leak Detection*	# Monitoring Pts.	16. Date of Last Tank Test (mm/dd/yy)	Test Method*	17. Past Leak?	18. Remedial Action*	19. Amount Lost (gallons)
0	0	0 0	0	4		
0	0	0 0	0	4		
0	0	0 0	0	4		

F. Comments:

Premises purchased by
Fuel Oil Service Company, Inc.
3-11-86.

G. Under penalty of perjury, to the best of my knowledge, I certify that the information provided is true & correct.

Printed Name: Stephen R Dahl
Title: Vice President
Signature: [Handwritten Signature]
Date: 3-26-86

RECEIVED

NOV 22 1989



Minnesota Pollution Control Agency

UNDERGROUND STORAGE TANK REMOVAL INFORMATION FORM

This Is An Optional Form Provided To Tank Owners, Fire Department Representatives And Others To Assist The Observation Of Underground Storage Tank Removals. It Is The Legal Duty Of The Tank Owner And Operator To Report Any Evidence Of Petroleum Contamination To The Minnesota Pollution Control Agency (MPCA).

Observer: Rebecca A. Buldon Date: 5/8/89 Time: 11:09 am

Signature: Rebecca A. Buldon
Organization: Warzyn Engineering, Inc.
Position: Environmental Specialist/Geologist
Address: 715 Florida Avenue, Mpls, MN 55436
Telephone No. (s): (612) 593-5650

TANK INFORMATION

Tank Owner Name: Mr Steve Lall
Contact Person: Mr Steve Lall Title:
Tank Location Name: Phillips 66
Address: 809 Selky Avenue, City: St. Paul, MN
County: Ramsey Telephone Number: (612) 488-7201
Excavation Contractor: Minnesota Petroleum
Address: 5223 University Ave. N.E. Mpls, MN
Telephone Number: (612) 571-2490

Table with 6 columns: TANK, Condition & Size, Contents (Product), Visible Corrosion, Visible Leakage, Soil Contamination. Rows 1-6 show gasoline in 300L tanks with varying corrosion and leakage levels.

SOIL CONDITIONS WITHIN THE EXCAVATION

- 1. Detectable Petroleum Contamination Was Found? YES/NO
2. Petroleum Odors: (Circle) Weak, Moderate, Strong YES/NO
3. Visible Petroleum Product In Soil: YES/NO
4. Sheen On Water Mixed With Soil: YES/NO
5. Sheen On Ground Water In Excavation: YES/NO
6. Petroleum Product On Ground Water In Excavation: YES/NO
7. Instrument (hNu or other device) Readings: 0-250ppm YES/NO
8. Soil Type: (Circle) Clay, Silt, Sand, Gravel, Fill
9. Pictures Taken: Y/N BY:
10. Tank Disposal BY: Deerman's Where: Fridley, MN

The Minnesota Pollution Control Agency (MPCA) must be notified immediately of any evidence of petroleum contamination. 24 Hour Emergency Leak or Spill Number: (1-612-296-8100) During Business Hours: (1-612-296-7235) or (1-612-296-7709) Continued on back:----->

APPENDIX C

MPCA APPROVAL OF PETROLEUM
CONTAMINATION SOIL TREATMENT



Minnesota Pollution Control Agency

520 Lafayette Road, Saint Paul, Minnesota 55155

Telephone (612) 296-6300



June 28, 1989

Ms. Rebecca Gulden
Warzyn Engineering, Inc.
715 Florida Avenue
Suite 209
Minneapolis, Minnesota 55426

REC'D

JUN 29 89

WARZYN

Dear Ms. Gulden:

Re: Approval of Petroleum Contaminated Soil Treatment at Asphalt Concrete Plant
Site: Phillips 66, 809 Selby Avenue, St. Paul
Site ID#: LEAL00001080

Your application dated June 26, 1989, for treatment of 250 cubic yards of petroleum contaminated soil from the above site is hereby approved by staff of the Minnesota Pollution Control Agency (MPCA) subject to the following conditions.

1. Soils will be treated by the C.S. McCrossan Asphalt Plant in Maple Grove, Minnesota.
2. Protection from both infiltration and runoff shall be provided to contaminated soils stored prior to treatment.
3. Soil treatment will be completed by July 14, 1989.
4. Treated soils shall be incorporated into asphalt or used as road base.
5. MPCA staff shall be notified by mail when soil treatment is completed.

