# SITE CHARACTERIZATION REPORT
# MICKLESEN AUTOMOTIVE
# 10215 GREENWOOD AVENUE NORTH
# SEATTLE, WASHINGTON 98133

WO# 92-007

GLACIER
ENVIRONMENTAL SERVICES, INCORPORATED

March 17, 1992

Ms. Christie Madden
Department of Ecology
Northwest Regional Office
3190 - 160th Ave SE
Bellevue, WA 98008-5452

RE: UST Site Characterization, 10215 Greenwood Ave North, Seattle, Washington. WSDOE incident 2735

Dear Ms. Madden,

The following information is submitted in compliance with WAC 173-340-450 (4) (b), site characterization report for the above referenced site.

**BACKGROUND**

The subject commercial property is located at 10215 Greenwood Avenue North, Seattle, Washington in King County. It occupies the southwest corner of 103rd N.W. and Greenwood Avenue N. The site is shown relative to surrounding physical features in the attached Vicinity Map.

The property is owned and operated by Mr. Kim Micklesen of 17235 Brookside Boulevard N.E., Seattle, Washington. Mr. Micklesen operates an automotive repair facility at the site.

Site features include a service station building surrounded by asphaltic concrete and a covered fuel service island. A generalized Site Plan of the facility is also attached. Site topography slopes approximately 2 percent from east to west and has a surface elevation of approximately 300 feet above sea level.

From 1958 until early 1985, a previous owner operated a gasoline service station on the property.

**GEOLOGY**

The site is underlain primarily by fill materials and glacial till deposits. Fill materials were encountered in the upper 7 to 8 feet of the sides of excavations. The fill material consists of brown, dry to slightly damp, poorly sorted, medium to fine grained sand with some silt and gravel.

The glacial till deposits underlying the fill consist of slightly damp, gray, poorly sorted fine to medium grained silty sand with some gravel and cobbles.

Groundwater was not encountered during site activities.

**TANK CLOSURE**

On or about December 3, 1991, under contract to Mr. Micklesen, four (4) underground storage tanks (USTs) were removed from the site by Lee Morse General Contractor.

Three ex-gasoline USTs, 10,000, 5,000 and 4,000 gallons in capacity were located north of the existing building and a 500 gallon used oil tank located east of the building were removed (see site plan for tank locations).

The removal contractor conducted a site assessment to determine if a release from the system had occurred. Analytical results from this effort confirmed that petroleum hydrocarbons greater than Method A Cleanup Levels were present in soils in both the gasoline and used oil tank excavations (a copy of the removal contractors report and analytical data are attached as appendix 1). Release confirmation was reported to Ecology's Northwest Regional Office on December 3, 1992 by the removal contractor. This report was confirmed by the owner on receipt of analytical data on December 20, 1992.

**SOIL QUALITY**

On February 14, 1992, Mr. Micklesen contracted Glacier Environmental Services, Inc. (GES) to conduct site characterization and initiate remediation at the site.

GES effort began by removal of product pumps, product lines and re-excavation of contaminated soil backfilled to the used oil tank excavation by the removal contractor. Our effort was to characterize the extent of and remediate by removal of hydrocarbon impacted soils on site. Remediation would include on site treatment of gasoline range contaminated soil and off site disposal of heavier hydrocarbon impacted material.

Backfilled soils were excavated from the used oil tank excavation on February 28, 1992. Our representative used visual, water sheen and headspace vapor screening methods to help identify contaminated soil as it was excavated. Excavation continued in this manner until significant reduction or elimination of contamination was noted. Approximately 35 cubic yards of soil was excavated.

Representative soil samples were taken from the excavation side walls and bottom and submitted to Analytical Services of Redmond, Washington. A sample of highly contaminated excavated material was also submitted and tested prior to other samples for WTPH-HCID. Results of this analysis indicated both gasoline range (Toluene- C-12) and lube oil range contaminants (>C24) in the excavated soils. The remaining samples (3) were then tested for Total Recoverable Hydrocarbons (WTPH-418.1) and Volatile Hydrocarbons with BTEX distinction (as gasoline WTPH-G 8015/8020). Analytical results are as follows (see attached site plan for sample locations):

