246-00917-0 ERRUST

KEROSENE UST CLOSURE REPORT

TECUMSEH PRODUCTS COMPANY
GRAFTON, WISCONSIN

PREPARED FOR:

TECUMSEH PRODUCTS COMPANY
GRAFTON, WISCONSIN

SUBMITTED BY:

FOX ENVIRONMENTAL SERVICES, INC.
MILWAUKEE, WISCONSIN

PROJECT: F-92513
OCTOBER, 1993

fox environmental services, inc.

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TECUMSEH PRODUCTS COMPANY

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Prepared for:

TECUMSEH PRODUCTS COMPANY

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Prepared by:

FOX ENVIRONMENTAL SERVICES, INC.

October, 1993

John Weber, Hydrogeologist

Foster Johnston, REP, CHCM

KEROSENE UST CLOSURE REPORT

Tecumseh Products Company
Grafton, Wisconsin

Project No. F - 92513

INTRODUCTION

This is a final report prepared by Fox Environmental Services, Inc. **(FOX)** to describe the site investigation activities performed at Tecumseh Products Company, 900 North Street in Grafton, Wisconsin **(Figure 1)**. The site investigation was in response to a leak from a kerosene underground storage tank (UST). The purpose of the site investigation is to define the degree and extent of contamination in all media impacted, and provide a basis for choosing the most appropriate remedial action alternative(s).

SITE LOCATION/DESCRIPTION

The site is located at 900 North Street, on the north side of the road, approximately 600 feet west of the intersection of Wisconsin Avenue and North Street (SW ¼, SE ¼, S13, 10N, 21E). Directly adjoining the property are the following:

South - across North Street is Grafton's Municipal Well #1 and residential homes;

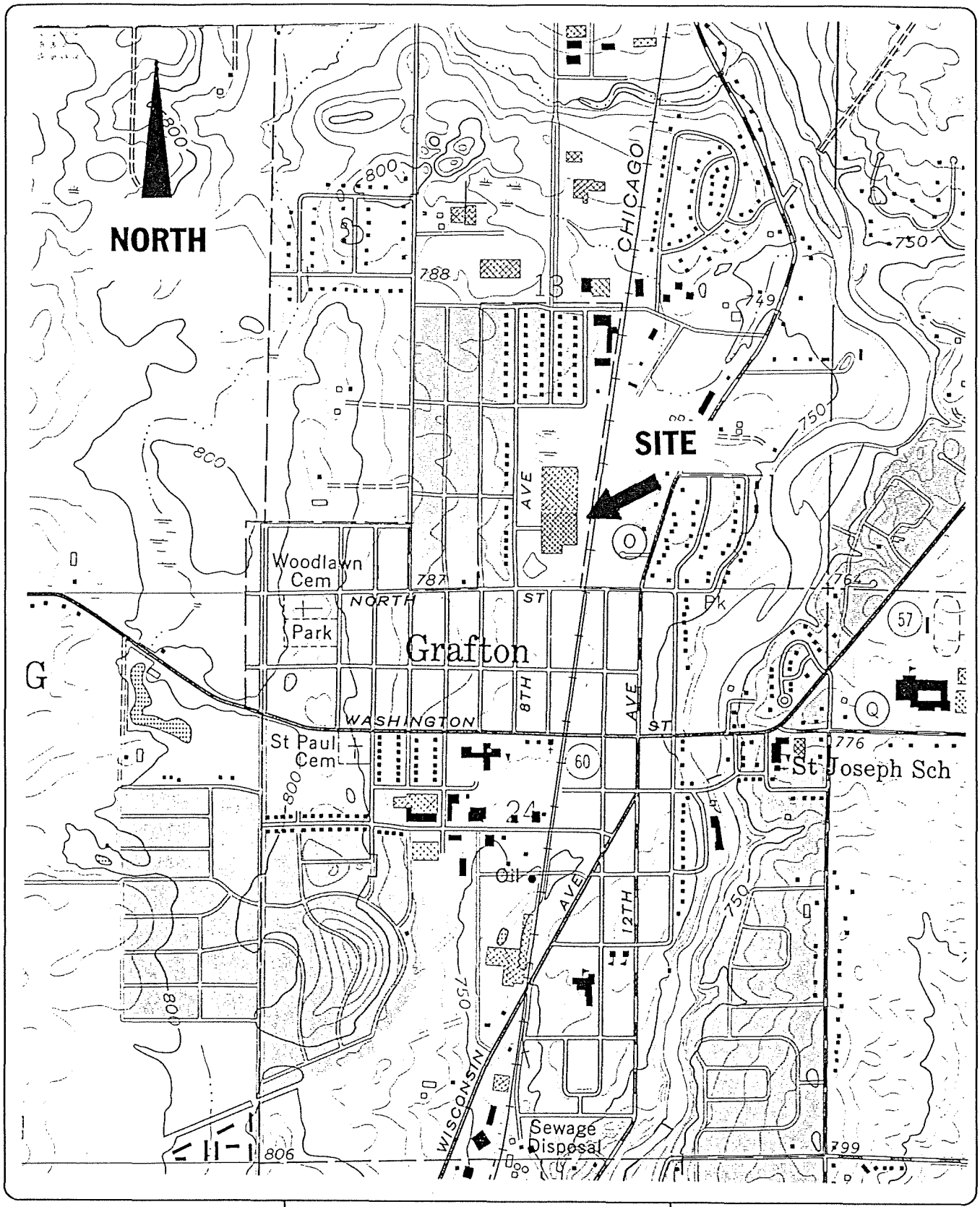
East - across CMS&P railroad track are residential homes;

North - commercial business and residential homes; and,

West - across 8th Avenue are residential homes.