Failure to comply with the conditions of this approval may result in enforcement actions against either or both the generator of the contaminated soil or the facility operators. Failure to comply may also result in refusal by the MPCA to approve of similar applications for contaminated soil treatment by the facility or generator in the future.

Please contact me at 612/296-7982, if you have questions about this approval or cannot meet any of the above conditions.

Thank you.

Sincerely,

Jean M. Hanson
Pollution Control Specialist Senior
Tanks and Spills Section
Hazardous Waste Division

Asphalting Disposal Permission Granted

Louis Chamberlain, Supervisor
Waste Incineration
Air Quality Division

JMH:kra

cc: Steve Dahl, Fuel Oil Service, St. Paul
Jonathan R. Elam, Maple Grove

Regional Offices: Duluth • Brainerd • Detroit Lakes • Marshall • Rochester
Equal Opportunity Employer

Printed on Recycled Paper

APPENDIX D
AINLAY TANK SYSTEM
TEST RESULTS

Re: Ainlay Testing at
GEORGE'S 66
St. Paul MN.
For: Bud Dahl
Owner
Date: August 25, 1988

<u>Tank No.</u>	<u>Product/Capacity</u>	<u>Water</u>	<u>Test Results</u>	<u>Remarks</u>
1)	REGULAR/4000	1/4"	Tank Tight	Lines Tight at 40 psi.
2)	UNLEADED/3000*	0"	System Failed	Lines Tight at 40 psi.
	UNLEADED/3000*	0"	System Failed	Lines Tight at 40 psi.

Remarks: *The 3000 gallon unleaded tanks are siphoned to each other with no direct method of disconnecting the tanks. The unleaded tanks were tested as a system with a 6000 gallon capacity. The system showed a leak rate of 0.17 Gal/Hr. Due to large fluctuations in the manometer readings during the test, it is recommended that the syphon between the tanks be broken and each unleaded tank be retested independently.

Testing of the above tanks was conducted with the Ainlay tank testing system by Soiltest Environmental Division. The Ainlay system uses a slope tube manometer in conjunction with temperature probes, which are lowered inside the tank. Temperature variations are recorded by an electronic data logger/thermometer throughout the test. Volume changes due to temperature variations are calculated, and compared to volume changes measured by the manometer. The leak rate is determined from these volume changes. The tank is declared tight if the leak rate does not exceed 0.050 gallons per hour as determined by the National Fire Protection Association., Bulletin N.F.P.A. 329.

The line tests were conducted using a Petro Tite line tester by Heath Consultants Incorporated. Product lines for remote pump systems are tested at one and a half times the pump on pressure. The lines are determined tight if the leak rate does not exceed 0.050 gallons per hour.

Since product is brought above ground in the standpipe, the entire tank is tested, including vent lines, fill pipes, and tank fittings. It should be noted that a loose vent pipe or fitting at the top of a tank would usually be above the product level of the tank during normal use.

Should you have any questions please call our office at at (612) 644-0013.

enclosures:



