MSA
PROFESSIONAL SERVICES
TRANSPORTATION • MUNICIPAL
DEVELOPMENT • ENVIRONMENTAL

May 20, 2008

Mr. John Houck
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-0201

Re: Curtis Oil Excavation Report, Hermantown, Minnesota (Former Junction Food-n-Fuel)
MPCA Leak # Associated with Leak Site 3534
MSA Project # 6390703B

Dear Mr. Houck:

One underground gasoline tank was removed from the above referenced property. The exact volume of the tank is unknown as it appeared the tank was crushed and buried. Laboratory analysis on the soil sample collected from below the tank indicates the tank has leaked. At this time, MSA is recommending this new information be considered with background information from MPCA Leak #3534. Please contact me if you have any questions about the project.

Sincerely,

MSA Professional Services, Inc.

Lynette Carney
Project Manager

DRA/LMC:amr

Enc MPCA General Excavation Report Worksheet
cc: Mr. Jack Curtis – Property Owner
Sarah Larsen, MPCA

Minnesota Pollution Control Agency

General Excavation Report Worksheet

Guidance Document 3-02

Complete the worksheet below to document excavation and treatment of petroleum-contaminated soil removed **prior to** a Site Investigation and/or during tank removals and/or upgrades. If soil is excavated as an MPCA-approved corrective action **after** a Site Investigation is conducted, complete Guidance Document 3-02a *Corrective Action Excavation Report Worksheet*. Conduct excavations in accordance with Guidance Document 3-01 *Excavation of Petroleum Contaminated Soil*. Please type or print clearly. Do not revise or delete text or questions from this report form.

The excavation worksheet 3-02 deadline is 10 months from the date of receipt of the MPCA "Petroleum Storage Tank Release Investigation and Corrective Action" letter. MPCA staff may establish a shorter deadline for high priority sites.

PART I: BACKGROUND

A. Site: Curtis Oil (Former Junction FNF)
MPCA Site ID#: LEAK00003534

Street: 5493 Miller Trunk Highway
City, Zip: Hermantown 55811
County: St. Louis

B. Tank Owner/Operator: Curtis Oil

Mailing Address: 4995 Miller Trunk Hwy

Street/Box: 4995 Miller Trunk Hwy
City, Zip: Hermantown, 55811
Telephone: 218-729-8537

C. Excavating Contractor: Twin Ports Environmental/Construction

Contact: Kevin Lund
Telephone: (218) 343-3312
Tank Contractor Certification Number: 3045

D. Consultant: MSA Professional Services

Contact: Lynette Carney
Street/Box: 301 W 1st St Suite 408
City, Zip: Duluth, MN
Telephone: 218-722-3915

E. Others on-site during site work (e.g., fire marshal, local officials, MPCA staff, etc.):
Mr. John Houck-Dept of Commerce, Lynette Carney/Darin Albrecht – MSA, Nate Blasing-MPCA

F. Site Location Information: Attach Guidance Document 1-03a *Spatial Data Reporting Form* if it has not already been submitted or will not be submitted as part of Guidance Document 4-06 *Investigation Report Form*.

I. Historic contamination present (unknown origin?). ☒ Yes, ☐ No
The tank was located on the property of MPCA Leak # 3534 (Junction Food & Fuel)

J. When did the release occur? (if known): Unknown

K. Describe source of on-site drinking water. Private Well

L. Has the site ever, at any point had an E-85 tank? ☐ Yes, ☒ No

PART IV: EXCAVATION INFORMATION

A. Dimensions of excavation(s): Length 25 feet Width 20 feet Depth 11 feet below top of mound, 3 feet below native soil

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

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

D. Quantity of contaminated soil removed for treatment (cubic yards): Not Applicable
(Indicate on the site map where the petroleum contaminated soil was excavated)

How many cubic yards of the removed soil was petroleum saturated? Not Applicable
(Indicate on the site map where the petroleum saturated soil was excavated)

[**Note**: If the volume removed is more than allowed in Guidance Document 3-01 *Excavation of Petroleum Contaminated Soil*, please document MPCA staff approval.]

E. Were new tanks and/or piping and dispensers installed? No If yes, what volume of contaminated soil was excavated to accommodate the installation of the new tanks and piping?

F. If contaminated soil was removed to accommodate the installation of new tanks and/or piping, show your calculations for the amount of soil removal allowed using Table 3 in Guidance Document 3-01 *Excavation of Petroleum Contaminated Soil.*

G. Was ground water encountered or a suspected perched water layer or was there evidence of a seasonally high ground water table (i.e. mottling)? Groundwater was not encountered. If so, at what depth was water encountered? Not Applicable

H. If ground water was not encountered during the excavation, what is the expected depth of ground water? MN Unique well number 473834 showed water as shallow as 6 feet below ground surface. This well is currently abandoned.

I. Additional investigation to determine the need for a Limited Site Investigation is necessary at sites with sandy or silty sandy soil, a water table within 25 feet of the ground surface, and visual or other evidence of soil remaining contamination. See Table 2 in Guidance Document 3-01 *Excavation of Petroleum Contaminated Soil.* If a soil boring is necessary, describe the soil screening and analytical results. Attach the boring logs and laboratory results to this report.

Table 2

Sample Code	GRO	DRO	Benzene mg/kg	Ethyl-benzene mg/kg	Toluene Mg/kg	Xylene mg/kg	MTBE mg/kg	Lead mg/kg
TP-1 11 feet	710	2100	<0.28	1.6	<1.4	5.5	<0.28	No Data

Note: Attach copies of laboratory reports and chain of custody forms.

PART 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 of all present and former tanks, piping, and dispensers;
   b. Location of surface soil contamination
   c. Location of other structures (buildings, canopies, etc.);
   d. Adjacent city, township, or county roadways;
   e. Dimensions of excavation(s), including contour lines (maximum 2-foot contour intervals) to represent the depths of the final excavation(s);
   f. Location of soil screening samples (e.g. R-1), soil analytical samples (e.g., S-1 or B-1), and any soil borings (e.g., SB-1). Also, attach all boring logs.
   g. North arrow, bar scale and map legend.
   h. Provide location of any on-site water wells. If on-site water wells exist, please provide well logs and/or construction diagrams.
   i. Locations of new tanks, piping and dispensers, if installed.

PART VII: CONCLUSIONS AND RECOMMENDATIONS

Recommendation for site:
☐ Site closure
☒ Additional investigation

Justify the recommendations for the site. If no further action is necessary, the MPCA staff will review this report following notification of soil treatment.

Laboratory analysis confirmed the presence of a release to the soil. This information should be incorporated into MPCA Leak # 3534 (Junction Food & Fuel) to determine if additional action is required.

PART VIII: SOIL TREATMENT INFORMATION

A. Soil treatment method used (thermal, land application, composting, other). If you choose "other," specify treatment method: Not Applicable

B. Location of treatment site/facility: Not Applicable

C. Date MPCA approved soil treatment (if thermal treatment was used, indicate date that the MPCA-permitted thermal treatment facility agreed to accept soil): Not Applicable