TOPOGRAPHY/DRAINAGE

According to the U.S. Geological Survey Topographic Quadrangle Map of the area (Cedarburg, Wisconsin, 1959, photorevised 1971 & 1976), the site is approximately 770 feet above mean sea level **(Figure 1)**. The surface topography in the immediate area is relatively level but gently slopes downward to the east. The Milwaukee River is approximately 2000 feet directly east of the site. A large retention pond holding over one million gallons of water is on the southwest corner of the property.



fox environmental services, inc.

5150 North Port Washington Rd.
Suite 101
Milwaukee, Wisconsin 53217
(414) 332 - 5857

FIGURE 1

LOCATION PLAN

PROJECT NO. 92513

OCTOBER, 1992

BACKGROUND

On June 15 & 16, 1992, E&K Hazardous Waste Services, Inc. (E&K) removed a 350 gallon kerosene UST and the associated piping, and performed a tank closure assessment. Four samples were collected from the base of the excavation along each sidewall. Impacts from DRO were detected by the analytical laboratory in all four samples from the tank excavation, with concentrations ranging from 32 to 8,400 parts per million (ppm) (see Table 1). For details of the closure assessment, refer to the report titled *Site Assessment and Tank Closure Report*; Tecumseh Products Company; Grafton, Wisconsin; E&K No. 152922, dated August 18, 1992.

TABLE 1
Tank Closure Sample Results

Sample location	DRO (in ppm)
South end bottom	32
West end bottom	450
East end bottom	8,400
North end bottom	110

SITE INVESTIGATION (FIRST PHASE)

On September 11, 1992, FOX attempted to drill four soil borings in and around the excavation backfill for the kerosene tank which was in the maintenance storage area on the east side of the building. Using a General 550 drill rig soil cores were collected with a 6 inch shelby tube and screened in the field with a Thermo Electron, Model 580, photoionization detector (PID). The soil was classified and entered on boring logs along with the field screening results **(Appendix A)**. The soils encountered were beige sand and gravel fill with cobbles to a depth of about 4 - 5 feet, underlain by light yellow brown, fine to medium sandy clay to a depth of about 10 feet. Moist, sandy clay was encountered in one of the borings (SB2KT) at a depth of about 10 feet. For reasons explained below only borings SB1KT and SB2KT were advanced sufficiently deep to obtain useful soil samples. The locations of these two borings are identified on **Figure 2.** A total of four soil samples were submitted to Precision Analytical Laboratory (PAL) for diesel range organics (DRO), petroleum volatile organic compounds (PVOC), and polynuclear aromatic hydrocarbons (PAH) analyses. All four boreholes were properly abandoned, however because their depths were 10 feet or less no abandonment forms were completed.

The General 550 drill rig is a compact rig and was selected because of the space constraints inside the building. The rig has a five horsepower engine and was found to be underpowered when attempts were made to deepen some of the boreholes. Boring