AINLAY TANK 'TEGRITY TESTER'™ FIELD TEST DATA

1 TANK OPERATOR	NAME <u>BUD DAHL SERVICES CO. INC.</u> ADDRESS <u>290 Atwater St. St. Paul 65117</u> PHONE <u>488-72</u>				
	(<u>GEORGE'S 66</u>) <u>809 Selby St. St. Paul 55107</u> <u>291-17</u>				
2 TANKS TO BE TESTED	IDENTIFICATION	CAPACITY—GALS.	MANUFACTURER	STEEL/FIBRGLS.	AGE—YRS.
	REGULAR	4000	UNKNOWN	STEEL	31
	UNLEADED	3000 *	UNKNOWN	STEEL	31
	UNLEADED	3000 *	UNKNOWN	STEEL	31
3 WATER TABLE	DISTANCE FROM GRADE TO WATER _____ INS. <u>198'</u> <u>Minn. Geological Survey well data from 637 S.</u>				
4 TANK FILL-UP	TANK WILL BE FILLED <u>1900</u> (TIME) ON <u>8/24/88</u> EXTRA 5 GALS PRODUCT AVAILABLE FROM <u>George</u> FILL UP TO BE ARRANGED BY MR. <u>DAHL & George</u> PHONE (<u>291</u>) <u>291-17</u> CONTACT AT STORAGE TERMINAL IS MR. <u>DAHL</u> PHONE () <u>488-72</u>				
5 OUTSIDE CONTRACTORS	NAME _____ ADDRESS _____ PHONE _____				
6 OFFICIALS TO BE CONTACTED	NAME _____ AUTHORITY _____ PHONE _____				