| SAMPLE # | LOCATION | PARAMETER | RESULTS |
|---|---|---|---|
| 92007-HCID | Highly contaminated excavated soil | WTPH-HCID | Gasoline and lube oil |
| 92007-B1 | Bottom sample 10' BGS below tank fill | WTPH-418.1 | 40 mg/kg |
| | | WTPH-G 8015 | N/D |
| | | Benzene | N/D |
| | | Ethylbenzene | N/D |
| | | Toluene | N/D |
| | | Xylenes | N/D |
| 72007-S1 | North end of excavation 7' BGS | WTPH-418.1 | 650 mg/kg |
| | | WTPH-G 8015 | 38 mg/kg |
| | | Benzene | <50 ug/kg |
| | | Ethylbenzene | <50 ug/kg |
| | | Toluene | 81 ug/kg |
| | | O-Xylene | 490 ug/kg |
| | | MP-Xylene | 240 ug/kg |
| 72006-S2 | South end of excavation 7' BGS | WTPH-418.1 | 650 mg/kg |
| | | WTPH-G 8015 | 38 mg/kg |
| | | Benzene | <50 ug/kg |
| | | Ethylbenzene | <50 ug/kg |
| | | Toluene | 81 ug/kg |
| | | O-Xylene | 490 ug/kg |
| | | MP-Xylene | 240 ug/kg |

Notes: BGS = Below ground surface
N/D = Analyte not detected in sample
mg/kg= Parts per million
ug/kg= Parts per billion
Results of laboratory analysis are attached as Appendix 2

Analytical results indicated levels of TPH greater than Method A Cleanup levels in sample S-1. Continued excavation in the area

of sample S1 on March 3, 1992; revealed volatile contaminants at that location and continuing horizontally north, east and west. Contamination appeared to decrease in the southerly direction. The excavation was deepened to approximately 12.5 feet below ground surface (BGS). Excavated soils were monitored with the PID with results in the 1,500 ppm to 2,000 ppm range. Excavation became too difficult at this point to continue with equipment on site due to depth and dense soil conditions (till).

On March 4, 1992; using a track mounted excavator, GES continued excavation to a depth of approximately 20' bgs at the north end of the used oil excavation (this excavation is shown on the site plan as test pit 1). Excavated soils were again monitored with the PID with results as follows:

| | |
|---|---|
| 13 Feet bgs | 3,200 ppm |
| 17 Feet bgs | 2,700 ppm |
| 20 Feet bgs | 350 ppm |

Evidence of contamination began to decrease with depth, however excavation was discontinued due to the close proximity of the city right of way and the on site building. The City of Seattle requires a 1:1 angle of repose from there improvements to the bottom of an excavation or structural shoring. This excavation was backfilled with contaminated soils to approximately 12 feet bgs. No groundwater was observed in the excavation. Approximately 50 cubic yards of material has been excavated to this date from the waste oil tank location. It remains covered on site for later disposal.

Due to unanticipated depth and extent of gasoline range contaminants, a decision was made to try to better determine the extent of contamination across the site and abandon remediation efforts at this time. This effort began with a test pit excavated to approximately 14 feet at the south end of the original used oil tank excavation (shown on site plan as test pit 2) PID monitoring of soils at this location indicated levels not greater than 100 ppm. Previous excavation and monitoring in this area during remediation attempts were consistent with these findings. This excavation has been backfilled to approximately 10 feet BGS with clean soil (as determined by field screening). Groundwater was not observed in this excavation.

Test pit 3 was excavated at a location approximately 8 feet north of the service station canopy, directly in line with product lines which previously ran from the pump island to the gasoline USTs (see site plan). Heavy gasoline contamination was encountered at 10 feet BGS and continued to increase in concentration until the excavation was terminated at 17 feet BGS.

Excavation was discontinued again due to the position of street improvements. A representative soil sample was obtained from the 17 foot level of the excavation and submitted for WTPH-HCID analysis. This excavation was back filled to grade with contaminated soils. Groundwater was not observed in this excavation. PID readings and laboratory analysis from test pit 3 are as follows:

| PID | |
|---|---|
| 10 Feet bgs | 550 ppm |
| 12 Feet bgs | 1650 ppm |
| 15 Feet bgs | 2000 ppm |
| 17 Feet bgs | 2950 ppm |

Sample 92007-HCID-2 Gasoline range hydrocarbons (C6-C11)

Test pit 4 was excavated at the northwest end of the original gasoline tank excavation (see site plan). Soils excavated included approximately 5 feet of material back filled by the tank removal contractor. Excavation continued to 17 feet BGS with slight contamination noted by field screening techniques (all PID readings of less than 100 ppm). This excavation was back filled with the material removed to approximately 6 feet bgs. No groundwater was observed in the excavation.

