Rec 4/7/93

KEROSENE UNDERGROUND STORAGE TANK PHASE II SITE INVESTIGATION WORK PLAN

TECUMSEH PRODUCTS COMPANY GRAFTON, WISCONSIN

PREPARED FOR:

TECUMSEH PRODUCTS COMPANY
GRAFTON, WISCONSIN

SUBMITTED BY:

FOX ENVIRONMENTAL SERVICES, INC.
MILWAUKEE, WISCONSIN

PROJECT: F-93513
APRIL, 1993

fox environmental services, inc.

KEROSENE UNDERGROUND STORAGE TANK

PHASE II SITE INVESTIGATION WORK PLAN

TECUMSEH PRODUCTS COMPANY

GRAFTON, WISCONSIN

Prepared for:

TECUMSEH PRODUCTS COMPANY

GRAFTON, WISCONSIN

Prepared by:

FOX ENVIRONMENTAL SERVICES, INC.

April, 1993

Foster Johnston, REP, CHCM

SITE INVESTIGATION WORK PLAN
Kerosene Tank

Tecumseh Products Company
Grafton, Wisconsin

Project No. F - 92513

INTRODUCTION

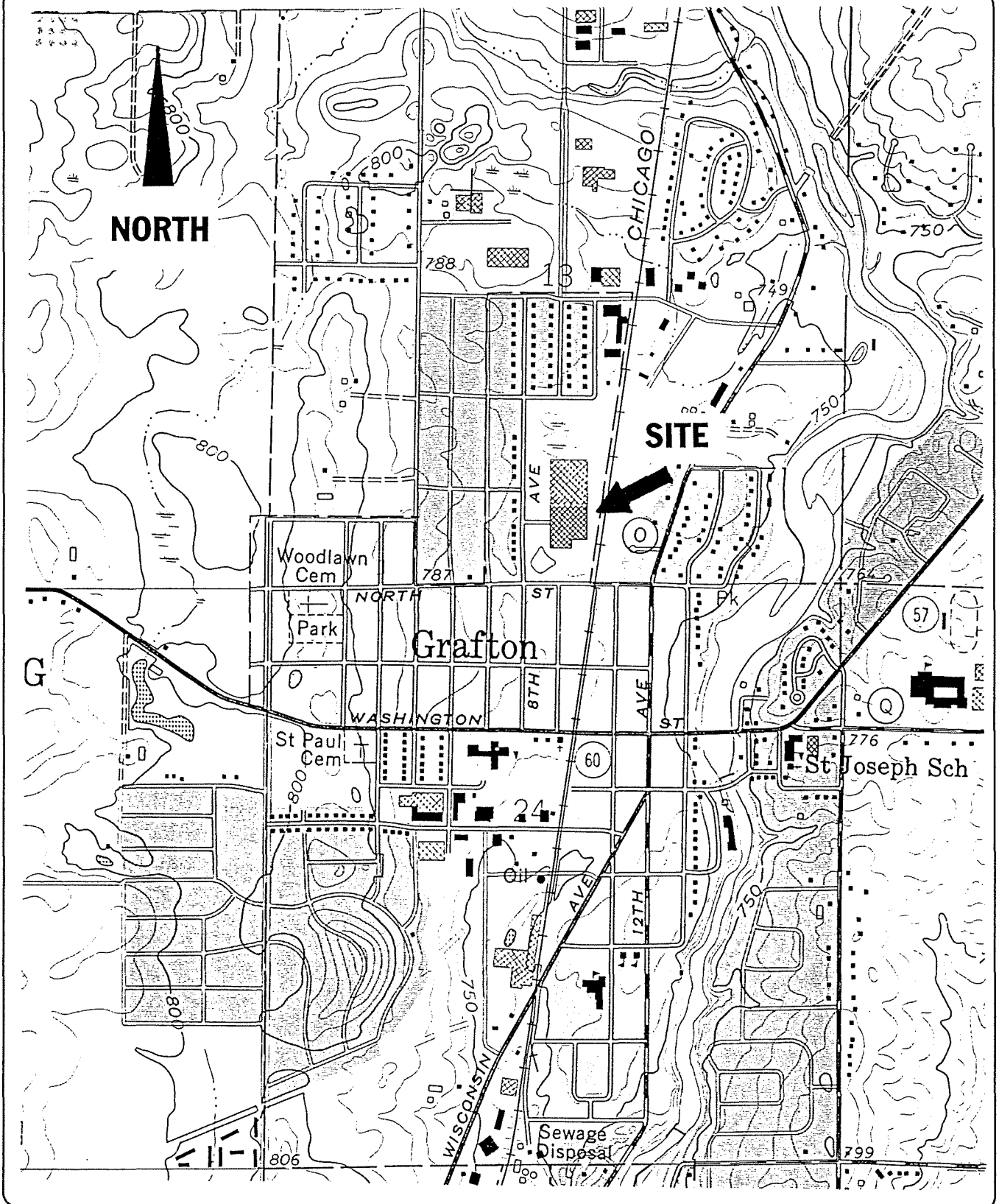
This is a work plan prepared by Fox Environmental Services, Inc. **(FOX)** to describe the Phase II site investigation activities planned at Tecumseh Products Company, 900 North Street in Grafton, Wisconsin **(Figure 1)**. The site investigation was in response to a leak from a kerosene underground storage 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).