7 SPECIAL NOTES OR PRECAUTIONS	* BOTH 3000 GALLON UNLEADED TANKS ARE SIGNONED TO ONE ANOTHER. THEY WERE TESTED AS A 6000 Gallon System				
8 TEST RESULTS	ALL TESTS WERE PERFORMED IN ACCORDANCE WITH PROCEDURES DESCRIBED IN SOILTES INSTRUCTION BOOK. CRITERIA FOR TIGHTNESS IS ESTABLISHED BY NATIONAL FIRE PROTECTI ASSOCIATION BULLETIN. N.F.P.A. 329.				
	TANK IDENT	TANK IS TIGHT	TANK IS NOT TIGHT	LEAK RATE G. P. H.	TEST DATE
REGULAR / 4000	YES		-0.0354	8-25-88	
UNLEADED / 3000 } UNLEADED / 3000 }		X } X }	+0.17	8-25-88	
9 CERTIFICATION	THIS CERTIFIES THAT THE TANKS DESCRIBED WERE TESTED BY THE UNDERSIGNED AND THAT THE STAT RESULTS REPRESENT THE TRUE STATE OF THE TANKS ON THIS DATE TO THE BEST OF MY KNOWLEDG				
SIGNED	<u>John Hall</u>			CERTIFICATE NO. _____	
FOR (TEST COMPANY)	<u>DAHL & ASSOC.</u>			ISSUE DATE _____	
ADDRESS	<u>2303 Wycliff St. suite 2W</u> <u>St. Paul MN. 55114</u>			STATE _____ ZIP _____	

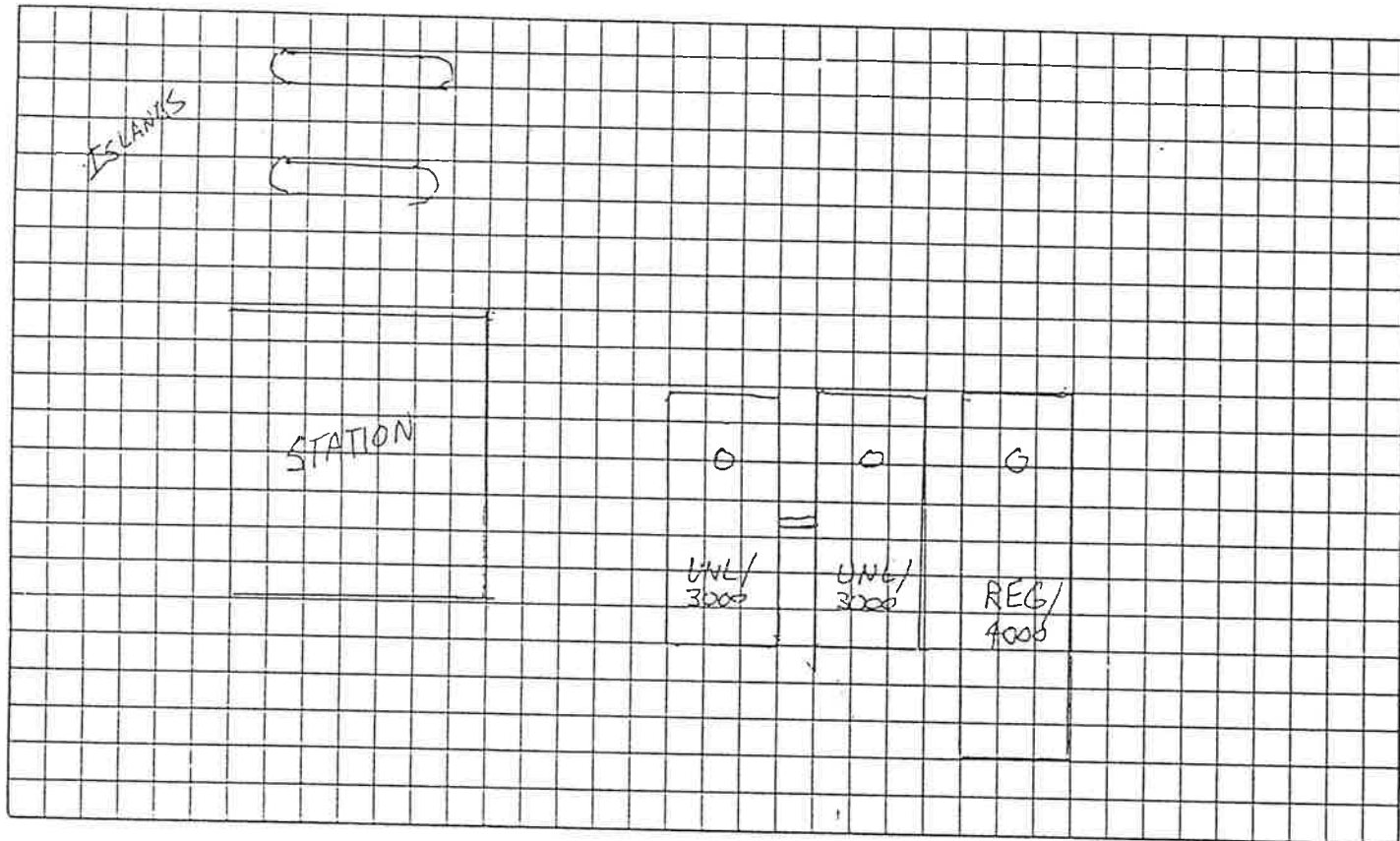
AINLAY TANK TIGHTNESS TEST No.