D. Identify the location of stockpiled contaminated soil:
Not Applicable

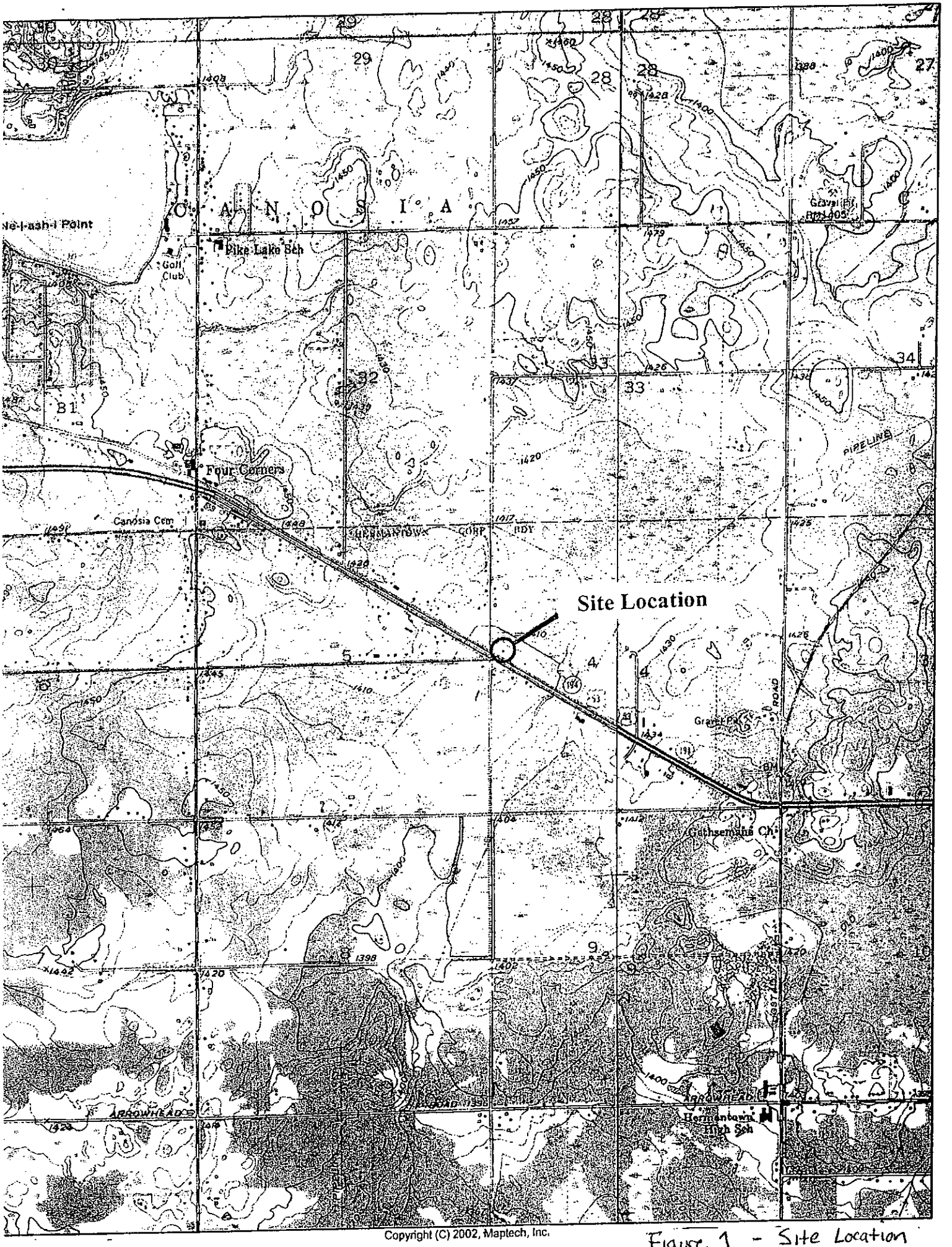


Figure 1 - Site Location

Curtis Oil Site Layout Map

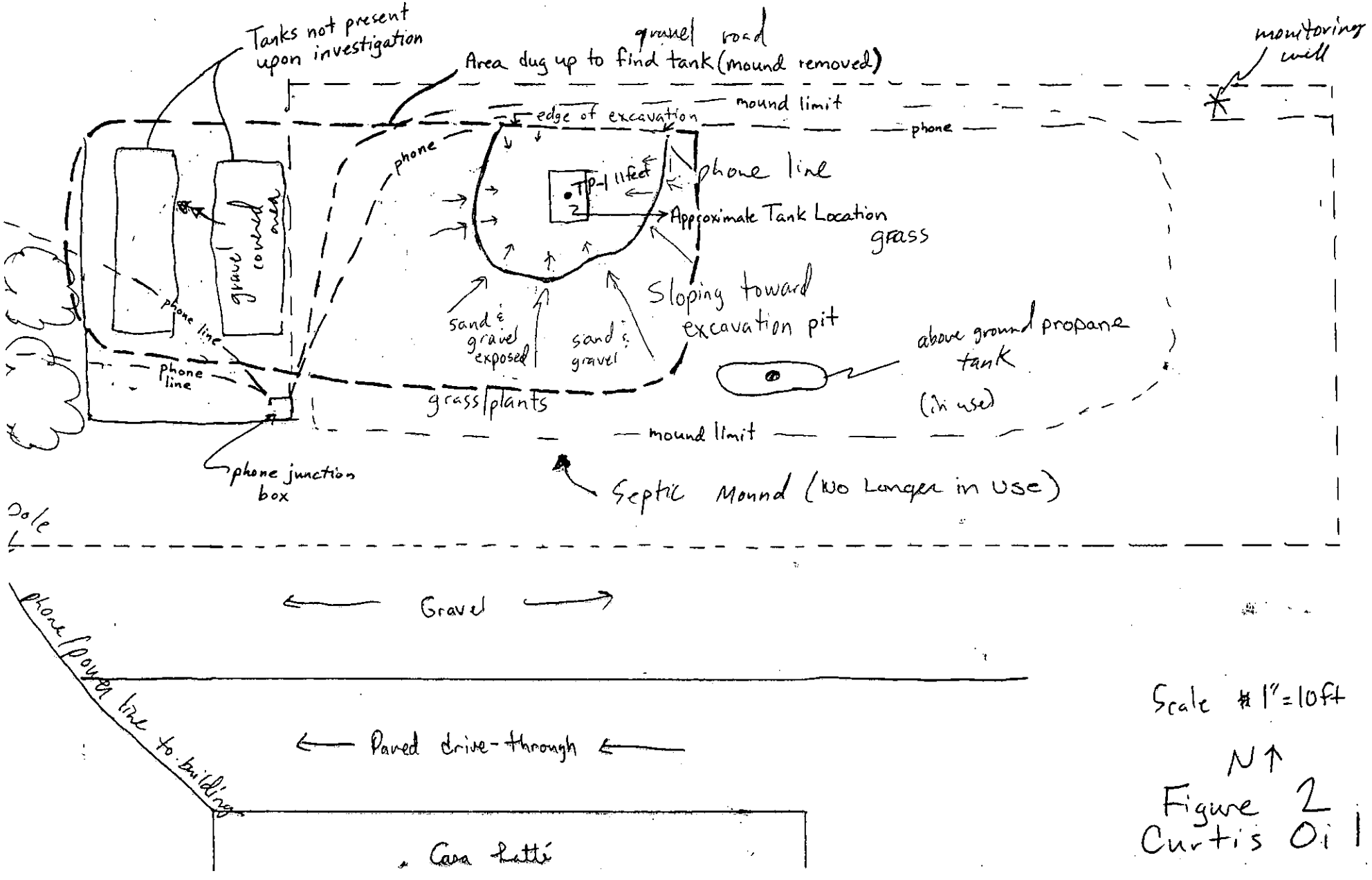
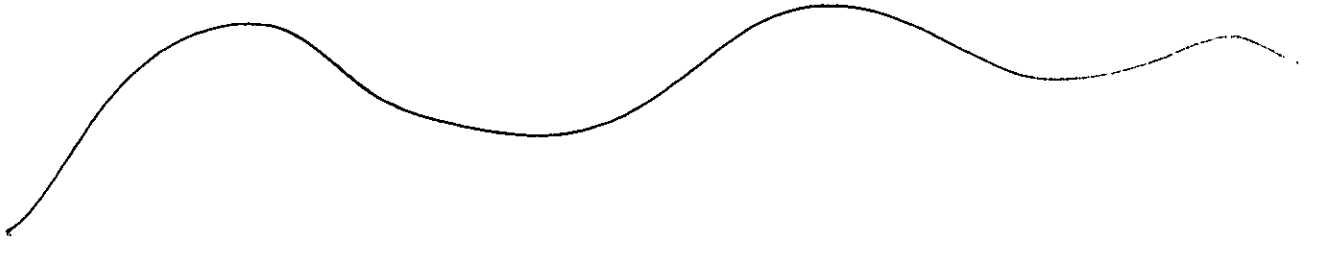


Figure 2
Curtis Oil

APPENDIX A

Spatial Data Reporting Form 1-03a



Petroleum Remediation Program
Minnesota Pollution Control Agency
http://www.pca.state.mn.us/programs/lust_p.html

Spatial Data Reporting Form

Guidance Document 1-03a
(For complete instructions, see Guidance Document 1-03.)

Part 1. Background

Has a site location data point been submitted for this site (circle/highlight)? YES or NO
If yes, you do not need to complete Part 2 of this form but should complete Part 3 if there are additional site features to report. This form can be submitted electronically if desired (e.g., as an e-mail attachment to the project manager).

MPCA Site ID: LEAK000
Site Name: Curtis Oil UST Site
Data Collection Date: 4/16/2008
Name of Person Who Collected Data: Lynette Carney
Organization Name: MSA Professional Services
Organization Type: Consulting Firm

Part 2. Site Location (use one of the three spatial data reporting formats provided)

Point Description: Tank Location
Collection Method: Terrain Navigator Pro
Datum (circle/highlight): NAD27
1) Longitude (dd mm ss.ss): 92° 15'29.12" W Latitude (dd mm ss.ss): 46° 50'.41.29"
2) Longitude (dd.dddddd): Latitude (dd.dddddd):
3) UTM - X (Easting): UTM - Y (Northing):
UTM Zone:

Part 3. Other Site Features

Point Description:
Collection Method:
Datum (circle/highlight): WGS84 NAD83
1) Longitude (dd mm ss.ss): Latitude (dd mm ss.ss):
2) Longitude (dd.dddddd): Latitude (dd.dddddd):
3) UTM - X (Easting): UTM - Y (Northing):
UTM Zone:

Point Description:
Collection Method:
Datum (circle/highlight): WGS84 NAD83
1) Longitude (dd mm ss.ss): Latitude (dd mm ss.ss):
2) Longitude (dd.dddddd): Latitude (dd.dddddd):
3) UTM - X (Easting): UTM - Y (Northing):
UTM Zone:

Point Description:
Collection Method:
Datum (circle/highlight): WGS84 NAD83
1) Longitude (dd mm ss.ss): Latitude (dd mm ss.ss):
2) Longitude (dd.dddddd): Latitude (dd.dddddd):
3) UTM - X (Easting): UTM - Y (Northing):
UTM Zone:

Point Description:
Collection Method:
Datum (circle/highlight): WGS84 NAD83
1) Longitude (dd mm ss.ss): Latitude (dd mm ss.ss):
2) Longitude (dd.dddddd): Latitude (dd.dddddd):
3) UTM - X (Easting): UTM - Y (Northing):
UTM Zone:

Point Description:
Collection Method:
Datum (circle/highlight): WGS84 NAD83
1) Longitude (dd mm ss.ss): Latitude (dd mm ss.ss):
2) Longitude (dd.dddddd): Latitude (dd.dddddd):
3) UTM - X (Easting): UTM - Y (Northing):
UTM Zone:

APPENDIX B

Tank Closure Documentation

Notification/Change in Status for Underground Storage Tanks

Minnesota Pollution Control Agency
Hazardous Waste Division Tanks and Spills Section
520 Lafayette Road North St. Paul, MN 55155
(612) 297-8664 or 1-800-657-3864

Site #:	
Leak #:	
Owner #:	
Date received:	

A. Facility Information

1. Tank Site Location	2. Owner Location
Name Former Food-N-Fuel	Name Jack Curtis
Street 5493 Miller Trunk Hwy	Street 4995 Miller Trunk Hwy
City Hermantown County St. Louis	City Hermantown County St. Louis
State MN. Zip 55811 Phone ( )	State MN. Zip 55811 Phone (218) 729-5500
Contact Person Jack Curtis	Contact Person Jack Curtis

3. Type of Facility Please check applicable box.
Service station ☒ Government ☐ Education ☐ Industry/factory ☐
Church ☐ Auto dealer ☐ Utility ☐ Other (specify): _____

4. Is tank facility located on Tribal Lands? ☐ yes ☒ no

B. Tank Number

Type or use black ink and complete as well as possible. Please photocopy form if site has more than three tanks.

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

	TANK 1	TANK 2	TANK 3
	001		

2. Tank installation date:

	TANK 1	TANK 2	TANK 3
	1940+- mo/day/yr	mo/day/yr	mo/day/yr

C. Tank Action

Please check applicable boxes.

	TANK 1	TANK 2	TANK 3	Date Occurred
Initial notification of site	☐	☐	☐	
Changed site name/address (please give previous name/address in Box H)	☐	☐	☐	/ /
Changed tank owner (please give previous owner's name and address in Box H)	☐	☐	☐	/ /
Changed tank contents	☐	☐	☐	/ /
Installed new tanks & piping	☐	☐	☐	
Installed new tank(s) at site	☐	☐	☐	
Installed new piping	☐	☐	☐	/ /
Repaired/upgraded tank (complete D3, D4, D5 and Box G if pertains and explain actions in Box H)	☐	☐	☐	/ /
Repaired/upgraded piping (please complete Box F and explain actions in Box H)	☐	☐	☐	/ /
Removed tank	☒	☐	☐	4 14 08
Name of tank disposal company: Disposed as Scrap to Azcon Corp				
Hazardous waste generator ID #: _____				
Closed tank in place	☐	☐	☐	/ /
Abandoned	☐	☐	☐	/ /
Is tank empty? ☐ yes ☐ no				
Temporarily closed	☐	☐	☐	/ /
Is tank empty? ☐ yes ☐ no				

D. Tank Information

Please check applicable boxes.

1. Type of Tank:	TANK 1	TANK 2	TANK 3
STIP3	☐	☐	☐
Fiberglass	☐	☐	☐
Composite	☐	☐	☐
Jacketed steel	☐	☐	☐
Asphalt coated steel	☐	☐	☐
Painted steel	☒	☐	☐

D. Tank Information continued

	TANK 1	TANK 2	TANK 3
2. Secondary Containment:			
Double wall	☐	☐	☐
Vault	☐	☐	☐
Internal bladder	☐	☐	☐
External liner	☐	☐	☐
3. Cathodic Protection:			
Anodes	☐	☐	☐
Impressed current	☐	☐	☐
Lined tank	☐	☐	☐
Not needed (ie. fiberglass)	☐	☐	☐

If certified by corrosion expert, write name and PE or certification # in Box H.