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. At four locations within the tank excavation soil contamination was detected (32 - 8,400 parts per million) by the analytical laboratory. 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.

SITE INVESTIGATION

On September 11, 1992, four soil borings were placed in and around the excavation backfill for the kerosene tank which was in the maintenance storage area on the east side of the building. The location of the borings are identified in **Figure 2.** Using a General 550 drill rig soil samples were collected with a six (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 results of the screened samples. The soils were a beige sand and gravel fill with cobbles down to 4 to 5 feet, and light yellow brown, fine to medium sandy clay to about 10 feet. The depth of the borings ranged from eight (8) to ten (10) feet and water was encountered at ten (10) feet. A total of four soil samples were submitted to PAL for diesel range organics (DRO), petroleum volatile organic compounds (PVOC), and polynuclear aromatic



fox environmental services, inc.

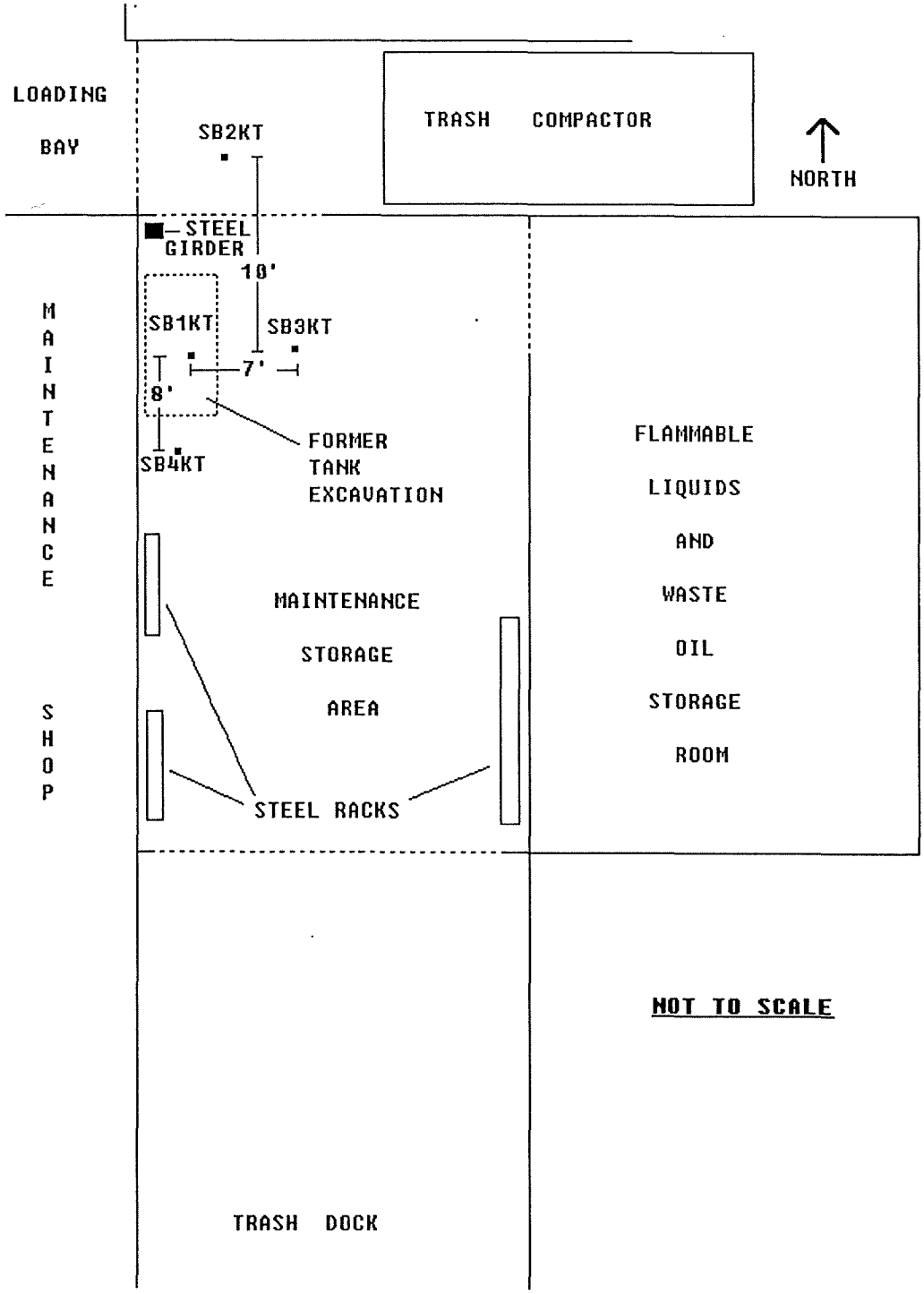
5150 North Port Washington Rd.
Suite 101
Milwaukee, Wisconsin 53217
(414) 332 - 5857

FIGURE 1

LOCATION PLAN

PROJECT NO. 92513

OCTOBER, 1992



fox environmental services, inc.

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

FIGURE 2

SITE PLAN

PROJECT NO. 92513

OCTOBER, 1992

hydrocarbons (PAH) analysis. The boreholes were properly abandoned, however, the depths were less than 10 feet and no abandonment forms were completed.

