

Foth & Van Dyke

R E P O R T

**Petroleum Tank Release
Corrective Action Report**

Scope I.D.: 88W79

*Waste Management, Inc.
Menomonee Falls, Wisconsin*

March 1989



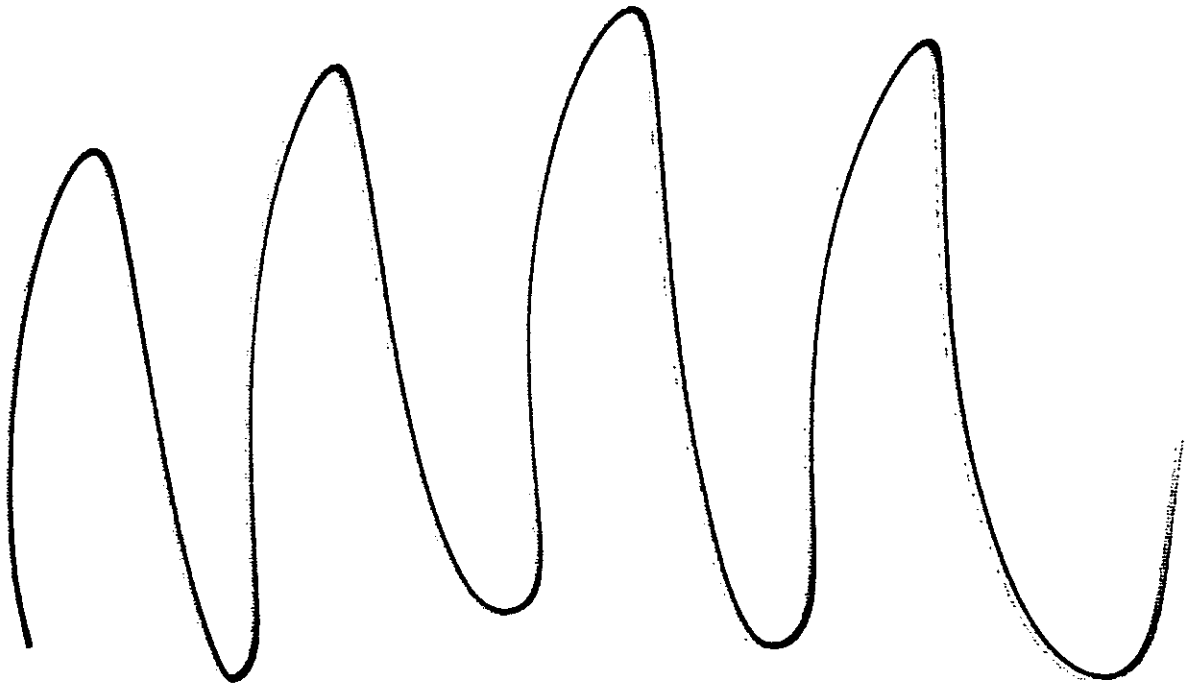
10/20/89
snaps

MAR 02 89

DEAL

Foth & Van Dyke

6474 City West Parkway
Eden Prairie, MN 55344
612/942-0396



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Engineers

Architects

Planners

Scientists

Economists

February 27, 1989

Mr. John Moeger
Tanks and Spills Section
Hazardous Waste Division
Minnesota Pollution Control
520 Lafayette Road
St. Paul, Minnesota 55155

MAR 02 89

MPCA, Hazardous
Waste Division

Dear Mr. Moeger:

RE: Petroleum Tank Release Corrective Action Report
Waste Management Incorporated
12448 Pennsylvania Avenue South
Savage, Minnesota

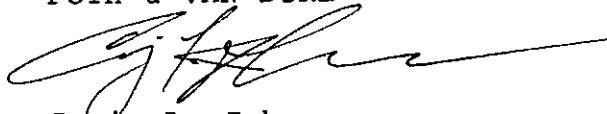
On behalf of Waste Management, Inc., Foth & Van Dyke Associates, Incorporated is submitting two copies of the report entitled "Petroleum Release Corrective Action Report, Waste Management, Inc., Savage, Minnesota.

The report consists of Parts I, II and III of the Petroleum Tank Release Corrective Action Report as outlined by the Minnesota Pollution Control Agency (MPCA). The report documents tank ownership and use, tank removal, soil sampling, and soil excavation activities.

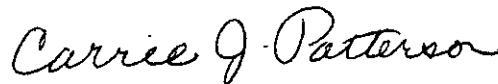
Please contact Craig Johanesen or Carrie Patterson at (612) 942-0396 if you have any questions during your review process. We are available to meet with you to discuss the report and proposed remedial action after you have had an opportunity to review our submittal.

Sincerely,

FOTH & VAN DYKE



Craig L. Johanesen
Manager, Branch Office



Carrie J. Patterson
Project Geologist

88W79



DISTRIBUTION LIST

<u>No. of Copies</u>	<u>Sent to</u>
2	Mr. John Moeger Tanks and Spills Section Hazardous Waste Division Minnesota Pollution Control Agency 520 Lafayette Road St. Paul, Minnesota 55155
1	✓ Richard Pager Waste Management, Inc. W124 N8925 Boundary Road Menomonee Falls, Wisconsin 53051
1	Michael Berkopec Waste Management, Inc. 12448 Pennsylvania Avenue South Savage, Minnesota 55378
1	✓ Craig L. Johanesen Foth & Van Dyke 6474 City West Parkway Eden Prairie, Minnesota 55344
1	✓ James C. Fahrbach, P.E. Foth & Van Dyke 2737 South Ridge Road P.O. Box 190121 Green Bay, Wisconsin 54307-9012

PETROLEUM TANK RELEASE
CORRECTIVE ACTION REPORT
WASTE MANAGEMENT, INC.
12448 PENNSYLVANIA AVENUE SOUTH
SAVAGE, MINNESOTA

Prepared for:
WASTE MANAGEMENT, INC.
MENOMONEE FALLS, WISCONSIN

Prepared by:
FOTH & VAN DYKE AND ASSOCIATES, INC.
6474 City West Parkway
Eden Prairie, Minnesota 55344

FEBRUARY, 1989

Foth & Van Dyke

6474 City West Parkway
Eden Prairie, Minnesota 55344
612/942-0396

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1.0 BACKGROUND INFORMATION - PART I

Documentation in this report is provided in accordance with the Minnesota Pollution Control Agency (MPCA) outline for Petroleum Tank Release Corrective Action Reports. The report follows the sequence and format of the MPCA outline. Part I contains background information pertaining to Waste Management of Minnesota, Inc., Savage, Minnesota. It includes a history of site ownership and use, a site description, and map. It also includes information on the use, and removal or abandonment of two 10,000 gallon tanks that were owned by Waste Management of Minnesota, Inc. The tank removed in August, 1988 appeared to have released product.

1.1 Site Location and Legal Description

The site is located in Township 115 N., Range 21 W., Section 8, C, D, A, C. The legal description of the property is:

Lot nine (9), Block two (2), Greenvale except the southerly 18.00 feet and the easterly 30.00 feet, as measured at right angles to the southerly and easterly lines of said log, according to the recorded plat of Greenvale on file in the office of the County Recorder, Scott County, Minnesota. (Per Certificate of Title No. 15408)

And

Lot ten (10), Block two (2), Greenvale except the easterly 15.00 feet as measured at a right angle to the easterly line of said lot, according to the recorded plat of Greenvale on file in the office of the County Recorder, Scott County, Minnesota. (Per Certificate of Title no. 15409)

And

Lots eleven (11) and twelve (12), Block two (2), Greenvale except the easterly 15.00 feet of said lots as measured at a right angle to the easterly line of said lots, according to the recorded plat of Greenvale on file in the office of the County Recorder, Scott County, Minnesota. (Per Certificate of Title No. 15410)

And

Lots thirteen (13) and fourteen (14), Block two (2), Greenvale except the easterly 15.00 feet as measured at a right angle to the easterly line of said lots, according to the recorded plat of Greenvale on file in the office of the County Recorder, Scott County, Minnesota. (Per Certificate of Title No. 15411)

The mailing address is 12448 Pennsylvania Avenue South, Savage, Minnesota, 55378.

1.2 History of Site Ownership and Operation

1.2.1 Site Ownership

As of December 1988, the owner of the above-described property is Waste Management of Minnesota, Inc. The address and contact person at Waste Management in Savage is:

Michael Berkopec, General Manager
Waste Management, Inc.
12448 Pennsylvania Avenue South
Savage, Minnesota 55378

Waste Management of Minnesota, Inc. acquired the property from G. and H. Sanitation, Inc., in 1984. This company was owned by:

- 1) Edward Gregory, Prior Lake MN (612) 445-5124 (H), 445-9426 (W), and
- 2) Allen Hennes, Eagan, MN (612) 890-2542

The first building on the site was constructed in 1964 and 1965 and additions were made in 1966 and 1969.