Test pit 5 was excavated to a depth of 7 feet bgs in the lower driveway on the northwest end of the service station building (see site plan). No indication of contamination was encountered at this location. The excavation was back filled to grade. Ground water was not encountered.

Four product dispensing pumps and product lines were removed from the site by GES. These were flushed with a soapy water solution and sent to a steel recycling facility. Product lines were removed between the pump and tank locations. Samples were not taken from below the product lines at this time due to suspected deeper contamination. Soil monitoring during line removal did not indicate contamination from line leakage. However, repair couplings were noted to have been installed in at least one of the lines and fittings were found loose at the north end of the pump island.

Analytical and field screening of soils at the northeast corner of the site indicate a presence of hydrocarbon contamination greater than Method A Cleanup Levels.

**CONCLUSIONS AND RECOMMENDATIONS**

GES recommends that further investigation of the site be conducted to determine the lateral extent of contamination.

Unfortunately, site limitations such as above ground structures and close proximity to City of Seattle Right-of-Way prevent further assessment or remediation by excavation without elaborate shoring measures. Further assessment may best be accomplished by installation of soil borings.

GES recommendations include further characterization of excavated lubricant range hydrocarbon impacted soil for off site disposal. Removal from the site of this material would conclude issues associated with the removed used oil tank.

In our opinion, site soil conditions and depth of contamination are not conducive to in-situ treatment. Furthermore, remediation by excavation would likely result in an extremely limited cleanup.

Water well information obtained from WSDOE records suggests that regional groundwater at the site is at an elevation of 40 to 60 feet bgs. There are no domestic wells on record in the immediate vicinity. Considering depth to groundwater and current limitations preventing a complete cleanup, additional remediation at the site may not be warranted until such time as the limitations are removed.

Glacier Environmental Services, Inc. makes no warranty to the environmental condition of this property or to any bordering property or properties. GES has solely reported findings from specific actions taken as a result of the decommissioning of underground storage tank(s) and the performance of a site characterization following state guidelines as published in Washington State Department of Ecology's Document "Guidance for Remediation of Releases from Underground Storage Tanks". GES does warranty that all work performed was in accordance with state and federal regulations and with acceptable industry standards.