SB1KT was forced to terminate at eight feet due to the rock and gravel fill. Due to the interior constraints of the building, a compact drill rig was used, but, with only a 5 horsepower engine, it lacked the power to advance beyond this depth. Two additional boring locations (SB3KT and SB4KT) were also terminated at four feet for the same reason as SB1KT. 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

The results of the laboratory analysis are summarized in **Table 1** and a copy of the lab report is in **Appendix A**. Concentrations of DRO were detected in SB1KT 7' - 7.5' and SB1KT 8' - 8.5' at 230 and 390 parts per million (ppm), respectively. No DRO were detected in SB2KT 7.75' - 8.25' and SB2KT 9.75' - 10.25'. No PVOC or PAH were detected in any of the samples.

TABLE 1
KEROSENE TANK

	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

PHASE II WORK PLAN

The results of the field screening and the laboratory analysis identified concentrations of DRO in the two samples from SB1KT. No groundwater or perched groundwater was encountered. However, in order to assess the extent of the contamination, a more powerful drill rig capable of being placed in the maintenance storage area and auguring through the rocky fill, is needed. FOX recommends modifying a trailer-mounted SIMCO rig onto skids (or equivalent) and continuing with the soil borings in and around the excavation backfill, as originally planned. A Phase II site investigation will be performed with the following objectives:

- Notify the WDNR on the progress involving the kerosene site investigation. *(This was completed in a letter to Giselle Red on November 25, 1992 from Tecumseh Products)*
- Placement of soil borings to determine the extent of the contamination.