1.2.2 Tank Ownership and Leasing

Two tanks were installed when the site was owned by G. and H. Sanitation, Inc. Tank 1 has a 10,000-gallon capacity, was installed in approximately 1967 and was used for storage of gasoline and diesel fuel.

Tank 2 also had a 10,000 gallon capacity. It was installed in 1981 and was used for storage of gasoline and diesel fuel.

1.2.3 General Site Activities

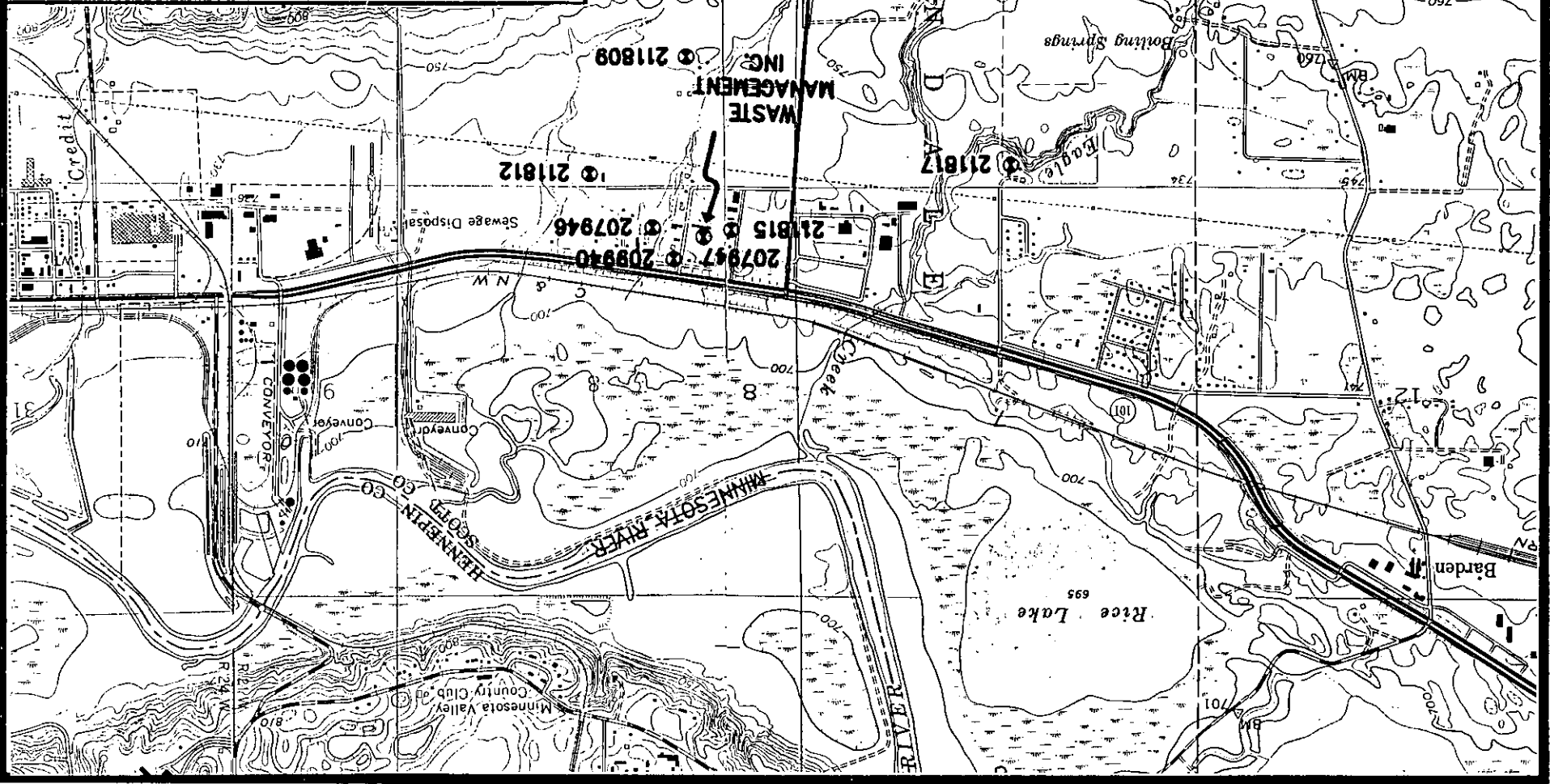
G. and H. Sanitation was a refuse hauling company as is Waste Management of Minnesota, Inc.. The site has always been used for activities associated with waste hauling: truck maintenance, truck and bin storage, and office work.

1.3 Site Description

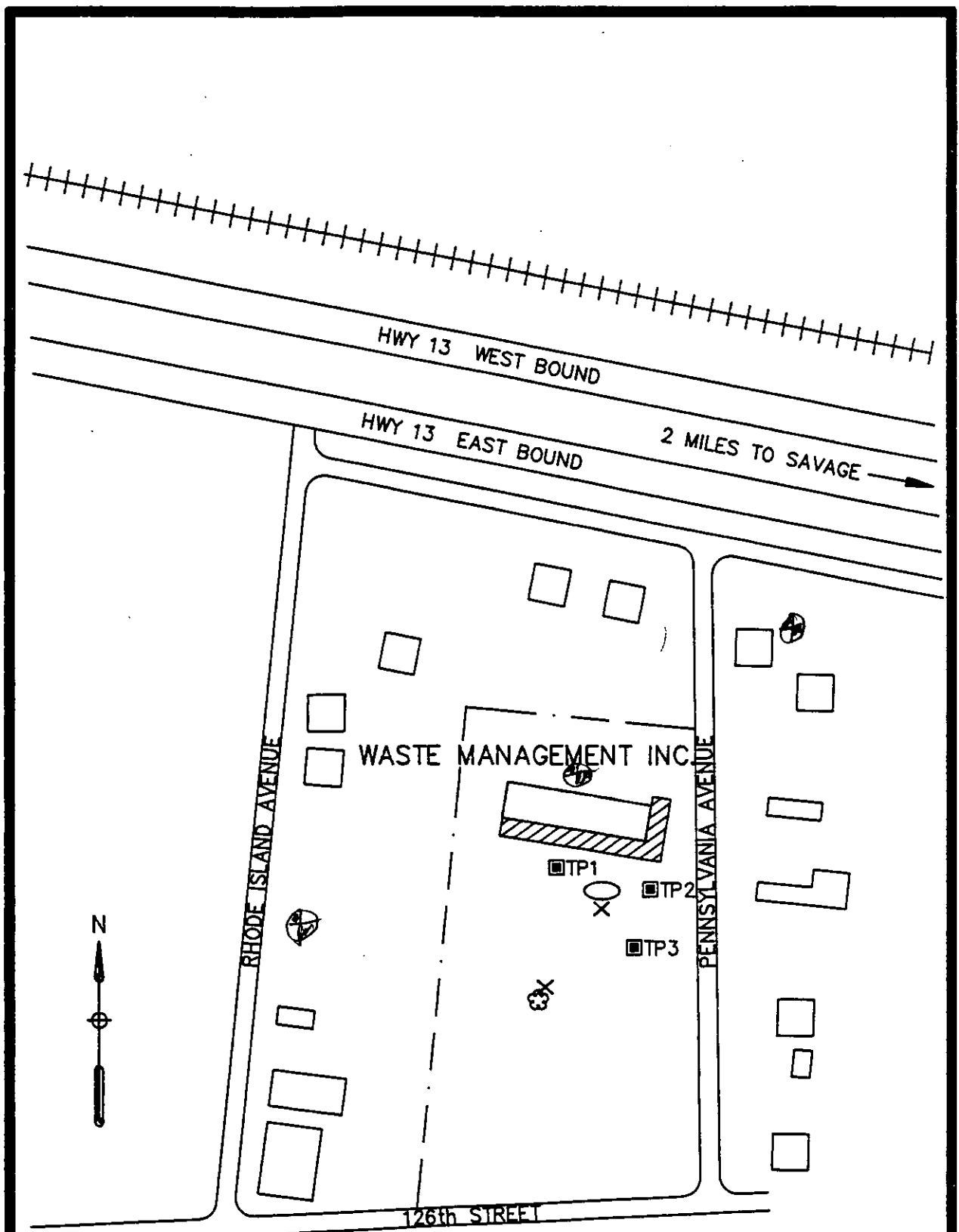
The location of the site is shown on Figure No. 1-1, an excerpt from two U.S.G.S. topographic quadrants, Bloomington and Eden Prairie. Industrial and private wells registered with the Minnesota Geological Survey (MGS) are also plotted on Figure No. 1-1.