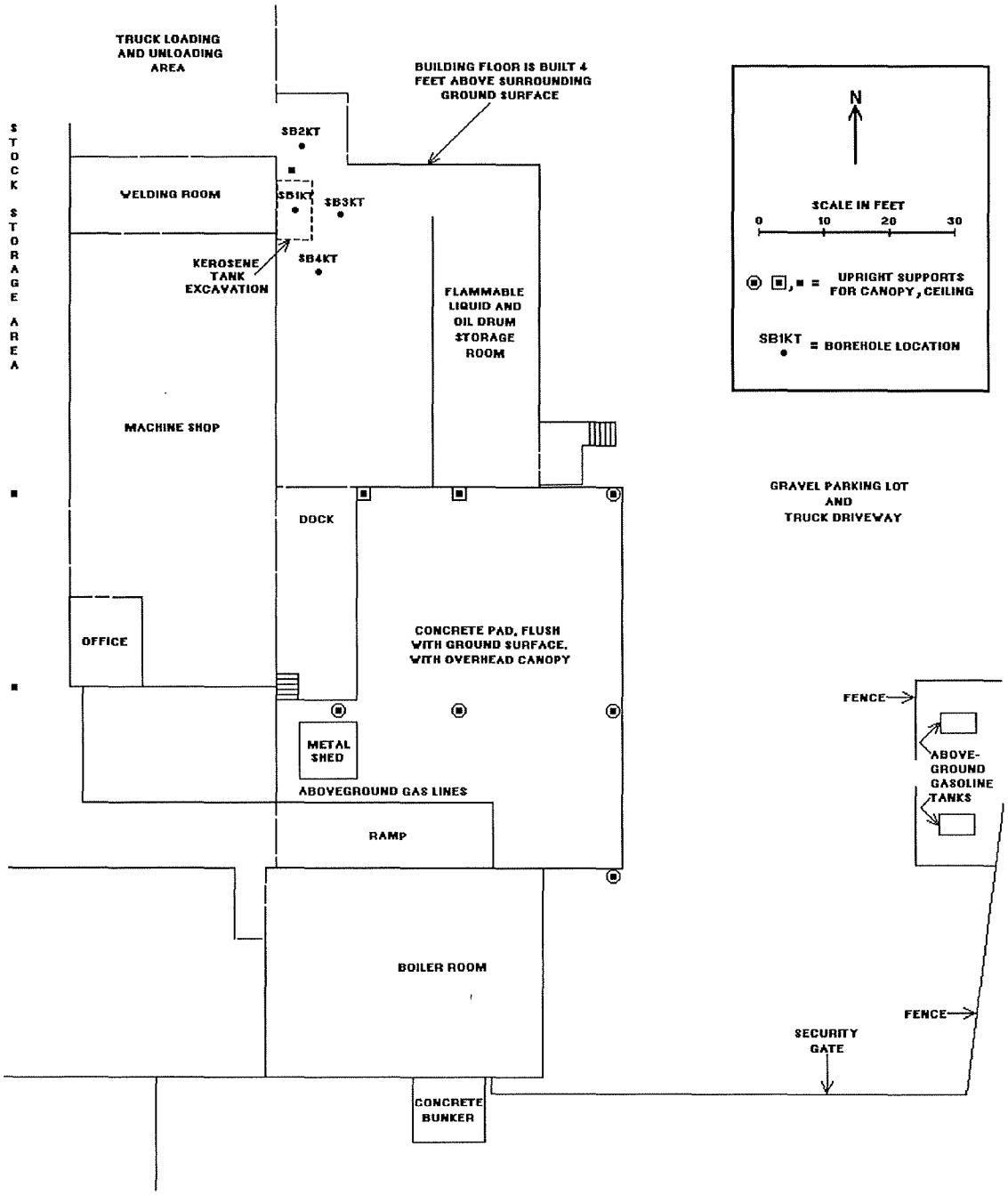


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FIGURE 2

SOIL BORING LOCATIONS

PROJECT NO. 92513

OCTOBER, 1993

SB1KT was forced to terminate at about 8 feet due to interference from the rock and gravel fill. Two other borings could be advanced to just 4 feet for the same reason. Only soil boring SB2KT was advanced to a sufficient depth for site investigation purposes. A more powerful but larger drill rig was mobilized to the site, however the attempt to place it in the maintenance storage area failed due to the narrow wall openings.

Results

Impacts from DRO were detected in SB1KT 7 - 7.5 feet and SB1KT 8 - 8.5 feet at 230 and 390 ppm, respectively. No DRO impacts were detected in SB2KT 7.75 - 8.25 feet (lab ID SBKT2 4'-4.5') and SB2KT 9.75 feet - 10.25 feet (lab ID SBKT2 6'-6.5'). No PVOC or PAH impacts were detected in any of the samples. The results of the laboratory analyses are summarized in **Table 2** and a copy of the lab report is in **Appendix B**. A progress report was prepared by FOX and submitted to the WDNR with a letter to Giselle Red on November 25, 1992 from Tecumseh Products.

TABLE 2
First Phase Sample Results
September 11, 1992

	SB1KT 7' - 7.5'	SB1KT 8' - 8.5'	SB2KT 7.75' - 8.25'	SB2KT 9.75' - 10.25'
DRO (in parts per million)	230	390	<10	<10
PVOC (in parts per billion)	All BQL	All BQL	All BQL	All BQL
PAH (in parts per billion)	NS	All BQL	NS	NS

BQL = below quantification limit
NS = no sample submitted for analysis

SITE INVESTIGATION (SECOND PHASE)

Prior to starting the second phase of the site investigation, FOX submitted a work plan with a letter to Giselle Red of the WDNR on March 31, 1993. On May 3 & 4, 1993 FOX mobilized another drill rig to the site, a compact but relatively powerful SIMCO D-25 skid rig. Two more borings, SB3KT and SB4KT, were drilled on the east and south sides, respectively, of the excavation backfill for the kerosene tank. The locations of these two borings are identified on **Figure 2.** Because of the presence of a brick wall on the western edge of the excavation and because of severe space constraints encountered in the welding room on the other side of this wall, no borehole could be placed on the west side of the excavation. Soil cores were collected every 2.5 feet with

a split spoon sampler and screened in the field with a Thermo Environmental, Model 580A, photoionization detector (PID). The soil was classified and entered on boring logs along with the field screening results **(Appendix A)**. A thick, saturated sand formation was encountered at a depth of about 15 - 15.5 feet, underlying the clay described earlier. The borings were terminated in the saturated sand zone at depths of 17 and 16.5 feet, respectively. Two soil samples from each boring, for a total of four samples, were submitted to PAL for diesel range organics (DRO) and petroleum volatile organic compounds (PVOC) analyses.

Results

All four of the samples had DRO and PVOC results below the quantification limit (BQL), except for SB4KT 8.5 - 10 feet, which had an impact from toluene at 230 parts per billion (ppb). The results of the laboratory analyses are summarized in **Table 3** and a copy of the lab report is in **Appendix B**.

TABLE 3
Second Phase Sample Results
May 3 - 4, 1993

	SB3KT 8.5' - 10'	SB3KT 15.5' - 17'	SB4KT 8.5' - 10'	SB4KT 15' - 16.5'
DRO (in parts per million)	BQL	BQL	BQL	BQL
PVOC (in part per billion)				
Benzene	BQL	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	BQL	BQL
Methyl-t-butylether	BQL	BQL	BQL	BQL
Toluene	BQL	BQL	230	BQL
1,2,4-Trimethylbenzene	BQL	BQL	BQL	BQL
1,3,5-Trimethylbenzene	BQL	BQL	BQL	BQL
Total Xylenes	BQL	BQL	BQL	BQL

SUMMARY

Following the removal of an underground kerosene storage tank and the determination of soil contamination during the closure assessment, FOX performed a two phase site investigation in and around the tank excavation. Borings were placed in two phases because the original drill rig was unable to auger past the rock and gravel fill beneath the concrete slab in some locations. Ultimately four borings were placed: one to the north, one to the east and one to the south of the tank excavation and one through the excavation backfill. The soils encountered consisted of several feet of sandy, gravelly,

stony fill atop silty or sandy clay. A saturated sand formation was encountered at a depth of about 15 - 15.5 feet. Soil from SB1KT, the boring in the excavation backfill, had DRO impacts of 230 ppm at a depth of 7 - 7.5 feet and 390 ppm at a depth of 8 - 8.5 feet. Soil from SB4KT, the boring 5 feet south of the excavation, had toluene impacts of 230 ppb at a depth of 8.5 - 10 feet. No other impacts from DRO or PVOC were detected in the soil boring samples, including the samples obtained from the top of the saturated sand.