4. Does tank have spill prevention equipment?

TANK 1		TANK 2		TANK 3	
yes	no	yes	no	yes	no
☐	☒	☐	☐	☐	☐

5. Overfill Prevention Equipment	TANK 1	TANK 2	TANK 3
Ball float valve	☐	☐	☐
Automatic shut-off	☐	☐	☐
Audible alarm	☐	☐	☐

6. Is the tank compartmental?

TANK 1		TANK 2		TANK 3	
yes	no	yes	no	yes	no
☐	☒	☐	☐	☐	☐

If answered "yes" to #6, please proceed to Box E

7. Capacity (in gallons):

TANK 1	TANK 2	TANK 3
1000+-		

8. Substance currently or last stored:	TANK 1	TANK 2	TANK 3
Gasoline	☐	☐	☐
Alcohol blend (over 5%) gasoline	☐	☐	☐
Diesel	☒	☐	☐
Used (waste) oil	☐	☐	☐
Fuel oil	☐	☐	☐
Kerosene	☐	☐	☐
Hazardous substance (specify chemical and tank # in Box H)	☐	☐	☐
Other (specify in Box H)	☐	☐	☐

9. Is product stored in tank used only for heating?

TANK 1		TANK 2		TANK 3	
yes	no	yes	no	yes	no
☐	☒	☐	☐	☐	☐

297-2343
8683

Minnesota Pollution Control Agency

Metro District/Regular Facilities, 520 Lafayette Road North, St. Paul, MN 55155
(651) 297-8664 or (800) 657-3864 Fax (651) 282-6247

For Office Use Only
Site #:
County

Ten-day Advance Notice for Underground Storage Tank Installation or Closure

Please type or use black/blue ink and complete all applicable sections as accurately as possible. If the site has more than 6 tanks, please photocopy this form prior to completion and submit additional sheets as necessary. If you have questions refer to directions or call.

Submit the completed and signed form to Attn. Joann Henry at the above address.

Caller:	
Company:	
Phone:	
Date:	

PLEASE RETAIN A COPY FOR YOUR RECORDS.

A Facility Information

Site Information

Site Name	Curtis Oil		
Street	5493 Miller Trunk Hwy		
City	Hermantown	County	St. Louis
State	MN.	Zip	55811
Phone		Phone	
Has the site been registered before?		Yes☒	No☐
Fill in if known	Site #	Major Permit #	

Owner Information

Name	Jack Curtis		
Street	5493 Miller Trunk Hwy.		
City	Hermantown		
State	MN.	Zip	55811
Contact Name			

B. Tank Information

Tank # If unknown assign (i.e. 1001,1002...)

	Tank #001	Tank #002	Tank #	Tank #	Tank #	Tank #
Install tank	☐	☐	☐	☐	☐	☐
Install pipe	☐	☐	☐	☐	☐	☐
Repair/upgrade tank	☐	☐	☐	☐	☐	☐
Repair/upgrade pipe	☐	☐	☐	☐	☐	☐
Remove tank	☒	☒	☐	☐	☐	☐
Remove pipe	☐	☐	☐	☐	☐	☐
Capacity in Gallons (Size of Tank)	UNK	UNK				
Tank type? (Steel, Fiberglass, Composite, etc.)	Steel	Steel				
Product type? (Diesel, Gasoline, etc.)	UNK	UNK				
Pipe type? (Steel, Fiberglass, Composite, etc.)	Steel	Steel				
Is the tank registered?	Yes☐ No☒	Yes☐ No☒	Yes☐ No☐	Yes☐ No☐	Yes☐ No☐	Yes☐ No☐

Installation	**Closure**
Installation Date: UNK	Closure Date: To Be Scheduled-
Contractor #1 Name:	Contractor #1 Name: TPEC
Certification Number:	Certification Number: 695
Contractor #2 Name:	Contractor #2 Name:
Certification Number:	Certification Number:

Comments (attach additional sheets if necessary)

Informational packet sent to: site☐ owner ☐ other ☐

Weight Recorded By
Toledo Electric

AZCON CORPORATION
630 ARTHUR AVENUE
DULUTH, MINNESOTA 55802
Phone (218) 722-7703

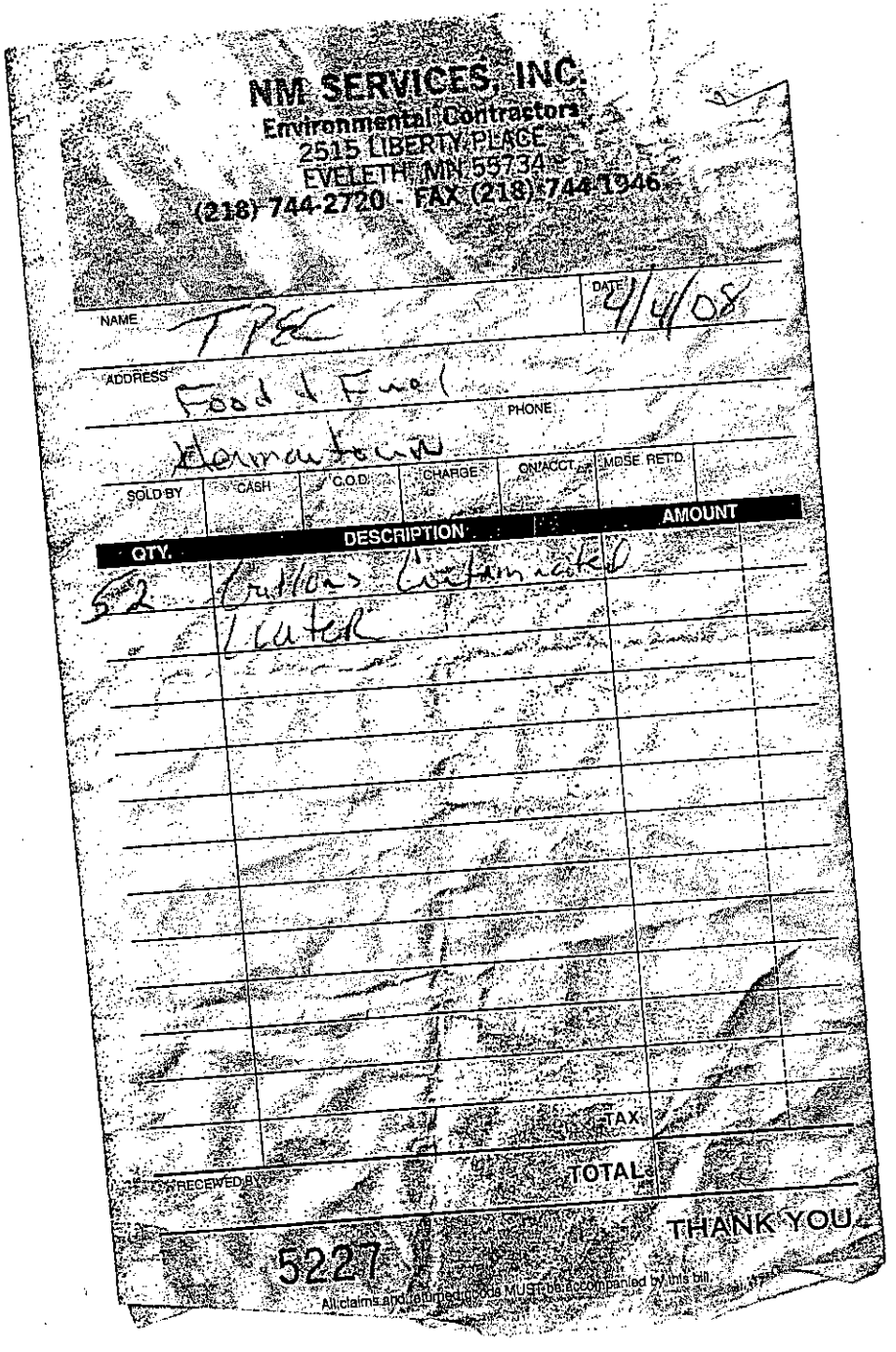
MODEL 8132 Readout
MODEL 8805 Printer

ID 6 34820 lb (1) INBOUND
11:47 04 08 08
G 34820 lb (1)
T 34480 lb
N 340 lb
ID 6 11:55 04 08 08 OUTBOUND

R- 100391

Car/Truck No: YAS 1980	Date: 8 APR 08
Marked Tare: 6 axles	Driver: ☒ OFF ☐ ON
Commodity: #1 unprep	Mat'l Code: 5001
From: Twin Port Environmental	
Address:	
City: Duluth State: MN ZIP:	
Our Order No.	Customer Order No.
Price:	
Remarks:	
Received By:	Weighed By: KC

955 Disposal



NM SERVICES, INC.
Environmental Contractors
2515 LIBERTY PLACE
EVELETH, MN 55734
(218) 744-2720 - FAX (218) 744-1946

NAME TPC
DATE 4/4/08
ADDRESS Food 1 Fuel
PHONE
Hermantown

SOLD BY	CASH	C.O.D.	CHARGE	ON ACCT.	MDSE. RET'D.

QTY.	DESCRIPTION	AMOUNT
52	Gallons Winterized Water	
	TAX	
	TOTAL	

RECEIVED BY

THANK YOU

5227

All claims and returned goods MUST be accompanied by this bill.

Prairie Pumping

APPENDIX C

MSA Field Methods & Procedures

STORAGE TANK REMOVAL

Tank removals will be completed by a MPCA certified contractor. Tank registration and removal notification will be prepared and submitted to the MPCA by the contractor 15 days prior to initiating the work. Any liquid will be pumped prior to removal, if necessary. Sludge or petroleum product discovered in the tank will be placed in 55-gallon drums. If water is encountered, depending on volume, a polyethylene tank could be provided to store the water removed. This water will require testing and permitting in order to dispose of properly and the testing will determine whether the local wastewater treatment facility will accept the water. The tank(s) will be degassed, piping disconnected, tank(s) opened, sludge removed and containerized, and cleaned. The tank and piping will be removed from the site and transported to the disposal site.

CONTAMINATION ASSESSMENT

DRILLING LOCATIONS

Soil borings will be completed in all likely source areas to define the extent and magnitude of soil contamination. Soil borings will be completed to five feet below the water table or, if contamination extended below the groundwater table, to ten feet below the deepest measurable contamination. In order to evaluate site stratigraphy, one boring will extend 20 feet below the water table or to 20 feet below deepest measurable site contamination which ever is deeper. Geologic descriptions for all soil samples collected are recorded and changes are noted as drilling conditions provided relevant geologic and stratigraphic information. A drilling log is completed for every soil boring advanced. The soil boring logs include the following information:

- Depth to start and finish of each soil sample interval attempted (feet).
- Recovery for each soil sample interval attempted (feet).
- Soil classification in accordance with the 1952 Unified Soil Classification System (USCS).
- Description of grain size, sorting, color, etc.
- Depth of significant changes in material (feet).
- Depth of sampled horizons.
- Approximate location of water table.
- Organic vapor measurements in parts per million (ppm).
- Comments regarding significant geologic, hydrogeologic features or evidence of contamination.
- Date boring started and ended.
- Name of driller and consultant present during drilling.
- Boring identification number.
- Penetration test records, if applicable.
- Ground surface elevation. To establish ground surface elevation, all borings were surveyed.