WASTE MANAGEMENT OF MINNESOTA
FIGURE NO. 1-1
LOCATION MAP

SCALE: 1"=2000' DWG: W7901F11 DATE: 2-6-89
 PREPARED BY: FOTH & VAN DYKE
 BY: CJP



MINNESOTA UNIQUE WELL NUMBER AND WELL LOCATION
 211815



*This map is not
newer JRL*

- PROPERTY LINE
- TANK EXCAVATION
- TEST PIT LOCATION
- SOIL STORAGE PILE
- SAMPLING LOCATION

WASTE MANAGEMENT OF MINNESOTA		
FIGURE NO. 1-2		
SITE MAP WITH SAMPLING LOCATIONS		
SCALE: NO SCALE	DWG: W7901F12	DATE: 2-6-89
PREPARED BY:	FOTH & VAN DYKE	BY: CJP

Buildings existing in the area in 1977 are shown on the site map, Figure No. 1-2. Figure No. 1-2 also shows the property line, former locations of tanks 1 and 2, associated pumps and dispensers, and soil and groundwater sampling locations. See also Drawing No. 1-1 in the map pocket at the back of the report.

1.4 Tank Information

Tank 1 was used from 1967 to January 1, 1985. It was properly abandoned and filled with sand. It is located beneath the concrete floor of the shop. This cylindrical 10,000 gallon tank had a radius of 9 feet, and was 27 feet long. It is made of uncoated steel and connected by steel piping to an outside pumping island. The piping was abandoned in place. Gasoline, and more recently diesel fuel were stored within the tank. There is no product inventory reconciliation information available.

Tank 2 was used from January 9, 1981 through March of 1988. It was removed August 22, 1988. The tank failed the Certa-tek tank test administered by Griggs Contracting, Inc. on January 15, 1988. See Appendix A for results of this test. Further inspection on April 25, 1988 inside and outside the tank resulted in a decision to remove the tank. This cylindrical 10,000 gallon tank had a diameter of 9 feet, and was 27 feet long. It was made of coated steel with no external or internal protection. It was anchored in place with cables and concrete. Sand was used to fill the area around the tank when it was installed. The tank was used for gasoline and more recently diesel fuel storage. No inventory reconciliation records are available.

Tank 2 was removed under the observation of Fire Marshall McColl of the Savage Fire Department ((612) 890-1045). Fire Marshall McColl was satisfied with the tank removal procedures. However, Waste Management of Minnesota, Inc. wanted to investigate the situation further. According to Waste Management of Minnesota, Inc., the tank was not corroded but the tar coating was gone. The east end of the tank was dented. The leakage was apparently occurring through a seam on the tank end. Griggs Contracting, Inc. of Minneapolis removed the tank to Determan Welding and Tank of Fridley on August 22, 1988 where it was destroyed that same day.

It's probably been leaking since installation

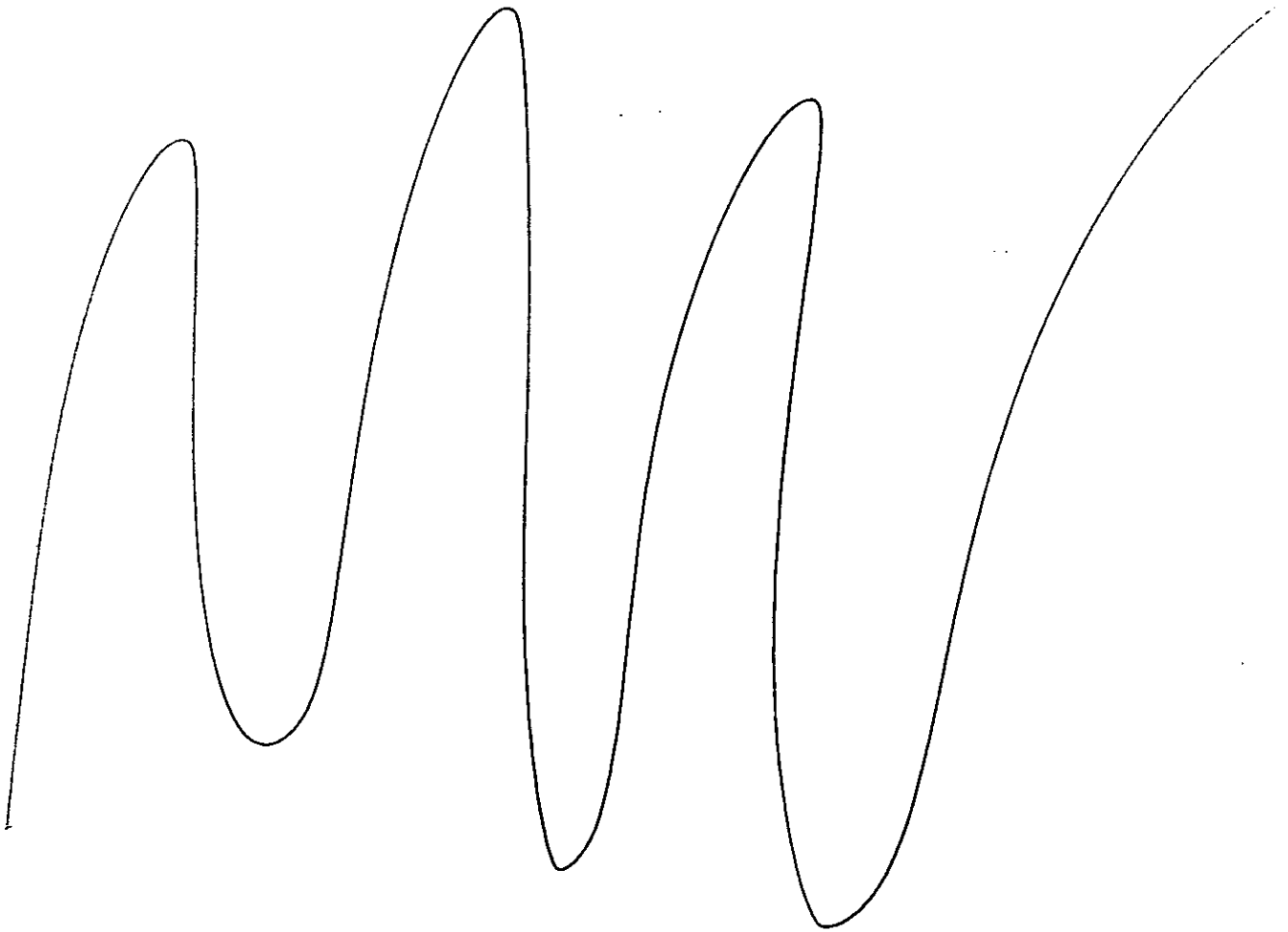
1.5 Product Release

No spills or overfills were recorded for either tank. The leak being investigated currently is the only known release of product. The Certa-tek tank test determined the rate of release during the hour-long test to be 0.45 gallons/hour (Appendix A). The Minnesota Pollution Control Agency was notified by Waste Management of Minnesota of the product release.

4/5/98 *when?*
$$\frac{.45 \text{ gal}}{\text{hr}} \times \frac{24 \text{ hrs}}{\text{Day}} \times \frac{365 \text{ Days}}{\text{yr}} = 3942 \frac{\text{gal}}{\text{yr}}$$

As described by Waste Management, during tank removal petroleum odors were evident. A visual inspection of the soil indicated contamination. The approximately 100 cubic yards of soil that was removed during tank excavation is covered with plastic sheeting and is being stored on site until a remediation method is decided upon.

*So this
stuff had been
sitting there for a year?*



2.0 TECHNICAL DATA AND CONCLUSION - PART II

2.1 Site Map and Sample Locations

Figure Nos. 1-2 and 2-1 show the locations of the November 9, 1988 sampling sites on the Waste Management property. The soil at test pits TP1, TP2, and TP3 was excavated with a tractor backhoe to a depth of 6 to 7 feet. Water samples and grab soil samples were taken at the maximum depth of each test pit. A water sample, sample No. TP4, was collected from the surface water which partly filled the tank excavation pit. A grab soil sample, sample No. TP5, was taken from the soil storage pile. All samples were chilled upon collection, delivered using chain-of-custody procedures to SERCO laboratories in St. Paul and analyzed for purgeable halocarbons, purgeable aromatics, and non-halogenated volatile organics and total lead as described in EPA procedures 8015, 601, and 602.

Samples were also taken 8 feet ^{the diked end} east of the tank at a depth of 6 feet and 8 feet south of the east end of the tank at a depth of 8 feet by Waste Management in May of 1988. These samples were analyzed by SERCO laboratories according to EPA procedures 8015 and 8020.