10	TANK I.D. INCLUDE ENOUGH INFO. TO ACCURATELY IDENTIFY TANK. (NUMBER/CONTENTS/POSITION, ETC.) TANK DIAMETER <u>REGULAR</u> 25 <u>64</u> INS FILL PIPE LENGTH <u>31</u> INS																																																																																																																																
11	WATER IN TANK (a) START WATER IN TANK <u>1/4"</u> INS (b) START WATER IN TANK <u>3</u> GALS			(c) END WATER IN TANK <u>1/4"</u> INS (d) END WATER IN TANK <u>3</u> GALS																																																																																																																													
12	PRODUCT VOLUME (a) NOMINAL CAPACITY <u>4000</u> GALS (b) ACTUAL CAPACITY <u>4011</u> GALS (FROM TANK CHART)			(c) DEDUCT WATER IN TANK <u>3</u> GALS (d) TOTAL PRODUCT VOL. <u>4008</u> GALS																																																																																																																													
13	FILL PIPE EXTENSION (a) HEIGHT OF WATER TABLE ABOVE TANK BOTTOM = <u>0</u> (h) INS <i>M.G.S. Well Data</i> (b) DENSITY OF TANK PRODUCT = _____ (w) LB/CU. IN. (FROM TABLES) DENSITY OF EXTERNAL WATER = <u>0.036</u> LB/CU. IN. (c) ADDITIONAL HEAD REQUIRED = $\frac{(h) \times 0.036}{(w)}$ = <u>0</u> x 0.036 = _____ INS NOTE: TO AVOID POSSIBLE TANK DAMAGE THE ADDED PRESSURE FROM A FILL PIPE EXTENSION MUST NEVER EXCEED 5 P.S.I. AT THE WATER LEVEL.																																																																																																																																
14	PRELIM TEST DATA (a) START TEMP CHECK <u>0515</u> AM/PM (b) END TEMP CHECK <u>0616</u> AM/PM (c) TIME SINCE LAST LIQ. ADDED <u>9</u> HRS				(d) A.P.I. GRAVITY <u>60.8</u> AT <u>67</u> °F (e) A.P.I. GRAVITY <u>60.1</u> AT 60°F (f) COEFF. OF EXPANSION <u>0.00068399</u>																																																																																																																												
15	TEST DATA (a) START TEST <u>0515</u> AM/PM: END TEST <u>0616</u> AM/PM: TEST TIME <u>61</u> MINS. START <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>TIME</th> <th>TEMP 1</th> <th>TEMP 2</th> <th>TEMP 3</th> <th>WTD. AVG.</th> <th>TIME</th> <th>TEMP 1</th> <th>TEMP 2</th> <th>TEMP 3</th> <th>WTD. AVG.</th> </tr> </thead> <tbody> <tr> <td><u>0515</u></td> <td><u>79.3556</u></td> <td><u>80.2212</u></td> <td><u>82.9989</u></td> <td><u>80.7005</u></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">↓</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><u>0615</u></td> <td><u>79.4199</u></td> <td><u>80.1378</u></td> <td><u>83.2141</u></td> <td><u>80.7291</u></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>									TIME	TEMP 1	TEMP 2	TEMP 3	WTD. AVG.	TIME	TEMP 1	TEMP 2	TEMP 3	WTD. AVG.	<u>0515</u>	<u>79.3556</u>	<u>80.2212</u>	<u>82.9989</u>	<u>80.7005</u>						↓										<u>0615</u>	<u>79.4199</u>	<u>80.1378</u>	<u>83.2141</u>	<u>80.7291</u>																																																																																					
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<u>0515</u>	<u>79.3556</u>	<u>80.2212</u>	<u>82.9989</u>	<u>80.7005</u>																																																																																																																													
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<u>0615</u>	<u>79.4199</u>	<u>80.1378</u>	<u>83.2141</u>	<u>80.7291</u>																																																																																																																													
(b) TOTAL TEMP. CHANGE (AVG END TEMP. — AVG START TEMP.) = <u>80.7291 - 80.7005 = +0.0286</u> °F. (c) VOL. CHANGE DUE TO TEMP = PRODUCT VOL x TEMP. CHANGE x COEFF. EXP. = <u>4008</u> ^(12d) x <u>0.0286</u> ^(15b) x <u>0.00068399</u> ^(14f) = <u>+0.0784</u> GALS. (d) TOTAL LIQUID VOL. ADDED SUBTRACTED AT END OF TEST = <u>+(-0.115)</u> GALS. (e) VOL. CHANGE NOT DUE TO TEMP [(c) + (d)] = <u>+0.0784 + -0.115 = -0.0366</u> GALS. (f) LEAK RATE = $\frac{(e) \times 60}{\text{TIME OF TEST (MINS)}}$ = $\frac{0.0366 \times 60}{61}$ = <u>0.0357</u> G.P.H.																																																																																																																																	
THIS LEAK RATE DOES/DOES NOT EXCEED THE STANDARD OF 0.050 G.P.H. DESCRIBED IN NATIONAL FIRE PROTECTION ASSOC., BULLETIN N.F.P.A. 329. THE TANK IS TIGHT <input checked="" type="checkbox"/> / THE TANK IS NOT TIGHT <input type="checkbox"/>																																																																																																																																	

