



April 22, 1993

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MPCA, HAZARDOUS  
WASTE DIVISION

STS Project 94810-XG

Ms. Jean Hanson  
Minnesota Pollution Control Agency  
Tanks and Spills Section  
520 Lafayette Road  
St. Paul, MN 55155-3898

Re: Resubmittal of the Remedial Investigation and Corrective Action Design Report  
for Carson Pirie Scott Warehouse Facility Located in Minneapolis, Minnesota  
(MPCA Leak No. 916)

Dear Ms. Hanson:

Please find enclosed a copy of the Remedial Investigation/Corrective Action Design Report for the above-referenced facility. STS previously submitted this report to the Minnesota Pollution Control Agency on January 29, 1993. Attached is a copy of the January 29, 1993 transmittal letter.

The results of the Remedial Investigation performed at the warehouse site appear to indicate that the petroleum compounds identified on site are originating from an off-site source, specifically the Archer Daniels Midland facility which borders on the northern end of the site. The Corrective Action Design recommended that one additional round of groundwater sampling be conducted and that the responsibility for the petroleum release be assigned to ADM. The additional round of groundwater sampling recommended in the RI/CAD was completed in January 1993. Therefore Carson Pirie Scott does not intend to conduct any additional monitoring activities on the site unless directed to do so by the MPCA.

If you have any questions regarding this report, or require further information, please contact us at 612/559-1900.

Sincerely,

STS CONSULTANTS, LTD.

A handwritten signature in cursive script, appearing to read 'Allen R. Paulson'.

Allen R. Paulson, EIT  
Assistant Project Engineer

ARP/dn  
Enc.

**STS Consultants Ltd.**  
Consulting Engineers

3650 Annapolis Lane  
Suite 120  
Minneapolis, Minnesota 55447  
612.559.1900/Fax 612.559.4507



January 29, 1993

Ms. Jean Hanson  
Minnesota Pollution Control Agency  
Tanks and Spills Section  
520 Lafayette Road  
St. Paul, MN 55155-3898

STS Project 94810-XG

Re: Remedial Investigation Corrective Action Design Report for the Carson Pirie Scott Warehouse Facility Located in Minneapolis, Minnesota; MPCA Leak No. 916

Dear Ms. Hanson:

STS Consultants, Ltd. has completed the Remedial Investigation/Corrective Action Design (RI/CAD) report for the Carson Pirie Scott Warehouse located at 3601 Hiawatha Avenue South in Minneapolis, Minnesota. STS is submitting this report on behalf of P.A. Bergner & Co.

If you have any questions regarding this report or we may be of other assistance, please contact us at 612/559-1900.

Sincerely,

STS CONSULTANTS, LTD.

A handwritten signature in cursive script, appearing to read 'A. R. Paulson'.

Allen R. Paulson, EIT  
Assistant Project Engineer

ARP/cms

cc: Mr. Quang Tran - P.A. Bergner & Co.

**STS Consultants Ltd.**  
Consulting Engineers

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December 16, 1992

Mr. Quang Tran  
Carson Pirie Scott  
c/o P.A. Bergner & Co.  
331 West Wisconsin Avenue  
Milwaukee, WI 53203

APR 26 1993

MPCA, HAZARDOUS  
WASTE DIVISION

STS Project 94810-XG

Re: Remedial Investigation/Corrective Action Design Report for CPS Warehouse in  
Minneapolis, Minnesota (MPCA Leak No. 0916)

Dear Mr. Tran:

STS Consultants, Ltd. has completed the Remedial Investigation/Corrective Action Design (RI/CAD) report for the Carson Pirie Scott Warehouse located at 3601 Hiawatha Avenue South in Minneapolis, Minnesota. The results of the Remedial Investigation indicate that an off-site petroleum release may be impacting groundwater below the CPS Warehouse. Petroleum products released from underground storage tanks at the CPS Warehouse did not appear to have impacted groundwater below the site. Groundwater monitoring is the Corrective Action recommended for the site.

We are pleased to provide continuing service to you on this project. If you have any questions regarding information contained in this report. Please feel free to contact us at 612/559-1900.

Sincerely,

STS CONSULTANTS, LTD.

Allen R. Paulson, EIT  
Assistant Project Engineer

Robert L. DeGroot, CPG PE  
Principal Engineer

ARP/cms  
Encs.

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## APPENDIX

**Remedial Investigation/Corrective Action Design Report  
for CPS Warehouse in Minneapolis, Minnesota (MPCA Leak No. 0916)**

**1.0 INTRODUCTION**

The Minnesota Pollution Control Agency petroleum release site number for the CPS Warehouse is Leak No. 0916. This release number was assigned to a fuel oil underground storage tank (UST) located within the CPS warehouse facility. The MPCA site I.D. No. 4522 was subsequently assigned to a diesel fuel UST located near the northwest corner of the building. Both leaksites were merged by the MPCA under site I.D. No. 0916. Leaksite No. 4522 was eliminated from the petroleum release tracking system.

The scope of work performed at the site includes the following:

- Preliminary site assessments for leak detection purposes at diesel tank and fuel oil tank.
- Closure in place of fuel oil UST.
- Removal of diesel UST.
- Soil exploration adjacent to diesel UST.
- Soil exploration and monitoring well installation associated with fuel oil UST.

The purpose of the Remedial Investigation was to evaluate the extent of petroleum impacts to the environment from the UST releases.

Work during the time period of January 1989 through December 1990 was authorized by Carson Pirie Scott of Minneapolis, Minnesota. Work conducted since January 1991 was authorized by Carson Pirie Scott in care of P.A. Bergner & Company of Milwaukee, Wisconsin. Carson Pirie Scott underwent reorganization during the time period of the Remedial Investigation which led to delays in performance of the work.

## **2.0 BACKGROUND AND PROJECT SUMMARY**

The Carson Pirie Scott Warehouse is located in part of the NE 1/4 of the NW 1/4 of the SE 1/4 of the SE 1/4 of Section 1, Township 28 North, Range 24 West in Hennepin County, Minnesota, see Figure 1, Appendix B. The warehouse facility is situated at the southeast quadrant of the intersection of 36th Street and Hiawatha Avenue South (Highway 55) in the City of Minneapolis. Surrounding land uses include ADM Milling Corporation to the north, railroad tracks and grain elevators to the east, grain elevators to the south and Hiawatha Avenue with residential areas to the west.

Two underground storage tanks (UST's) existed at the CPS Warehouse. A 14,000 gallon capacity fuel oil UST was located under the concrete floor in the central portion of the building, see Figure 2, Appendix B. The uncoated steel UST was approximately 35 years old. The fuel oil UST was abandoned in-place with concrete grout using light weight aggregate. A 10,000 gallon diesel fuel UST was located at the northwest corner of the building, see Figure 2, Appendix B. The diesel fuel UST was removed without over excavation of soils. A replacement UST was not installed.

The chronology of events associated with the underground storage tank activities of the site is summarized below:

- Tank tightness testing performed in 1988 by HTI Laboratories and Industrial Consultants indicated the tank was not "tight". The tank testing was performed as part of an environmental site assessment for property transfer.
- Site condition evaluations conducted in April 1989 for the fuel oil UST and December 1989 for the diesel UST consisted of preliminary soil explorations, tank measurements and collection of other tank associated data to fulfill a portion of regulatory leak detection requirements.

- Closure in-place of fuel oil UST in December 1989.
- Removal of diesel fuel UST in August 1991.
- Soil explorations throughout the period of 1989 through 1992 were performed to determine the extent of petroleum releases at the on-site UST's.
- Four monitoring wells (2 in 1991 and 2 in 1992) were installed to evaluate surficial groundwater quality below the site.

A tank integrity test was performed in 1988 by HTI. Results of the tank integrity test were inconclusive because of multiple fill lines associated with the tank. A 10,000 gallon inventory discrepancy made the integrity of the fuel oil UST system suspect. A search of records failed to resolve the discrepancy. Verbal discussions with site personnel indicated the possibility that the fuel oil may have been burned during operation of the boiler in March-April, 1988.

Major petroleum releases at the site were not suspected. Observations made during UST closure activities for both UST systems did not point to the UST systems as major release sources. Hand auger borings immediately adjacent to the fuel oil UST indicated petroleum impacts to soil at shallow depths. Other hand auger borings advanced to greater depth adjacent to and at a distance from the fuel oil UST were not indicative of a major release of product.

A soil boring advanced through the former basin of the diesel fuel UST showed no indications of petroleum impacts in natural soils below the bottom of the tank basin. However, petroleum impacts were identified at the soil/groundwater interface.

Carson Pirie Scott  
STS Project 94810-XG

The ADM Milling Corporation is an identified petroleum release site (MPCA Leak No. 2486). Free product on the groundwater surface was identified at the ADM site (WW Engineering and Science (WWES) report, Project No. 35023.00). Groundwater flow direction is to the south towards the CPS Warehouse site (WWES Report). The WWES report was prepared during the winter of 1991-1992.



### **3.0 TANK CLOSURE RESULTS**

#### **3.1 Diesel Fuel UST**

The results of the excavation of the diesel fuel UST are summarized in the completed "Excavation Report for Petroleum Release Sites", see Appendix A. No holes were observed in the UST. In addition, no staining on the exterior of the UST indicative of a petroleum release was observed. The vent pipe for the diesel fuel UST was in poor condition. Other piping associated with the tank system appeared to be in fair to poor condition. A fuel oil smell was noted in soils immediately below the fuel dispenser pump. Minor HNU meter deflections were recorded for soil samples obtained from few locations within the excavation, see Soil Vapor Headspace Results and Figure A attached to Excavation Report. Also included in Appendix A are the MPCA Tank Notification Forms, Residual Fuel Disposal Certificate and Tank Destruction Certificate.

Soil samples for chemical analysis were taken below each end of the UST and below the fuel dispenser pump. Soil samples below the dispenser pump and the north end of the tank yielded concentrations of total hydrocarbons as fuel oil of 54 and 97 milligrams per kilograms, respectively, see Excavation Report. Because the total petroleum hydrocarbon concentrations were greater than 50 parts per million in the sandy soils of the site, a Remedial Investigation was required based on MPCA guidelines.

#### **3.2 Fuel Oil UST**

Visual observations of the interior of the fuel oil UST made by the contractor prior to conducting the closure in-place revealed no obvious holes or indications of leaks. Soil borings B-3 and B-7 made adjacent to the fuel oil UST exhibited elevated HNU meter readings at depth, see soil borings in Appendix C. Other soil borings at greater horizontal distances from the immediate

vicinity of the fuel oil UST did not exhibit elevated HNU meter readings. Chemical analyses of soil samples from selected soil borings did not indicate the presence of petroleum constituents, see Appendix D and Section 5.11 of this report.

## **4.0 METHODS OF WORK**

The Remedial Investigation consisted of a soil exploration with hand auger and power auger borings and installation of four monitoring wells. The methods used to perform the Remedial Investigation are discussed below.

### **4.1 Soil Borings**

Nine hand bucket auger soil borings were conducted within the building to depths up to 15 feet. Continuous sampling was obtained using a 3 inch inside diameter bucket auger.

Six power auger borings were accomplished with a truck mounted rotary drill rig using 3 1/4 inch I.D. hollow stem augers. Soil samples were obtained, in general, at depth intervals of 2.5 feet. A sampling interval of 5 feet was performed in monitoring well MW-1 and for a portion of soil boring B-10. The sampling was undertaken in general conformance with ASTM Specification D-1586 for split-barrel sampling. The split-barrel sampler was cleaned between sampling intervals in a solution of Alconox detergent and rinsed with deionized water.

The power auger borings were advanced to depths approximately 5 feet below groundwater level except for soil boring B-10 which was completed above the groundwater level. The borings were drilled to a minimum depth of 16 feet below the ground surface.

Soil samples were classified in the field by a field engineer in accordance with the Unified Soil Classification System (USCS). Soil classifications were later confirmed by an engineer in the laboratory at STS. Boring logs showing the soil types are included in Appendix C.

Soil samples were screened with an HNU photoionization detector meter equipped with a 10.2 eV lamp. Soils were removed from the split-barrel sampler and placed in clean glass sample jar containers. The samples were then agitated and an HNU meter reading was obtained from the

headspace in the jar above the soil sample. The soil sample screening was conducted in general conformance with Minnesota Pollution Control Agency recommended procedures for jar headspace analysis.

#### 4.2 Monitoring Well Installations

Four monitoring wells were installed at the site. Monitoring wells MW-1, MW-2 and MW-3 were installed using a truck mounted rotary drill rig equipped with 6 5/8 inch I.D. hollow stem augers. Monitoring well MW-4 was installed by opening a soil boring to the water table with a hand auger and driving a stainless steel drive point below groundwater level.

Soil samples were classified in the field by a field engineer in accordance with the USCS. The soil classification was later confirmed by an engineer in the laboratory of STS. Boring logs showing the soil types encountered at the monitoring well locations are included in Appendix C. Monitoring wells MW-1 and MW-2 were constructed with 2 inch diameter black iron riser pipe with threaded couplings. Two inch diameter 0.01 inch slot stainless steel screens were set to intercept the groundwater surface at approximately the midpoint of the well screen. A clean silica sand pack was placed around the screen section. Monitoring well MW-3 was constructed with threaded flush joint 2 inch diameter PVC riser pipe and 2 inch diameter 0.01 inch slot PVC well screen. MW-3 was installed with silica sand surrounding the well screen and the well screen set to intercept the groundwater table at approximately the mid-point of the screen. Monitoring well MW-4 was constructed with 2 inch diameter black iron riser pipe and a 2 inch diameter 0.01 slot stainless steel drive point. Well construction diagrams for the monitoring wells are included on the soil boring logs for each well.

The monitoring wells were developed in accordance with the STS Groundwater Monitoring Quality Assurance Manual. Well development records for the monitoring wells are included in Appendix E.