During site reconnaissance and sampling, the area was screened for volatile organic compounds using a photo ionization device which determines total ionizables present (TIP). This TIP meter was calibrated with 100 ppm of isobutylene.

Chemical data for all of the samples mentioned above are in Appendix B.

2.2 Geologic Information

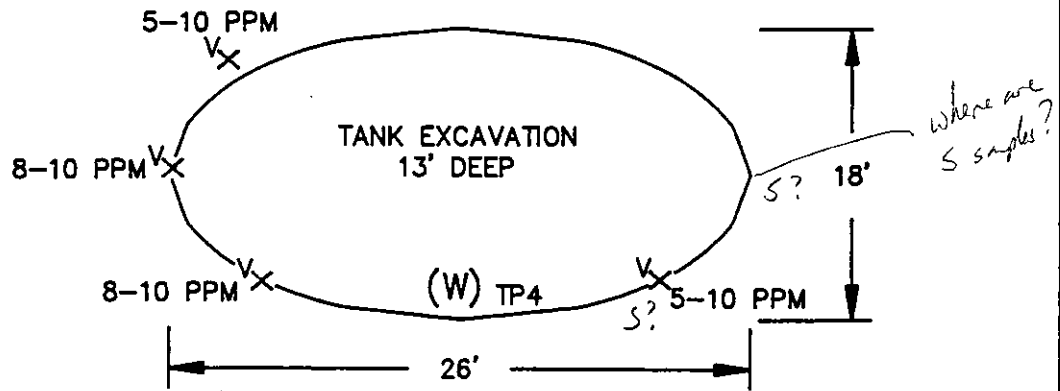
The following geologic information is gathered from well logs held by the MGS, the Metropolitan Waste Control Commission's 1977 publication, "Baseline Environmental Inventory Twin Cities Metropolitan Area," the MGS's 1972 publication, "Geology of Minnesota," and the U.S.G.S.'s 1974 Hydrologic Investigations Atlas HA - 526.

2.2.1 Soils

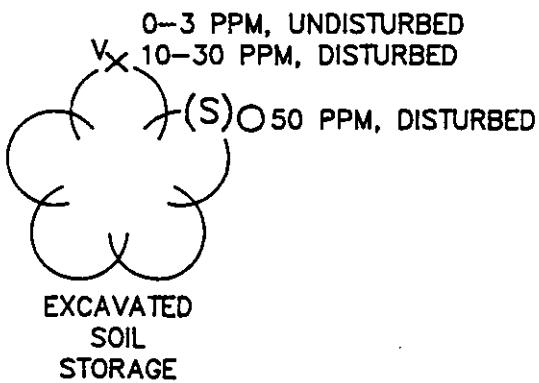
The Waste Management property is adjacent to the flood plain of the Minnesota River. The surface sediments are of Quaternary age and consist of Minnesota Valley outwash sands, silty sands, clayey sands and alluvium. The depth of this unconsolidated unit in the area of the tank removal is 15 feet as indicated in available well logs.

TP1 (S/W)

TP2 (S/W)
○ 95-100 PPM



TP3 (S/W)



VAPOR SURVEY POINTS V_X 8-24-88
○ 11-9-88

SAMPLE SITES 11-9-88
SOIL AND WATER (S/W)
WATER (W)
SOIL ONLY (S)

WASTE MANAGEMENT OF MINNESOTA		
FIGURE NO. 2-1		
SAMPLING AND VAPOR SURVEY POINTS		
SCALE: NO SCALE	DWG: W7901F21	DATE: 2-6-89
PREPARED BY:	FOTH & VAN DYKE	BY: CJP

2.2.2 Bedrock

The bedrock surface is at a depth of 15 feet in the area of the tanks. This is apparently a local bedrock high; surrounding areas have depths to bedrock ranging from 29 to 35 feet. This uppermost bedrock unit is a dolomite of the Prairie du Chien Group. The dolomite is underlain by the Jordan Sandstone. According to the well logs included in Appendix C, the Prairie du Chien Group is locally 30 - 47 feet thick and the Jordan Sandstone is found at depths ranging from 145 to 176 feet.

2.3 Groundwater

2.3.1 Bedrock Aquifer

The well logs in Appendix C indicate that most wells in the area access the combined Prairie du Chien - Jordan aquifer. This is one of the two major aquifers in the Twin Cities. It yields 500 - 3,000 gallons per minute (gpm) to wells 400 to 1800 feet deep with the usual yield being 600 gpm. The Jordan sandstone has a greater porosity than the Prairie du Chien but the Prairie du Chien has greater yields.

2.3.2 Unconsolidated Aquifer

The outwash sands which parallel the Minnesota River valley constitute an aquifer. Local wells which access this aquifer are Minnesota Unique Well numbers 211812 (drilled in 1969), 211815 (1970), and 207946 (1971). 207946 is apparently down-gradient from Tank 2. In the area of the removal of Tank 2, groundwater is 5-1/2 feet below the surface. The groundwater in the excavation of Test Pit 2 appeared to be moving to the north.

2.3.3 Hydraulic Connection of the Aquifer

The Prairie du Chien - Jordan aquifers are hydraulically connected (Hogberg, 1972). Although clay lenses occur in the Quaternary unit above the Prairie du Chien, it is unlikely that they are extensive enough to act as a confining layer. The groundwater flow between the unconsolidated sediment and the bedrock has not been determined but the bedrock wells are artesian. This is a discharge zone for the bedrock aquifer. Although the bedrock wells are artesian, there may be some downward flow from the unconsolidated sediment to the bedrock.

*Sounds like
wishful thinking
to me* *Really?*

2.3.4 Analytical Results

The laboratory analyses for volatile organic compounds (VOCs) and lead for the soil and groundwater samples are included in Appendix B. These analyses are summarized in Table No. 2-1, 2-2, and 2-3.

Groundwater analysis data for TP2 indicate levels of benzene, toluene, xylene, and ethyl benzene which exceed the Recommended Allowable limits (RALs) for drinking water set by the Minnesota Department of Health. In addition, the scan for total hydrocarbons as fuel oil indicated 430 ppm diesel fuel (fuel oil) present in the groundwater for TP2.

Soil samples for TP1, TP2, TP3, and TP5 indicate low to moderate concentrations of total lead (13, 8.8, 4.0, and 17 mg/kg or ppm). These appear to be background lead levels of unknown origin. The amount of fuel oil in TP2 (2200 ppm) made it impossible to quantify the amount of gasoline.

Soil samples from TP2 also contained benzene, (.57 ppm), toluene, (18 ppm), xylene (22 ppm), and ethyl benzene (3.3 ppm).

2.4 Surface Water

An intermittent creek to the east of Pennsylvania Avenue is a tributary to the Minnesota River. It would presumably be the first of the surface waters to be affected. The Minnesota River and an associated wetland area are likely to be affected by groundwater discharge from the area of the tank.

*but I thought flow was
to the N?!*

2.5 Free Product and Vapor Seepage

The surface of the water which filled the tank excavation pit had a slight sheen near the corners of the pit. Free product was not visible in the soil or groundwater samples taken from TP1, TP2, TP3, and TP5.

Vapor seepage into basements, other structures, or along utility lines has not been reported.

TABLE NO. 2-1
 11/21/88
 SUMMARY OF SOIL ANALYSIS DATA (FOOT AND VAN DYKE)

LOCATION	DEPTH	BENZENE (ppm)	TOLUENE (ppm)	ETHYL- BENZENE (ppm)	XYLENE (ppm)	FID FUEL OIL (ppm)	FID GAS (ppm)	LEAD (ppm)
Test Pit 1								
Sample 1-1	7'	X	X	X	X	X	X	--
Sample 1-2	7'	X	X	X	X	X	X	--
Sample 1-3	7'	--	--	--	--	--	--	13.00
Test Pit 2								
Sample 2-1	7'	0.002	0.009	X	0.075	X	0.550	--
Sample 2-2	7'	0.57	18.00	3.30	22.00	2200:00	--	--
Sample 2-3	7'	--	--	--	--	--	--	8.80
Test Pit 3								
Sample 3-1	7'	X	X	X	X	X	X	--
Sample 3-2	7'	--	--	--	--	--	--	4.00
Soil Storage Pile		--	--	--	--	--	--	17.00

** Unable to quantify due to high concentration of Fuel Oil (diesel).
 Fuel Oil value may include a significant amount of gasoline.