SOIL BORING DRILLING TECHNIQUES

SOIL PROBE SAMPLING

The Geoprobe® is a direct push sampling technique, which eliminates the generation of drill cuttings. A Geoprobe® machine relies on a relatively small amount of static (vehicle) weight combined with percussion as the energy for advancement of a toolstring. Using a Geoprobe® machine, you can drive one-inch diameter by two-foot long, or two-inch diameter by four-foot long, steel tubes into the ground to obtain continuous soil cores or discrete soil samples and groundwater samples. Soil samples are collected from dedicated acetate plastic liners placed inside the sampling tube.

HOLLOW-STEM AUGER

Hollow-stem auger is the most common and cost-effective method for shallow well installation and soil sample collection in unconsolidated materials. Hollow stem augers are used to a depth of approximately 100 feet. Drill cuttings are pushed up the outside of the drill stem as the auger rotates into the soil. Soil samples are collected through the hollow portion of the stem in general accordance with ASTM: D 1586-84. Using this procedure, a two-inch diameter split-barrel sampler is lowered down the hollow stem and driven into the soil by a 140-pound weight falling 30 inches. After an initial set of six inches, the sampler is driven and additional 12 to 18 inches to obtain a representative soil sample and is then retrieved. The number of blows required to drive the sampler the additional 12 inches is known as the penetration resistance or N value. The N value is an index of the relative density of cohesionless soils and the consistency of cohesive soils.

MUD ROTARY

In the mud rotary method, the borehole is advanced by rapid rotation of a drill bit mounted upon the end of drill rods. The bit cuts and breaks the material at the bottom of the hole into small pieces (cuttings). The cuttings are removed by pumping drilling fluid mixed with bentonite down through the drill rods and bit and up the annulus between the borehole and the drill rods. The drilling fluid also serves to cool the drill bit and stabilize the borehole walls, to prevent the flows of fluids between the borehole and surrounding earth materials, and to reduce cross contamination between aquifers.

All boreholes will be abandoned in accordance with Minnesota Department of Health (MDH) rules.

SOIL CLASSIFICATION

As samples are obtained in the field, they are visually and manually classified by a MSA representative in general accordance with ASTM: D 2488. Representative portions of the samples are then returned to MSA's office in the event there is need for further examination and verification of the field classification. The classification of soil boring samples, soil boring depths, identification of the various strata, the N value, water level information, and pertinent information regarding the method of maintaining and advancing the drill holes are recorded on the boring logs. Charts describing the soil classification procedure, the descriptive terminology, and symbols used on the boring logs are included on the logs.

SOIL VAPOR SCREENING

Field screening procedures follow the guidelines in MPCA Fact Sheet # 3.01 and MPCA Fact sheet # 3.22. A properly calibrated photoionization detector (PID) is used for soil vapor screening the soil samples using the headspace method. All field instruments will be maintained and calibrated following a schedule recommended by the manufacturer. MSA uses either a Foxboro Model 128 OVA (FID), a Thermo Environmental Instruments Model 580B OVM (PID), or HNU Model PI 101 (PID). Prior to conducting the vapor screening, the PID is field calibrated for a direct equivalent reading of parts per million (ppm) benzene using a calibration gas consisting of 100ppm isobutylene. With the headspace method, a fresh soil sample is placed in a zip-loc®-type baggie. Once collected and sealed, the headspace samples shall be agitated to break the soil clods and release the vapors, unless the soil is moist and cohesive. Each baggie is be filled approximately 1/3 full with soil, sealed and allowed to equilibrate for at least 10 minutes. After equilibration the PID tip is inserted into the sample baggie. The instrument reading is recorded for each sample.

Headspace samples must be allowed to equilibrate prior to analysis. Minimum equilibration times are dependent upon ambient air temperature and shall conform to the following specifications:

Ambient Air Temp.	Min. Equilibration Time
< 40EF	40 min.
41E - 55E	20 min.
56E - 69E	10 min.
> 70E	5 min.

During equilibration, the baggie should be placed in a warm place but out of direct sunlight. Equilibration times can be reduced to 10 minutes if samples are placed in a 70E water bath or under the direct heat in a running vehicle.

Soil screening will be completed frequently enough to verify the need for additional sampling, borings or soil removal (or at least one soil vapor analysis for each 10 cubic yards of soil removed). Samples will be collected from borings, tank excavation and remedial excavations, as necessary. All samples screened during the excavations will be labeled with prefix "R" for removed. After the excavation is complete, soil will be screened from the bottom and sidewalls of the excavation. All sample locations will be documented on a scaled map with the depth and location of each sample identified.

Minimum requirements for documenting organic vapor field screening are as follows:

- Record weather conditions, including outside temperature, temperature where samples are stored during equilibration, and general weather conditions (i.e., sunny, partly cloudy, light rain, windy, blizzard, etc.).
- Record instrument data, including make and model, date of last factory calibration, type of calibration gas and concentration used to check calibration, date and time of last field calibration, lamp energy in Ev, instrument gain setting (if applicable), erratic readings (if applicable), and field repairs (if applicable).
- Record field observations for each sample, including maximum concentration of each sample, relative moisture, noticeable odors, stains, and instrument quenching.

GROUNDWATER LEVEL MEASUREMENTS

Water levels are identified and measured in each boring. Soils are inspected for evidence of a fluctuating water table and a seasonable high water table. If soil borings are performed in clay or silt and appear unsaturated, one boring will be left open for at least 6 hours to confirm that groundwater had not been encountered.

Groundwater level measurements from temporary and/or permanent wells are obtained using a measuring tape equipped with a probe that emits an electronic signal when in contact with water. Measurements are obtained by lowering the probe into a well or boring and then recording the depth of the probe when the electronic signal is emitted. Measurements are referenced to the top of the well or the ground surface and recorded to the nearest 0.01 feet. The manufacturer's reported accuracy, depending on the make and model of the instrument, generally is 0.04 feet.

SAMPLE COLLECTION

SOIL SAMPLES

Soil samples collected for laboratory analysis are obtained from native soil using clean stainless steel sampling equipment and disposable nitrile gloves. Soil samples collected for laboratory analysis are weighed and placed into

glass jars with teflon-lined lids, as supplied by the laboratory. The sample containers are labeled and placed into a cooler, with ice for transport to the laboratory. Soil samples will be collected in the location and frequency mandated by the MPCA Fact Sheet 3.01. Sidewall and floor samples will be collected after removing one foot of exposed soil to ensure the collection of a fresh sample. All soil samples will be collected in accordance with MPCA Fact Sheet #3.22. Samples are collected as follows:

- Approximately 30 grams of soil are transferred to the sample jar using a clean plastic syringe to obtain the sample and weighing the sample on a scale.
- For samples requiring preservation (e.g GRO, BETX), the laboratory supplied premeasured 25 mls of 'Purge and Trap Grade" methanol are also transferred to the jar.
- The jar is capped. Methanol preserved samples will be slightly agitated to coat the soil particles with methanol.
- The jar is returned to the cooler with ice until delivered to the laboratory.
- One additional jar is filled and submitted for percent solids analysis with the corresponding sample.

For soils sampled for:

- Percent Solids
- RCRA Metals
- Polynuclear aromatic hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs)

Soil samples are to be placed on ice, but do not need to be field preserved with methanol. The soil sample collection procedure for these analyses is as follows, using one jar per analysis.

- A soil sample will be transferred form the sampling tool (i.e., acetate liner, split-spoon or backhoe bucket) using clean stainless steel sampling equipment and disposable nitrile gloves into a stainless steel bowl to be homogenized.
- An adequate volume of soil will be transferred using the stainless steel equipment into an appropriate, clean, laboratory-supplied jar.
- The soil is packed into the jar with a nitrile-gloved hand to minimize headspace. However, if there is not enough soil for all required analyses, an attempt will be made to place as much soil as possible into the jars for other analyses.
- The jar is sealed with Teflon-lined, screw cap.
- The sample is placed in a cooler with ice.
- The procedure is repeated until samples are collected for all required analyses and/or duplicates.
- Field personnel will decide which samples are to be laboratory analyzed based upon field instrument readings and other field observations, such as petroleum odor and soil staining. Only the samples that will be laboratory analyzed are left in the cooler. All other samples are discarded.

All soil-sampling procedures for samples to be tested for VOCs will be consistent with EPA method 5035.

GROUNDWATER SAMPLES

Groundwater sample collection can be preformed using a variety of methods.

Groundwater screening samples can be collected through the hydraulic probe. A slotted 4-foot stainless steel retractable screen or temporary 5 to 10-foot PVC well screen is used to retrieve water samples. The screen is placed so that the water table intersects the mid-point of the screen. The groundwater sample is collected by drawing water up (with a Geoprobe pump) through new plastic tubing, the tip of which is set within the submerged

slotted interval. New plastic tubing is used for each sample collected. Groundwater samples are collected directly from the tubing into laboratory sample containers. A transfer container is not used unless it is disposable. Groundwater samples are collected after removing approximately 2 liters (corresponding to approximately 10 "well" volumes) of groundwater to produce sediment-free water.

Groundwater samples can be collected through the HydroPunch II. The HydroPunch is driven into the aquifer by the drill rig, ahead of the hollow-stem augers. The tool utilizes an airtight and watertight sealed intake screen and sample chamber, which is isolated from the surrounding environment as the tool is advanced. The shape and smooth surface of the tool prevents the downward transport of contamination as the tool is advanced. As the soil is displaced, it compacts into the walls of the hole. This produces a very tight annular seal around the tool, enabling it to collect a discrete sample from a specific depth. When the desired depth is reached, the tool is opened by pulling back on the body of the tool. Soil friction holds the drive cone in place as the body moves back. Once the O-ring seal between the drive cone and the body of the tool is broken, groundwater flows from the surrounding formation into the sample chamber. As the tool is pulled upward, increased hydrostatic head within the tool closes a low and upper check valve, which retains the sample within the body of the HydroPunch. Once at the surface, the Hydropunch is inverted and the sample is decanted through a top discharge valve and tubing. New plastic tubing and a new screen with the HydroPunch are used for each groundwater sample collected Decontamination of the HydroPunch is conducted after each sample is collected. The body and drive case is scrubbed with non-phosphate detergent solution and an inert brush. The tool is rinsed with organic-free tap water.

Permanent and temporary monitoring wells can be sampled using dedicated disposable bailer equipped with a bottom-closing ball-check valve or by mechanical pumping using a low-flow peristaltic pump to draw water to the surface. With the bailer, a new retrieval line is used for each sampling point. The bailer is submerged just below the groundwater table and brought to the surface, without touching any other potentially contaminated surface. Water within the bailer is transferred quickly into the sample container while minimizing turbulence and exposure to the atmosphere. The low-flow pumping method draws the water up through new plastic tubing, the tip of which is set within the submerged zone. New plastic tubing/collection device is used for each sample collected. Groundwater samples are collected directly into laboratory sample containers from the tubing. Only laboratory supplied sampling containers and preservative are used for groundwater samples. All chemical preservations are added by the laboratory before sampling.

Independent of which groundwater sample extraction method is used; water quality measurements (temperature, dissolved oxygen, specific conductance, pH, oxidation-reduction potential, and salinity, dissolved oxygen percent) are recorded using the Hydrolab Quanta G, which is a down-hole probe. The probe is set at the midpoint of the screened interval. Well water flows past the probe during measurement through a circulator, which continuously supplies a fresh sample to all sensors. When changes with time become negligible, it is assumed that the instruments readings have stabilized and are then recorded. In addition to measuring ground water quality conditions in the field, the following general procedures are followed while filling sample containers:

- Sample containers are not opened until they are filled.
- The area surrounding sample collection is kept as clean as possible to minimize the potential for contamination of samples.
- Samples are collected upwind from possible airborne contamination and shielded from the wind.
- A clean pair of gloves is used at each new sampling point.