Subsurface Investigation

This section presents the general procedures and equipment for performing the planned soil sampling activities at the site. Sampling activities will include the placement of soil borings with subsequent sampling for laboratory analysis. All drilling activities will follow ASTM guidelines [1].

All soil borings will be advanced by a drill rig using hollow-stem auger techniques (ASTM 1452). Soil samples will be collected at two and one-half (2½) foot intervals using a split spoon sampler to a depth of twenty (20) feet. A sufficient number of split spoons will be kept in the field to ensure uninterrupted sampling. All downhole equipment will be steam-cleaned prior to drilling each borehole. The split spoon sampler will be washed with trisodium phosphate (TSP) and rinsed with distilled water between consecutive samples. All steam cleaning rinsate and washwater will be containerized and stored in a secure location on the site pending waste characterization and disposal.

Soil cores will be described in the field by a FOX hydrogeologist by visual inspection. The description will include information pertaining to soil type, grain size distribution, gradation, color, odor, moisture content, consistency, density, grain shape and lithology, structure, and genetic origin. In addition, special note will be made of any heterogeneities, mottling, layering, lenses, fractures, organic matter, fill material or solid waste, and voids.

The soil sampling procedures described below have been developed to obtain representative information of the materials encountered, and will be used during the drilling of all soil borings. The procedures provide information on sampling, data recording and equipment decontamination techniques.

1. Record borehole location and sample (depth) intervals on data sheet.
2. Prior to sampling each interval. label all necessary sample containers with the project number, depth interval, date, time and analysis to be performed.
3. Hand-auger or drill to the start of the designated sampling interval and obtain soil samples. When a split-spoon sampler is driven into the unconsolidated deposits to recover the sample, record the number of blow counts over each six inch interval, and the length of material recovered.

---

[1] "Standard Practice for Soil Investigation and Sampling by Auger Borings", ASTM Designation No. D 1452-80 (Reapproved 1990).

The cores recovered in each auger head or split-spoon will be screened in the field for the presence of contaminants through visual examination and with a OVA brand photoionization detector (PID). The PID will have a lamp energy of 10.6 electrovolts. The field PID will be calibrated daily with 100 ppm isobutylene in air. The purpose of the screening is to provide qualitative information on the level of ionizable compounds in the sample, to examine the sample for evidence of nonvolatile contaminants (e.g., metal shavings, paint chips) and to provide information for health and safety purposes.

A portion of each recovered soil core will be placed in a labeled, resealable, polyethylene bag. Once collected and sealed, headspace samples will be agitated for at least 30 seconds to break up soil clods and release vapors. Head space samples will be allowed to equilibrate in a location out of direct sun light for an appropriate time period prior to screening with calibrated PID. The following guidelines, established by the WDNR underground storage tank closure assessment program, will be used to determine the proper equilibration time for headspace samples:

Ambient outside Air Temperature At Time of Sample Collected	Minimum Equilibration Time at 70°F or Greater
< 40°F	40 min.
41-55°F	20 min.
56-69°F	10 min.
>70°F	5 min.

Field screening of samples will be conducted by carefully opening a small section of the bag's seal, inserting the probe of the PID, sealing the bag around the probe and allowing the detector to draw headspace sample until a peak reading is reached. The highest detector reading for each sample will be recorded. The PID will be withdrawn from the sample and allowed to draw clean air until a 0.0 or background reading is reestablished. The sample number, depth, peak PID reading, and background concentrations (in ambient air) will be recorded in the field notebook.