The kerosene contaminated soil was transported to Parkview Recycling and Disposal Facility in Menomonee Falls, Wisconsin. The Application to Treat or Dispose of Petroleum Contaminated Soil (4400-120) and the Generator's Waste Profile Sheet is in **Appendix C**.

CONCLUSIONS

Impacts resulting from the presence of the kerosene tank are limited to the fill and clay soil located immediately around the base of the excavation sidewalls, the floor of the excavation and in an area within a few feet south of the excavation floor. The impacted soils are located in the unsaturated zone and are separated from the underlying saturated sand zone by about 5 feet of material. Contaminant movement into the saturated sand zone is not likely to occur because the intervening material is comprised of mostly clay. Also, contaminant movement is not likely to be influenced by infiltrating surface water because the area is shielded from rainfall - being inside a building, beneath a concrete floor.

The maximum volume of impacted soil is probably less than 30 cubic yards. Any attempt to excavate the impacted soils would be very difficult because of the space constraints inside the building. The volume of impacted soils removed by any potential excavation would be limited to less than 25 cubic yards in order to avoid the danger of undermining the brick wall to the west and because of the presence of a steel support girder and subfloor retaining wall, both located just north of the existing excavation border.

Given that: 1) the volume of impacted soil is small (< 30 cubic yards), 2) groundwater is not impacted, 3) contaminant movement is not very likely to occur and 4) any attempt to excavate the impacted soil would be very difficult and costly, FOX recommends no further action on the kerosene UST site.

APPENDIX A

Boring Logs

SAMPLE/CORE LOG

BORING/WELL SB1KT PROJECT/NO. Tecumseh Products Co. - #92513 PAGE 1 OF 1

SITE LOCATION 900 North Street DRILLING STARTED 9:10 AM DRILLING COMPLETED 11:10 AM DATE 9/11/92

TOTAL DEPTH DRILLED 8 feet HOLE DIAMETER 4 inches TYPE OF SAMPLE/CORING DEVICE Shelby Tube

LENGTH AND DIAMETER OF CORING DEVICE 6" x 1.5" SAMPLING INTERVAL NA feet

LAND SURFACE ELEVATION _____ feet SURVEYED _____ ESTIMATED DATUM _____

DRILLING FLUID USED None DRILLING METHOD Hollow Stem Auger

DRILLING CONTRACTOR Giles Engineering DRILLER Jeff HELPER Dean

PREPARED BY Julie Erato HAMMER WEIGHT NA HAMMER DROP NA inches

Sample Core Depth (feet below land surface) FROM	TO	Core Recovery (feet)	OVA Meter Reading (units)	Sample/Core Description
0	7	------		Drilled straight to 7' , beige sand and gravel fill;
7	7.5	0.5	18	Light yellow-brown fine to medium sandy clay with trace of cobbles;
8	8.5	0.5	-----	Light yellow-brown fine to medium sandy clay with trace of cobbles;
				BORING TERMINATED AT 8.5' DUE TO REFUSAL

NOTES

SAMPLE/CORE LOG

BORING/WELL SB2KT PROJECT/NO. Tecumseh Products Co. - #92513 PAGE 1 OF 1

SITE LOCATION 900 North Street DRILLING STARTED 11:25 AM DRILLING COMPLETED 12:05 PM DATE 9/11/92

TOTAL DEPTH DRILLED 9.75 feet HOLE DIAMETER 4 inches TYPE OF SAMPLE/CORING DEVICE Shelby Tube

LENGTH AND DIAMETER OF CORING DEVICE 6" x 1.5" SAMPLING INTERVAL 2.0 feet

LAND SURFACE ELEVATION _____ feet SURVEYED _____ ESTIMATED DATUM _____

DRILLING FLUID USED None DRILLING METHOD Solid Stem Auger

DRILLING CONTRACTOR Giles Engineering DRILLER Jeff HELPER Dean

PREPARED BY Julie Erato HAMMER WEIGHT NA HAMMER DROP NA inches

Sample Core Depth (feet below land surface) FROM	TO	Core Recovery (feet)	OVA Meter Reading (units)	Sample/Core Description
0	3.75	------		A 45" hollow space exists beneath the concrete floor;
5.75	6.25	0.5	0	Light yellow-brown fine to medium sandy clay;
7.75	8.25	0.5	0	Light yellow-brown fine to medium sandy clay;
9.75	10.25	0.5	0	Light yellow-brown fine to medium sandy clay; very moist

NOTES

SAMPLE/CORE LOG

DATE 5-3-93

BORING/WELL SB3KT PROJECT/NO. Tecumseh Products Co. / 92513 PAGE 1 OF 1

SITE LOCATION 900 North Street, Grafton, WI DRILLING STARTED 1445 DRILLING COMPLETED 1650

TOTAL DEPTH DRILLED 15.5 feet HOLE DIAMETER 6 inches TYPE OF SAMPLE/CORING DEVICE split spoon

LENGTH AND DIAMETER OF CORING DEVICE 28" x 2" SAMPLING INTERVAL variable feet

LAND SURFACE ELEVATION feet SURVEYED ESTIMATED DATUM

DRILLING FLUID USED none DRILLING METHOD hollow stem auger

DRILLING CONTRACTOR Exploration Technology Inc. DRILLER Louis / Mike HELPER Jim

PREPARED BY John Weber HAMMER WEIGHT 135 lb HAMMER DROP 30 inches

Sample Core Depth (feet below land surface) FROM	TO	Core Recovery (inches)	Blows Per 6 inches	Sample/Core Description
0	8.5	-	-	Blind drill, through concrete floor and at least 4' of built-up fill, to 8.5'.
8.5	10	15	36, 55, 35	Brown,very silty clay with trace of sand and gravel and with tan, light greenish gray and beige mottling, fairly dry; OVM = 6 units***; ss - stripped exterior.
10.5	12	0	39, 31, 50 - 4"	No recovery.
13.5	15	8	31, 100 -4"	Brown, very silty clay with trace of sand, very damp to moist; OVM = 4 units***.
15.5	17	9	3, 7, 32	2" of brown, very silty clay, moist, atop 7" of brown, well sorted sand, wet; OVM = 1 unit***; ss from the sand.