The monitoring well elevations for the site are based on an assumed elevation of 100.00 based at the top nut of a fire hydrant located at the northeast corner of 37th Street and Hiawatha Avenue.

#### **4.3 Sampling For Chemical Analysis**

Soil samples for chemical analysis were selected based on photoionization detector meter readings and olfactory and/or visual indications of contamination. Soil samples for chemical analysis were removed from sampling equipment following STS protocols. Soil samples were appropriately bottled, placed on ice in a cooler and transported to a subcontract laboratory for analysis.

Groundwater samples were obtained from monitoring wells following STS monitoring sampling protocols. Various methods used to purge and sample the wells are documented on completed sampling information forms found in Appendix E.

#### **4.4 Receptor Survey (Well Search)**

A search of water wells located within a one mile radius of the subject property was performed. The search was conducted in Sections 1 and 12, Township 28, Range 24 and Sections 6 and 7, Township 28, Range 23 in Hennepin County, Minnesota. The source of water well information was the Groundwater Clearing House System of the Land Management Information Center of the Minnesota State Planning Agency and the Minnesota Geological Survey. The well search data is included as Appendix G.

#### **4.5 Review of Data From Adjacent Petroleum Release Site**

STS Consultants, Ltd. reviewed the results section of a Remedial Investigation prepared for ADM Milling Corporation by WW Engineering and Science (WWES Project No. 35023.00). The ADM petroleum release site (MPCA Leak No. 2486) is located up-gradient in groundwater flow direction from the CPS Warehouse site. A copy of the results portion of the WW report with diagrams was obtained through the Minnesota Pollution Control Agency. The report copy is included in Appendix I.

## **5.0 REMEDIAL INVESTIGATION**

Section 5.0 of this report presents the results of the Remedial Investigation including soil and groundwater conditions encountered. The results are discussed in Section 5.2. Conclusions developed through an analysis of the results are presented in Section 5.3.

### **5.1 Results**

The results of the soil exploration program, groundwater monitoring well sampling, vapor survey, well receptor survey and review of a report concerning an up-gradient petroleum release site are presented below.

#### **5.1.1 Soil Exploration**

Soil borings were conducted inside and outside of the CPS Warehouse Building, see Figure 3, Appendix B. The soil borings generally encountered clayey fill materials over sandy natural soils, see soil boring logs, Appendix C. Clayey glacial till was encountered below groundwater level near the termination depths of soil borings advanced for installation of monitoring wells MW-1 and MW-2. Generalized cross-sections of soil conditions at the site are illustrated on Figures 4 and 5 (Profiles A-A' and B-B'), see Appendix B.

Elevated photoionization detector (PID) meter readings, ranging from 1 to 65 meter units, were observed in soil borings B-3, B-7, B-8 and B-11. Soil borings B-3, B-7 and B-8 were augered in the immediate vicinity of the fuel oil underground storage tank and associated product supply lines servicing the boiler. No elevated PID meter readings were obtained at soil borings located in the building at distance from the fuel oil UST.

Soil boring B-11 was advanced through the former diesel fuel underground storage tank base. Elevated PID meter readings were observed at the soil/groundwater interface. It should be noted that PID meter readings at background levels were observed in natural unsaturated soils below the base of the former diesel fuel tank basin.

No PID meter deflections above background levels were encountered at the soil borings advanced for placement of the monitoring wells.

Chemical analysis results of soil samples obtained from soil borings and monitoring well locations are summarized below in Tables A and B.

**Table A**  
**Soil Chemical Analysis Results**

<u>Parameter</u> (units)	<u>Soil Boring/(Sample Depth)</u>				
	<u>B-7</u> (4.5 feet)	<u>B-8</u> (13 feet)	<u>B-9</u> (13 feet)	<u>MW-1</u> (12 feet)	<u>MW-2</u> (14 feet)
Benzene (mg/kg)	<0.06	<0.06	<0.06	<0.059	<0.059
Toluene (mg/kg)	<b>0.92</b>	<0.11	<0.11	<0.063	<0.063
Ethylbenzene (mg/kg)	<b>1.6</b>	<0.05	<0.05	<0.041	<0.041
Xylene (mg/kg)	<b>7.6</b>	<0.28	<0.28	<0.18	<0.18
Total hydrocarbons as fuel oil (mg/kg)	<b>9900</b>	<b>5.3</b>	<b>7.3</b>	<1.4	<1.4

Note: Detection limits varied - see individual laboratory reports in Appendix D.



**Table B**  
**Soil Chemical Analysis Results**

<u>Parameter</u> (units)	<u>Soil Boring/(Sample Depth)</u>			
	<u>MW-4</u> (12.5 feet)	<u>MW-4</u> (18 feet)	<u>B-11</u> (17.5 feet)	<u>B-11</u> (20 feet)
MTBE (mg/kg)	<0.036	<0.035	<0.038	<0.038
Benzene (mg/kg)	<0.025	<0.025	<0.027	<0.027
Toluene (mg/kg)	<0.026	<0.026	<0.028	<0.028
Ethylbenzene (mg/kg)	<0.017	<0.017	<0.018	<b>0.69</b>
Xylene (mg/kg)	<0.074	<0.073	<0.078	<b>0.49</b>
1,3,5-Trimethylbenzene (mg/kg)	<0.011	<0.016	<0.011	<b>1.8</b>
1,2,4-Trimethylbenzene (mg/kg)	<0.016	<0.016	<0.017	<b>2.8</b>
Wisconsin DNR DRO: Diesel Range Organics (mg/kg)	<b>1.3</b>	<1.0	<b>1.2</b>	<b>9200</b>
Total Solids (%)	94.7	96.4	89.3	88.9

Note: Detection limits vary - see individual laboratory reports in Appendix D.

A total hydrocarbons as fuel oil concentration of 9900 mg/kg was found in a soil sample obtained from shallow depth (4.5 feet at soil boring B-7) near the fuel oil UST. Lower total hydrocarbons as fuel oil concentrations were reported for soil samples obtained at depth adjacent to the fuel oil UST (samples from 13 feet depth at soil borings B-8 and B-9). Soil samples obtained at greater horizontal distance from the fuel oil UST (samples from monitoring wells MW-1, MW-2 and MW-4, Tables A and B) had reported parameter concentrations below detection limits except for a Wisconsin DNR diesel range organics concentration of 1.3 mg/kg in the soil sample from monitoring well MW-4.

Soil boring B-11 was advanced through the former diesel fuel UST basin and soil samples were obtained from natural soils above and below the soil/groundwater interface. The soil sample obtained above the soil/groundwater interface showed low concentration of Wisconsin DNR diesel range organics. The soil sample obtained below the groundwater table showed elevated concentration of Wisconsin DNR DRO as well as concentrations above detection limits for ethylbenzene, xylene, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene.

### 5.1.2 Groundwater Monitoring

The results of chemical analyses for groundwater obtained during the first two sampling events are summarized in Tables C and D below. The sampling events in Tables C and D were conducted prior to installation of monitoring wells MW-3 and MW-4. Table E presents a partial list of parameters for the third sampling event.

**Table C**  
**Groundwater Chemical Analysis Results**  
**July 8, 1991 Sample Events**

<u>Parameter (units)</u>	<u>Target Detection Limit</u>	<u>MW-1</u>	<u>MW-2</u>	<u>Field Blank</u>
Benzene (ug/L)	0.47	<0.47	<0.47	<0.47
Toluene (ug/L)	0.50	<0.50	<0.50	<b>1.3</b>
Ethylbenzene (ug/L)	0.33	<0.33	<0.33	<0.33
Xylenes (ug/L)	1.4	<1.4	<1.4	<1.4
Total hydrocarbons as fuel oil (ug/L)	41	<b>2400</b>	<41	<41

**Table D**  
**Groundwater Chemical Analysis Results**  
**July 21, 1992 Sample Event**

<u>Parameter (units)</u>	<u>Method Detection Limit</u>	<u>MW-1</u>	<u>MW-2</u>	<u>Field Blank</u>
Benzene (ug/L)	1.0	<1.0	<1.0	<1.0
Toluene (ug/L)	1.0	<1.0	<1.0	<b>1.0</b>
Ethylbenzene (ug/L)	1.0	<1.0	<1.0	<1.0
Xylenes (ug/L)	2.0	<2.0	<2.0	<2.0
Total hydrocarbons as gasoline (ug/L)	10	<b>210</b>	<10	<10
Fuel Oil #1 (ug/L)	100	<100	<100	<100
Fuel Oil #2 (ug/L)	100	<100	<100	<100
Total Petroleum Hydrocarbons (ug/L)	100	<b>320</b>	<100	<b>120</b>

ND = not detected

**Table E**

**Groundwater Chemical Analysis Results  
 October 21-22, 1992**

<u>Parameter (units)</u>	<u>Method Detection Limit</u>	<u>MW-1</u>	<u>MW-2</u>	<u>MW-3</u>	<u>MW-4</u>	<u>Field Blank</u>
<b>EPA Method SW-846, 8020</b>						
Benzene (ug/L)	0.47	<0.47	<0.47	<0.47	<0.47	<0.47
Toluene (ug/L)	0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene (ug/L)	0.33	<0.33	<0.33	<0.33	<b>1.6</b>	<0.33
Xylenes (ug/L)	1.4	<1.4	<1.4	<1.4	<b>8.8</b>	<1.4
WI DNR GRO (ug/L)	13	<13	<13	<13	<b>510</b>	<13
WI DNR DRO (ug/L)	25	<b>3800</b>	<25	<25	<b>31000</b>	--
<b>Method MDH 465-D</b>						
1,3-Dichlorobenzene (ug/L)	0.46	<b>0.62</b>	<0.46	<0.46	<0.46	<0.46
1,4-Dichlorobenzene (ug/L)	0.69	<b>1.3</b>	<0.69	<0.69	<0.69	<0.69
1,2-Dichlorobenzene (ug/L)	0.49	<b>1.5</b>	<0.49	<0.49	<0.49	<0.49
Ethylbenzene (ug/L)	0.42	<0.42	<0.42	<0.42	<b>2.5</b>	<0.42
M/P-Xylene (ug/L)	0.46	<0.46	<0.46	<0.46	<b>4.7</b>	<0.46
O-Xylene (ug/L)	0.25	<0.25	<0.25	<0.25	<b>7.3</b>	<0.25
Isopropylbenzene (ug/L)	1.8	<1.8	<1.8	<1.8	<b>3.9</b>	<1.8
n-Propylbenzene (ug/L)	0.24	<0.24	<0.24	<0.24	<b>4.8</b>	<0.24
1,3,5-Trimethylbenzene (ug/L)	0.21	<0.21	<0.21	<0.21	<b>4.5</b>	<0.21
1,2,4-Trimethylbenzene (ug/L)	0.30	<0.30	<0.30	<0.30	<b>31</b>	<0.30
sec-Butylbenzene (ug/L)	0.23	<b>2.9</b>	<0.23	<0.23	<b>5.2</b>	<0.23
p-Isopropyltoluene (ug/L)	0.17	<b>0.49</b>	<0.17	<0.17	<b>0.68</b>	<0.17
n-Butylbenzene (ug/L)	0.27	<b>0.60</b>	<0.27	<0.27	<b>16</b>	<0.27
Naphthalene (ug/l)	0.56	<b>0.88</b>	<0.56	<0.56	<b>78</b>	<0.56

No detections above detection limits were reported for monitoring well MW-2 for both monitoring events. In addition, no detections above detection limits were reported for monitoring well MW-3 for the October 1992 sampling event.

Elevated concentrations of petroleum related compounds were reported for monitoring wells MW-1 and MW-4. An elevated concentration of total hydrocarbons as fuel oil was reported for monitoring well MW-1 for the July 8, 1991 sampling event. Concentrations of total hydrocarbons both as gasoline and as fuel oil were reported for monitoring well MW-1 for the July 1992 sampling event. Diesel range organics plus benzene and toluene related compounds were identified at monitoring well MW-1 for the October 1992 sampling event. Monitoring well MW-4 had gasoline range organics and diesel range organics identified as well as ethylbenzene, xylenes and benzene and toluene related organics. In addition, naphthalene was identified in both monitoring wells MW-1 and MW-4 for the October 1992 sampling event. The MPCA's "Hydrogeologic Setting and Groundwater Contamination Characterization Worksheet" is included as Appendix H.

The groundwater elevation data presented on the water level summary sheet in Appendix B indicate a groundwater flow direction towards monitoring well MW-3 or to the south, also see Figures 6 and 7, Appendix B.

#### 5.1.3 Vapor Survey

Vapor surveys performed both inside and outside of the CPS Warehouse at various times during the Remedial Investigation did not indicate the presence of organic vapors. A vapor survey conducted in a utility trench opened along the west side of the building during utilities installation detected no organic vapors.

#### 5.1.4 Review of Report Concerning Adjacent Petroleum Release

The WW Engineering and Science (WWES) report indicated the presence of free product in monitoring wells at the ADM Milling Company site. Groundwater flow direction was to the south or towards the CPS Warehouse site for measurements taken in March 1991, July 1991 and January

1992. Depth of free product ranged between 1/4 inch to 2 feet in the various monitoring wells. Monitoring well MW-3 located in the south portion of the site consistently had free product during observations in June and July 1991. MW-3 is the monitoring well on the ADM site closest to the CPS Warehouse site.

Total hydrocarbons as fuel oil concentrations in monitoring wells MW-2 and MW-3 were 110 mg/L and 47 mg/L (110,000 ppb and 47,000 ppb), respectively, for the January 3, 1992 sampling. Historical groundwater analytical data was not included in the report reviewed. A groundwater pump and treat system appeared to be proposed for remediation of the site.