X Tested but not detected = ND
 --Not tested

TABLE NO. 2-2
 5/31/88
 SUMMARY OF SOIL ANALYSIS DATA (FOTH AND VAN DYKE)

LOCATION	DEPTH	BENZENE (ppb)	TOLUENE (ppb)	XYLENE (ppb)	FID FUEL OIL (ppb)	FID GAS (ppb)	FID HYDROCARBON (ppm)
8' fr. E end of tank	6'	27.0	1700.0	3400.0	230.0	40.0	120.0
E end of tank	6'	3.0	190.0	9900.0	73.0	4.0	170.0

TABLE NO. 2-3
 11/21/88
 SUMMARY OF WATER ANALYSIS DATA

LOCATION	DEPTH	BENZENE (ppm)	TOLUENE (ppm)	XYLENE (ppm)	FID FUEL OIL (ppm)	FID GAS (ppm)
Test Pit 1	7'	X	X	X	X	X
Test Pit 2	7'	0.11	8.50	6.20	430.00	**
Test Pit 3	7'	X	X	X	X	X
Tank Excav.		X	0.002	X	X	X

X Not detected

** Unable to quantify due to high concentration of Fuel Oil (diesel).
 Fuel Oil value may include a significant amount of gasoline.

2.6 Technical Conclusions

2.6.1 Source, Current Extent, and Potential Extent of the Release

There?

Tank 2, which has been removed, was apparently the source of the product release. The product apparently issued from the east end of the tank. Diesel-contaminated soil and groundwater was found at the location of Test Pit 2. The extent of the release in the direction of groundwater flow (presumably to the north/northeast) has not been determined. Potentially, the contamination could travel to the surface waters of an intermittent creek, the floodplain wetland, and the Minnesota River itself.

In addition, Well No. 207946 is the only shallow well that is apparently down-gradient of Tank 2 (Well No. 209940 is a deep well). This well has the potential to be affected by contaminated groundwater from the area of the tanks. It is 40 feet deep and is encased to 37 feet. Well No. 207947 belongs to Waste Management of Minnesota, Inc. and is located beneath the office area of their building. It is 53 feet deep, encased to 38 feet and is artesian (15 - 18 lbs psi). It was used for drinking water but is no longer being used.

sample A

Although the soil storage pile is covered with plastic sheeting, this covering is not complete and there is potential for limited vapor release and leaching of contaminants into the ground at this location.

*underlain
w/ water?*

3.0 REMEDIATION

3.1 Groundwater

At this point we are recommending that three to four groundwater monitoring wells be installed on or near the property. If the nearby landowners do not give their approval, all wells will be on Waste Management's property. The wells should be constructed to intersect the upper aquifer. The wells should be sampled for petroleum parameters as required by the MPCA. Sampling of nearby down-gradient private wells should also be completed. *and Waste Management well*

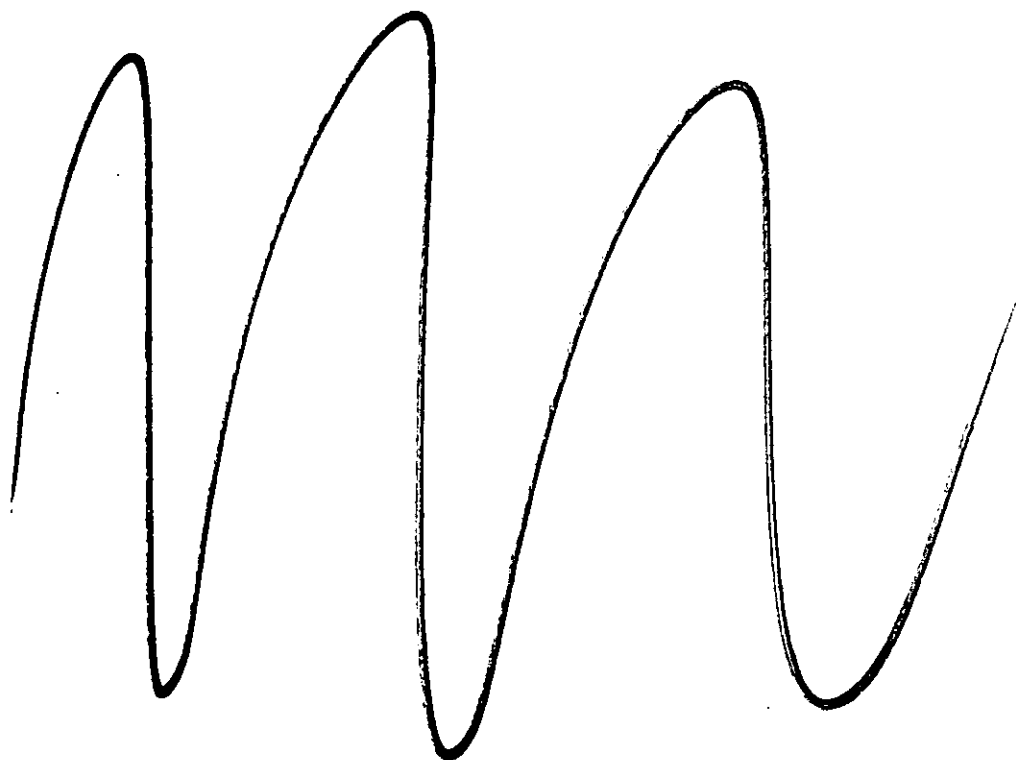
Upon completing one sampling round and reviewing the analytical results, we would make a recommendation as to the most appropriate remediation for the site. These activities will begin within 45 days after receiving MPCA approval.

3.2 Excavated Soil

We are proposing that the stock-piled soil be treated by land application with final disposal dependent upon MPCA approval. Land application is most effective in warmer weather when petroleum parameters are easily volatilized. A land application proposal will be prepared and submitted to the MPCA in March, 1989. *OK*

APPENDIX A

CERTA-TEK TANK TEST RESULTS



Customer

ID..... WASTE MA

Waste MGMT
12448 Pennsylvania
Savage Mn
Plant
Mike

890-1100

Tank Information

Tank ID..... 1
Location / Description. Var Lot
Quoted Capacity..... 10000 gallons
Calculated Capacity.... 10152 gallons
Tank Orientation..... Horizontal
Tank Diameter 96.00 inches
Tank Length 324.00 inches

Test Information

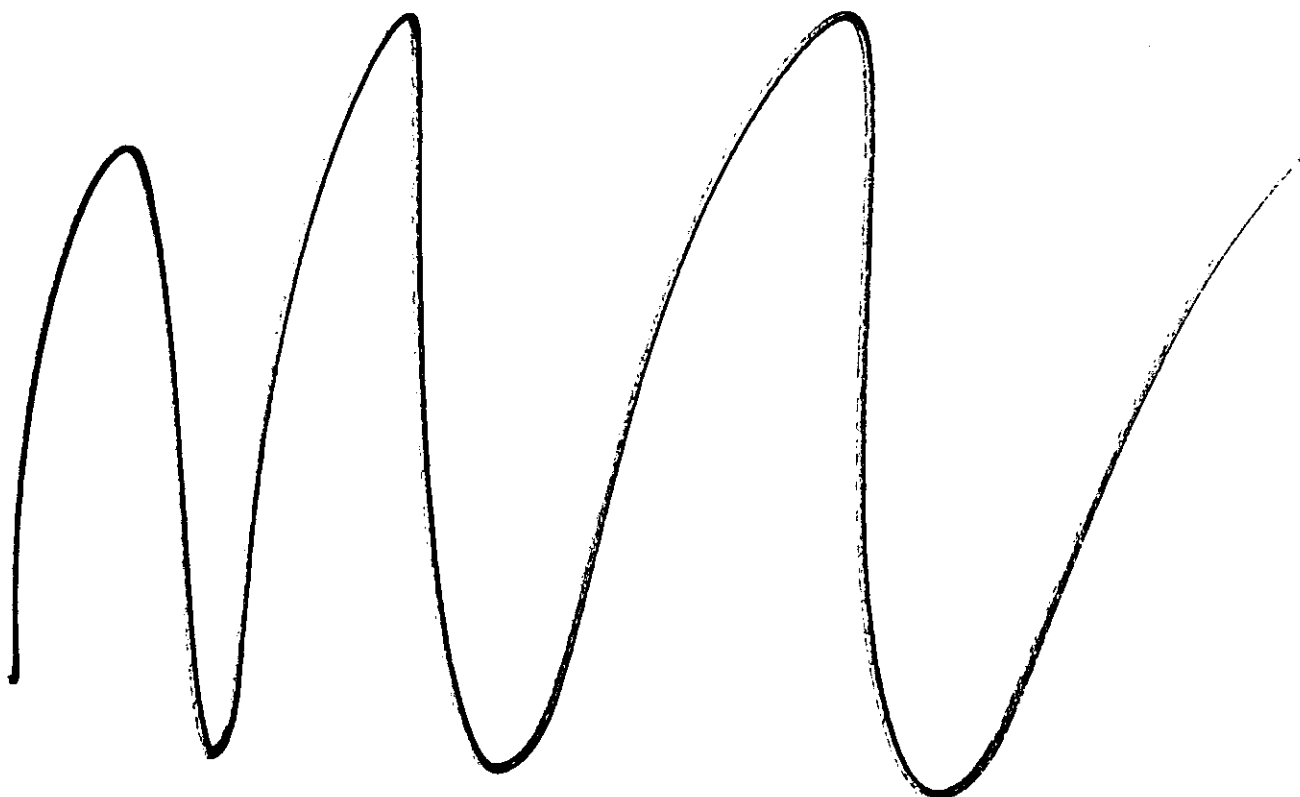
Test Date..... January 15, 1988
Product Description..... fuel oil
Testing Conducted by.... Griggs Contracting
2113 Cedar Avenue
Minneapolis, MN 55404
(612) 339-4713