NOTES:

* = OVM reading taken at top of auger in open drill hole

** = OVM reading taken at bottom end of closed split spoon

*** = OVM reading taken from sample inside opened split spoon

ss = Soil sample taken from corresponding depth interval

NR = Not recorded

SAMPLE/CORE LOG

DATE 5-4-93

BORING/WELL SB4KT PROJECT/NO. Tecumseh Products Co. / 92513 PAGE 1 OF 1

SITE LOCATION 900 North Street, Grafton, WI DRILLING STARTED 0800 DRILLING COMPLETED 1030

TOTAL DEPTH DRILLED 15 feet HOLE DIAMETER 7 inches TYPE OF SAMPLE/CORING DEVICE split spoon

LENGTH AND DIAMETER OF CORING DEVICE 28" x 2" SAMPLING INTERVAL variable feet

LAND SURFACE ELEVATION feet SURVEYED ESTIMATED DATUM

DRILLING FLUID USED none DRILLING METHOD hollow stem auger

DRILLING CONTRACTOR Exploration Technology Inc. DRILLER Louis / Mike HELPER Jim

PREPARED BY John Weber HAMMER WEIGHT 135 lb HAMMER DROP 30 inches

Sample Core Depth (feet below land surface) FROM	TO	Core Recovery (inches)	Blows Per 6 inches	Sample/Core Description
0	3.5	-	-	Blind drill, through concrete floor and built-up fill, to 3.5'.
3.5	5	8	11, 42, 63	Brown, sandy, gravelly silt with fragments of limestone or dolomite pebbles, fairly dry; OVM = 0 units***.
5.5	7	5	16, 13, 18	Brown, gravelly, very sandy silt and dark brown, sandy silt, fairly dry; OVM = 0 units***.
8.5	10	16	11, 19, 35	Brown, silty clay with trace of pebbles and sand and some light greenish gray mottling, damp to very damp; OVM = 1 unit***; ss - stripped exterior.
10.5	12	18	13, 21, 33	Brown, silty clay, damp to very damp; OVM = 1 unit***.
13.5	15	20	22, 20, 36	Gray, silty clay, very damp, grading in bottom 1" of core into brown, well sorted sand, wet; OVM = 0 units*** in the clay.
15	16.5	20	53, 22, 60	Brown, well sorted sand, wet; OVM = 0 units***; ss.

NOTES:
* = OVM reading taken at top of auger in open drill hole
** = OVM reading taken at bottom end of closed split spoon
*** = OVM reading taken from sample inside opened split spoon
ss = Soil sample taken from corresponding depth interval
NR = Not recorded

APPENDIX B

Laboratory Reports

Precision Analytical Lab, Inc
205 West Galena
Milwaukee, WI 53212

Phone: (414) 272-5222

Fox Environmental Services
5150 N. Port Washington Rd.
Milwaukee, WI 53217

Attn: Lawrence L. Fox
Invoice Number:

Order #: 92-09-132
Date: 09/30/92 16:12
Work ID: 92513
Date Received: 09/11/92
Date Completed: 09/30/92
Client Code: FOX_ENVIRO

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	SBKT 17-7.5	03	SBKT-24-4.5
02	SBKT 18-8.5	04	SBKT-26-6.5

Laboratory ID Number (Wisconsin DNR): 241369260

Certified By
Jeff Bushner

Sample: 01A SBKT 17-7.5 **Collected: 09/11/92**

Test Description		Result	Limit	Units	Analyzed	By
Mod. DRO (WDNR)		230		mg/kg	09/29/92	SEL
PVOC Soil, (WDNR) 8020						
Benzene	#	< 43		ug/kg	09/21/92	LJS
Ethylbenzene		< 43		ug/kg	09/21/92	LJS
Methyl-t-butylether		< 43		ug/kg	09/21/92	LJS
Toluene		< 43		ug/kg	09/21/92	LJS
1,2,4-Trimethylbenzene		< 43		ug/kg	09/21/92	LJS
1,3,5-Trimethylbenzene		< 43		ug/kg	09/21/92	LJS
Total Xylenes		< 43		ug/kg	09/21/92	LJS