5.1.5 Groundwater Receptor Survey (Well Search)

The well search identified seven wells within a one mile radius of the subject property. Table F below lists the unique well number, depth of well screen interval, aquifer and depth to water for each well. Well numbers 200602, 200402, 236024, and 200605 are down gradient. While well numbers 223848, 235546 and 200601 are cross gradient to the site in surficial groundwater flow direction. The assumed regional groundwater flow direction is to the east towards the Mississippi River.

Table F

**Well Search Data**

	<u>200601</u>	<u>200602</u>	<u>200402</u>	Well I.D. <u>200605</u>	<u>235546</u>	<u>223848</u>	<u>236024</u>
Depth of well	45 ft.	502 ft.	No log available	72 ft.	abandoned well	120-125 ft.	364 ft.
Screen interval	unknown	238-502 OH				unknown	unknown
Aquifer	Platteville Fm.	Prairie du Chien		Platteville Fm.		Quaternary	Prairie du Chien

Well use	unknown	unknown	general	unknown	unknown
Depth to water	unknown	60 ft.	31 ft.	85 ft.	92 ft.

OH = Open hole

The available well logs and a location diagram are included in Appendix G.

## 5.2 Discussion

### 5.2.1 Soil Exploration

Field screening and chemical analysis results of soil samples obtained from soil borings made adjacent to the fuel oil UST indicated the likelihood of a petroleum release limited to shallow depth near the fuel oil UST. Low concentrations of petroleum hydrocarbons as fuel oil at depth indicated that an extensive release did not likely occur from the fuel oil UST system. Observations of the UST interior during in-place closure operations did not indicate the presence of holes in the UST. The 10,000 gallon inventory discrepancy remains unresolved, however, the results of the soil exploration do not indicate a fuel oil release of this magnitude.

The source of release from the diesel UST is believed to have been an inadvertent overfill or leak in the piping system. Total petroleum hydrocarbon concentrations of soil samples obtained from the excavation opened for removal of the diesel fuel UST exceeded 50 ppm per million and indicated the need for a soil boring advanced through the tank basin based on MPCA requirements. Chemical analysis of a soil sample obtained from natural soils below the tank basin but above groundwater level did not indicate petroleum impacts. A soil sample obtained from below the groundwater level indicated petroleum impacts. The identified petroleum impacts do not appear to be the result of on-site petroleum release based on the results of the soil sample chemical analyses.

### 5.2.2 Groundwater Monitoring

Groundwater impacts were observed in monitoring wells MW-1 and MW-4.

Benzene was not identified in any of the groundwater samples taken at the site. The recommended allowable limit (Minnesota Department of Health) of 30 ppb for naphthalene was exceeded at monitoring well MW-4 with a concentration of 78 ppb. No other RALs for compounds identified in the wells above detection limits were exceeded.

No free product was observed in any of the monitoring wells on-site. Free product was observed in monitoring wells on an adjacent property (ADM Milling Company) located up-gradient in groundwater flow direction from the site.

### 5.2.3 Vapor Survey

Vapor surveys performed inside and outside the CPS Warehouse found no vapor accumulations or releases. The risk of vapor accumulations appears minimal due to the type of fuels (diesel and fuel oil).

### 5.2.4 Review of Petroleum Release Report for Adjacent Property

Free product exists on the groundwater surface at the ADM Milling Company petroleum release site located up-gradient in groundwater flow direction from the CPS Warehouse site. Free product was not observed in monitoring wells on the CPS Warehouse site. Chemical analysis of a soil sample obtained from below the groundwater level at the north end of the CPS Warehouse site indicates petroleum impacts at the former diesel fuel underground storage tank site. The diesel fuel release was shown to be minimal and not impacting groundwater by chemical analysis of a



soil sample obtained above the water to be below the former tank basin. In addition, a large scale release of fuel oil from the UST within the warehouse appears unlikely based on the results of the soil exploration. The ADM Milling site appears to be the likely source of petroleum impacts to groundwater identified below the CPS Warehouse site.

#### 5.2.5 Well Receptor Survey

Surficial groundwater below the CPS Warehouse does not appear to be contiguous with the Prairie du Chien aquifer from which water supply wells draw drinking water. Clay till was encountered below petroleum impacted water bearing sands in the soil boring at the site. Clay layers are also indicated on a number of the well logs. The clay till may act as an aquitard for downward movement of petroleum impacted surficial groundwater. Wells screened at shallow depth in the vicinity of the site appear to be used for irrigation purposes and are located up-gradient and/or cross-gradient from the site. Cross-contamination from the shallow water bearing sands to drinking water aquifers appears unlikely.

### 5.3 Conclusions

#### 5.3.1 Soil Impacts

No petroleum impacted soils requiring treatment were encountered during removal of the diesel fuel UST at the northwest corner of the CPS Warehouse building. Soils with low total petroleum hydrocarbon concentrations were identified in soil samples obtained from the dispenser pump location and north end of the base of the excavation. Based on the soil sample chemical results, a soil boring through the former tank basin with chemical analysis of selected soil samples was performed as required by MPCA guidelines. The chemical analysis results indicated no petroleum impacts below the tank basin but indicated groundwater impacts. The petroleum release at the diesel fuel UST was minimal, did not impact groundwater and does not require further remediation

based on the available data. The source of the petroleum release was removed. Soils remaining in-place with low levels of petroleum impacts are located below concrete pavement which minimizes infiltration of precipitation. The low concentrations of petroleum product left in-place at the former diesel fuel UST site do not appear to pose a threat of groundwater contamination.

The results of the soil exploration conducted for the fuel oil UST located within the CPS Warehouse did not indicate a large scale release of petroleum products to the soil. Petroleum impacted soil was identified at shallow depth. Low concentrations of total petroleum hydrocarbons were identified at greater depths next to the UST. In addition, the low concentration of total petroleum hydrocarbons at depth adjacent to the tank indicate that groundwater contamination from the fuel oil release is unlikely. The source of the petroleum release was removed by in-place closure of the fuel oil UST. Movement of petroleum products remaining in-place will be minimized due to the coverage of the release location by a building. The coverage by the building eliminates precipitation from moving petroleum products remaining in-place downward to the groundwater.

### 5.3.2 Groundwater Impacts

Groundwater impacts were indicated at the diesel fuel location by soil sample results and at the fuel oil UST location by impacts identified in monitoring wells. The results of the soil exploration did not point to the on-site USTs as sources of the identified groundwater contamination. No free product was observed in monitoring wells located on the CPS Warehouse site.

Free product was observed in monitoring wells at the ADM Milling site located north and up-gradient in groundwater flow direction from the CPS Warehouse site. Total hydrocarbon concentrations at the CPS Warehouse site are similar in magnitude to total hydrocarbon

concentrations identified in monitoring wells at the ADM Milling site. The available data indicate the possibility that groundwater impacts identified at the CPS Warehouse site may originate off-site at the ADM facility.

### 5.3.3 Vapor Survey

The results of vapor surveys conducted at the site did not encounter vapors and indicated a low risk for vapor accumulation at the site.

### 5.3.4 ADM Milling Remedial Investigation Report

The Remedial Investigation Report prepared for ADM Milling Company by WWES suggests a pump and treat system to remediate groundwater at the ADM petroleum release site. Groundwater flow direction towards the CPS Warehouse site and the presence of free product on the groundwater surface indicate potential for groundwater impacts down-gradient. Groundwater cleanup at ADM may remove the petroleum source impacting groundwater below the CPS Warehouse site. Further work, including continued groundwater monitoring results on the ADM and CPS Warehouse site during site remediation, would be required to confirm areawide cleanup.

### 5.3.5 Well Receptor Survey

No potential receptors of contaminated groundwater were identified by the well search. The potential for cross-contamination of drinking water supplies by the contaminated groundwater below the site appears slight.

## **6.0 CORRECTIVE ACTION DESIGN**

The Corrective Action Design recommended for the Carson Pirie Scott Warehouse site is monitoring of on-site groundwater monitoring wells. The two closed underground storage tanks located on the site were not identified as the source of groundwater contamination below the site by the Remedial Investigation. An up-gradient petroleum release site appears to be the likely source of groundwater contamination identified at the Carson Pirie Scott Warehouse site.

A groundwater monitoring program integrated with groundwater remediation activities at the ADM Milling site, when instituted, would provide information about the effectiveness of the clean-up effort. Access agreements, data sharing between consultants through the MPCA and installation of additional monitoring wells may be required to address the effect of the remediation on groundwater cleanup at the sites..

STS Consultants, Ltd. recommends that the Carson Pirie Scott leakesite be considered closed by the MPCA. Additional groundwater monitoring should be coordinated with clean-up efforts at the ADM Milling Company site. One additional groundwater sampling event should be performed to confirm the results reported in this RI.

The results of the RI indicate the groundwater contamination at the adjacent ADM facilities appears to be the source of impacts to the CPS site. Therefore, it is justifiable to remove the warehouse facility from the leak site list and assign responsibility for the groundwater impacts to ADM.

## **7.0 GENERAL QUALIFICATIONS**

The analysis and recommendations submitted in this report are based upon data obtained from 11 soil borings and 4 monitoring wells at the locations identified on the location diagram and from any other information discussed in this report. This report does not reflect any variations which may occur between the soil borings. In performance of the subsurface exploration, specific information was obtained at specific locations at specific times. However, it is a well known fact that variations in soil and rock conditions exist on most sites between boring locations at specific times. Water level readings were made in monitoring wells at a specific point in time. This data was reviewed and an interpretation made in the text of this report. It should be noted that seasonal and annual fluctuations in the level of the groundwater will likely occur. These fluctuations may affect the interpretation of groundwater conditions at the site.

This report was prepared in accordance with generally accepted engineering practices to assist the owner in evaluation of the site. No other warranty, expressed or implied, is made. The scope of this report is limited to the specific project and the locations described herein and our description of the project represents our understanding of the significant aspects in reference to the site.

**APPENDIX A**

Excavation Report for Petroleum Release Sites

**APPENDIX B**

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

**APPENDIX C**

Soil Boring Logs

**APPENDIX D**

Soil Chemical Analysis Results

**APPENDIX E**

Development and Sampling Records

**APPENDIX F**

Groundwater Chemical Analysis Results

**APPENDIX G**

Well Receptor Survey

**APPENDIX H**

Hydrologic Setting and Groundwater Contamination Characterization

**APPENDIX I**

WWES Report for ADM Milling Co. Site

# EXCAVATION REPORT FOR PETROLEUM RELEASE SITES

Minnesota Pollution Control Agency  
Tanks and Spills Section  
May 1992

Complete the information below and submit to the Minnesota Pollution Control Agency (MPCA) Tanks and Spills Section to document excavation and treatment of petroleum contaminated soil. Excavations must be done in accordance with "Excavation of Petroleum Contaminated Soil" (Guidance Document 6). Please attach any available preliminary site investigation reports to this excavation report.

Additional pages may be attached. Please type or print clearly.

## I. BACKGROUND

- A. Site:  
Carson Pirie Scott Warehouse  
Street: 3601 Hiawatha Ave. S.  
City, Zip: Minneapolis, MN 55417  
County: Hennepin
- B. Tank Owner/Operator: P. A. Bergner  
Company, Attn: Mr. Quang Tran  
Mailing Address:  
Street/Box: 331 West Wisconsin Ave.  
City, Zip: Milwaukee, WI 53203  
Telephone: 414/347-5438
- MPCA Site ID#: LEAK0000\_0916 (fuel oil) (formerly #4522, diesel tank only)
- C. Excavating Contractor:  
Minnesota Petroleum Service, Inc.  
Contact: Mr. Ken Pierce  
Telephone: 612/571-8490  
Tank Contractor Certification  
Number: 0604
- D. Consultant:  
STS Consultants, Ltd.  
Contact: Mr. Allen Paulson  
Street/Box: 3650 Annapolis Lane  
City, Zip: Minneapolis, MN 55447  
Telephone: 612/559-1900
- E. Others on-site during site work (e.g., fire marshal, local officials, MPCA staff, etc.):

Fire Marshal, Minneapolis Pollution Control Agency

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

## II. DATES

- A. Date release reported to MPCA: 1/5/89
- B. Dates site work performed:
- | Work Performed                     | Date                 |
|------------------------------------|----------------------|
| <u>Preliminary Site Assessment</u> | <u>2/3/89</u>        |
| <u>Tank Excavation and Removal</u> | <u>8/16/91</u>       |
| <u>Remedial Investigation</u>      | <u>1991 and 1992</u> |

**III. RELEASE INFORMATION**

A. Provide the following information for all removed tanks.

Tank 1: Capacity 10,000 Type steel Age 37 years

Condition: Good - no holes or evidence of tank leakage - piping in poor condition

Product history: Diesel fuel

Approximate quantity of petroleum released, if known: Unknown

Cause of release: Likely from leak in vent piping

Tank 2: Capacity \_\_\_\_\_ Type \_\_\_\_\_ Age \_\_\_\_\_

Condition: \_\_\_\_\_

Product history:

Approximate quantity of petroleum released, if known:

Cause of release:

Tank 3: Capacity \_\_\_\_\_ Type \_\_\_\_\_ Age \_\_\_\_\_

Condition: \_\_\_\_\_

Product history:

Approximate quantity of petroleum released, if known:

Cause of release:



B. Provide the following information for all existing tanks.

Tank No.	Capacity	Contents	Type	Age
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

C. If the release was associated with the lines or dispensers, briefly describe the problem:

Vent piping appeared to be in poor condition.

D. If the release was a surface spill, briefly describe the problem:

-----

#### IV. EXCAVATION

A. Dimensions of excavation: 22 feet (N-S); 24 feet (E-W); 15 feet deep

B. Original tank backfill material (sand, gravel, etc.): Sand

C. Native soil type (clay, sand, etc.): Sand

D. Quantity of contaminated soil removed (cubic yards): 0 yards

**[Note: If more than 400 cubic yards removed, please attach copy of written approval from MPCA.]**

E. Was ground water encountered or was there evidence of a seasonally high ground water table? At what depth?

No

F. If a soil boring was necessary (as indicated in Part VI of "Excavation of Petroleum Contaminated Soil" (Guidance Document 6) for sand and silty sand native soils) describe the soil analytical and soil vapor headspace results. Attach the boring logs and laboratory results to this report.