Results Summary

Observed volume change..... 0.67 gallons
Volume change due to temperature.. 1.11 gallons
Net volume change..... -0.44 gallons
Test duration..... 0.99 hours
Tank system leak rate..... -0.45 gallons per hour

APPENDIX B

ANALYTICAL RESULTS FOR SOIL AND WATER SAMPLES





SERCO Laboratories

St. Paul, Minnesota • Cedar Rapids, Iowa

1931 West County Road C2, St. Paul, Minnesota 55113 (612) 636-7173

LABORATORY ANALYSIS REPORT NO: 1975 PAGE 1
11/21/88

Foth and Van Dyke
6474 City West Parkway
Eden Prairie, MN 55344

Mr. Craig L. Johanesen

DATE COLLECTED: 11/09/88
DATE RECEIVED: 11/09/88
COLLECTED BY: CLIENT
PICKED UP BY: CLIENT
SAMPLE TYPE: WATER
SOIL

SERCO SAMPLE NO:	60498	60508	60518	60528	60538
SAMPLE DESCRIPTION:	TP 1 SOIL #2 COMP	TP 1 SOIL #1 GRAB	TP 1 GROUND WATER	TP 1 GRAB FOR LEAD	TP 2 SAMP 1 COMP SOIL


ANALYSIS:

FID Scan, mg/kg as Fuel Oil, EPA 8015	<0.50	<0.50	-	-	<0.50
FID Scan mg/kg as Gasoline	<0.05	<0.05	-	-	0.55
Benzene, mg/kg, EPA 602	<0.001	<0.001	-	-	0.002
Toluene, mg/kg, EPA 602	<0.001	<0.001	-	-	0.009
Xylene, mg/kg, EPA 601/602	<0.001	<0.001	-	-	0.075
Ethylbenzene, mg/kg	<0.001	<0.001	-	-	<0.001
FID Scan, mg/L as Gasoline, EPA 8015	-	-	<0.05	-	-
FID Scan, mg/L as Fuel Oil, EPA 8015	-	-	<0.50	-	-
Benzene, mg/L, EPA 602	-	-	<0.001	-	-
Toluene, mg/L, EPA 602	-	-	<0.001	-	-
Xylene, mg/L, EPA 601/602	-	-	<0.001	-	-
Ethyl Benzene, mg/L	-	-	<0.001	-	-
Lead, mg/kg as Pb	-	-	-	13	-

SERCO SAMPLE NO:	60548	60558	60568	60578	60588
SAMPLE DESCRIPTION:	TP 2 SAMP 2 GRAB	TP 2 GROUND WATER	TP 2 COMP FOR LEAD	TP 3 GRAB SOIL	TP 3 GROUND WATER

ANALYSIS:

FID Scan, mg/kg as Fuel Oil, EPA 8015	2200	-	-	<0.50	-
---------------------------------------	------	---	---	-------	---

Approved by:  < means "not detected at this level". 1 mg = 1000 ug. continued



Member



SERCO Laboratories

St. Paul, Minnesota • Cedar Rapids, Iowa

1931 West County Road C2, St. Paul, Minnesota 55113 (612) 636-7173

LABORATORY ANALYSIS REPORT NO: 1975 PAGE 2
11/21/88

SERCO SAMPLE NO:	60548	60558	60568	60578	60588
SAMPLE DESCRIPTION:	TP 2 SAMP 2 GRAB	TP 2 GROUND WATER	TP 2 COMP FOR LEAD	TP 3 GRAB SOIL	TP 3 GROUND WATER

ANALYSIS:

FID Scan mg/kg as Gasoline	**	-	-	<0.05	-
Benzene, mg/kg, EPA 602	0.57	-	-	<0.001	-
Toluene, mg/kg, EPA 602	18	-	-	<0.001	-
Xylene, mg/kg, EPA 601/602	22	-	-	<0.001	-
Ethylbenzene, mg/kg	3.3	-	-	<0.001	-
FID Scan, mg/L as Gasoline, EPA 8015	-	**	-	-	<0.05
FID Scan, mg/L as Fuel Oil, EPA 8015	-	430	-	-	<0.50
Benzene, mg/L, EPA 602	-	0.11	-	-	<0.001
Toluene, mg/L, EPA 602	-	8.5	-	-	<0.001
Xylene, mg/L, EPA 601/602	-	6.2	-	-	<0.001
Ethyl Benzene, mg/L	-	2.0	-	-	<0.001
Lead, mg/kg as Pb	-	-	8.8	-	-

SERCO SAMPLE NO:	60598	60608	60618
SAMPLE DESCRIPTION:	TP 3 COMP FOR LEAD	TP 4 SURFACE WATER	TP 5 COMP FOR LEAD

ANALYSIS:

FID Scan, mg/L as Gasoline, EPA 8015	-	<0.05	-
FID Scan, mg/L as Fuel Oil, EPA 8015	-	<0.50	-

Approved by: *[Signature]* < means "not detected at this level". 1 mg = 1000 ug. continued



Member



SERCO Laboratories

St. Paul, Minnesota • Central

1931 West County Road C2, St. Paul, Minnesota 55113 (612) 636-7173

LABORATORY ANALYSIS REPORT NO: 1975 PAGE 3
11/21/88

SERCO SAMPLE NO:	60598	60608	60618
SAMPLE DESCRIPTION:	TP 3	TP 4	TP 5
	COMP	SURFACE	COMP
	FOR	WATER	FOR
ANALYSIS:	LEAD		LEAD

Benzene, mg/L, EPA 602	-	<0.001	-
Toluene, mg/L, EPA 602	-	0.002	-
Xylene, mg/L, EPA 601/602	-	<0.001	-
Ethyl Benzene, mg/L	-	<0.001	-
Lead, mg/kg as Pb	4.0	-	17

All analyses were performed using EPA or other accepted methodologies. Samples that may be of an environmentally hazardous nature will be returned to you. Other samples will be stored for 30 days from the date of this report, then disposed of by SERCO Laboratories. Please contact me if other arrangements are needed.

Report submitted by,

Diane J. Anderson
Project Manager

** Unable to quantify due to high concentration of Fuel Oil. Fuel Oil value may include a significant amount of gasoline.

< means "not detected at this level". 1 mg = 1000 ug.



Member



SERCO Laboratories

St. Paul, Minnesota • Cedar Falls, Iowa

1931 West County Road C2, St. Paul, Minnesota 55113 (612) 636-7173

LABORATORY ANALYSIS REPORT NO: 808 PAGE 1
05/31/88

Waste Management-Savage
12448 Pennsylvania Ave. South
Savage, MN 55378

DATE RECEIVED: 05/12/88
COLLECTED BY: CLIENT
PICKED UP BY: CLIENT
SAMPLE TYPE: SOLID

Mr. Mike Berkopec

SERCO SAMPLE NO: 25208 25218
SAMPLE DESCRIPTION:

*7/22/88
Sample 5.2
#1
#2 at E. end
6 down*

ANALYSIS:

	25208	25218
FID Scan, ug/kg as Hydrocarbons, EPA 8015	120000	17000
FID Scan, ug/kg as Gasoline, EPA 8015	40	4.0
FID Scan, ug/kg as fuel oil	230	73
Benzene, ug/kg, EPA 8020	27	3.0
Toluene, ug/kg, EPA 8020	1700	190
o,p-Xylene, ug/kg, EPA 8020	3400	9900

All analyses were performed using EPA or other accepted methodologies. Samples that may be of an environmentally hazardous nature will be returned to you. Other samples will be stored for 30 days from the date of this report, then disposed of by SERCO Laboratories. Please contact me if other arrangements are needed.