Sample: 02A SBKT 18-8.5 **Collected: 09/11/92**

Test Description		Result	Limit	Units	Analyzed	By
Mod. DRO (WDNR)		390		mg/kg	09/29/92	SEL
PAH Soil, Method 8270						
Acenaphthene		< 660		ug/kg	09/22/92	JJB
Acenaphthylene		< 660		ug/kg	09/22/92	JJB
Anthracene		< 660		ug/kg	09/22/92	JJB
Benzo(a)anthracene		< 660		ug/kg	09/22/92	JJB
Benzo(b)fluoranthene		< 660		ug/kg	09/22/92	JJB
Benzo(k)fluoranthene		< 660		ug/kg	09/22/92	JJB
Benzo(g,h,i)perylene		< 660		ug/kg	09/22/92	JJB
Benzo(a)pyrene		< 660		ug/kg	09/22/92	JJB
Chrysene		< 660		ug/kg	09/22/92	JJB
Dibenz(a,h)anthracene		< 660		ug/kg	09/22/92	JJB
Fluoranthene		< 660		ug/kg	09/22/92	JJB
Fluorene		< 660		ug/kg	09/22/92	JJB
Indeno(1,2,3-cd)pyrene		< 660		ug/kg	09/22/92	JJB
Naphthalene		< 660		ug/kg	09/22/92	JJB
Phenanthrene		< 660		ug/kg	09/22/92	JJB
Pyrene		< 660		ug/kg	09/22/92	JJB
PVOC Soil, (WDNR) 8020						
Benzene	#	< 50		ug/kg	09/21/92	LJS
Ethylbenzene		< 50		ug/kg	09/21/92	LJS
Methyl-t-butylether		< 50		ug/kg	09/21/92	LJS
Toluene		< 50		ug/kg	09/21/92	LJS
1,2,4-Trimethylbenzene		< 50		ug/kg	09/21/92	LJS
1,3,5-Trimethylbenzene		< 50		ug/kg	09/21/92	LJS
Total Xylenes		< 50		ug/kg	09/21/92	LJS

Sample: 03A SBKT-24-4.5 **Collected: 09/11/92**

Test Description	Result	Limit	Units	Analyzed	By
Mod. DRO (WDNR)	< 10		mg/kg	09/26/92	SEL

Test Description		Result	Limit	Units	Analyzed	By
PVOC Soil, (WDNR) 8020						
Benzene	#	< 50		ug/kg	09/21/92	LJS
Ethylbenzene		< 50		ug/kg	09/21/92	LJS
Methyl-t-butylether		< 50		ug/kg	09/21/92	LJS
Toluene		< 50		ug/kg	09/21/92	LJS
1,2,4-Trimethylbenzene		< 50		ug/kg	09/21/92	LJS
1,3,5-Trimethylbenzene		< 50		ug/kg	09/21/92	LJS
Total Xylenes		< 50		ug/kg	09/21/92	LJS

Sample: 04A SBKT-26-6.5 **Collected: 09/11/92**

Test Description		Result	Limit	Units	Analyzed	By
Mod. DRO (WDNR)		< 10		mg/kg	09/26/92	SEL
PVOC Soil, (WDNR) 8020						
Benzene	#	< 50		ug/kg	09/21/92	LJS
Ethylbenzene		< 50		ug/kg	09/21/92	LJS
Methyl-t-butylether		< 50		ug/kg	09/21/92	LJS
Toluene		< 50		ug/kg	09/21/92	LJS
1,2,4-Trimethylbenzene		< 50		ug/kg	09/21/92	LJS
1,3,5-Trimethylbenzene		< 50		ug/kg	09/21/92	LJS
Total Xylenes		< 50		ug/kg	09/21/92	LJS

Elevated detection limit due to compliance with the Wisconsin DNR modified PVOC method.

The organic data is reported out on a dry-weight basis.

Sample was covered air tight in approved container, shipped in cooler from the source to our lab, temperature upon arrival was 4 degrees C.

The samples ordered for PVOC were analyzed according to Method 8020 (SW 846 Test Methods for Evaluating Solid Waste - Physical/ Chemical Methods)

The samples ordered for PAHs were analyzed according to Method 8270 (SW 846 Test Methods for Evaluating Solid Waste - Physical/ Chemical Methods)

The samples ordered for DRO were analyzed by the Wisconsin DNR Modified DRO method.

The extraction qc for the DRO samples exhibited recoveries that were just outside our normal criteria. The samples were not re-extracted due to hold-time considerations; however, the values reported should not be affected significantly.

CLIENT INFORMATION

PAL Precision Analytical Laboratory
205 W. Galena
Milwaukee, WI 53212

Phone: (414) 272-5222
Fax: (414) 272-6949

Project Manager:
Company: FOX ENVIRONMENTAL SERVICES
Address: 5150 N. PORT WASHINGTON RD
MILWAUKEE, WI 53217
Phone: (414) 332-5857 Fax: ( )
Project: 92513
Quote/Reference:
Reports to be sent to: FOSTER JOHNSTON

Chain of Custody

Page 1 of 1 № 5395

SPECIAL INSTRUCTIONS:

Property Owner: Tecumseh
Property Address: 900 NORTH STREET
Telephone Number:

Del'v: Hand Comm.
Ship Cont. OK? (Y) N N/A
Rec'd Refrig.? (Y) N N/A
Seals OK? (Y) N N/A
Samples leaking? Y (N) N/A
Comments:

Temperature Blank: ____ C
On Ice

SAMPLE HANDLING
X Nonhazardous
___ Flammable
___ Skin Irritant
___ Highly Toxic
___ Other (specify) ____
___ Reactive
___ Work in Hood
___ Wear Gloves
___ Infectious

Turnaround Time
X Normal
___ Rush ** (Please refer to Quote/Reference Number)
Date Needed: ____
** WAS LAB NOTIFIED (Y/N) ____

ANALYSIS	DRO	PVOC	PAH	DRY WEIGHT	
FILTERED (YES/NO)	NO	NO	NO		
PRESERVED (CODE)	NO	YES	NO	M	
REFRIGERATED (YES/NO)	YES	YES	YES		

Preservation Code
A-None B-HN03
C-H_2SO_4 D-NAOH
E-HCL F- ____
(M-MEOH)

TOTAL NUMBER OF CONTAINERS
MATRIX: Surface Water(1), Ground Water(2) Soil(3), Solid/Liquid Waste(4/5), Other(6)