Two soil borings were performed at the tank site. Soil boring B-10 was performed adjacent to the tank prior to tank removal. Soil boring B-11 was performed through the tank basin after tank removal.

No indications of a petroleum release were identified in soil boring B-10. PID readings of soil samples were at background levels for the full depth of the soil boring.

No indications of a petroleum release were identified in natural soils below the former tank basin between a depth of 12.0 feet to 19.0 feet. Chemical analysis of a soil sample from a depth of 17.0 to 18.0 feet indicated diesel range organics (DRO) concentration of 1.2 mg/kg. The chemical sample confirms that soil impacts in the tank basin were below the action limit of 50 ppm in sandy soils. A chemical sample of soil from soil boring B-11 which had elevated PID readings obtained near the soil/groundwater interface at approximately 19.5 feet depth identified DRO at a concentration of 9200 mg/kg. Ethylbenzene, xylenes, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene were also identified. Benzene, toluene, and MTBE concentrations were below detection limits.

- G. If ground water was encountered or if a soil boring was conducted, was there evidence of ground water contamination? Specify, e.g., free product (specify thickness), product sheen, ground water in contact with petroleum contaminated soil, water analytical results, etc.

[Note: If free product was observed, contact MPCA staff immediately as outlined in "Petroleum Tank Release Reports" (Guidance Document 2).]

Soil samples from below the water table at soil boring B-11 exhibited strong petroleum odor, sheen and rainbow colors. Chemical analysis results of a soil sample were described in IV.F. above. An off-site source(s) of groundwater contamination is suspected.

- H. Was bedrock encountered in the excavation? At what depth?

Bedrock was not encountered.

- I. Were other unique conditions associated with this site? If so, explain.

Known releases of petroleum products have occurred on an adjacent site up-gradient in groundwater flow direction from the subject site.

## V. SAMPLING

- A. Briefly describe the field methods (including use of a photoionization detector) used to distinguish contaminated from uncontaminated soil:

A Model 101 HNU photoionization detector equipped with a 10.2 eV lamp calibrated to a benzene reference gas was used to screen soil samples obtained at the site. Soil

samples for screening were taken from the backhoe bucket and placed in clean jars for headspace analysis following MPCA recommended procedures.

- B. List soil vapor headspace analysis results. Indicate sampling locations using sample codes (with sampling depths in parentheses), e.g. SV-1 (2 feet), SV-2 (10 feet), etc. Samples collected at different depths at the same location should be labeled SV-1A (2 feet), SV-1B (4 feet), SV-1C (6 feet), etc. These should correspond with the codes on the site map in Part VI. If the sample represents soil from the final extent of the excavation indicate "bottom" or "sidewall" in the bottom/sidewall column.

<u>Sample Code</u>	<u>Soil Type</u>	<u>Reading, ppm</u>	<u>Bottom/Sidewall</u>	<u>Sample Code</u>	<u>Soil Type</u>	<u>Reading, ppm</u>	<u>Bottom/Sidewall</u>
SV-1 (4')	Sand	0	Sidewall	SV-8 (15')	Sand	4	Bottom
SV-2 (2')	Sand	1.6	--	SV-9 (16')	Sand	0	Bottom
SV-3 (7')	Sand	0	Sidewall	SV-10 (7')	Sand	0	Sidewall
SV-4 (3')	Sand	0	--	SV-11 (6')	Sand	0	Sidewall
SV-5 (9')	Sand	1	Sidewall	SV-12 (6')	Sand	0	Sidewall
SV-6 (4')	Sand	4	--	SV-13 (5')	Sand	0	Sidewall
SV-7 (15')	Sand	0	Bottom				

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

Soil sampling for chemical analysis was accomplished using a clean spatula to transfer sample from backhoe bucket immediately to 40 ml sample containers while wearing nitrile gloves.

- D. List the appropriate soil sample analytical results from the bottom and sidewalls of the excavation below (refer to "Soil and Ground Water Analysis at Petroleum Release Sites", Guidance Document 11). If the petroleum was not gasoline or fuel oil attach appropriate analytical results. Code the samples (with sampling depths in parentheses) SS-1 (8 feet), SS-2 (4 feet), etc. These should correspond with the codes on the site map in Part VI. Do not include analyses from the stockpiled soils.

Excavation Report for Petroleum Release Sites

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May 1992

Sample Code	THC as gas or <u>FO</u> ppm (circle one)	Benzene ppm	Ethyl-benzene ppm	Toluene ppm	Xylene ppm	MTBE ppm	Lead ppm
SS-1 (3')	54	ND	ND	ND	ND	---	---
SS-2 (15')	ND	ND	ND	ND	ND	---	---
SS-3 (15')	97	ND	ND	ND	ND	---	---

NOTE: COPIES OF LABORATORY REPORTS AND CHAIN OF CUSTODY FORMS MUST BE INCLUDED.

**VI. FIGURES**

Attach the following figures to this report:

1. Site location map
2. Site map(s) drawn to scale illustrating the following:
  - a. location (or former location) of all present and former tanks, lines, and dispensers;
  - b. location of other structures (buildings, canopies, etc.);
  - c. adjacent city, township, or county roadways;
  - d. final extent of excavation; and
  - e. location of soil vapor analyses (e.g. SV-1), soil samples (e.g. SS-1), and soil borings (e.g. SB-1). Also, attach all boring logs.
  - f. north arrow and map legend.

**VII. SUMMARY**

Briefly summarize evidence indicating whether or not additional investigation is necessary at the site, as discussed in Part VI of "Excavation of Petroleum Contaminated Soil" (Guidance Document 6). If no further action is recommended, the MPCA staff will review this report following notification of soil treatment.

**VIII. SOIL TREATMENT INFORMATION**

- A. Soil treatment method used (thermal, land application, other). If you choose "other" specify treatment method: None
- B. Location of treatment site/facility: ---
- C. Date MPCA approved soil treatment (if thermal treatment was used after May 1, 1991, indicate date that the MPCA permitted thermal treatment facility agreed to accept soil):  
---
- D. Identify the location of any stockpiled contaminated soil:  
---

**IX. CONSULTANT (OR OTHER) PREPARING THIS REPORT**

Company Name: STS Consultants, Ltd.  
Street/Box: 3650 Annapolis Lane  
City, Zip: Minneapolis, MN 55447  
Telephone: 612/559-1900  
Contact: Allen Paulson

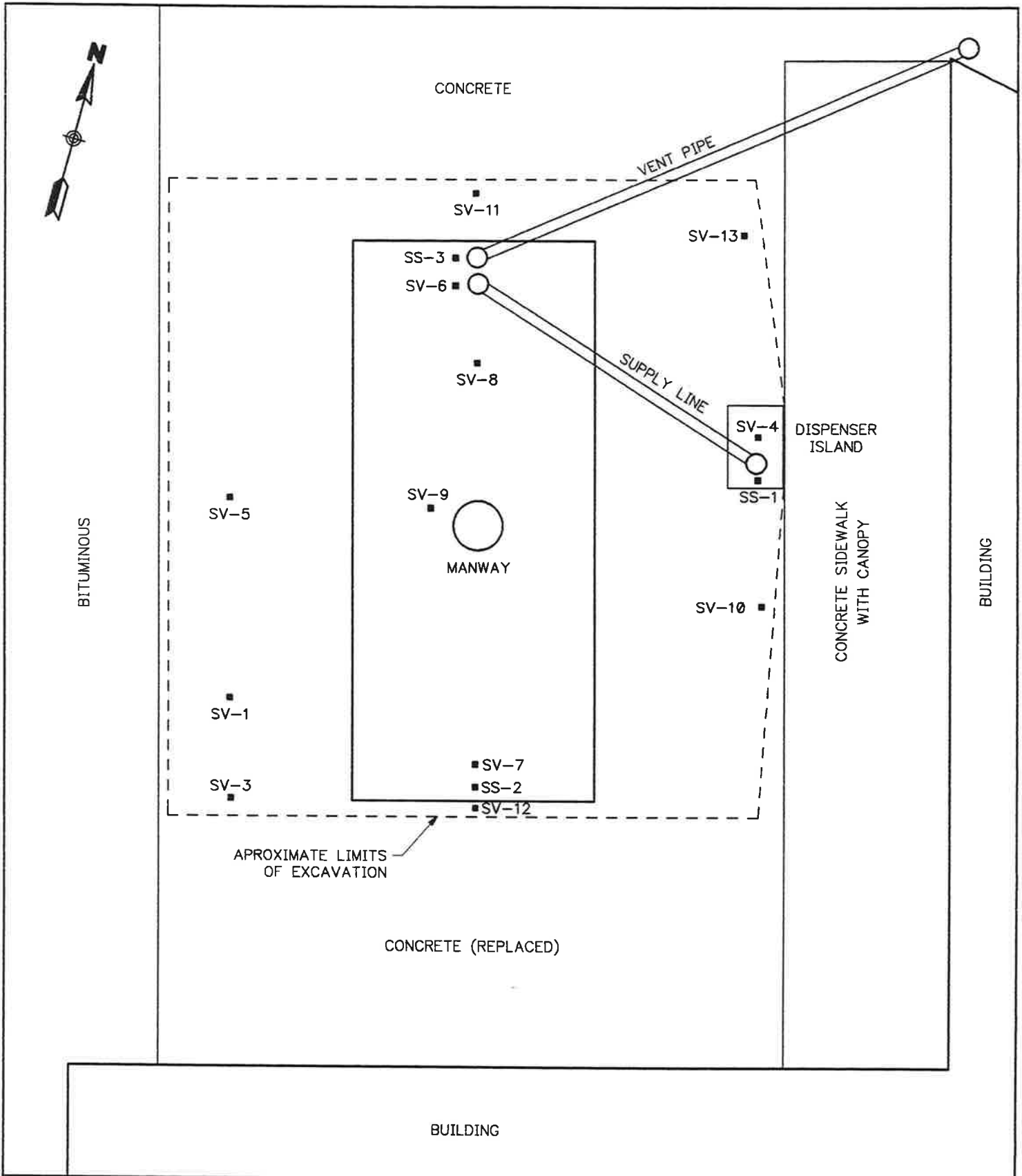
Signature: \_\_\_\_\_

Date: \_\_\_\_\_

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

(Project Manager)  
Minnesota Pollution Control Agency  
Hazardous Waste Division  
Tanks and Spills Section  
520 Lafayette Road  
St. Paul, Minnesota 55155

If additional investigation is required at the site, include this form as a section in the Remedial Investigation/Corrective Action Design report. Excavation reports indicating a remedial investigation (RI) is necessary will not be reviewed by MPCA staff until the RI has been completed.



**LEGEND**

SV-1 SAMPLE LOCATIONS



**UST REMOVAL DIAGRAM**



Project: CARSON PIRIE SCOTT WAREHOUSE  
 Client: CARSON PIRIE SCOTT  
 Location: MINNEAPOLIS, MINNESOTA

AutoCAD File: 94810UST  
 STS Project No: 94810-XG  
 Client Proj. No:

Checked by: GJR  
 Approved by: RLD

CAD Operator: SNS Plot Date: 11\_18\_1992

Revision No:

Figure: A



# REPORT OF LABORATORY ANALYSIS

STS Consultants, Ltd.  
3650 Annapolis Lane  
Minneapolis, MN 55447

September 05, 1991  
PACE Project Number: 910819509

Attn: Ms. Jenny Ross

94810-YF

PACE Sample Number:	10 0291897	10 0291900	10 0291919
Date Collected:	08/16/91	08/16/91	08/16/91
Date Received:	08/19/91	08/19/91	08/19/91

	Sample #1		
Parameter	Below Fuel Tank	Sample #2 South End	Sample #3 North End
Units			
	MDL		

## ORGANIC ANALYSIS

### VOLATILE PETROLEUM RELATED CMPDS IN SOIL

Date Analyzed			8/26/91	8/27/91	8/27/91
Benzene	mg/kg	0.12	ND	ND	ND
Toluene	mg/kg	0.12	ND	ND	ND
Ethyl benzene	mg/kg	0.12	ND	ND	ND
Xylene	mg/kg	0.12	ND	ND	ND
Total Hydrocarbons as gasoline	mg/kg	1.0	ND	ND	ND HB

### HEXANE EXTRACT PETROLEUM PRODUCTS SOIL

Date Analyzed			B 08/31/91	B 08/31/91	B 08/31/91
Date Extracted			08/21/91	08/21/91	08/21/91
Fuel oil #1	mg/kg	3.3	ND	ND	ND
Fuel oil #2	mg/kg	3.3	54	ND	97
Total Petroleum Hydrocarbons	mg/kg	3.3	-	ND	-

MDL Method Detection Limit  
 ND Not detected at or above the MDL.  
 HB High boiling point hydrocarbons are present in sample.

These data have been reviewed and are approved for release.

*Liesa Shanahan*

Liesa A. Shanahan  
Organic Chemistry Manager

September 05, 1991

SEPT 11 91

Ms. Jenny Ross  
STS Consultants, Ltd.  
3650 Annapolis Lane  
Minneapolis, MN 55447

RE: PACE Project No. 910819.509  
94810-YF

Dear Ms. Ross:

Enclosed is the report of laboratory analyses for samples received August 19, 1991.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,



Wendy A. Patrick  
Project Manager

Enclosures



410819.509 048160

# STS CHAIN OF CUSTODY RECORD

No 14496 RECORD NO. THROUGH

Contact Person Jessie Ross  
 Phone No. 559-1900  
 Project No. 94810-4F PO No. \_\_\_\_\_  
 STS Office Mpls.