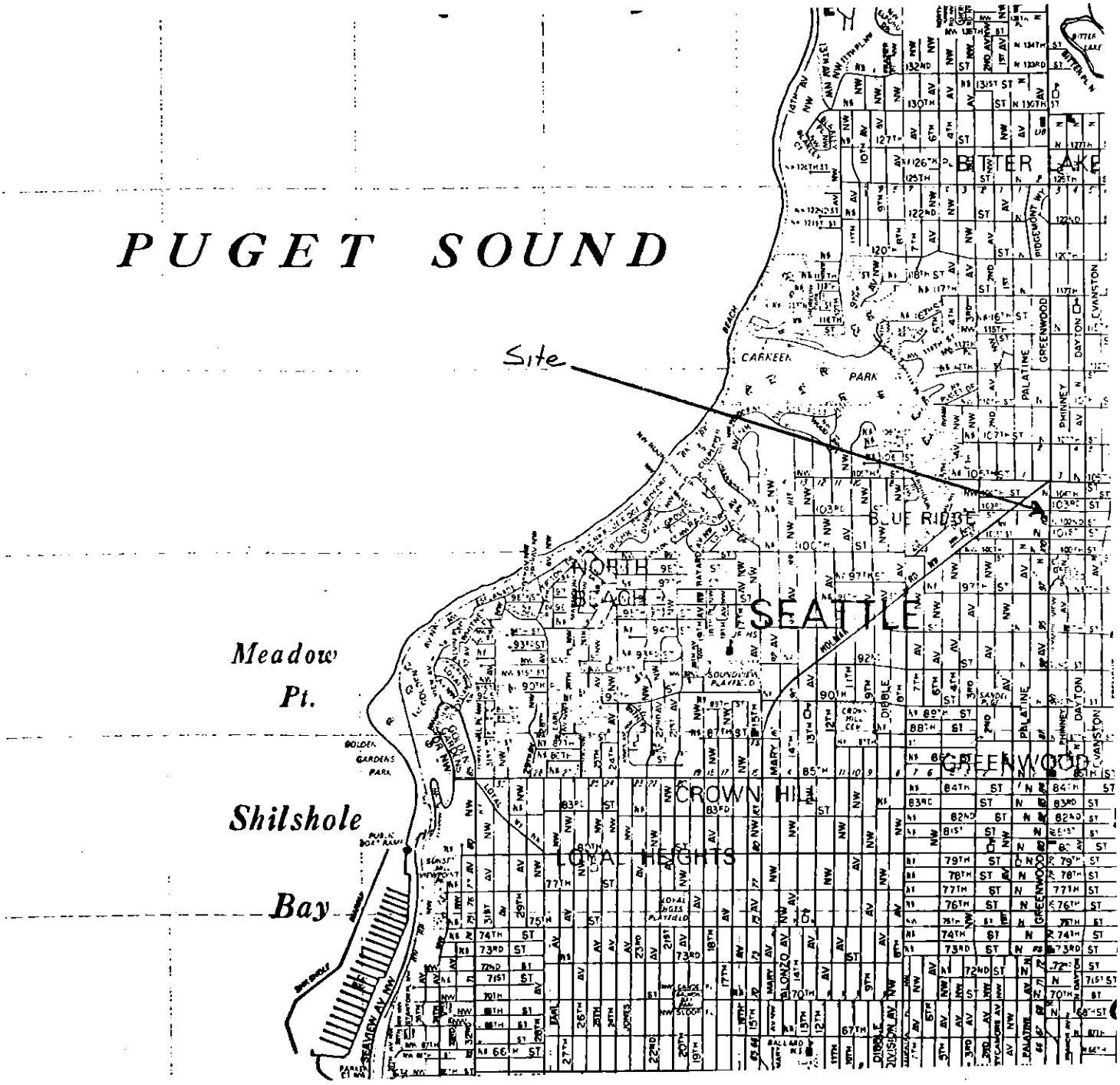
Please direct questions regarding this report to Steve Miles at (206) 355-2826

Respectfully Submitted,
Glacier Environmental Services, Inc.

Steve Miles
Vice President

VICINITY MAP

MICKLESEN AUTOMOTIVE
10215 GREENWOOD AVENUE NORTH
SEATTLE, WASHINGTON 98133



NICHELSON AUTOMOTIVE

LOWER DRIVEWAY

TEST PIT 5

ROCKERY

10,000 GAL. UST GAS (REMOVED)

TEST PIT 4

5000 GAL. UST GAS (REMOVED)

4000 GAL. UST GAS (REMOVED)

92007-HCID2

TEST PIT 3

PROPERTY LINE

BILLBOARD

500 GAL. USED OIL TANK REMOVED

92007-S2

92007-B1

92007-S1

TEST PIT 2

TEST PIT 1

PRODUCT LINES REMOVED

PUMP ISLAND

CANOPY

92007-HCID

STOCKFILE OF CONTAMINATED DIRT

POWER POLE

GREENWOOD AVENUE

103TH AVE. N.W.

N

## LEGEND / NOTES

FOR LAB REPORTS SEE ATTACHMENT BY A.S.I. APPENDIX 2.