LAB USE ONLY	DATE	TIME	COMP	GRAB	TOTAL NUMBER OF CONTAINERS	MATRIX	FIELD ID	LOCATION / DESCRIPTION	DRO	PVOC	PAH	DRY WEIGHT			REMARKS
9209132-1	9-11-92	9:10		X	~~3~~ 5	3	SBKT 17-7.5		2 ✓	2 ✓	~~2~~	1 ✓			
-2	9-11-92	~~9:10~~ 11:25		X	~~5~~ 7	3	SBKT 18-8.5		2 ✓	2 ✓	2 ✓	1 ✓			
-3	9-11-92	~~11:25~~ 11:35		X	5	3	SBKT 24-4.5		2 ✓	2 ✓		1 ✓			
-4	9-11-92	11:25		X	5	3	SBKT 26-6.5		2 ✓	2 ✓		1 ✓			~~1 Amber jar~~
-5	9-11-92			X	1		TRIP BLANK								1 Amber jar
				X											

Fill in spaces with bottles per test

cancelled per client 9/16/92 5Am

Disposition of unused portion of sample Laboratory Should:
X Dispose *
___ Return
___ Retain for ___ days
___ Other

* Disposal charges listed in fee schedule

Relinquished By (Signature)	Date / Time	Received By (Signature)
Julie Erato	9/11/92 4:45p	[signature]
Relinquished By (Signature)	Date / Time	Received By (Signature)
Relinquished By (Signature)	Date / Time	Received For Laboratory By: (Signature)

White - Lab Canary - Report Pink - File Golden Rod - Customer

PRECISION ANALYTICAL LABORATORY

205 WEST GALENA
MILWAUKEE, WI 53212
(414) 272-5222

05/20/93

Analytical Report

Attn: Foster Johnson
Client: Fox Environmental Services
5150 N. Port Washington Rd.
Milwaukee, WI 53217

WORK ID: 92513

Date Received: 05/05/93
Date Reported: 05/14/93

PAL ORDER #: 9305052

SAMPLE DESCRIPTION	LAB ID	DATE COLLECTED
SB3 KT 8.5-10	01A	05/03/93
SB3 KT 8.5-10	01B	05/03/93
SB3 KT 15.5-17	02A	05/03/93
SB3 KT 15.5-17	02B	05/03/93
SB4 KT 8.5-10	03A	05/04/93
SB4 KT 8.5-10	03B	05/04/93
SB4 KT 15-16.5	04A	05/04/93
SB4 KT 15-16.5	04B	05/04/93

Laboratory ID Number (Wisconsin DNR): 241369260

Certified By
Jeff Bushner

PRECISION ANALYTICAL LABORATORY

CLIENT: **Fox Environmental Services**

Test	Result	Limit	Units	Analyzed	Extracted	BY	Method(SW846)
Sample ID: SB3 KT 8.5-10			Lab ID:	9305052-01A		Collected: 05/03/93	
PVOC Soil, (WDNR)							8020
Benzene	BQL	50	ug/kg	05/10/93		EMC	
Ethylbenzene	BQL	50	ug/kg	05/10/93		EMC	
Methyl-t-butylether	BQL	50	ug/kg	05/10/93		EMC	
Toluene	BQL	50	ug/kg	05/10/93		EMC	
1,2,4-Trimethylbenzene	BQL	50	ug/kg	05/10/93		EMC	
1,3,5-Trimethylbenzene	BQL	50	ug/kg	05/10/93		EMC	
Total Xylenes	BQL	100	ug/kg	05/10/93		EMC	
Sample ID: SB3 KT 8.5-10			Lab ID:	9305052-01B		Collected: 05/03/93	
Dry Weight	88		%	05/07/93		GQ	
Mod. DRO (WDNR), Soil	** BQL	10	mg/kg	05/08/93	05/05/93	SEL	Wis Mod. DNR
Sample ID: SB3 KT 15.5-17			Lab ID:	9305052-02A		Collected: 05/03/93	
PVOC Soil, (WDNR)							8020
Benzene	BQL	50	ug/kg	05/10/93		EMC	
Ethylbenzene	BQL	50	ug/kg	05/10/93		EMC	
Methyl-t-butylether	BQL	50	ug/kg	05/10/93		EMC	
Toluene	BQL	50	ug/kg	05/10/93		EMC	
1,2,4-Trimethylbenzene	BQL	50	ug/kg	05/10/93		EMC	
1,3,5-Trimethylbenzene	BQL	50	ug/kg	05/10/93		EMC	
Total Xylenes	BQL	100	ug/kg	05/10/93		EMC	
Sample ID: SB3 KT 15.5-17			Lab ID:	9305052-02B		Collected: 05/03/93	
Dry Weight	79		%	05/07/93		GQ	
Mod. DRO (WDNR), Soil	** BQL	10	mg/kg	05/08/93	05/05/93	SEL	Wis Mod. DNR
Sample ID: SB4 KT 8.5-10			Lab ID:	9305052-03A		Collected: 05/04/93	
PVOC Soil, (WDNR)							8020
Benzene	BQL	50	ug/kg	05/10/93		EMC	
Ethylbenzene	BQL	50	ug/kg	05/10/93		EMC	
Methyl-t-butylether	BQL	50	ug/kg	05/10/93		EMC	
Toluene	230	50	ug/kg	05/10/93		EMC	
1,2,4-Trimethylbenzene	BQL	50	ug/kg	05/10/93		EMC	
1,3,5-Trimethylbenzene	BQL	50	ug/kg	05/10/93		EMC	
Total Xylenes	BQL	100	ug/kg	05/10/93		EMC	