DECONTAMINATION PROCEDURES

Proper equipment decontamination procedures are followed to minimize the potential for cross-contamination between sampling points and maintain data quality. The level of equipment decontamination required typically depends on the following:

- The type, concentration, sorption and limits of detection of analytes being sampled,
- The risk of equipment coming into contact with contamination during storage and transport,
- Regulatory objectives and requirements, and
- The level of quality assurance/quality control procedures required.

All equipment contacting an unclean surface is properly decontaminated after contact. Examples of equipment that required decontamination included: water level instruments, split-barrel or spoon samplers, well purging devices, soil samplers, and spatulas.

Guidelines have been established by ASTM Method D 5088-90 for the Decontamination of Field Equipment Used at Nonradioactive Waste Sites. The minimum decontamination procedures recommended by ASTM are as follows:

- Wash sample contact equipment with a non-phosphate detergent solution (i.e., Alconox).
- Thoroughly rinse the equipment with organic-free tap water.

The more rigorous decontamination procedures recommended by ASTM are as follows:

- Wash the equipment with a non-phosphate detergent solution and scrub with an inert brush. For internal mechanisms and tubing, circulate the detergent solution through the equipment.
- Thoroughly rinse the equipment with organic-free tap water.
- For organic sampling, rinse the equipment with an organic desorbing agent (e.g., pesticide grade isopropanol, acetone, methanol or hexane). For inorganic sampling, rinse with inorganic desorbing agent (e.g., dilute hydrochloric or nitric acid solution).
- Rinse with organic-free tap water followed by rinse with deionized reagent grade organic free water.
- Place the equipment in an inert container or wrap in clean aluminum foil for storage and transport.

Decontamination documentation will be recorded as follows:

- The location where decontamination occurred.
- The individuals performing the decontamination.
- The decontamination procedures, including the wash solution and rinse water used (e.g., tap water and reagent grade water).
- The handling and disposal of decontamination wastewater.

DOCUMENTATION OF SAMPLING EVENT

All data and documentation procedures will be recorded in a standard field notebook along with standard field forms. Any exceptions to standard procedures will be recorded in the field notebook. Any field conditions that may have had an adverse affect on sampling procedures will also be recorded in the field notebook. Proper equipment decontamination procedures were followed to minimize the potential for cross-contamination between sampling points and maintain data quality.

SAMPLE PRESERVATION, HANDLING AND TRANSPORT

Sample preservation is conducted according to the procedures set forth by each laboratory's sample preservation requirements. All samples are placed immediately after collection in an insulated cooler containing ice and water slurry. The cooler is then taken directly to the laboratory or shipped next day air following completion of sample

collection via MSA personnel. The cooler temperature is recorded upon receipt at the laboratory to verify that samples were kept refrigerated at approximately 4 degrees Celsius.

CHAIN OF CUSTODY

Following the collection of samples, paperwork is completed to document the method and location of collections, sampling personnel, type of sample, and other information. This documentation includes, but is not limited to: chain-of-custody, custody seals, field notebooks, air bills, and sample identification matrix form.

Laboratory custody will conform to procedures established by the contracted laboratory. These procedures include:

- Designation of a sample custodian.
- Correct completion by the custodian of the chain-of-custody record (including documentation of sample condition upon receipt).
- Laboratory sampling tracking and documentation procedures.
- Secure sample storage (of the appropriate environment--refrigerated, dry, etc.).
- Proper data logging and documentation procedures including custody of all original laboratory records.

SAMPLE PACKAGING AND SHIPPING

The sampling packaging and shipping procedures are based on EPA specifications, as well as Department of Transportation regulation (49 CFR). The procedures vary according to the sample concentration and matrix and are designed to provide optimum protection of samples and the public. All samples are shipped within 48 hours of collection or before 50 percent of the holding time had elapsed. Shipping containers are insulated, durable, and water tight. Bagged samples are cushioned within the shipping containers packing material.

SAMPLE DUPLICATES, FIELD BLANKS AND TRIP BLANKS

REPLICATE (DUPLICATE) SAMPLES

A field duplicate is collected to determine variability in the sampling procedure. Field duplicates are collected with each batch of ten or fewer groundwater or surface water samples. The duplicate samples are collected and handled using the same procedures, but are labeled as separate samples. The initial sample is collected first by filling all the sample containers. The duplicate sample is then collected by filling all its sample containers.

FIELD BLANKS, TRIP BLANKS AND DUPLICATES

Field Blanks

A field blank is reagent grade water processed through the sampling equipment. It has the same field preparation and preservation requirements as the samples to determine if field-cleaning procedures are adequate. Field blanks should be collected at the midpoint of the sampling event. A minimum of one field blank is collected per sampling event with a frequency of one for every ten samples. A methanol field blank will also be collected if soil VOCs are included in the sample shipment. Equipment blanks are collected for surface water and groundwater samples.

Trip Blanks

The trip blank is reagent grade volatile free water from the laboratory, which accompanies the VOC sample containers to the field and back to the laboratory. The purpose of the trip blank is to determine if samples have been contaminated with VOCs before or during sampling or shipping. A trip blank is included with each VOC sample shipment.

Duplicates

One field duplicate for this sampling set from each matrix for the standard DRO, PAH, lead and arsenic analysis will be collected to determine variability in the sampling procedure. Field duplicates will also be collected with each batch of ten or fewer groundwater or surface water samples. The duplicate samples will be collected and handled using the same procedures, but are labeled as separate samples. The initial sample is collected first by filling all sample containers. The duplicate sample is the collected by filling all its sample containers.

Spikes

The laboratory will perform surrogate spikes for each organic analysis completed. For some projects, a matrix spike/matrix spike duplicate will be submitted to the required analysis. . These spikes are used to demonstrate the ability of the laboratory to generate acceptable accuracy and precision with the method. When a matrix spike / matrix spike duplicate is submitted, the required information identified on the MPCA Laboratory Data Checklist Fact Sheet dated May 1998 will be included on the final laboratory report.

INVESTIGATION-DERIVED WASTE

As a general practice, all soil cuttings, decontamination wastewater, and monitoring well development water generated during the investigation are collected in drums approved by the Minnesota Department of Transportation and temporarily stored on-site. Decontamination wastewater, if allowed, will be splashed on the ground surface. Excess purged ground water and well development water will either be splashed on the ground surface or, if suspected to be contaminated, disposed of off-site after analytical results are received. Excess soil cuttings removed from the soil borings are disposed either on or off-site depending on the suspected contamination conditions and the current state or regulatory guidelines. Disposable PPE (e.g., gloves, tyvek) will be containerized using polyethylene bags and disposed in a waste receptacle.

RECEPTOR SURVEY

WATER WELL SURVEY

A survey was conducted to identify possible water supply wells that may be at risk from the petroleum release and to provide information regarding the geology and groundwater use near the release site. For the water well survey, the following was completed:

- A walking survey of all properties was conducted within 500 feet of the edges of the plum to locate all water supply wells and possible off-site petroleum contamination.
- The addresses of the properties within 500 feet of the plume were provided to the city engineer to confirm the status of water supply wells to those addresses.

- Information was requested from the MGS for wells within 1 mile of the plume to complete a review of the well log database.

VAPOR RISK ASSESSMENT AND SURVEY

The utility vapor survey was conducted as follows:

- Diggers Hotline marked all site utilities prior to site activities. Following the initial site investigation, it was determined that the risk to site utilities was minimal as PID readings were low and no utilities were located within the area of the former UST basin.

Basement surveys are conducted as follows:

- An interview with the building owner is conducted to determine any history of petroleum odors.
- The site basement was checked using a MicroMax Four Gas monitor and a PID. Vapor readings are recorded in ambient air to assess air quality.
- Basement sewer drains, corners and areas of poor air circulation were checked for vapor.

CONTAMINATED SOIL EXCAVATION STORAGE AND TREATMENT

Prior to implementation of excavation activities, a plan for the storage of all disturbed and/or removed contaminated soil material will be prepared and a treatment options will be identified. All soil removed will be field screened and separated based on field screening criteria identified in MPCA Fact Sheet #3.01. Excavated waste and soil that will be temporarily stored prior to treatment or transport off site will be placed on an impermeable surface and covered with plastic. The plastic will be anchored with clean soil or other suitable material.

APPENDIX D

Laboratory Analytical Results and Chain of Custody

MSA Professional Services

301 West First Street. Suite 408
Duluth,MN 55802

Alternate billing information:

Chain of Custody
Page 1 of 1

Prepared by:

ENVIRONMENTAL SCIENCE CORP.
12065 Lebanon Road
Mt. Juliet, TN 37122
Phone (800) 767-5859
FAX (615) 758-5859

Report to: Lynette M. Carney, P.G.

Email: lcarney@msa-ps.com

Project Description: Curtis Oil

City/State Collected: Hermantown MN

Phone: (218) 722-3915
FAX: (218) 722-4548

Client Project #: 6390703B

Lab Project #: MSAPRODMN-6390703B

Collected by (print): DARIN R. ALBRECHT

Site/Facility ID#: Curtis Oil Tank Pull

P.O.#:

Collected by (signature): Darin R. Albrecht
Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day.....100%
___ Two Day.....50%
___ Three Day.....25%

Date Results Needed

Email? ___No X Yes
FAX? ___No ___Yes

Acctnum: MSAPRODMN (lab use only)
Template/Prelogin: T48134/P232578
Cooler #: 1-17-086
Shipped Via: FedEx Ground

Analysis/Container/Preservative

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	GRO WM (60ml Amb/MeOH/Syr)	TS 2ozClr-NoPres	VB 8260/8465 (60ml Amb/MeOH/Syr)	Volatile Screen 2ozClr-NoPres	DRO (60ml Amb/HCl preserved)		Remarks/Contaminant	Sample # (lab only)
TP-1	Grab	SS	11 feet	4/4/08	10:20	4	X	X	X	X	X			L339631-01
		~~SS~~				4	X	X	X	X				
		~~SS~~				4	X	X	X	X				
		~~SS~~				4	X	X	X	X				

*Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other_____

pH _____ Temp _____

Remarks:

Flow _____ Other _____

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
Darin R. Albrecht	4/4/08	1:15pm	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____
Temp: 3.6c Bottles Received: 4
COC Seal Intact: Y N NA

Condition: OK (lab use only)
pH Checked: NCF:

Date: 4/5/08 Time: 0600

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1-800-767-5859
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Est. 1970

REPORT OF ANALYSIS

April 11,2008

Lynette M. Carney, P.G.
MSA Professional Services
301 West First Street, Suite 408
Duluth, MN 55802