**SPECIAL HANDLING REQUEST**

RUSH  
 VERBAL  
 OTHER

Laboratory Fishers Island PACE  
 Contact Person \_\_\_\_\_  
 Phone No. \_\_\_\_\_  
 Results Due \_\_\_\_\_

Sample I.D.	Date	Time	Grab	Composite	No. of Containers	Sample Type (Water, soil, air, sludge, etc.)	Preservation		Field Data			Analysis Request	Comments on Sample (Include Major Contaminants)
							Y	N	PID/FID	Sample	PH		
Sample #1 Island Fuel Island	8/16	10:35	X		2	Soil	X					BETX, TPH as fuel oil	29189.7
Sample #2 South end	8/16	11:30	X		2	Soil	X					BETX, TPH as fuel oil	29190.0
Sample #3 North end	8/16	11:35	X		2	Soil	X					BETX, TPH as fuel oil	29191.9

Collected by: JAMES KINGOLD Date 8/16/91 Time ~  
 Received by: Sahn Wynne Date 8-19-91 Time 2:00  
 Received by: \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Received by: \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Received for lab by: \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Laboratory Comments Only: Seals Intact Upon Receipt  Yes  No  N/A

Final disposition: \_\_\_\_\_

Comments (Weather Conditions, Precautions, Hazards):  
Carson Pine Scott Warehouse



# Notification for Underground Storage Tanks

Minnesota Pollution Control Agency  
Hazardous Waste Division Tanks and Spills Section  
520 Lafayette Road North St. Paul, MN 55155

for office use:

ID#

LK#

PQ-00410-03 (8/90)

### A. Name of Tank Site

Carson, Pirie, Scott, Warehouse

Tank Site Address

3601 Hiawatha Ave. S.

City

Minneapolis

Zip Code

55407

Phone

(612) 347-5438

County

Hennepin

Fire Marshal Permit #

### B. Name of Owner

P. A. Berringer & Co.

Mailing Address

331 Wisconsin Ave.

City

Milwaukee

State

WI

Zip Code

53203

Phone

(414) 347-5438

Questions?

Call

(612) 643-3413

or Toll-free

1-800-652-9747

during normal

business hours

### C. Tank number Type or use ink and complete as best as possible. Please photocopy form if site has more than 3 tanks.

1. Assign a 3 digit number to each tank (eg. 001, 002...)

001

2. Installation date:

Unknown

month/yr month/yr month/yr

3. Is tank currently used?

yes  no

yes  no  yes  no

### 2. Type of Tank:

	1	2	3
STIP3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Composite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asphalt coated steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Painted steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bare steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concrete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify in Box K)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### D. Tank Action 1. Please check applicable box(es).

	1	2	3
Initial notification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Add new tank(s) to site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Change in tank owner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Change tank contents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Repair tank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(please explain in Box K)			
Remove tank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Close tank in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temporary closure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(product in tank, in # of gallons):

2. Please write date of above action:

8/16/91

### 3. Capacity: (# of gal)

10,000

### 4. Substance Currently or Last Stored:

	1	2	3
Regular gasoline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unleaded gasoline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diesel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Used (waste) oil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fuel (heating) oil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kerosene	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hazardous substance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(specify chemical and tank # in Box K, on back)			
Other (specify in Box K)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 5. Corrosion Protection:

Anodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impressed current	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not needed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(if certified by corrosion expert, write name and PE or certification # in Box K)

### E. Tank Information Please check applicable boxes.

#### 1. Type of Pump:

	1	2	3
Submersible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Suction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify in Box K)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

turn page over!

6. Secondary Containment:

	1	2	3
Double wall tank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not Applicable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Does tank have spill containment?

	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	yes	no	yes	no	yes	no

8. Does tank have overflow prevention?

	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	yes	no	yes	no	yes	no

**F. Piping:**

1. Construction Material:

Galvanized steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wrapped steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black iron	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double walled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Copper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify in Box K)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Corrosion Protection:

Anodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impressed current	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wrapped	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not needed (ie. fiberglass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(if certified by corrosion protection expert, write name and PE or certification # in Box K)

**G. Financial Responsibility**

(Applies to petroleum

marketers with 1-12 tanks after Oct. 26, 1991, those with 13-99 tanks at more than one facility after April 26, 1991, and other tank owners as specified in 40 CFR, part 280.)

Type: \_\_\_\_\_  
 Insurer: \_\_\_\_\_  
 Policy #: \_\_\_\_\_ Expiration date: \_\_\_/\_\_\_/\_\_\_

**H. Release Detection**

To be completed for tanks (except heating oil) installed after Dec. 22, 1988 and older tanks if subject to 40 CFR, part 280, subp. D. Choose all that apply.

1. Tanks:

	1	2	3
Inventory control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(daily sticking)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tank tightness test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manual tank gauging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Automatic tank gauging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil vapor monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Groundwater monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify in Box K)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Date of last tank tightness test (if applicable):

**I. Owner's Signature**

I certify under penalty of law that the information submitted is accurate and complete to the best of my knowledge, and that all work was performed as per the manufacturers' instructions, industry standards, and applicable state and federal regulations. For installations performed after July 9, 1990, I certify that the installer was in compliance with the certification requirements of Minn. Rules, chap. 7105.

Print name of owner or authorized representative and title

Signature of owner/authorized representative \_\_\_\_\_ Date \_\_\_\_\_  
 (Unsigned forms will be returned)

**J. Tank Contractor's Signature**

I certify under penalty of law that all work was performed as specified by the manufacturers' instructions, and according to industry standards, applicable state and federal regulations and is complete to the best of my knowledge. I certify that I am in compliance with Minn. Rules, chap. 7105, if work was completed after July 9, 1990.

MINNESOTA PETROLEUM SERV. 0604  
 Name of tank contractor company MPCA Contractor #

LARRY OLSON  
 Print supervisor name MPCA Supervisor #

Larry Olson  
 Supervisor signature Date

Contractor Address: 5333 UNIVERSITY AVE  
 City: MINNEAPOLIS State: MN Zip: 55421

Please write tank number(s) that work was performed on:

**K. Comments** (attach additional sheets if necessary)

3. Piping:

	1	2	3
Automatic line leak detector and annual line tightness test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vapor monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Groundwater monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interstitial monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify in Box K)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Line tightness test every three years (for suction piping only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not needed (for suction piping only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Date of last line tightness test (if applicable):



To: Ken Pierce  
Minnesota Petroleum Equipment

From: Pat O'Halloran

Date: August 30, 1991

Re: Residual fuel disposal at Carson, Pierre, Scott - Hiawatha Ave.

We pumped and disposed of 1,400 gallons of from this site. All residual fuel was disposed of in accordance with M. P. C. A. and E.P.A. rules and guidelines. We are certified by the M. P. C. A. and have the E. P. A. permit necessary to handle petroleum waste products. Our permits are as follows:

Minnesota Pollution Control Agency contractor Certification Number: 0013

Environmental Protection Agency Waste Permit Number: MND 980993877

Cordially,

Pat O'Halloran

**Petro Tank Services**  
1047 Raymond Ave.  
St. Paul, MN 55108  
612-659-0086

**Tank Bill of Sale**  
**(Tank Destruction Documentation)**

**Project No: 1147**  
**Client Acct #: 1098**  
**Invoice No.: 1198**  
**Date: 8/21/91**

<u>Responsible Party:</u> Minnesota Petroleum Equipment Ken Pierce 5333 University Ave. N. E. Minneapolis MN 55421	<u>Site of Work:</u> Catson, Pierre, Scott Ken Pierce Hlawatha Ave. Minneapolis MN
--	--

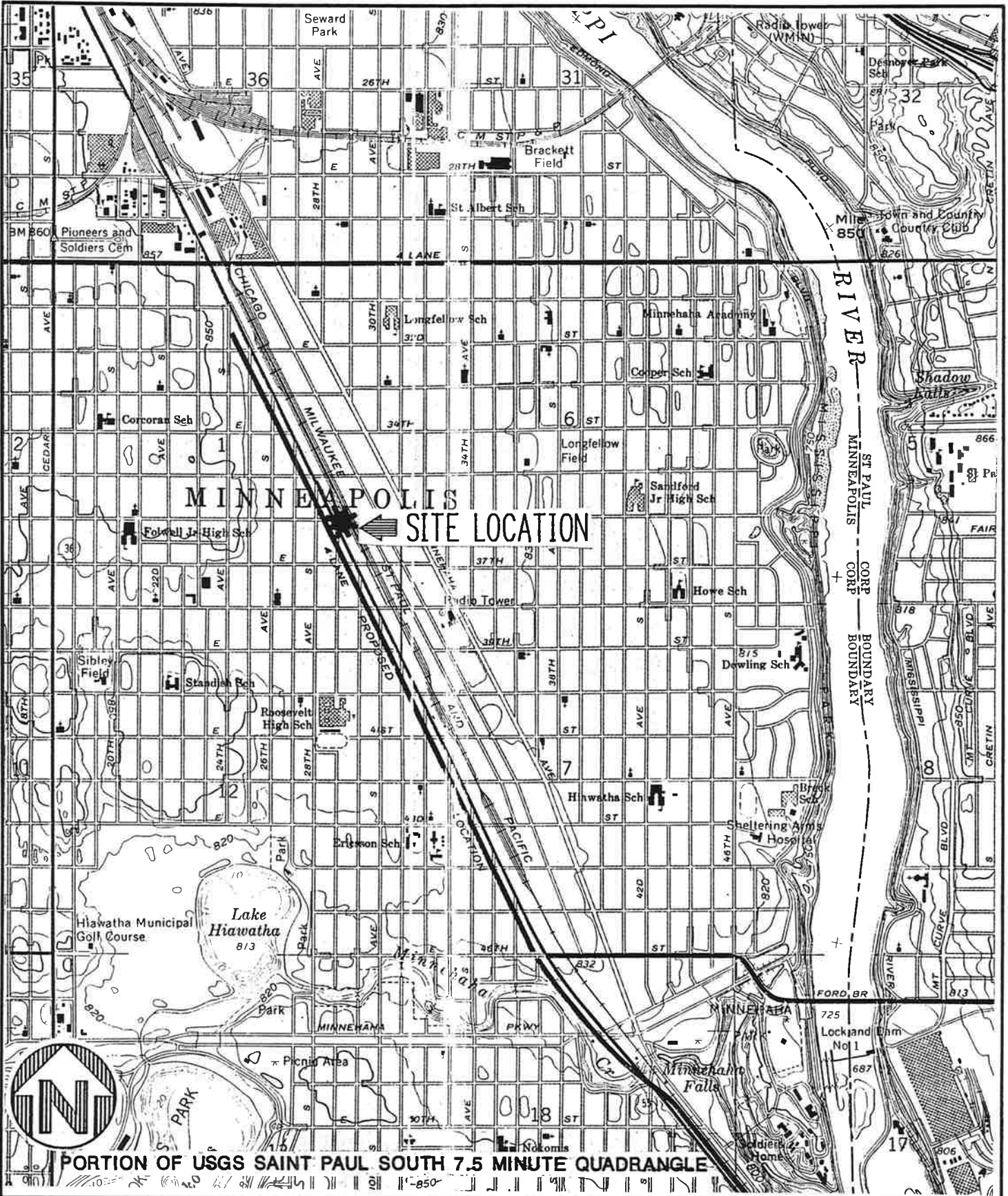
**Completion Date 8/20/91**      **Terms**

Petro Tank Services was the contractor on the project referred to above. This letter is provided to you to document that the underground storage tank(s) from your project were disposed of in accordance with all governmental regulations. All residual product was disposed of properly. The tank(s) were cleaned and dismantled for scrap. This letter represents 'bill of sale' from above owner to Petro Tank Services at the rate of \$1.00 per tank for the following tanks:

- (1) 10,000 gallon steel tank previously containing Diesel.

It is important for you to keep this document on the former tank site for future proof of proper disposal of your tanks.

If you have any questions feel free to contact us.