Report submitted by,

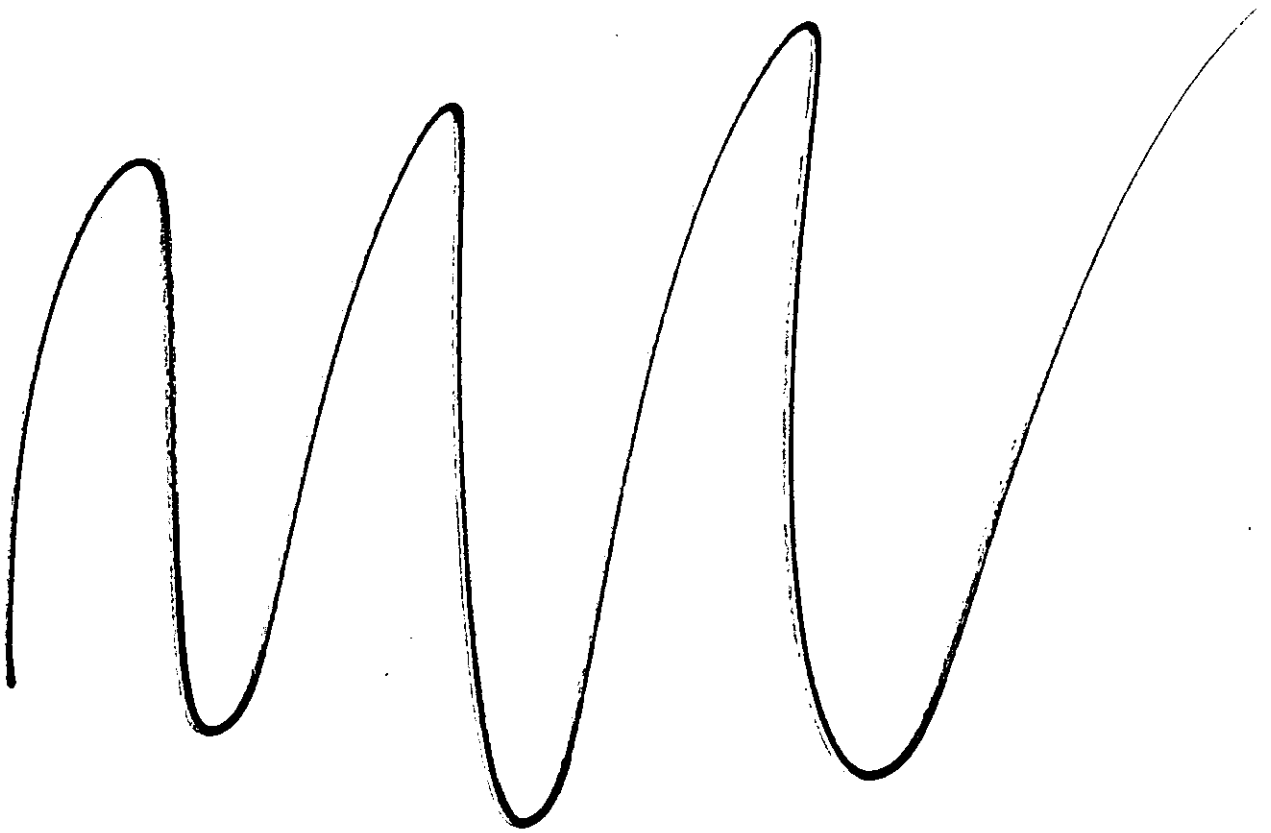
Diane J. Anderson
Diane J. Anderson
Project Manager

< means "not detected at this level". 1 mg = 1000 ug.



Member

APPENDIX C
PRIVATE WELL LOGS



(104D)
2
✓

207947

CODED

OK W/P
OK

115-21-8 [REDACTED] CC.DAA

elev. 715±5

(Now Waste Management)

Well Address <u>E. H. Smitheiser</u> <u>Sanage. Behind Shell Oil Co.</u>		WELL RECORD	
Driller's Signature <u>Buel Plummer</u>	Date <u>10/12/64</u>	Permit Number	
Drilling Company <u>MVWD</u>	Address	Telephone	
SIZE OF WELL..... <u>4</u> INCHES	WATER LEVEL..... <u>0 (715)</u> FEET		
WELL DEPTH..... <u>53</u> FEET	DRAW DOWN..... <u>0</u> FEET		
CASING DEPTH..... <u>38</u> FEET	CAPACITY GALLONS..... <u>2000</u> PER/HR.		
DEPTH OF IMPERVIOUS FORMATION..... FEET	CASED WITH		
SAND POINT..... FEET INCHES BY INCHES	WELDED JOINT ()		
MAKE AND TYPE MATERIAL: <u>15 open hole</u>	SCREWED JOINT (x)		
Remarks:			



Kind of Formation	Color	Started Depth	Ended Depth	Width of Formation	Remarks
QFUV Clay	Bn.	0	15	15	CLAY
OPDC Lime Rock	 	15	32	38	DLMT T/700
					AQUIFER
					OPDC-OPDC

OPC: 700, 38?
662

209940
115-21-8 CDBDBB
Elev. 715 ± 5

(1042)

OK W/B

Well at front of station
Valley Oil Co. ? Gypsy Ln. & Hwy. 13

Well Address <u>Savage & Kelly</u>		WELL RECORD 428
Driller's Signature <u>Vernon Croutz</u>		Permit Number
Drilling Company <u>Vernon Croutz</u>		Telephone
Date <u>Sept 19-1963</u>		Address
SIZE OF WELL <u>8 in 16</u> INCHES	WATER LEVEL <u>flow</u> FEET	
WELL DEPTH <u>225</u> FEET	DRAW DOWN <u>0</u> FEET	
CASING DEPTH <u>4" 16.5</u> FEET	CAPACITY GALLONS <u>3600</u> PER/HR.	
I DEPTH OF IMPERVIOUS FORMATION <u>0-19</u> FEET	CASED WITH	
S SAND POINT _____ FEET _____ INCHES/BY _____ INCHES	WELDED JOINT (X)	
M MAKE AND TYPE MATERIAL:	SCREWED JOINT ()	
Remarks: <u>Ordinary Sandstone</u>		

STOP
DOWN

209940
CODED

poor quality

7/5

ob: 696
600

600, 140?

T1570
GDN

Kind of Formation	Color	Started Depth	Ended Depth	Width of Formation	Remarks
Clay	Brown	0	19	CLAY	QF11
Sand & gravel	Brown	19	30	SAND, GRVL	C.F. 11
Warty sand	Brown	30	113	SAND	QF11
Gravel	Brown	113	115	GRVL	QF
Prob.	Grey	115	145	DLMT	QF
Sandstone	Brown	145	163	SANDS	C.F. 11
Sandstone	grey	163	355	96 SANDS	C.F. 11

115
115
163
355

AGLITEE
(W)N-C.F. 11

1042

207946

115-21-8 CDBDPA

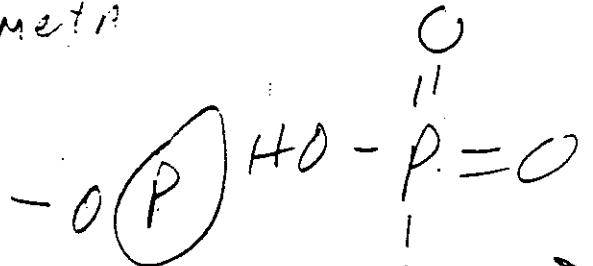
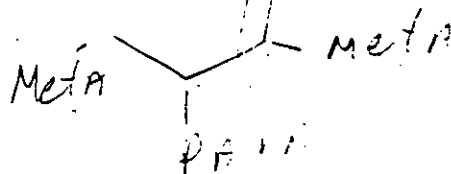
OKW

elev. 7107.5

Well Address <i>Burt Erickson</i>		WELL RECORD	
Driller's Signature <i>B + M. Peters - Sauge</i>		Permit Number	
Date <i>6-12-71</i>		Drilling Company	
Address		Telephone	
SIZE OF WELL <i>2</i> INCHES	WATER LEVEL <i>16 (689)</i> FEET	WELL DEPTH <i>40</i> FEET	DRAW DOWN <i>0</i> FEET
CASING DEPTH <i>37</i> FEET	CAPACITY GALLONS <i>600</i> PER/HR.		
DEPTH OF IMPERVIOUS FORMATION..... FEET		CASED WITH	
SAND POINT <i>3</i> FEET INCHES/BY <i>1 1/4</i> INCHES		WELDED JOINT ()	
MAKE AND TYPE MATERIAL: <i>Johson 10 1/2" Steel</i>		SCREWED JOINT <input checked="" type="checkbox"/>	
Remarks:			