ESC Sample # : L339631-01

Date Received : April 05, 2008
Description : Curtis Oil

Site ID : CURTIS OIL TANK PULL

Sample ID : TP-1 11FT

Project # : 6390703B

Collected By : Darin R. Albrecht
Collection Date : 04/04/08 10:20

Parameter	Dry Result	Det. Limit	Units	Method	Date	Dil.
Total Solids	86.3		%	2540G	04/10/08	1
WI DNR						
GRO (C6-C12)	710	53.	mg/kg	GROWM/8015M	04/10/08	460
Surrogate Recovery (70-130)						
a,a,a-Trifluorotoluene(PID)	99.3		% Rec.	GROWM/8015M	04/10/08	460
Volatile Organics						
Acetone	BDL	14.	mg/kg	8260B	04/07/08	243
Acrylonitrile	BDL	2.8	mg/kg	8260B	04/07/08	243
Allyl chloride	BDL	1.4	mg/kg	8260B	04/07/08	243
Benzene	BDL	0.28	mg/kg	8260B	04/07/08	243
Bromobenzene	BDL	0.28	mg/kg	8260B	04/07/08	243
Bromodichloromethane	BDL	0.28	mg/kg	8260B	04/07/08	243
Bromoform	BDL	0.28	mg/kg	8260B	04/07/08	243
Bromomethane	BDL	1.4	mg/kg	8260B	04/07/08	243
n-Butylbenzene	BDL	0.28	mg/kg	8260B	04/07/08	243
sec-Butylbenzene	BDL	0.28	mg/kg	8260B	04/07/08	243
tert-Butylbenzene	BDL	0.28	mg/kg	8260B	04/07/08	243
Carbon tetrachloride	BDL	0.28	mg/kg	8260B	04/07/08	243
Chlorobenzene	BDL	0.28	mg/kg	8260B	04/07/08	243
Chlorodibromomethane	BDL	0.28	mg/kg	8260B	04/07/08	243
Chloroethane	BDL	1.4	mg/kg	8260B	04/07/08	243
2-Chloroethyl vinyl ether	BDL	14.	mg/kg	8260B	04/07/08	243
Chloroform	BDL	1.4	mg/kg	8260B	04/07/08	243
Chloromethane	BDL	0.28	mg/kg	8260B	04/07/08	243
2-Chlorotoluene	BDL	0.28	mg/kg	8260B	04/07/08	243
4-Chlorotoluene	BDL	0.28	mg/kg	8260B	04/07/08	243
1,2-Dibromo-3-Chloropropane	BDL	1.4	mg/kg	8260B	04/07/08	243
1,2-Dibromoethane	BDL	0.28	mg/kg	8260B	04/07/08	243
Dibromomethane	BDL	0.28	mg/kg	8260B	04/07/08	243
1,2-Dichlorobenzene	BDL	0.28	mg/kg	8260B	04/07/08	243
1,3-Dichlorobenzene	BDL	0.28	mg/kg	8260B	04/07/08	243
1,4-Dichlorobenzene	BDL	0.28	mg/kg	8260B	04/07/08	243
Dichlorodifluoromethane	BDL	1.4	mg/kg	8260B	04/07/08	243
1,1-Dichloroethane	BDL	0.28	mg/kg	8260B	04/07/08	243
1,2-Dichloroethane	BDL	0.28	mg/kg	8260B	04/07/08	243
1,1-Dichloroethene	BDL	0.28	mg/kg	8260B	04/07/08	243
cis-1,2-Dichloroethene	BDL	0.28	mg/kg	8260B	04/07/08	243
trans-1,2-Dichloroethene	BDL	0.28	mg/kg	8260B	04/07/08	243
1,2-Dichloropropane	BDL	0.28	mg/kg	8260B	04/07/08	243
1,1-Dichloropropene	BDL	0.28	mg/kg	8260B	04/07/08	243
1,3-Dichloropropane	BDL	0.28	mg/kg	8260B	04/07/08	243
cis-1,3-Dichloropropene	BDL	0.28	mg/kg	8260B	04/07/08	243

Results listed are dry weight basis.
BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:

The reported analytical results relate only to the sample submitted
L339631-01 (V8260/465) - Non-target compounds too high to run at a lower dilution.

missing pg 3

Attachment A
List of Analytes with QC Qualifiers

Sample #	Analyte	Qualifier
L339631-01	1,2,3-Trichlorobenzene	J4

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MSA Professional Services
Lynette M. Carney, P.G.
301 West First Street, Suite 408

Duluth, MN 55802

Quality Assurance Report
Level II

L339631

April 11, 2008

Laboratory Blank

Analyte	Result	Units	Date Analyzed	Batch
1,1,1,2-Tetrachloroethane	< .001	mg/kg	04/07/08 12:41	WG354147
1,1,1-Trichloroethane	< .001	mg/kg	04/07/08 12:41	WG354147
1,1,2,2-Tetrachloroethane	< .001	mg/kg	04/07/08 12:41	WG354147
1,1,2-Trichloroethane	< .001	mg/kg	04/07/08 12:41	WG354147
1,1,2-Trichloro-1,2,2-trifluoroethane	< .001	mg/kg	04/07/08 12:41	WG354147
1,1-Dichloroethane	< .001	mg/kg	04/07/08 12:41	WG354147
1,1-Dichloroethene	< .001	mg/kg	04/07/08 12:41	WG354147
1,1-Dichloropropene	< .001	mg/kg	04/07/08 12:41	WG354147
1,2,3-Trichlorobenzene	< .001	mg/kg	04/07/08 12:41	WG354147
1,2,3-Trichloropropane	< .001	mg/kg	04/07/08 12:41	WG354147
1,2,3-Trimethylbenzene	< .001	mg/kg	04/07/08 12:41	WG354147
1,2,4-Trichlorobenzene	< .001	mg/kg	04/07/08 12:41	WG354147
1,2,4-Trimethylbenzene	< .005	mg/kg	04/07/08 12:41	WG354147
1,2-Dibromo-3-Chloropropane	< .001	mg/kg	04/07/08 12:41	WG354147
1,2-Dibromoethane	< .001	mg/kg	04/07/08 12:41	WG354147
1,2-Dichlorobenzene	< .001	mg/kg	04/07/08 12:41	WG354147
1,2-Dichloroethane	< .001	mg/kg	04/07/08 12:41	WG354147
1,2-Dichloropropane	< .001	mg/kg	04/07/08 12:41	WG354147
1,3,5-Trimethylbenzene	< .001	mg/kg	04/07/08 12:41	WG354147
1,3-Dichlorobenzene	< .001	mg/kg	04/07/08 12:41	WG354147
1,3-Dichloropropane	< .001	mg/kg	04/07/08 12:41	WG354147
1,4-Dichlorobenzene	< .001	mg/kg	04/07/08 12:41	WG354147
2,2-Dichloropropane	< .01	mg/kg	04/07/08 12:41	WG354147
2-Butanone (MEK)	< .001	mg/kg	04/07/08 12:41	WG354147
2-Chloroethyl vinyl ether	< .001	mg/kg	04/07/08 12:41	WG354147
2-Chlorotoluene	< .01	mg/kg	04/07/08 12:41	WG354147
2-Hexanone	< .001	mg/kg	04/07/08 12:41	WG354147
4-Chlorotoluene	< .01	mg/kg	04/07/08 12:41	WG354147
4-Methyl-2-pentanone (MIBK)	< .05	mg/kg	04/07/08 12:41	WG354147
Acetone	< .01	mg/kg	04/07/08 12:41	WG354147
Acrylonitrile	< .025	mg/kg	04/07/08 12:41	WG354147
Allyl chloride	< .001	mg/kg	04/07/08 12:41	WG354147
Benzene	< .001	mg/kg	04/07/08 12:41	WG354147
Bromobenzene	< .001	mg/kg	04/07/08 12:41	WG354147
Bromodichloromethane	< .001	mg/kg	04/07/08 12:41	WG354147
Bromoform	< .005	mg/kg	04/07/08 12:41	WG354147
Bromomethane	< .001	mg/kg	04/07/08 12:41	WG354147
Carbon tetrachloride	< .001	mg/kg	04/07/08 12:41	WG354147
Chlorobenzene	< .001	mg/kg	04/07/08 12:41	WG354147
Chlorodibromomethane	< .005	mg/kg	04/07/08 12:41	WG354147
Chloroethane	< .005	mg/kg	04/07/08 12:41	WG354147
Chloroform	< .001	mg/kg	04/07/08 12:41	WG354147
Chloromethane	< .001	mg/kg	04/07/08 12:41	WG354147
cis-1,2-Dichloroethene	< .001	mg/kg	04/07/08 12:41	WG354147
cis-1,3-Dichloropropene	< .001	mg/kg	04/07/08 12:41	WG354147
Di-isopropyl ether	< .001	mg/kg	04/07/08 12:41	WG354147
Dibromomethane	< .005	mg/kg	04/07/08 12:41	WG354147
Dichlorodifluoromethane	< .001	mg/kg	04/07/08 12:41	WG354147
Ethyl ether	< .001	mg/kg	04/07/08 12:41	WG354147
Ethylbenzene	< .001	mg/kg	04/07/08 12:41	WG354147
Hexachlorobutadiene	< .001	mg/kg	04/07/08 12:41	WG354147
Isopropylbenzene	< .001	mg/kg	04/07/08 12:41	WG354147
Methyl tert-butyl ether	< .005	mg/kg	04/07/08 12:41	WG354147
Methylene Chloride	< .001	mg/kg	04/07/08 12:41	WG354147
n-Butylbenzene	< .001	mg/kg	04/07/08 12:41	WG354147
n-Propylbenzene	< .005	mg/kg	04/07/08 12:41	WG354147
Naphthalene	< .001	mg/kg	04/07/08 12:41	WG354147
p-Isopropyltoluene	< .001	mg/kg	04/07/08 12:41	WG354147
sec-Butylbenzene	< .001	mg/kg	04/07/08 12:41	WG354147
Styrene				

ENVIRONMENTAL SCIENCE CORP.