BQL - Below Quantification Limit

CLIENT:**Fox Environmental Services**

Test	Result	Limit	Units	Analyzed	Extracted	BY	Method(SW846)
Sample ID: SB4 KT 8.5-10			Lab ID:	9305052-03B		Collected: 05/04/93	
Dry Weight	88		%	05/07/93		GQ	
Mod. DRO (WDNR), Soil	** BQL	10	mg/kg	05/08/93	05/05/93	SEL	Wis Mod. DNR
Sample ID: SB4 KT 15-16.5			Lab ID:	9305052-04A		Collected: 05/04/93	
PVOC Soil, (WDNR)							8020
Benzene	BQL	53	ug/kg	05/10/93		EMC	
Ethylbenzene	BQL	53	ug/kg	05/10/93		EMC	
Methyl-t-butylether	BQL	53	ug/kg	05/10/93		EMC	
Toluene	BQL	53	ug/kg	05/10/93		EMC	
1,2,4-Trimethylbenzene	BQL	53	ug/kg	05/10/93		EMC	
1,3,5-Trimethylbenzene	BQL	53	ug/kg	05/10/93		EMC	
Total Xylenes	BQL	110	ug/kg	05/10/93		EMC	
Sample ID: SB4 KT 15-16.5			Lab ID:	9305052-04B		Collected: 05/04/93	
Dry Weight	87		%	05/07/93		GQ	
Mod. DRO (WDNR), Soil	** BQL	10	mg/kg	05/08/93	05/05/93	SEL	Wis Mod. DNR

BQL - Below Quantification Limit

PRECISION ANALYTICAL LABORATORY

05/20/93

Report Comments

CLIENT: Fox Environmental Services

PAL Order #: 9305052

All analysis as per approved method found in one or more of the following:
Standard Methods for Evaluation of Water and Wastewater, 17th Edition
Methods for Chemical Analysis for Water and Wastes, Revised March 1983, EPA 600/4-79-020
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, 3rd Edition 1986 EPA SW846

Analysis performed or certified by Precision Analytical Laboratory

The organic data is reported out on a dry-weight basis.

Sample was covered air tight in approved container, shipped in cooler from the source to our lab, temperature upon arrival was 4 degrees C.

** The extraction QC spikes associated with the DRO samples were just outside normal acceptable limits. Due to hold time considerations the samples were not re-extracted; however, the results should not be affected.

CHAIN OF CUSTODY INFORMATION

Precision Analytical Laboratory
205 W. Galena
Milwaukee, WI 53212

Phone: (414) 272-5222
Fax: (414) 272-6949

Project Manager: Foster Johnston
Company: Fox Environmental
Address: 5150 N Port Washington
Milwaukee WI 53217
Phone: (414) 332-5857 Fax: ( )
Project: 92513
Quote/Reference:
Reports to be sent to: Foster Johnston

Chain of Custody

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SPECIAL INSTRUCTIONS:

Property Owner:
Property Address:
Telephone Number:

Del'v: Hand Comm.
Ship Cont. OK? Y N N/A
Rec'd Refrig.? Y N N/A
Seals OK? Y N N/A
Samples leaking? Y N N/A
Comments:

Temperature Blank: ____ C

SAMPLE HANDLING

___ Nonhazardous ___ Reactive
___ Flammable ___ Work in Hood
___ Skin Irritant ___ Wear Gloves
X Highly Toxic ___ Infectious
___ Other (specify) _____

Turnaround Time

X Normal
___ Rush ** (Please refer to Quote/Reference Number)
Date Needed: _____
** WAS LAB NOTIFIED (Y/N) ____

LAB USE ONLY	DATE	TIME	COMP	GRAB	TOTAL NUMBER OF CONTAINERS	MATRIX: Surface Water(1), Ground Water(2) Soil(3), Solid/Liquid Waste(4/5), Other(6)	FIELD ID	LOCATION / DESCRIPTION	ANALYSIS: DRO	PVOC	Dry Weight				
									FILTERED (YES/NO)	N	N	N			
									PRESERVED (CODE)	A	M	A			
									REFRIGERATED (YES/NO)	Y	Y	Y			
	5/3/93			X	5	3	SB3 KT	8.5-10		2	2	1			
	5/3/93			X	5	3	SB3 KT	15.5-17		2	2	1			
	5/4/93			X	5	3	SB4 KT	8.5-10		2	2	1			
	5/4/93			X	5	3	SB4 KT	15-16.5		2	2	1			

Preservation Code
A-None B-HN03
C-H_2SO_4 D-NAOH
E-HCL F-____
M-MEOH

REMARKS:

Disposition of unused portion of sample
Laboratory Should:
X Dispose *
___ Return
___ Retain for ___ days
___ Other

Disposal charges listed in fee schedule

Relinquished By (Signature)	Date /Time	Received By (Signature)
	5-5-93 8:10 AM	
Relinquished By (Signature)	Date / Time	Received By (Signature)
	5-5-93 1120 A	
Relinquished By (Signature)	Date / Time	Received For Laboratory By: (Signature)

Lab Canary - Report Pink - File Golden Rod - Customer

APPENDIX C

Soil Disposal Application & Disposal Forms

Assume disposal of an estimated 20 cubic yards (yd^3), then;

BENZENE CALCULATION

$$\frac{\leq 0.13 \text{ mg/kg}}{1{,}000{,}000} \times 2800 \text{ lbs/yd}^3 \times 20\text{yd}^3 = <0.007 \text{ lbs}$$

DRO CALCUALTION

$$\frac{1100 \text{ mg/kg}}{1{,}000{,}000} \times 2800 \text{ lbs/yd}^3 \times 20\text{yd}^3 = 61.6 \text{ lbs}$$

- **Property Transfer Audits**
- **Environmental Assessments**
- **Underground Storage Tank Management**
- **Remedial Management Services**
- **Asbestos Management Services**
- **Industrial Hygiene Services**