Samples for laboratory is will be selected on the basis of field PID readings and visual observation of nonvolatile potential contaminants. Selected samples with the highest PID readings and representative samples from depths defining the upper and lower boundaries of contaminated zones will be submitted for laboratory analysis. The analyses performed will provide quantitative information regarding contamination extent and the zone of maximum impact.

If field screening indicates a particular boring is beyond the apparent zone of contamination, a representative sample(s) will be submitted to verify field observations.

At least two samples per boring will be submitted. If the boring extends into the saturated zone, then one representative sample will be collected from both the unsaturated zone and the saturated zone. The samples will be analyzed for the same parameters as the impacted samples.

Following the retrieval of the split-spoon sample, the bottom-most portion of the sample will immediately be placed into labeled 8 ounce sample containers, filled such that no head space remains, and cooled to 4˚C (±2˚C). No preservative is required. Samples will be selected for delivery to the laboratory. Analyses to be collected in this manner include 8260 and 8021.

The sampling equipment will be washed with a trisodium phosphate and water mixture, rinsed with tap water and double rinsed with distilled water. All washwater will be containerized and stored in a secure location on the site pending waste characterization and disposal.

A minimum of two samples from each boring will be collected for laboratory analysis from: 1) the location of the highest screened soil sample, and 2) where the boring intersects the water table. All samples will be submitted to a WDNR certified laboratory for diesel range organics (DRO) and petroleum volatile organic compounds (PVOC) analysis.

One duplicate soil sample will be submitted for every ten soil samples collected. If fewer than ten samples are collected during the subsurface investigation of a particular task area, one field duplicate will be submitted for that sampling round.

The duplicate sample will be identified by the same sample identifier as the co-located sample, but with a "D" at the end of the code.

The duplicate sample will be collected from the same core as the original sample by splitting the core longitudinally. Due to the natural heterogeneities of soil that may affect analytical results, the sampler will make every attempt to maintain the integrity and similarity of the two samples.

Upon completion, all boreholes deeper than three feet will be abandoned by filling the borehole to the ground surface with hydrate bentonite holeplug per NR141. Installation and abandonment procedures for borings greater than three feet in depth will be documented using WDNR forms 4400-122 (or equivalent) and 3300-5W, respectively.

All cuttings resulting from the drilling of the soil borings will be containerized in 55 gallon DOT approved drums and stored on-site. The exterior of the drums will identify the boring locations of the soil being contained. If soil boring sample analyses indicate contamination, a composite sample will be collected from the drummed cuttings and analyzed for disposal purposes.

Equipment for the soil sampling program will include:

- Stainless steel spatula and spoon
- Photoionization detector (PID)
- Twenty-eight inch long, two-inch diameter split-spoons made of stainless steel
- Hollow-stem auger drilling equipment with split-spoon sampling capabilities
- Distilled and potable water
- Personnel safety equipment
- Resealable plastic bags
- Steam cleaner, decontamination equipment and materials (brushes, buckets, trisodium phosphate cleaner)
- Soil sample jars
- Disposable gloves

APPENDIX A

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.

Chain of Custody

Page 1 of 1 № 5395

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

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) _____

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	RVOU	RAH	DRY WEIGHT			REMARKS
									FILTERED (YES/NO)						
									PRESERVED (CODE)						
									REFRIGERATED (YES/NO)						
9209132-1	9-11-92	9:10		X	~~35~~ 5	3	SBKT17-7.5		2	2	~~2~~ 3	1			
-2	9-11-92	~~9:10~~ 11:35		X	~~57~~ 5	3	SBKT18-8.5		2	2	2	1			
-3	9-11-92	~~11:35~~ 11:35		X	5	3	SBKT24-4.5		2	2		1			
-4	9-11-92	11:25		X	5	3	SBKT26-6.5		2	2		1			~~1 Amber JSY~~
-5	9-11-92			X	1		TRIP BLANK								1 Amber JSY
				X											

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

NO NO NO
NO YES NO M
YES YES YES

cancelled per client 9/16/92 SAH

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)
Luke Erato	9/11/92 4:45p	Barry Christy
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