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

MSA Professional Services
Lynette M. Carney, P.G.
301 West First Street, Suite 408

Duluth, MN 55802

Quality Assurance Report
Level II

L339631

April 11, 2008

Bromoform	mg/kg	.05	0.0489	97.7	64-139	WG354147

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Bromomethane	mg/kg	.05	0.0530	106.	41-175	WG354147
Carbon tetrachloride	mg/kg	.05	0.0527	105.	60-140	WG354147
Chlorobenzene	mg/kg	.05	0.0489	97.8	75-125	WG354147
Chlorodibromomethane	mg/kg	.05	0.0520	104.	72-137	WG354147
Chloroethane	mg/kg	.05	0.0543	109.	44-159	WG354147
Chloroform	mg/kg	.05	0.0481	96.1	63-123	WG354147
Chloromethane	mg/kg	.05	0.0502	100.	42-149	WG354147
cis-1,2-Dichloroethene	mg/kg	.05	0.0532	106.	71-129	WG354147
cis-1,3-Dichloropropene	mg/kg	.05	0.0531	106.	73-132	WG354147
Di-isopropyl ether	mg/kg	.05	0.0494	98.9	59-143	WG354147
Dibromomethane	mg/kg	.05	0.0509	102.	70-130	WG354147
Dichlorodifluoromethane	mg/kg	.05	0.0478	95.6	26-186	WG354147
Ethyl ether	mg/kg	.05	0.0482	96.3	56-147	WG354147
Ethylbenzene	mg/kg	.05	0.0493	98.5	74-128	WG354147
Hexachlorobutadiene	mg/kg	.05	0.0549	110.	65-137	WG354147
Isopropylbenzene	mg/kg	.05	0.0505	101.	73-130	WG354147
Methyl tert-butyl ether	mg/kg	.05	0.0497	99.3	44-148	WG354147
Methylene Chloride	mg/kg	.05	0.0525	105.	57-129	WG354147
n-Butylbenzene	mg/kg	.05	0.0473	94.5	60-145	WG354147
n-Propylbenzene	mg/kg	.05	0.0491	98.2	71-132	WG354147
Naphthalene	mg/kg	.05	0.0633	127.	61-142	WG354147
p-Isopropyltoluene	mg/kg	.05	0.0506	101.	67-138	WG354147
sec-Butylbenzene	mg/kg	.05	0.0499	99.9	71-134	WG354147
Styrene	mg/kg	.05	0.0496	99.1	76-133	WG354147
tert-Butylbenzene	mg/kg	.05	0.0488	97.6	72-132	WG354147
Tetrachloroethene	mg/kg	.05	0.0468	93.6	65-135	WG354147
Tetrahydrofuran	mg/kg	.05	0.0436	87.3	44-144	WG354147
Toluene	mg/kg	.05	0.0483	96.6	70-120	WG354147
trans-1,2-Dichloroethene	mg/kg	.05	0.0543	109.	61-133	WG354147
trans-1,3-Dichloropropene	mg/kg	.05	0.0518	104.	70-135	WG354147
Trichloroethene	mg/kg	.05	0.0491	98.3	71-126	WG354147
Trichlorofluoromethane	mg/kg	.05	0.0492	98.4	52-147	WG354147
Vinyl chloride	mg/kg	.05	0.0521	104.	50-151	WG354147
Xylenes, Total	mg/kg	.15	0.146	97.2	74-127	WG354147
WI DRO	mg/kg	40	33.4	83.4	70-120	WG354280
Total Solids	%	50	50.0	100.	85-115	WG354563
GRO (C6-C12)	mg/kg	.5	0.514	103.	70-130	WG354867

Laboratory Control Sample Duplicate

Analyte	Units	LCSD Res	Ref Res	RPD	Limit	%Rec	Batch
1,1,1,2-Tetrachloroethane	mg/kg	0.0546	0.0536	1.85	20	109	WG354147
1,1,1-Trichloroethane	mg/kg	0.0512	0.0511	0.0974	20	102	WG354147
1,1,2,2-Tetrachloroethane	mg/kg	0.0540	0.0509	5.87	20	108	WG354147
1,1,2-Trichloroethane	mg/kg	0.0524	0.0510	2.69	20	105	WG354147
1,1,2-Trichloro-1,2,2-trifluoroethane	mg/kg	0.0475	0.0482	1.43	20	95	WG354147
1,1-Dichloroethane	mg/kg	0.0506	0.0507	0.227	20	101	WG354147
1,1-Dichloroethene	mg/kg	0.0541	0.0547	1.05	20	108	WG354147
1,1-Dichloropropene	mg/kg	0.0487	0.0483	0.656	20	97	WG354147
1,2,3-Trichlorobenzene	mg/kg	0.0734	0.0769	4.68	20	147	WG354147
1,2,3-Trichloropropane	mg/kg	0.0525	0.0495	5.97	20	105	WG354147
1,2,3-Trimethylbenzene	mg/kg	0.0482	0.0468	2.90	20	96	WG354147
1,2,4-Trichlorobenzene	mg/kg	0.0561	0.0562	0.247	20	112	WG354147
1,2,4-Trimethylbenzene	mg/kg	0.0505	0.0503	0.340	20	101	WG354147
1,2-Dibromo-3-Chloropropane	mg/kg	0.0519	0.0465	10.9	21	104	WG354147
1,2-Dibromoethane	mg/kg	0.0535	0.0506	5.47	20	107	WG354147

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		Matrix Spike						
Analyte	Units	MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
,1,1,2-Tetrachloroethane	mg/kg	1.98	0.00	.05	99.1	29-145	L339248-01	WG354147
,1,1-Trichloroethane	mg/kg	1.89	0.00	.05	94.3	23-147	L339248-01	WG354147
,1,2,2-Tetrachloroethane	mg/kg	2.00	0.00	.05	100.	18-150	L339248-01	WG354147
,1,2-Trichloroethane	mg/kg	1.93	0.00	.05	96.6	35-140	L339248-01	WG354147
,1,2-Trichloro-1,2,2-trifluoroethane	mg/kg	1.87	0.00	.05	93.7	10-145	L339248-01	WG354147
,1-Dichloroethane	mg/kg	1.91	0.00	.05	95.7	24-148	L339248-01	WG354147
,1-Dichloroethene	mg/kg	2.15	0.00	.05	107.	10-149	L339248-01	WG354147
,1-Dichloropropene	mg/kg	1.89	0.00	.05	94.3	10-141	L339248-01	WG354147
,2,3-Trichlorobenzene	mg/kg	4.58	0.00	.05	229.	10-129	L339248-01	WG354147
,2,3-Trichloropropane	mg/kg	2.05	0.00	.05	103.	30-148	L339248-01	WG354147
,2,3-Trimethylbenzene	mg/kg	1.87	0.0400	.05	91.6	10-137	L339248-01	WG354147
,2,4-Trichlorobenzene	mg/kg	2.85	0.00	.05	142.	10-119	L339248-01	WG354147
,2,4-Trimethylbenzene	mg/kg	2.89	0.940	.05	97.5	10-145	L339248-01	WG354147
,2-Dibromo-3-Chloropropane	mg/kg	1.82	0.00	.05	91.0	19-145	L339248-01	WG354147
,2-Dibromoethane	mg/kg	1.92	0.00	.05	95.8	24-145	L339248-01	WG354147
,2-Dichlorobenzene	mg/kg	1.90	0.00	.05	94.9	12-130	L339248-01	WG354147
,2-Dichloroethane	mg/kg	1.84	0.00	.05	92.2	21-155	L339248-01	WG354147
,2-Dichloropropane	mg/kg	2.00	0.00	.05	99.8	28-144	L339248-01	WG354147
,3,5-Trimethylbenzene	mg/kg	2.40	0.0870	.05	116.	10-135	L339248-01	WG354147
,3-Dichlorobenzene	mg/kg	1.95	0.00	.05	97.7	10-129	L339248-01	WG354147
,3-Dichloropropane	mg/kg	1.83	0.00	.05	91.7	31-137	L339248-01	WG354147
,4-Dichlorobenzene	mg/kg	1.84	0.00	.05	92.0	10-121	L339248-01	WG354147
2,2-Dichloropropane	mg/kg	1.96	0.00	.05	98.2	18-144	L339248-01	WG354147
2-Butanone (MEK)	mg/kg	9.29	0.00	.25	92.9	21-143	L339248-01	WG354147
2-Chloroethyl vinyl ether	mg/kg	9.47	0.00	.25	94.7	0-176	L339248-01	WG354147
2-Chlorotoluene	mg/kg	1.88	0.00	.05	94.0	10-132	L339248-01	WG354147
2-Hexanone	mg/kg	9.22	0.00	.25	92.2	22-151	L339248-01	WG354147
4-Chlorotoluene	mg/kg	1.94	0.00	.05	96.9	10-129	L339248-01	WG354147
4-Methyl-2-pentanone (MIBK)	mg/kg	9.49	0.00	.25	94.9	31-151	L339248-01	WG354147
Acetone	mg/kg	8.28	0.00	.25	82.8	13-158	L339248-01	WG354147
Acrylonitrile	mg/kg	9.00	0.00	.25	90.0	20-154	L339248-01	WG354147
Allyl chloride	mg/kg	8.59	0.00	.25	85.9	0-0	L339248-01	WG354147
Benzene	mg/kg	1.93	0.0270	.05	95.1	16-143	L339248-01	WG354147
Bromobenzene	mg/kg	1.98	0.00	.05	99.2	14-135	L339248-01	WG354147
Bromodichloromethane	mg/kg	1.93	0.00	.05	96.4	27-139	L339248-01	WG354147
Bromoform	mg/kg	1.72	0.00	.05	86.2	21-144	L339248-01	WG354147
Bromomethane	mg/kg	0.809	0.00	.05	40.4	0-180	L339248-01	WG354147
Carbon tetrachloride	mg/kg	1.95	0.00	.05	97.4	12-149	L339248-01	WG354147
Chlorobenzene	mg/kg	1.89	0.00	.05	94.6	17-134	L339248-01	WG354147
Chlorodibromomethane	mg/kg	1.87	0.00	.05	93.5	28-147	L339248-01	WG354147
Chloroethane	mg/kg	0.863	0.00	.05	43.1	0-172	L339248-01	WG354147
Chloroform	mg/kg	1.79	0.00	.05	89.3	28-138	L339248-01	WG354147
Chloromethane	mg/kg	1.87	0.00	.05	93.6	10-158	L339248-01	WG354147
cis-1,2-Dichloroethene	mg/kg	2.00	0.00	.05	100.	21-147	L339248-01	WG354147
cis-1,3-Dichloropropene	mg/kg	1.99	0.00	.05	99.5	17-145	L339248-01	WG354147
Di-isopropyl ether	mg/kg	1.87	0.00	.05	93.3	31-153	L339248-01	WG354147
Dibromomethane	mg/kg	1.92	0.00	.05	96.1	24-147	L339248-01	WG354147
Dichlorodifluoromethane	mg/kg	1.88	0.00	.05	94.1	0-192	L339248-01	WG354147
Ethyl ether	mg/kg	1.67	0.00	.05	83.5	25-156	L339248-01	WG354147
Ethylbenzene	mg/kg	2.33	0.490	.05	92.1	12-137	L339248-01	WG354147
Hexachlorobutadiene	mg/kg	2.20	0.00	.05	110.	10-123	L339248-01	WG354147
Isopropylbenzene	mg/kg	2.09	0.140	.05	97.4	14-134	L339248-01	WG354147
Methyl tert-butyl ether	mg/kg	1.89	0.00	.05	94.5	21-157	L339248-01	WG354147
Methylene Chloride	mg/kg	1.91	0.00	.05	95.7	12-149	L339248-01	WG354147
n-Butylbenzene	mg/kg	2.11	0.00	.05	106.	10-130	L339248-01	WG354147
n-Propylbenzene	mg/kg	2.27	0.340	.05	96.3	10-130	L339248-01	WG354147
Naphthalene	mg/kg	3.78	0.290	.05	175.	0-146	L339248-01	WG354147
p-Isopropyltoluene	mg/kg	2.05	0.0290	.05	101.	10-131	L339248-01	WG354147
sec-Butylbenzene	mg/kg	2.01	0.0560	.05	97.6	10-134	L339248-01	WG354147
Styrene	mg/kg	1.91	0.00	.05	95.4	10-140	L339248-01	WG354147

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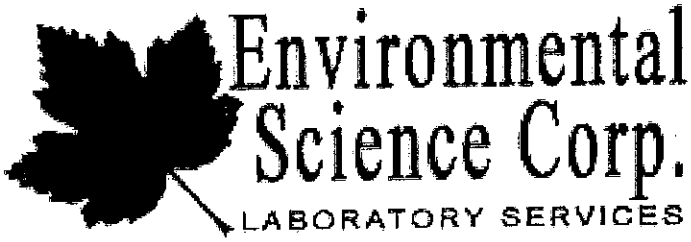
is-1,3-Dichloropropene	mg/kg	2.14	1.99	7.42	32	107.	L339248-01	WG354147