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 ADDRESS 809 Selby St TESTER John Hill
 TEST COMPANY MAHL & ASSOC

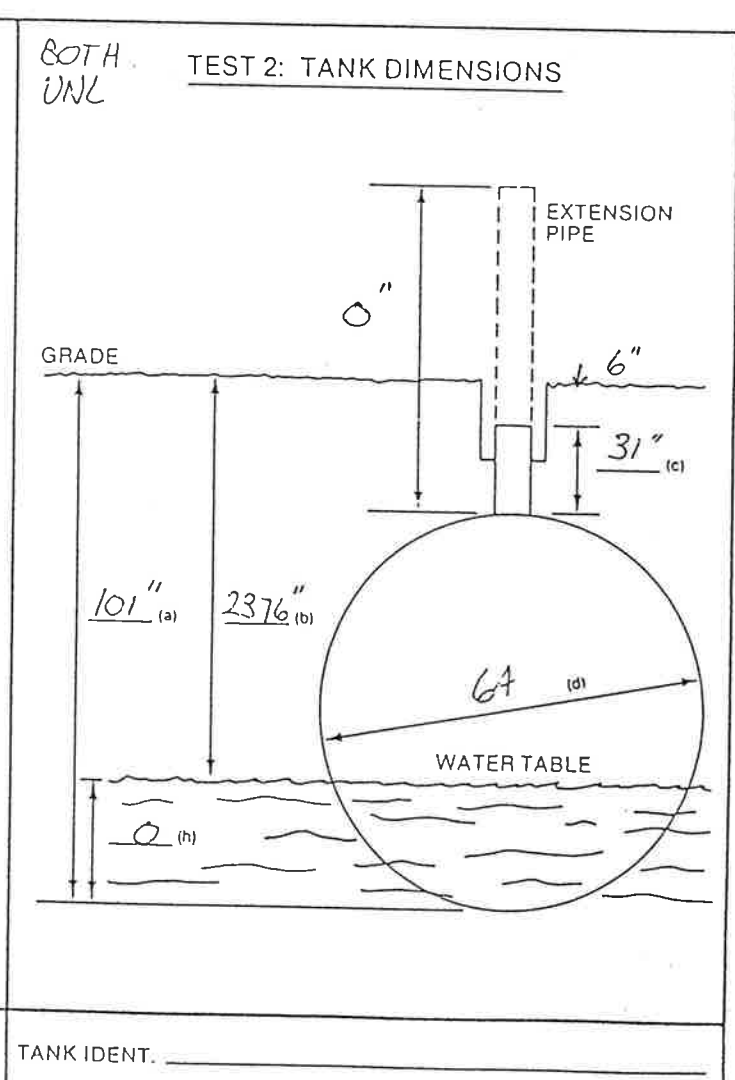
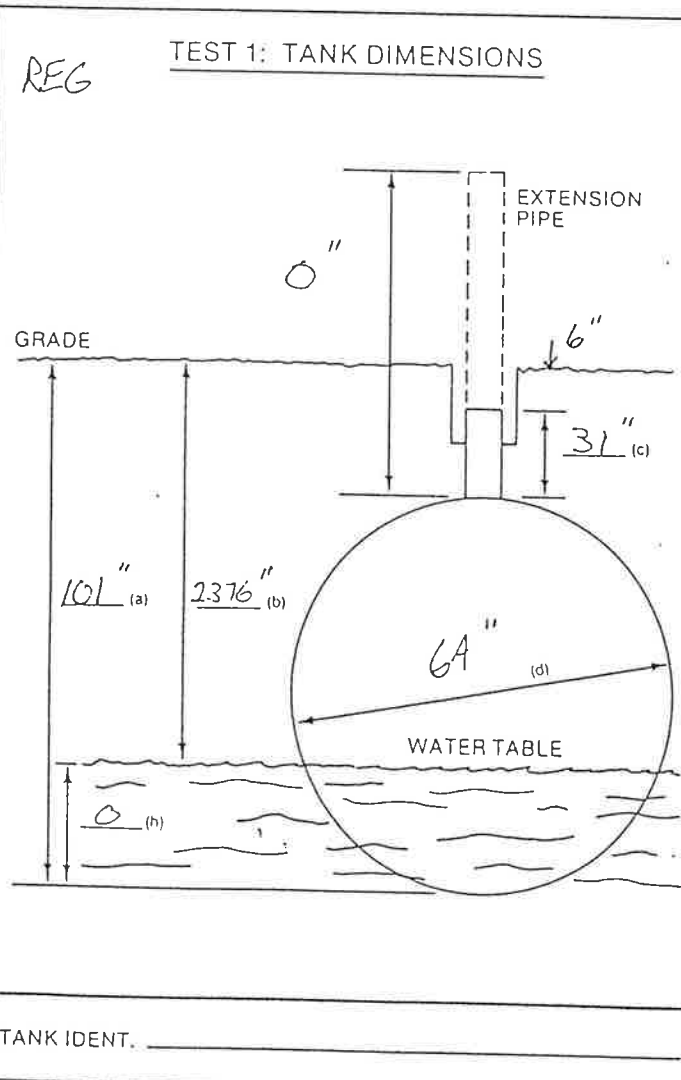
TEST SITE LAYOUT

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TESTER John Hg 11
TEST COMPANY MAHL & ASSOC.

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ADDRESS 809 SELBY

APPENDIX E
ANALYTICAL LABORATORY RESULTS
AND
CHAIN-OF-CUSTODYS



ANALYTICAL LABORATORY RESULTS
WI LAB CERTIFICATION ID#: 113138300

PROJECT: MINNESOTA PETROLEUM
LOCATION: ST. PAUL, MINNESOTA

PROJECT #: 50384.00
DATE SAMPLED: 05/08/89
CK'D: BJC APP'D: KCF
DATE ISSUED: 6-1-89

LAB NUMBER	33325
<u>SAMPLE DESCRIPTION</u>	<u>SS-5</u>
TOTAL SOLIDS (%)	93.4
LEAD (MG/KG AS RECEIVED)	26.2

METHOD REFERENCE: EPA-600, "METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES", MARCH, 1984.

METHOD 160.3: TOTAL SOLIDS

SW-846, "TEST METHODS FOR EVALUATING SOLID WASTE",
SEPTEMBER, 1986.

METHOD 7420: LEAD

VOLATILE ORGANIC COMPOUND RESULTS
 WI LAB CERTIFICATION ID#: 113138300
 PROJECT: MINNESOTA PETROLEUM
 LOCATION: ST. PAUL, MINNESOTA
 C#: 50384.00

PAGE 1 OF 3
 CK'D: BJC APP'D: D/E
 DATE ISSUED: 5/31/89

METHOD REFERENCE: SW846, "TEST METHODS FOR EVALUATING
 SOLID WASTE", SEPTEMBER, 1986.
 METHODS 8010 AND 8020.

BMDL - DETECTED, VALUE BELOW METHOD DETECTION LIMIT.
 X = ANALYZED, BUT NOT DETECTED.