# NICKLSON SITE PLAN

10215 GREENWOOD AVE., SEATTLE, WA.

| | | |
|---|---|---|
| SCALE: NTS | APPROVED BY: | DRAWN BY: GES |
| DATE: 8-23-92 | | REVISED |

GLACIER ENVIRONMENTAL SERVICES
12521 EVERGREEN DR., MUKILTEO, WA.
206-355-2826

DRAWING NUMBER 92007

# APPENDIX 1

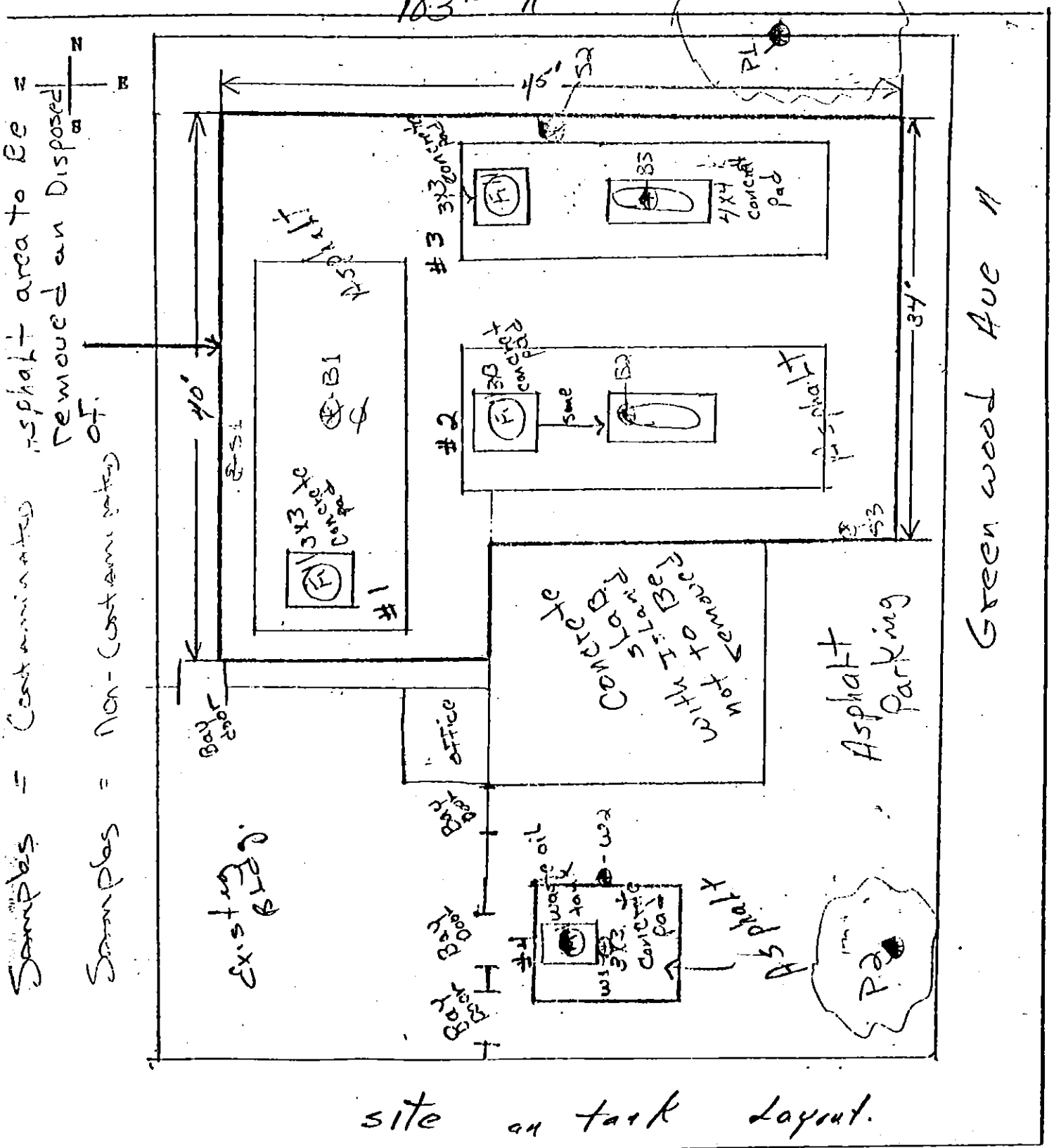
## SITE ASSESSMENT REPORT BY LEE MORSE GENERAL CONTRACTOR

DRAWING OF AREA:

Mickelson Automotive
10215 Greenwood Ave N
Seq. No.

Property lines, building lines, utilities
Fill & Vent Locations
Sidewalks & Streets

789-0738




site and tank layout.