MWD

CODED



710.15
695

Kind of Formation	Color	Started Depth	Ended Depth	Width of Formation	Remarks
RFUU	Sand	0	15	15	SAND
QFUU	Clay	15	26	11	CLAY
QFUU	Sand	26	40	14	SAND
BIG TO					AQUIFER
					QF00-QE
					3 3
					2nd called out
					middle loc

710
695
695

710
695
695

SC1203
EDEN PR MITL 4

~~_____~~ OK

211817
115-21-18 BAAACB
Elev. 740 ± 5

104C

At campground on
Eagle Creek
Sign on 13

CODED

Well Address Don G. Eichen		445-1756	
Wally Compton-Eichen Home-Savage, Minn		WELL RECORD 786	
Driller's Signature Dick Tweed		Date October 12, 1962	
Drilling Company Dependable Well Co.		Address 9743 Humboldt Ave. So.	
		Telephone TU. 8-4303	
SIZE OF WELL.....4.....INCHES	WATER LEVEL.....25 (715).....FEET	(25.3 ft 72 2.2)	
WELL DEPTH.....56.....FEET	DRAW DOWN.....5.....FEET		
CASING DEPTH.....46.....FEET	CAPACITY GALLONS.....2000.....PER/HR.		
DEPTH OF IMPERVIOUS FORMATION.....FEET		CASED WITH WELDED JOINT () SCREWED JOINT (x)	
SAND POINT.....FEETINCHES/BYINCHES			
MAKE AND TYPE MATERIAL: 10 foot open hole in rock			
Remarks:			

poor quality

740
 74.46
 694

Q-UU Sand SAND
 OPDC Rock DLMT
 T/694 OPDC

OPDC 694 10'

Kind of Formation	Color	Started Depth	Ended Depth	Width of Formation	Remarks
Sand	Red	0	46	46	Water c Water
Rock	Pink	46	56	10	
	Aquifer OPDC - OPDC				

740
 46
 694

115-21-18 DDABBB

139

G-1

EI. 870 ± 10 208819+

Bul. 27, p. 179, Glendale Twp., # 29

Dr. Kenneth Bulkley, now Bohn resident

QTCG { 0-5 Drift, clay etc. DFF- (L) }

GFUU { 5-135 * ~~St. Peter Sandstone~~ }

OKT
(Probably not
correct. Fall
G.W. drilled 1.

T/735^{OPV} 135-165 Limestone D.V.T

OPC

OPC: 735.30?
75

* Probably clean, white, river sand

Gravel pit at 115-21-18 DACC

shows ~ 50-60' of clean sand,

Unconsolidated, floor of pit

810' ± 10, Top of pit ~ 870'

Gravel pits at 115-21-18 DDABD and

DDDDD show unsorted till

Field checked by R.L. Little

C O D E D

115-21-17 BDBCBA
Elev. 745 ± 5

SC 1244

BLOOMINGTON 7200 W 128th St

890-0880

1043

211809

Well Address: **TRANSFER Co.**
BAY & BAY ~~TRANSFERS~~ - **SAVAGE**

Driller's Signature: **Ruo** Date: **10-8-75** Permit Number: _____

Drilling Company: **R.V.W.D.** Address: _____ Telephone: _____

SIZE OF WELL: **8 x 4** INCHES WATER LEVEL: **flowing + 745** FEET
 (altitude 0.5 above 7.8.21)

WELL DEPTH: **280** FEET DRAW DOWN: **0** FEET
 8" to 29'

CASING DEPTH: **4" to 176'** FEET CAPACITY GALLONS: **18,000** PER/HR.
 4" to 176'

DEPTH OF IMPERVIOUS FORMATION: _____ FEET CASED WITH _____

SAND POINT: _____ FEET _____ INCHES/BY _____ INCHES WELDED JOINT

MAKE AND TYPE MATERIAL: **open hole in rock** SCREWED JOINT

OK

Remarks:

CODED

Kind of Formation	Color	Started Depth	Ended Depth	Width of Formation	Remarks
Sand	black	0	2	2	SAND QFUU
Sand	brown	2	10	8	SAND QFUU
Sand	gray	10	27	17	SAND QFUU
Corse gravel					QFUU
broken lime rock		27	29	2	QFUU
Lime Rock	brown/				
	yellow	29	94	65	DLMT
Shale-Sand Rock	gray/				
Lime stone	white	94	99	5	DLMT
Lime stone	yellow	99	114	15	
Lime stone	gray	114	126	12	
Lime rock	brown	126	130	4	
Lime rock	white	130	132	2	DLMT
Lime rock	brown	132	136	4	
Lime rock	gray	136	140	4	
Lime rock	green	140	143	3	
Lime rock	brown	143	145	2	
Lime rock	gray				
Streaks of shale		145	148	3	DLMT, SHALE
Lime Rock	gray/brown	148	150	2	DLMT

T/716
OFDC

745
706

op c: 716
560

OFDC

over

W

Kind of Formation	Color	Depth	Depth	Formation	Remarks
Lime rock	brown/gray	150	151	1	DLMT
Lime rock white shale	gray	151	157	6	DLMT, SHALE
Lime rock white shale	brown	157	158	1	DLMT, SHALE
Lime rock white shale	gray	158	161	3	DLMT, SHALE
Lime rock sand stone	brown/gray	161	163	2	DLMT, SHALE
Lime stone sandrock/shale	gray green	163	176	13	DLMT, SAND, SHALE
T/EG9 CUDN Sand rock	white	176	195	19	SAND
Sand rock	gray	195	280	285	SAND, SHALE
Shale	gray				

OPLO

} CUDN

AQUIFER
CUDN-GUDN

OK
104.D

211815
115-21-8 CCACDB
Elev. 725 ± 5

Gust Auto Repair - 105 ASH LN SAUSAGE
Behind G & H Sanitation - ON GYPSY LN. SAUSAGE
~~on Rock Island Ave?~~
only 1 in back

Kenneth Rodostrom

881-0647

Well Address <u>Kenneth Rodostrom - Sausage</u>		WELL RECORD	
Driller's Signature <u>Charles Adelman</u>		Date <u>9-11-70</u>	Permit Number
Drilling Company		Address	
Telephone			
SIZE OF WELL..... <u>2</u> INCHES	WATER LEVEL..... <u>15 (70)</u> FEET		
WELL DEPTH..... <u>30</u> FEET	DRAW DOWN..... <u>0</u> FEET		
CASING DEPTH..... <u>27</u> FEET	CAPACITY GALLONS..... <u>600</u> PER/HR.		
DEPTH OF IMPERVIOUS FORMATION..... <u>0</u> FEET	SAND POINT..... <u>3</u> FEET	CASED WITH	
MAKE AND TYPE MATERIAL: <u>Jeharoc 10' slot</u>		WELDED JOINT ()	
Remarks:		SCREWED JOINT (X)	

DEPERMABLE

CODED

Kind of Formation	Color	Started Depth	Ended Depth	Width of Formation	Remarks
QFUU Sand & gravel B/69E AQUIFER Q501-Q501 2WT	Gray	0	30	30	SAND, GRVL

104D

SC 1204

Bloomington W

OK

211812

115-21-17ABBBBC

Elev. 725±5

CODY + SONS R. R SALVAGE

~~Rubber Specialties~~

8117 Pleasant Ave. S.

Well Address <i>Rubber Specialties -</i>		WELL RECORD	
<i>Behind Sput Cafe</i>			
Driller's Signature <i>Kay</i>	Date <i>4-2-69</i>	Permit Number	
Drilling Company <i>M.V.W.D.</i>	Address	Telephone	
SIZE OF WELL <i>4</i> INCHES	WATER LEVEL <i>Flows (+725)</i> FEET	<i>(1 ft above 78.8.21)</i>	
WELL DEPTH <i>135</i> FEET	DRAW DOWN 70 <i>60</i> FEET		
CASING DEPTH <i>130</i> FEET	CAPACITY GALLONS <i>1800</i> PER/HR.		
DEPTH OF IMPERVIOUS FORMATION <i>20</i> FEET	CASED WITH		
SAND POINT <i>5'</i> FEET <i>2</i> INCHES/BY <i>-</i> INCHES	WELDED JOINT ()		
MAKE AND TYPE MATERIAL:	SCREWED JOINT (<input checked="" type="checkbox"/>)		

Remarks:
7' pipe

5' bury use close nipple

CODED

Poor quality

1: 725 .80
645

ob: 625 35°
590

Kind of Formation	Color	Started Depth	Ended Depth	Width of Formation	Remarks
Sand + Mud	B	0	80	80	SAND, CLAY QFUU
Clay		80	100	20	CLAY QFUU
Sand		100	135	35	SAND QFUU
					E/590
					(35) - (35) QFA

7
13
-91