COMPOUND =====	REPORTABLE DETECTION LIMIT (UG/KG AS REC'D) =====	33321 SS-1 05/08/89 =====	33322 SS-2 05/08/89 =====
BENZENE	50.0	X	X
TERT-BUTYL METHYL ETHER	250	X	X
ETHYL BENZENE	50.0	X	X
TOLUENE	50.0	X	X
XYLENES	50.0	X	X

VOLATILE ORGANIC COMPOUND RESULTS
 WI LAB CERTIFICATION ID#: 113138300
 PROJECT: MINNESOTA PETROLEUM
 LOCATION: ST. PAUL, MINNESOTA
 C#: 50384.00

PAGE 2 OF 3
 CK'D: BJC APP'D: D/S
 DATE ISSUED: 5/21/89

METHOD REFERENCE: SW846, "TEST METHODS FOR EVALUATING
 SOLID WASTE", SEPTEMBER, 1986.
 METHODS 8010 AND 8020.

BMDL - DETECTED, VALUE BELOW METHOD DETECTION LIMIT.
 X = ANALYZED, BUT NOT DETECTED.

COMPOUND =====	REPORTABLE DETECTION LIMIT (UG/KG AS REC'D) =====	33323	33324
		SS-3 05/08/89 =====	SS-4 05/08/89 =====
BENZENE	50.0	X	X
TERT-BUTYL METHYL ETHER	250	X	X
ETHYL BENZENE	50.0	X	X
TOLUENE	50.0	X	X
XYLENES	50.0	X	X



VOLATILE ORGANIC COMPOUND RESULTS
WI LAB CERTIFICATION ID#: 113138300
PROJECT: MINNESOTA PETROLEUM
LOCATION: ST. PAUL, MINNESOTA
C#: 50384.00

PAGE 3 OF 3
CK'D: BJC APP'D: D/E
DATE ISSUED: 5/31/89

METHOD REFERENCE: SW846, "TEST METHODS FOR EVALUATING SOLID WASTE", SEPTEMBER, 1986.
METHODS 8010 AND 8020.

BMDL - DETECTED, VALUE BELOW METHOD DETECTION LIMIT.
X = ANALYZED, BUT NOT DETECTED.

- (1) ELEVATED DETECTION LIMITS DUE TO INTERFERING UNIDENTIFIED COMPOUNDS.
- (2) SAMPLE CHROMATOGRAM CONTAINS UNIDENTIFIED COMPOUNDS.

COMPOUND =====	REPORTABLE DETECTION LIMIT (UG/KG AS REC'D) =====	33325(1)(2) SS-5 05/08/89 =====
BENZENE	250	X
TERT-BUTYL METHYL ETHER	1250	X
ETHYL BENZENE	250	BMDL
TOLUENE	250	BMDL
XYLENES	250	17900



TOTAL PETROLEUM HYDROCARBONS
WI LAB CERTIFICATION ID#: 113138300
PROJECT: MINNESOTA PETROLEUM
LOCATION: ST. PAUL, MINNESOTA
C#: 50384.00

PAGE 1 OF 2
CK'D: BJC APP'D: P/E
DATE ISSUED: 5/31/89

METHOD REFERENCE: SW846, "TEST METHODS FOR EVALUATING
SOLID WASTES", SEPTEMBER, 1986.
METHOD 3550.

ASTM, "ANNUAL BOOK OF ASTM STANDARDS",
1983. METHOD D-3328-78 WITH
MODIFICATIONS.

NOTE: THE ANALYSIS OF SAMPLES FOR TOTAL PETROLEUM
HYDROCARBONS IS A SCREENING PROCEDURE. ANALYTICAL
RESULTS ARE COMPARED AND QUANTIFIED AGAINST KNOWN
REFERENCE STANDARD MIXTURES. DUE TO VARIABLES SUCH
AS DIFFERENCES IN PETROLEUM PRODUCT FORMULATIONS,
WEATHERING AND OTHER ENVIRONMENTAL FACTORS, POSITIVE
IDENTIFICATION AS ONE OF THE TARGET HYDROCARBON
MIXTURES MAY NOT BE POSSIBLE. THE VALUES REPORTED ARE
TENTATIVELY IDENTIFIED WITH ESTIMATED CONCENTRATIONS.