		Matrix Spike Duplicate						
nalyte	Units	MSD Res	Ref Res	RPD	Limit	%Rec	Ref Samp	Batch
i-isopropyl ether	mg/kg	2.03	1.87	8.44	29	101.	L339248-01	WG354147
ibromomethane	mg/kg	2.05	1.92	6.36	30	102.	L339248-01	WG354147
ichlorodifluoromethane	mg/kg	1.94	1.88	3.29	38	97.2	L339248-01	WG354147
thyl ether	mg/kg	1.93	1.67	14.5	31	96.5	L339248-01	WG354147
thylbenzene	mg/kg	2.49	2.33	6.69	36	100.	L339248-01	WG354147
exachlorobutadiene	mg/kg	1.80	2.20	19.9	50	89.9	L339248-01	WG354147
sopropylbenzene	mg/kg	2.24	2.09	6.80	37	105.	L339248-01	WG354147
lethyl tert-butyl ether	mg/kg	2.09	1.89	10.2	31	105.	L339248-01	WG354147
lethylene Chloride	mg/kg	2.10	1.91	9.27	31	105.	L339248-01	WG354147
-Butylbenzene	mg/kg	2.23	2.11	5.44	48	111.	L339248-01	WG354147
-Propylbenzene	mg/kg	2.41	2.27	6.09	40	103.	L339248-01	WG354147
aphthalene	mg/kg	2.50	3.78	40.8	43	110.	L339248-01	WG354147
-Isopropyltoluene	mg/kg	2.16	2.05	5.22	43	106.	L339248-01	WG354147
ec-Butylbenzene	mg/kg	2.12	2.01	5.63	43	103.	L339248-01	WG354147
tyrene	mg/kg	2.06	1.91	7.73	35	103.	L339248-01	WG354147
ert-Butylbenzene	mg/kg	2.03	1.92	5.97	39	102.	L339248-01	WG354147
etrachloroethene	mg/kg	2.00	1.84	8.63	35	100.	L339248-01	WG354147
etrahydrofuran	mg/kg	2.20	2.08	5.51	37	110.	L339248-01	WG354147
oluene	mg/kg	1.98	1.84	7.45	32	99.0	L339248-01	WG354147
rans-1,2-Dichloroethene	mg/kg	2.23	2.07	7.84	33	112.	L339248-01	WG354147
rans-1,3-Dichloropropene	mg/kg	2.09	1.94	7.48	32	105.	L339248-01	WG354147
richloroethene	mg/kg	2.07	1.90	8.79	33	104.	L339248-01	WG354147
richlorofluoromethane	mg/kg	1.58	1.57	0.461	32	78.8	L339248-01	WG354147
inyl chloride	mg/kg	2.18	2.02	7.53	36	109.	L339248-01	WG354147
ylenes, Total	mg/kg	6.24	5.81	7.16	36	101.	L339248-01	WG354147
RO (C6-C12)	mg/kg	25.1	24.1	4.27	20	103.	L340140-01	WG354867

Batch number /Run number / Sample number cross reference

WG354147: R361138: L339631-01
WG354563: R361790: L339631-01
WG354280: R361941: L339631-01
WG354867: R362056: L339631-01

* * Calculations are performed prior to rounding of reported values



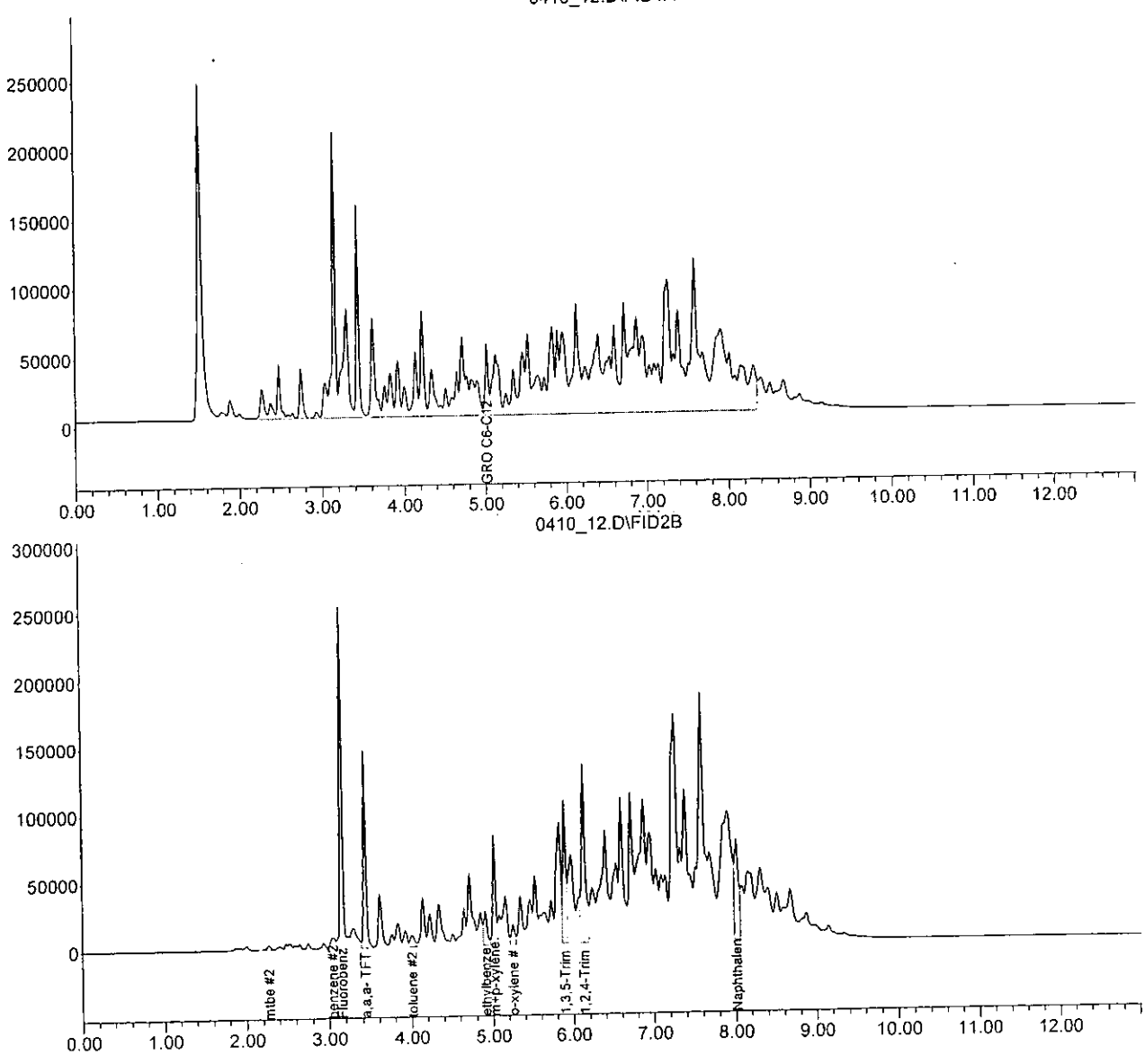
CHROMATOGRAMS

Quantitation Report (QT Reviewed)

Signal #1 : C:\HPCHEM\1\DATA\041008\0410_12.D\FID1A.CH Vial: 12
Signal #2 : C:\HPCHEM\1\DATA\041008\0410_12.D\FID2B.CH
Acq On : 10 Apr 2008 4:57 pm Operator: 055
Sample : L339631-01 460x WG354867 GROWM Inst : VOCGC3
Misc : soil IS 7L28531 Multiplr: 460.00
IntFile Signal #1: EVENTS3.E IntFile Signal #2: EVENTS2.E
Quant Time: Apr 11 10:16 2008 Quant Results File: PV03B19H.RES

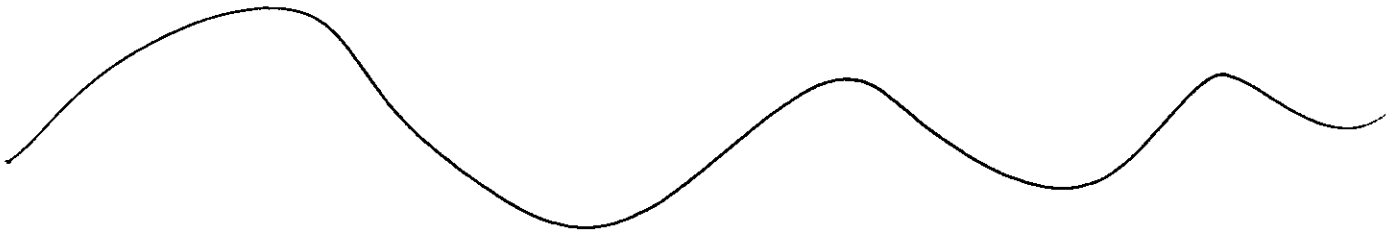
Quant Method : C:\HPCHEM\1\METHODS\PV03B19H.M (Chemstation Integrator)
Title : WIS GRO VOCGC6
Last Update : Thu Mar 27 13:02:50 2008
Response via : Multiple Level Calibration
DataAcq Meth : BTEXGRO.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

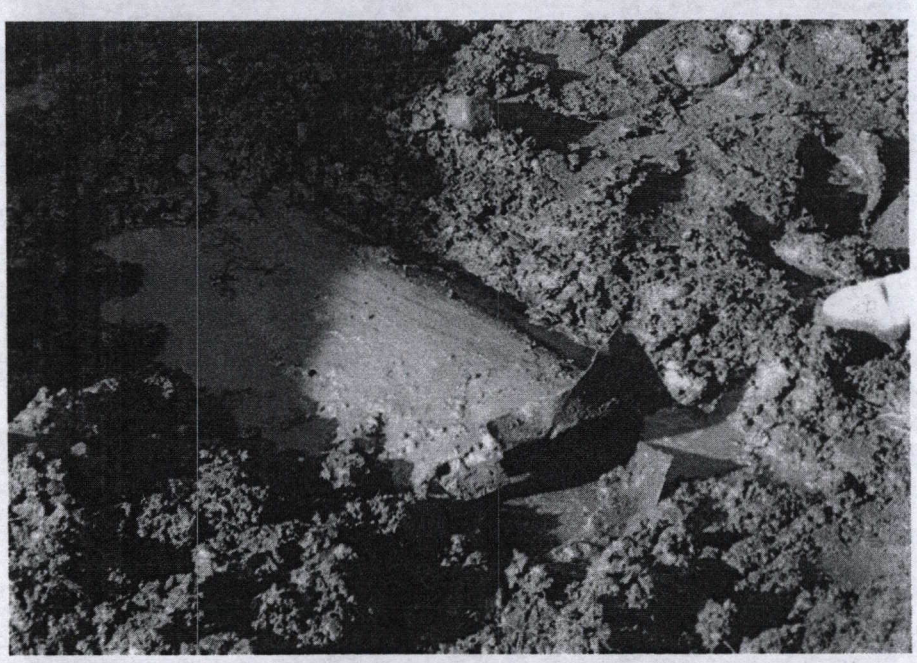


APPENDIX E

Site Photographs




CAT




CAT