PORTION OF USGS SAINT PAUL SOUTH 7.5 MINUTE QUADRANGLE

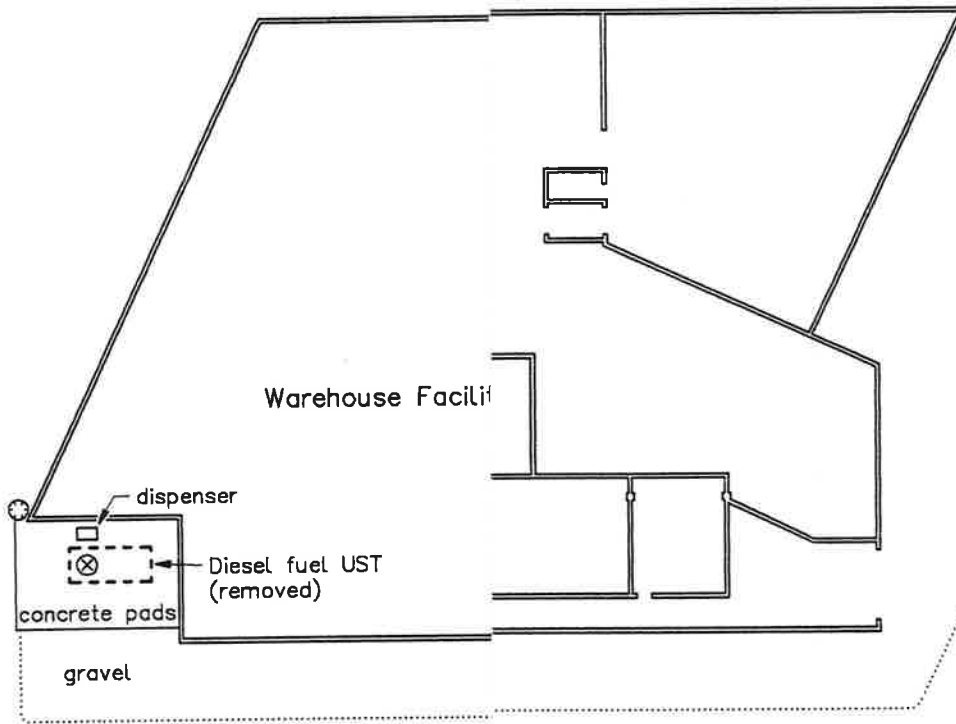


**STS Consultants Ltd.**  
Consulting Engineers

PROJECT/CLIENT

**CARSON PIRIE SCOTT WAREHOUSE LOCATION**  
**3601 HIAWATHA AVENUE SOUTH**  
**MINNEAPOLIS, MINNESOTA**

DRAWN BY	SJC
CHECKED BY	RLD
APPROVED BY	
SCALE	FIGURE NO.
1:24,000	1
STS DRAWING NO.	94810-XG



**LEGEND**

- building wall
- ⊠ underground tank
- ⋯ curb
- ⊙ vent
- ⊗ fill
- ⊕ manhole

**UT DIAGRAM**

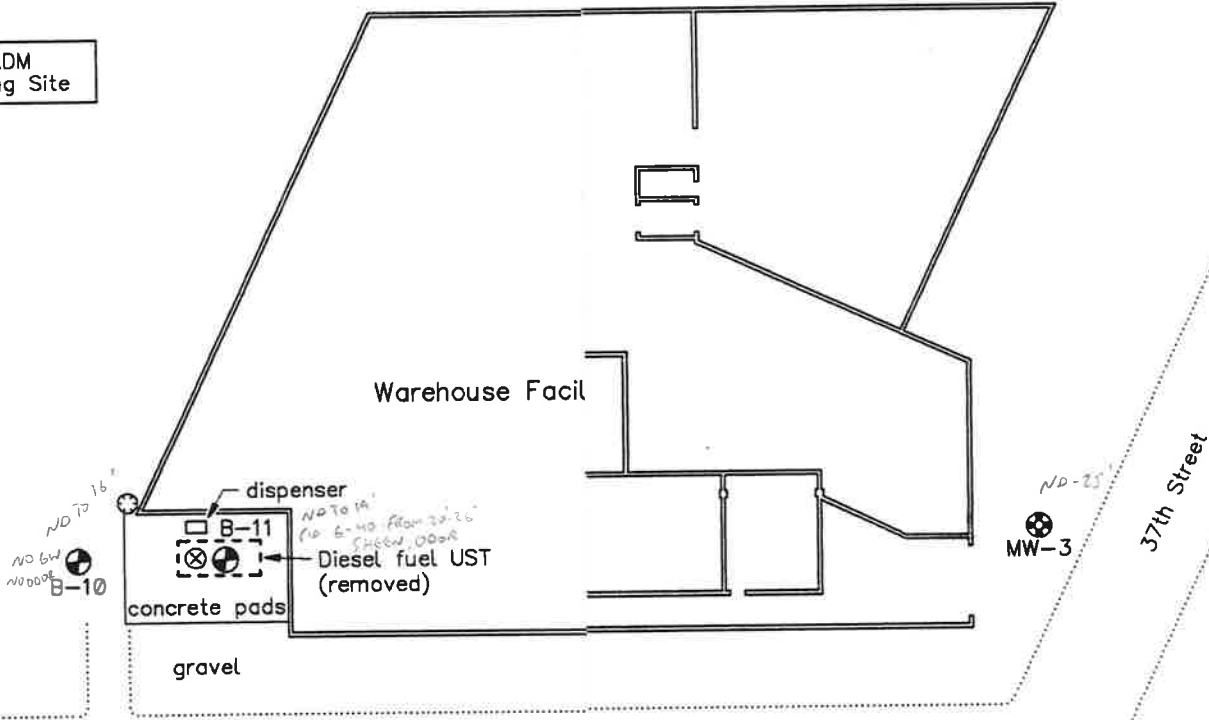
AutoCAD File: 94810LOC  
STS Project No: 94810XG  
Client Proj. No:

Checked by: ARP  
Approved by: RLD

Revision No:

Figure: 2





**WELL DESIGNATIONS**

STS NAME	MINNESOTA UNIQUE WELL NUMBER
MW-1	458668
MW-3	517633
MW-4	517634

**LEGEND**

- building wall
- underground tank
- curb
- vent
- fill
- manhole
- soil boring

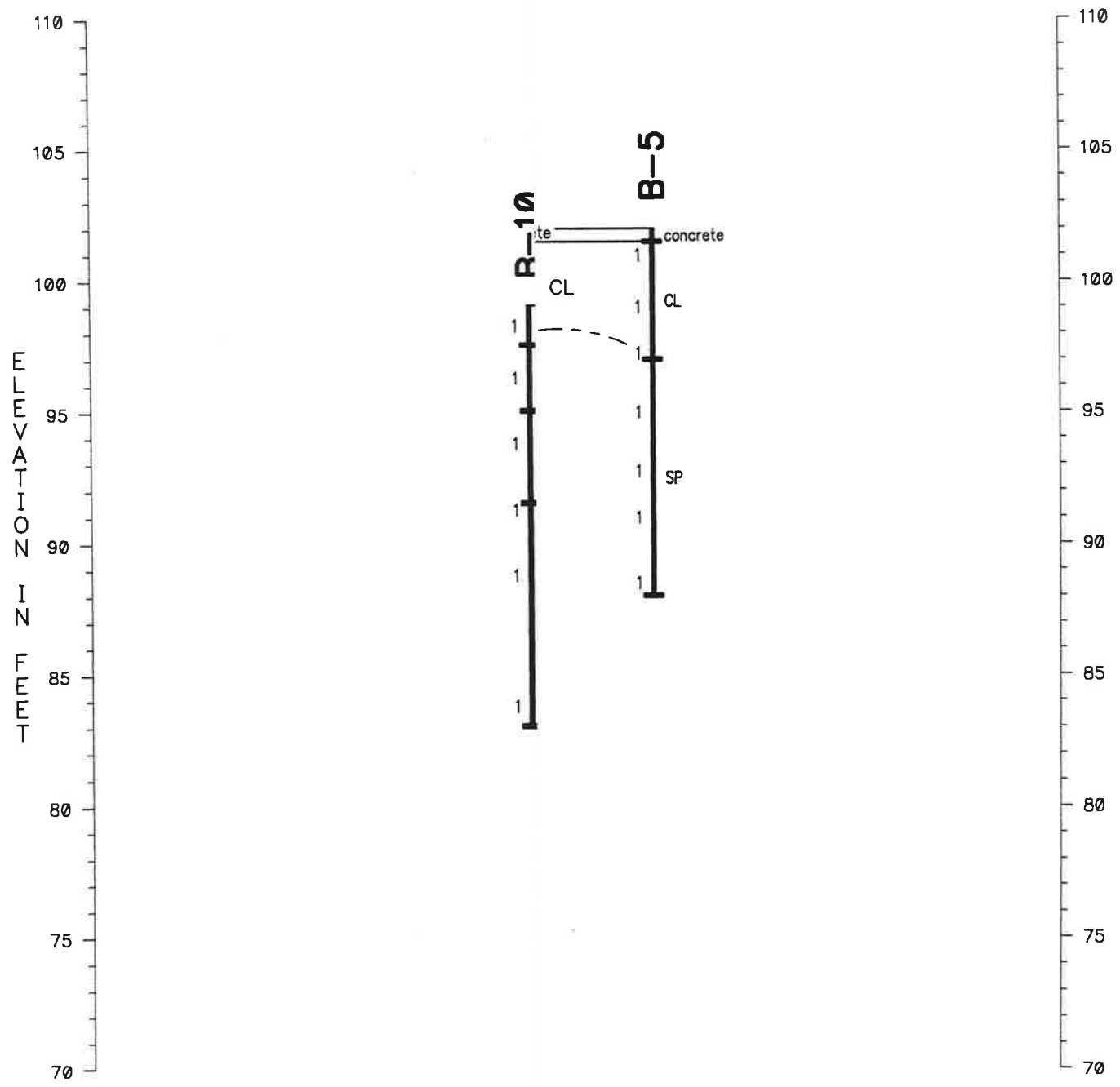
**ENGINEERING WELL LOCATION DIAGRAM**

AutoCAD File: 94810BOR	Checked by: ARP
STS Project No: 94810XG	Approved by: RLD
Client Proj. No:	
Revision No:	Figure: <b>3</b>

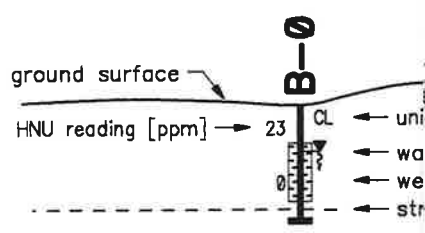


**A**  
north

**A'**  
south



**LEGEND**



**E A-A'**

AutoCAD File: 94810PRO  
STS Project No: 94810XG  
Client Proj. No:

Checked by: ARP  
Approved by: RLD

Revision No:

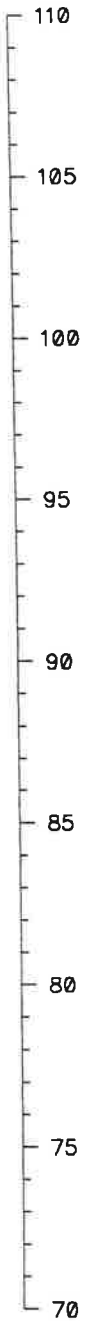
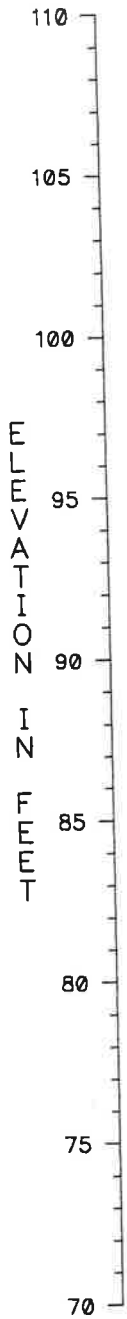
Figure: **4**

**B**

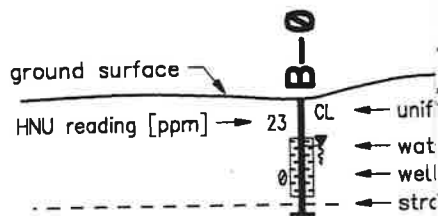
west

**B'**

east



**LEGEND**



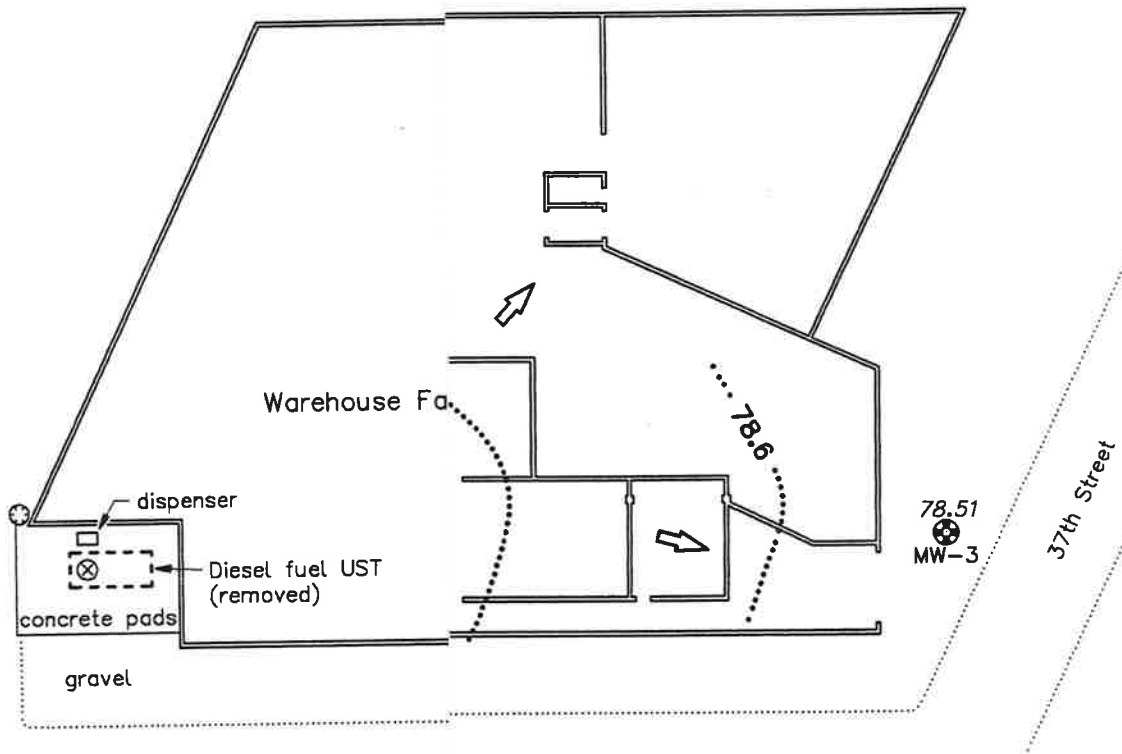
**E B-B'**

AutoCAD File: 94810PRO  
 STS Project No: 94810XG  
 Client Proj. No:

Checked by: ARP  
 Approved by: RLD

Revision No:

Figure: **5**



WELL DESIGNATIONS	
STS NAME	MINNESOTA UNIQUE WELL NUMBER
MW-1	458668
MW-3	517633
MW-4	517634

**LEGEND**

- building wall
- underground tank
- curb

..... 1359 MN

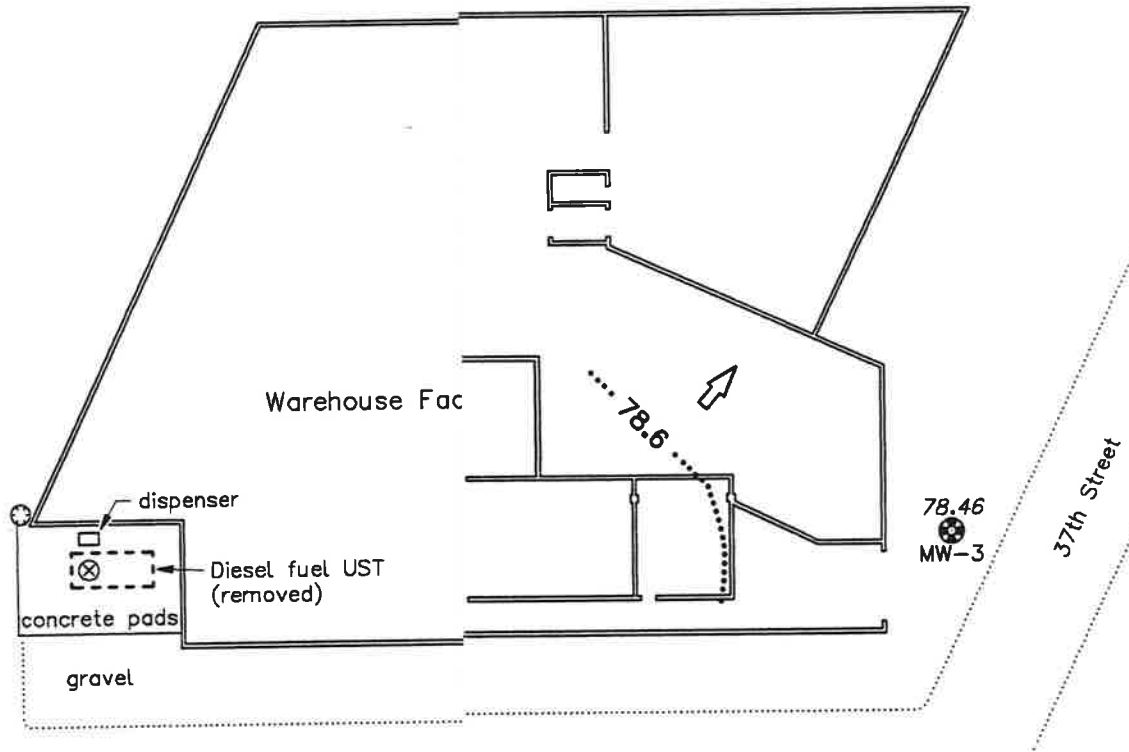
**JR MAP AS OF 10-21-1992**

AutoCAD File: 94810WAT  
 STS Project No: 94810XG  
 Client Proj. No:

Checked by: ARP  
 Approved by: RLD

92 Revision No:

Figure: **6**



**WELL DESIGNATIONS**

STS NAME	MINNESOTA UNIQUE WELL NUMBER
MW-1	458668
MW-3	517633
MW-4	517634

**LEGEND**

- building wall
- underground tank
- curb



**IR MAP AS OF 12-15-1992**

AutoCAD File: 94810WAT  
 STS Project No: 94810XG  
 Client Proj. No:

Checked by: ARP  
 Approved by: RLD

Revision No:

Figure: **7**





CLIENT  
Carson Pirie Scott

LOG OF BORING NUMBER B-1

PROJECT NAME  
Underground Storage Tank Exploration

ARCHITECT-ENGINEER

STS Consultants Ltd.

SITE LOCATION  
3601 Hiawatha Avenue, Minneapolis, MN

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>					
						1	2	3	4	5	
						PLASTIC LIMIT %		WATER CONTENT %		LIQUID LIMIT %	
						×	○	●	△		
						10	20	30	40	50	
						STANDARD PENETRATION		BLOWS/FT.			
						⊗	10	20	30	40	50
				SURFACE ELEVATION							
				Concrete floor slab							
	1	AS		Clay, trace sand - brown - moist - (CL) - fill	1						
5.0	2	AS			1						
	3	AS			1						
	4	AS			1						
10.0	5	AS		Clay, trace sand and organics, debris - black - moist - (CL) - fill	1						
13.0				End of boring at 13.0 feet. Hand augered to full depth. HNU meter calibrated to benzene referral. HNU meter background level = 1-2 HNU meter units. Boring grouted to the surface using a neat cement grout.							

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	none ft	WS OR WD	BORING STARTED	01/06/89	STS OFFICE	Minnesota
WL	BCR	ACR	BORING COMPLETED	01/06/89	ENTERED BY	djn
WL	none		RIG/FOREMAN	Hand auger SN	SHEET NO.	1 OF 1
				APP'D BY	ARP	STS JOB NO.
						94810-XG



STS Consultants Ltd.

CLIENT  
**Carson Pirie Scott**  
 PROJECT NAME  
**Underground Storage Tank Exploration**

LOG OF BORING NUMBER **B-2**  
 ARCHITECT-ENGINEER

SITE LOCATION  
**3601 Hiawatha Avenue, Minneapolis, MN**

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>				
						1	2	3	4	5
						PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %		
						×	●	△		
						⊗	STANDARD PENETRATION		BLOWS/FT.	
						10	20	30	40	50
				SURFACE ELEVATION						
				Concrete floor slab.						
	1	AS		Clay, trace sand and organics, debris - black - moist - (CL) - fill	1					
5.0	2	AS		Fine to medium sand, trace gravel - brown - moist - (SP)	1					
	3	AS			1					
	4	AS			1					
10.0	5	AS			1					
	6	AS			1					
	7	AS			1					
15.0				End of boring at 15.0 feet. Hand augered to full depth. HNU meter calibrated to benzene referral. HNU meter background level = 1-2 HNU meter units. Boring grouted to the surface using a neat cement grout.						

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	none ft	WS OR WD	BORING STARTED	01/06/89	STS OFFICE	Minnesota	
WL	BCR	ACR	BORING COMPLETED	01/06/89	ENTERED BY	djn	SHEET NO. 1 OF 1
WL	none		RIG/FOREMAN	Hand auger SN	APP'D BY	ARP	STS JOB NO. 94810-XG



STS Consultants Ltd.

CLIENT  
**Carson Pirie Scott**  
 PROJECT NAME  
**Underground Storage Tank Exploration**

LOG OF BORING NUMBER **B-3**  
 ARCHITECT-ENGINEER

SITE LOCATION  
**3601 Hiawatha Avenue, Minneapolis, MN**

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>							
							1	2	3	4	5			
							PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %					
							×	●	-----△					
							⊗	STANDARD PENETRATION		BLOWS/FT.				
							10	20	30	40	50			
					SURFACE ELEVATION									
	1	AS			Concrete slab	2								
					Clay, trace sand - brown - moist - (CL) - fill									
	2	AS				1								
5.0														
	3	AS				20								
	4	AS				23								
	5	AS				23								
10.0														
	6	AS				24								
	6A	AS			Clay, trace sand and organics, debris - black - moist - (CL) - fill									
12.0					End of boring at 12.0 feet. Hand augered to full depth. HNU meter calibrated to benzene referral. HNU meter background level = 1-2 HNU meter units. Boring grouted to the surface using a neat cement grout.									

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	none ft	WS OR WB	BORING STARTED	02/03/89	STS OFFICE	Minnesota
WL	BCR	ACR	BORING COMPLETED	02/03/89	ENTERED BY	djn
WL	not encountered		RIG/FOREMAN	Hand auger SN	APP'D BY	ARP
					SHEET NO.	1 OF 1
					STS JOB NO.	94810-XG





STS Consultants Ltd.

CLIENT  
**Carson Pirie Scott**

PROJECT NAME  
**Warehouse Facility**

LOG OF BORING NUMBER **B-4**

ARCHITECT-ENGINEER

SITE LOCATION  
**3601 Hiawatha Avenue, Minneapolis, MN**

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>				
							1	2	3	4	5
							PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %		
							×	●	- - - - - Δ		
							⊗	STANDARD PENETRATION		BLOWS/FT.	
							10	20	30	40	50
					<b>SURFACE ELEVATION</b>						
	1A	AS			Concrete floor slab						
	2	AS			Clay, trace sand - brown to black - moist - (CL) - fill	1					
5.0	3	AS			Fine to medium sand, trace silt gravel - brown - moist - (SP)	1					
	3A	AS									
	4	AS									
	5	AS									
10.0	6	AS				1					
	7	AS				1					
14.0					End of boring at 14.0 feet. Hand augered to full depth. HNU meter calibrated to a benzene referral. HNU meter background level = 1-2 HNU meter units. Borings grouted to the surface with cement grout.						

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	WS OR WD	BORING STARTED	11/08/89	STS OFFICE	Minnesota
WL	BCR	ACR	BORING COMPLETED	ENTERED BY	SHEET NO. 1 OF 1
			11/08/89	djn	
WL	not encountered	RIG/FOREMAN	Hand auger BR	APP'D BY	STS JOB NO. 94810-XG
				ARP	



STS Consultants Ltd.

CLIENT  
Carson Pirie Scott

LOG OF BORING NUMBER **B-5**

PROJECT NAME  
Warehouse Facility

ARCHITECT-ENGINEER

SITE LOCATION  
3601 Hiawatha Avenue, Minneapolis, MN

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>				
						1	2	3	4	5
						PLASTIC LIMIT %		WATER CONTENT %		LIQUID LIMIT %
						10	20	30	40	50
						STANDARD PENETRATION BLOWS/FT.				
						10	20	30	40	50
				SURFACE ELEVATION						
	1A	AS		Concrete floor slab	1					
	2	AS		Clay, trace sand - brown to black - moist - (CL) - fill	1					
5.0	3	AS			1					
	3A	AS		Fine to medium sand, trace silt and gravel - brown - moist - (SP)						
	4	AS			1					
10.0	5	AS			1					
	6	AS			1					
14.0	7	AS			1					
				End of boring at 14.0 feet. Hand augered to full depth. HNU meter calibrated to a benzene referral. HNU meter background level = 1-2 HNU meter units. Borings grouted to the surface with cement grout.						

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	WS OR WD	BORING STARTED	11/08/89	STS OFFICE	Minnesota
WL	BCR	ACR	BORING COMPLETED	ENTERED BY	SHEET NO. 1 OF 1
			11/08/89	djn	
WL	not encountered	RIG/FOREMAN	Hand auger BR	APP'D BY	STS JOB NO. 94810-XG
				ARP	



STS Consultants Ltd.

CLIENT  
Carson Pirie Scott

PROJECT NAME  
Warehouse Facility

LOG OF BORING NUMBER B-6

ARCHITECT-ENGINEER  
STS Consultants, Ltd.

SITE LOCATION  
3601 Hiawatha Avenue, Minneapolis, MN

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>					
						1	2	3	4	5	
						PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %			
						×	●	---			
						10	20	30	40	50	
						STANDARD PENETRATION	BLOWS/FT.				
						⊗	10	20	30	40	50
				SURFACE ELEVATION							
				Concrete floor slab							
				Clay, trace silt - brown to black - moist - (CL) - fill	1						
5.0	2	AS									
6.0				End of boring at 6.0 feet. Hand augered to full depth. HNU meter calibrated to a benzene referral. HNU meter background level = 1-2 HNU meter units. Borings grouted to the surface with cement grout.							

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	WS OR WD	BORING STARTED	11/08/89	STS OFFICE	Minnesota
WL	BCR	ACR	BORING COMPLETED	ENTERED BY	SHEET NO. 1 OF 1
			11/08/89	djn	
WL	not encountered	RIG/FOREMAN	Hand auger BR	APP'D BY	STS JOB NO. 94810-XG
				ARP	



STS Consultants Ltd.

CLIENT  
**Carson Pirie Scott**

LOG OF BORING NUMBER **B-7**

PROJECT NAME  
**Warehouse Facility**

ARCHITECT-ENGINEER  
**STS Consultants, Ltd.**

SITE LOCATION  
**3601 Hiawatha Avenue, Minneapolis, MN**

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR HEADING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>								
							1	2	3	4	5				
							PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %						
							X	●	△						
											STANDARD PENETRATION		BLOWS/FT.		
											10	20	30	40	50
					SURFACE ELEVATION										
	1	AS			Tile covered concrete - fill										
	2	AS			Clay lensed with silty sand - brown mottled - (CL)										
	3	AS			Bits of metal at 4.5 and 4.8 feet.	35									
4.9	4	AS			Auger refusal at 4.9 feet. End of boring at 4.9 feet. Hand augered to full depth. HNU meter calibrated to a benzene reference. HNU meter background level = 1-2 HNU meter units. Petroleum odors at 2.5 feet. Boring backfilled with clean cuttings.	65									
	5	AS				56									

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	WS OR WD	BORING STARTED	03/14/90	STS OFFICE	Minnesota
WL	BCR	ACR	BORING COMPLETED	ENTERED BY	SHEET NO. OF
			03/14/90	djn	1 OF 1
WL		RIG/FOREMAN	Hand auger SJC	APP'D BY	STS JOB NO.
				ARP	94810-XG



CLIENT  
Carson Pirie Scott

LOG OF BORING NUMBER **B-8**

PROJECT NAME  
Warehouse Facility

ARCHITECT-ENGINEER  
STS Consultants, Ltd.

STS Consultants Ltd.

SITE LOCATION  
3601 Hiawatha Avenue, Minneapolis, MN

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>							
							1	2	3	4	5			
							PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %				
							×	●		△				
							⊗	STANDARD PENETRATION		BLOWS/FT.				
							10	20	30	40	50			
					SURFACE ELEVATION									
	2	AS			Tile covered concrete - fill									
					Sand and clay - brown - (SP-CL)	1								
	3	AS			Clay lensed with silty sand - brown mottled with some yellow and gray mottles in silty sand - (CL)	3								
	4	AS			Sandy clay - yellow brown - dense - slight petroleum odor - (CL)									
5.0					Clay lensed with silty sand - dark brown, some red - no petroleum odor - (CL)	1								
	5	AS	III		Gravel at 9.5-10 feet.	1								
	6	AS	III		Black lens at 11.5-12 feet.	1								
10.0	7	AS	III		Coarse gravel and rubble at 13 feet.	1								
	8	AS	III			1								
13.0					Auger refusal at 13.0 feet. End of boring at 13.0 feet. Hand augered to full depth. HNU meter calibrated to a benzene reference. HNU meter background level = 1-2 HNU meter units. Boring backfilled with clean cuttings.									