COMPOUND =====	REPORTABLE DETECTION LIMIT (MG/KG AS REC'D) =====	33325 SS-5 05/08/89 =====
TOTAL HYDROCARBON AS:		
GASOLINE	5.00	X(1)
KEROSENE	5.00	X
#2 FUEL OIL	5.00	X

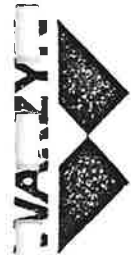


TOTAL PETROLEUM HYDROCARBONS
WI LAB CERTIFICATION ID#: 113138300
PROJECT: MINNESOTA PETROLEUM
LOCATION: ST. PAUL, MINNESOTA
C#: 50384.00

PAGE 2 OF 2
CK'D: BJC APP'D: D/E
DATE ISSUED: 5/31/89

BMDL = DETECTED, BUT BELOW METHOD DETECTION LIMIT.
X = ANALYZED, BUT NOT DETECTED.

- (1) SAMPLE 33325 CONTAINS WHAT APPEARS TO BE A HYDROCARBON FRACTION ELUTING OFF OF THE GAS CHROMATOGRAPH WITH A RETENTION TIME IN THE RANGE OF GASOLINE. THIS UNKNOWN DOES NOT MATCH ANY OF THE REFERENCE STANDARDS. AN ESTIMATED CONCENTRATION OF THE UNKNOWN CALCULATED AGAINST A GASOLINE STANDARD IS 209 MG/KG.



CHAIN OF CUSTODY RECORD

PROJ. NO. 50384.0
 PROJECT NAME ~~Drilling~~ Minnesota Petroleum
 LOCATION: Selby Ave., St. Paul, MN
 SAMPLERS: (Signature) *Rebecca A. Eulder*

LABNO.	DATE	TIME	COMP	GRAB	STATION/LOCATION	NO. OF CONTAINERS
33321	5/8/89			X	SS-1	1
33322	5/8/89			X	SS-2	1
33323	5/8/89			X	SS-3	1
33324	5/8/89			X	SS-4	1
33325	5/8/89		X		SS-5	3

REMARKS *Final*

BETX + MTRF
 LEAD (reduction of 5 ppm)
 Total Hydrocarbons

[use detectors limit of 5 ppm for lead]

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
<i>Rebecca A. Eulder</i>	5/8/89 5:00pm	<i>Kari Ann Link</i>	5/9/89 12:45 am

Relinquished by: (Signature)

Received for Laboratory by: (Signature)

PROJECT MANAGER: *Martin O. Bonnell / mpls*

Chain of custody No.s: 134 & 135
intact rec'd cold

6321

APPENDIX F
METHODS AND PROCEDURES

F.1 Decontamination of Equipment

The split barrel sampler was cleaned between samples to eliminate cross-contamination. The cleaning procedure consisted of soap and water wash using a brush and tap water rinse. The soap and water were changed regularly during the sampling and between borings. Additionally, all downhole drilling equipment and associated tools were steam cleaned before any project work and steam cleaned between borings. The cleaning between borings was done on-site. Fluids used in cleaning the split barrel sampler and drilling equipment were disposed of on-site.

F.2 Soil Sampling

Soil sampling was done in accordance with ASTM: D 1586-84. Using this procedure, a 2 inch O.D. split barrel sampler is driven into the soil by a 140 lb. weight falling 30 inches. After an initial set of 6 inch, the number of blows required to drive the sampler an additional 12 inches is known as the penetration resistance or N value. The N value is an index of the relative density of cohesionless soils and the consistency of cohesive soils.

F.3 Soil Classification

As the samples were obtained in the field, they were visually and manually classified by the crew chief in accordance with ASTM: D 2488-84. Representative portions of the samples were then returned to the laboratory for further examination and for verification of the field classification. Logs of the borings indicating the depth and identification of the various strata, the N value, water level information and pertinent information regarding the method of maintaining and advancing the drill holes are attached. Charts illustrating the soil classification procedure, the descriptive terminology and symbols used on the boring logs are also attached.

F.4 Soil Organic Vapor Monitoring

The soil samples were scanned with an HNU Model 101 photoionization detector with

either a 10.2 eV lamp calibrated for direct reading in ppm volume/volume of benzene. Fresh soil was exposed and the HNU probe immediately placed within 1 inch to 2 inch of soil surface.

F.5 Soil Sampling for Chemical Analysis

Samples for chemical analysis for selected parameters were collected using a split barrel sampler. Precautions, such as disposable latex gloves and chain-of-custody forms, were used to protect the chemical integrity of the samples.

Soil samples were stored in clean jars with teflon-lined lids at approximately 4°C.

F.6 Analytical Methods

The methods used in the chemical analyses are included in the chemistry laboratory report in Appendix E.