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	WS OR WB	BORING STARTED	03/14/90	STS OFFICE	Minnesota
WL	BCR	ACR	BORING COMPLETED	ENTERED BY	SHEET NO. 1 OF 1
WL			03/14/90	djn	
		RIG/FOREMAN	Hand auger	APP'D BY	STS JOB NO.
		SJC		ARP	94810-XG



STS Consultants Ltd.

CLIENT  
**Carson Pirie Scott**  
 PROJECT NAME  
**Warehouse Facility**

LOG OF BORING NUMBER **B-9**  
 ARCHITECT-ENGINEER  
**STS Consultants, Ltd.**

SITE LOCATION  
**3601 Hiawatha Avenue, Minneapolis, MN**

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>				
							1	2	3	4	5
							PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %		
							×	●	△		
							⊗	STANDARD PENETRATION		BLOWS/FT.	
							10	20	30	40	50
					SURFACE ELEVATION						
					Tile covered concrete - fill						
	3	AS			Sand, little clay - brown - moist - (SW)	1					
	4	AS			Clay - black mottled with gray and yellow - (CL)	1					
5.0					Clay with lenses of fine sand - brown mottled - (CL)						
	5	AS			Clay, trace sand - dark brown with mottles - (CL)	1					
10.0					Sandy clay with sand seams - dark brown with mottles - wood chips - (CL)						
	6	AS									
	7	AS			Clay, some sand - (CL)	1					
13.0					Clayey sand, trace gravel - brown with some mottling - moist - (SC)						
	8	AS									
					Auger refusal at 13.0 feet. End of boring at 13.0 feet. Hand augered to full depth. HNU meter calibrated to a benzene reference. HNU meter background level = 1-2 HNU meter units. Boring backfilled with clean cuttings.						

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	WS OR WD	BORING STARTED 03/15/90	STS OFFICE Minnesota
WL	BCR ACR	BORING COMPLETED 03/15/90	ENTERED BY djn SHEET NO. 1 OF 1
WL	RIG/FOREMAN	Hand auger SJC	APP'D BY ARP STS JOB NO. 94810-XG



STS Consultants Ltd.

CLIENT  
Carson Pirie Scott

LOG OF BORING NUMBER **B-10**

PROJECT NAME  
Warehouse Facility

ARCHITECT-ENGINEER

SITE LOCATION  
3601 Hiawatha Avenue, Minneapolis, MN

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>							
							1	2	3	4	5			
							PLASTIC LIMIT %	WATER CONTENT %		LIQUID LIMIT %				
							×	●		△				
							⊗	STANDARD PENETRATION		BLOWS/FT.				
							10	20	30	40	50			
					SURFACE ELEVATION									
	1	AS			Silty clayey sand, some gravel - brown - frozen - (SM) - fill.	1								
	2	AS			Silty sandy clay - brown - frozen to 2.5 feet - (CL)	1								
5.0	3	AS			Silty fine sand - light brown with orange mottles - desiccated - (SM)	1								
	4	AS			Fine and medium sand - brown - moist - (SP)	1								
	4A	AS												
10.0	5	AS				1								
15.0	6	AS			End of boring at 16.0 feet. Boring augered to full depth. No petroleum odors detected. No groundwater encountered.	1								
16.0														

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	WS OR WD	BORING STARTED	12/14/89	STS OFFICE	Minnesota	
WL	BCR	ACR	BORING COMPLETED	ENTERED BY	SHEET NO. 1 OF 1	
WL			12/14/89	djn		
		RIG/FOREMAN	0-50 0Z	APP'D BY	STS JOB NO.	
				ARP	94810-XG	



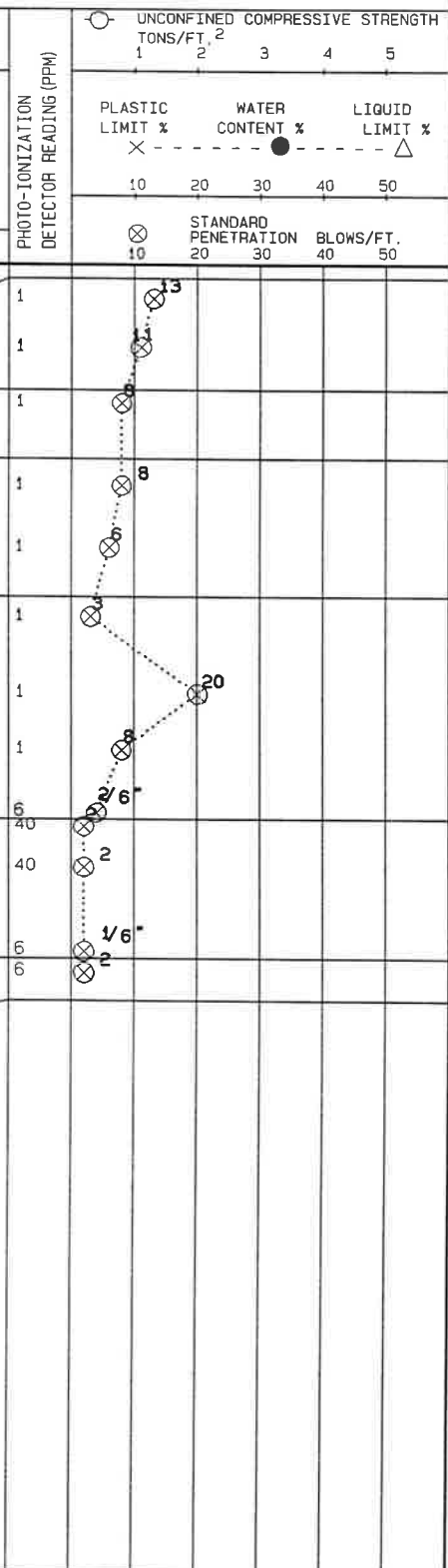
STS Consultants Ltd.

CLIENT  
**Carson Pirie Scott**  
 PROJECT NAME  
**Underground Storage Tank Exploration**

LOG OF BORING NUMBER **B-11**  
 ARCHITECT-ENGINEER

SITE LOCATION  
**3601 Hiawatha Avenue, Minneapolis, Minnesota**

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL
				SURFACE ELEVATION 98.8 ft
		HS		0.5 feet of concrete.
	S1	SS		Fine to coarse sand, little to some silt, little gravel, trace clay - brown - moist - medium dense - (SM) - fill
	S2	SS		
5.0	S3	SS		Fine to coarse sand, some silt & clay, little gravel - brown - moist - loose - (SC-SM) - fill
	S4	SS		Fine to coarse sand, trace gravel, trace silt - brown - moist - loose - (SP-SM) - fill
10.0	S5	SS		
	S6	SS		Fine to medium sand, trace coarse sand, trace silt, trace gravel - brown - moist to 18.3 feet then saturated - loose to medium dense - (SP)
15.0	S7	SS		
	S8	SS		
20.0	S9	SS		Sandy silt, little clay, trace gravel - dark gray to black - saturated - (ML) Note: Strong petroleum odor, with sheen and rainbow colors.
	S10	SS		
25.0	S11	SS		
26.5	S11	ASS		Fine sand, trace silt - brown - saturated - loose - (SP)
				End of boring 26.5 feet. Drilled and sampled with 3 1/4" I.D. hollow stem augers to full depth. Grouted boring with neat cement grout. Photoionization readings obtained with an HNU photoionization meter equipped with a 10.2 eV lamp, calibrated to a benzene reference gas. HNU background readings 0 - 2 HNU meter units. Sample S8 at a depth of 18.0 to 18.5 feet, and S9 at a depth of 20.0 to 20.5 feet, prepared and submitted for chemical analysis.



The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL 18.5 ft	WS OR WD WS	BORING STARTED 10/01/92	STS OFFICE Minnesota
WL 18.3 ft	BCR ACR	BORING COMPLETED 10/01/92	ENTERED BY DCJ
WL	RIG/FOREMAN D-50/Dennis Z.	APP'D BY DCJ	SHEET NO. 1 OF 1 STS JOB NO. 94810-XG







CLIENT  
Carson Pirie Scott

LOG OF BORING NUMBER **MW-2**  
MN Unique Well # 458669

PROJECT NAME  
Warehouse RI

ARCHITECT-ENGINEER  
STS Consultants, Ltd.

SITE LOCATION  
3601 Hiawatha Avenue, Minneapolis, MN

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	PERCENT PASSING # 200 SIEVE	PERMEABILITY K (CM/SEC)	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>					
									1	2	3	4	5	
					WELL INSTALLATION TOP STANDPIPE EL. + 98.67									
					SURFACE ELEVATION									
	1	AS			Organic silty clay, some sand, little gravel - black - (OL) - fill			1						
5.0	2	SS			Fine sand, little silt - brown - moist - loose - (SP-SM) - fill			1	9					
	3	SS			Fine sand, trace coarse and medium sand, trace silt - brown - moist - medium dense - (SP)			1	17					
10.0	4	SS						1	14					
	5	SS			Fine to coarse sand, little gravel, little silt brown - moist - medium dense - (SM-SM)			1	17					
15.0	6	SS			Gravelly sand, little silt - brown - moist - medium dense to dense - (SM) - saturated at 17.9 feet.			1	24					
	7	SS						1						
	8	SS						1						
20.0	8A	SS			Fine sand, trace silt - brown - saturated - medium dense - (SP)			1	9					
	8B	SS						1						
23.5	9	SS			Silty clay, little sand, little gravel - brown - (CL) - color change to gray at 22.0 feet.			1	9					
					End of boring at 23.5 feet. 1. Drilled and sampled boring with 3-1/4 inch ID hollow stem augers to full depth. 2. Removed 3-1/4 inch ID hollow stem augers and reamed hole with 6-5/8 inch ID hollow stem augers. 3. Soil sample taken from sample #7 for chemical analysis. 4. Set 2 inch x 10 feet, 10 slot, stainless steel monitoring well to 21.0 feet with black iron riser pipe. 5. Photoionization readings obtained with an HNU photoionization meter equipped with a 10.2 eV lamp, calibrated to a benzene reference gas. HNU background readings 0 - 1 HNU meter units.									

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally

WL 17.9' Ft BCR						BORING STARTED 06/19/91		STS OFFICE Minnesota			
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME	BORING COMPLETED 06/19/91		DRAWN BY djn		SHEET OF 1 1	
0.00	/ /	:	0.00	/ /	:						
0.00	/ /	:	0.00	/ /	:	RIG FOREMAN CME-750 OH		APP'D BY ARP		STS JOB NO. 94810-XG	



CLIENT  
Carson Pirie Scott

LOG OF BORING NUMBER **MW-3**  
MN. Unique well # 517633

PROJECT NAME  
Underground Storage Tank Exploration

ARCHITECT-ENGINEER

SITE LOCATION  
3601 Hiawatha Avenue, Minneapolis, Minnesota

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	PERCENT PASSING # 200 SIEVE	PERMEABILITY, K (CM/SEC)	PHOTO-IONIZATION DETECTOR READING (PPM)	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>											
									1	2	3	4	5							
					WELL INSTALLATION TOP STANDPIPE EL. + 99.91															
					SURFACE ELEVATION 97.8 Ft															
	S1	AS			Organic silty sand - black - (SM-ML) - topsoil fill			1												
	S2	SS			Silty clay, some sand - brown - (CL) - fill			1												
5.0	HS				Fine sand, trace silt - brown - moist - dense to medium dense - (SP) - possible fill Note: 10.0 to 10.1 feet coarse sand seam, iron stained.			1												
	S3	SS						1												
	S4	SS						1												
10.0	HS							1												
	S5	SS						1												
	S6	SS			Fine to coarse sand, trace gravel, trace silt - gray brown - moist to 15.5 feet then wet - loose to medium dense - (SP) Note: 16.0 feet dark iron staining.			1												
15.0	HS							1												
	S7	SS						1												
	S8	SS			Silty clay, some sand, gravel - brown - firm - (CL)			1												
20.0	S8A	SS						1												
	S9	SS			Fine sand, trace silt - gray brown - saturated - medium dense - (SP)			1												
	S10	SS			Fine to coarse sand, trace gravel, trace silt - brown - saturated - medium dense - (SP)			1												
25.0								1												
26.4	HS							1												
					End of boring 26.4 feet Drilled and sampled with 3 1/4 inch ID hollow stem augers (HSA) to 24.0 feet. Pulled 3 1/4 inch ID HSA. Drilled with 4 3/8" ID HSA to 26.5 feet. Set 2" X 10 ft., 10 slot, PVC well screen to 26.4 feet, with thread flush joint 2" PVC riser. Photoionization readings obtained with a Hnu photoionization meter equipped with a 10.2 ev lamp, calibrated to a benzene reference gas. Hnu background readings 0 - 2 Hnu meter units.															

The stratification lines represent the approximate boundary lines between soil types in-situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally

WL 19.5 feet (BGS)						BORING STARTED 10/01/92		STS OFFICE Minnesota	
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME	BORING COMPLETED 10/01/92		DRAWN BY DCJ	
0.00	/ /	:	0.00	/ /	:			SHEET 1 OF 1	
0.00	/ /	:	0.00	/ /	:	RIG FOREMAN D-50/Dennis Z.		APP'D BY DCJ	
0.00	/ /	:	0.00	/ /	:			STS JOB NO. 94B10-XG	