Laucks Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Chemistry Microbiology and Technical Services

CLIENT: Lee Horse General Contractor
11017 16th Ave. SW
Seattle, WA 98146

ATTN : David Luft

Work ID : Hickelson Auto
Taken By : Client
Transported by: Hand Delivered
Type : Soil

# Certificate of Analysis

Work Order# : 91-12-237
DATE RECEIVED : 12/04/91
DATE OF REPORT: 12/13/91
CLIENT JOB ID : 3501

SAMPLE IDENTIFICATION:

| | Sample Description | Collection Date | | Sample Description | Collection Date |
|---|---|---|---|---|---|
| 01 | S1 | 12/03/91 02:15 | 07 | W1 | 12/03/91 02:15 |
| 02 | S2 | 12/03/91 02:15 | 08 | W2 | 12/03/91 02:15 |
| 03 | S3 | 12/03/91 02:15 | 09 | P1 | 12/03/91 02:15 |
| 04 | B1 | 12/03/91 02:15 | 10 | P2 | 12/03/91 02:15 |
| 05 | B2 | 12/03/91 02:15 | 11 | Method Blank | N/A |
| 06 | B3 | 12/03/91 02:15 | | | |

FLAGGING:

The flag "U" indicates the analyte of interest was not detected, to the limit of detection indicated.

The flag "J" indicates the analyte of interest was detected below the routine reporting limit. This value should be regarded as an estimate.

ATTACHMENTS:

Following presentation of sample results, the following appendices are attached to this report:

Appendix A: Method Blank Report
Appendix B: MS/MSD Report
Appendix C: Blank Spike Recovery Report

Laucks 84 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Chemistry, Microbiology and Technical Services

CLIENT : Lee Horse General Contractor

Certificate of Analysis

Work Order# : 91-12-237

Unless otherwise instructed all samples will be discarded on 01/20/92

Respectfully submitted,
Laucks Testing Laboratories, Inc.

J. M. Owens
J. M. Owens

Laucks 84 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Chemistry, Microbiology, and Technical Services

CLIENT : Lee Horse General Contractor

# Certificate of Analysis

Work Order # 91-12-237

TESTS PERFORMED AND RESULTS:

| Analyte | Units | 01 | 02 | 03 | 04 |
|---|---|---|---|---|---|
| Lead (Method 6010) | mg/kg DB | 10. U | 10. U | 10. U | 10. U |
| Total Solids | % | 85.7 | 92.1 | 91.5 | 91.7 |

| Analyte | Units | 05 | 06 | 07 | 08 |
|---|---|---|---|---|---|
| Lead (Method 6010) | mg/kg DB | 10. U | 20. | | |
| TPH Oil & Grease | mg/kg DB | | | 1200. | 1300. |
| Total Solids | % | 91.8 | 90.2 | | |
| Total Solids | % | | | 88.2 | 89.5 |

| Analyte | Units | 09 | 10 |
|---|---|---|---|
| Lead (Method 6010) | mg/kg DB | 79. | |
| TPH Oil & Grease | mg/kg DB | | 1700. |
| Total Solids | % | 90.7 | 88.2 |

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Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Chemistry, Microbiology and Technical Services

Lab Sample ID : 9112237-11
Client Sample ID: Method Blank

Date Collected: N/A
Date Received : 12/04/91

---------- WTPH-G ----------

Preparation Date: 12/06/91
Analysis Date : 12/06/91

GC Method: Purge and trap GC

| | Result | | SDL | |
|---|---|---|---|---|
| Gasoline Range..... | 5.0 | U | 5.0 | mg/kg DB |
| Benzene..... | 0.05 | U | 0.05 | mg/kg DB |
| Toluene..... | 4.0 | U | 4.0 | mg/kg DB |
| Total Xylenes..... | 2.0 | U | 2.0 | mg/kg DB |
| Ethyl Benzene..... | 2.0 | U | 2.0 | mg/kg DB |

| Surrogate recoveries | % Rec | LCL | UCL |
|---|---|---|---|
| Trifluorotoluene..... | 97.0 | 50 | 150 |
| Bromofluorobenzene..... | 91.0 | 50 | 150 |

Analysis performed in accordance with Washington State Department of Ecology method WTPH-G.

**Laucks** 84 yrs
**Testing Laboratories, Inc.**
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Chemistry, Microbiology, and Technical Services

Lab Sample ID : 9112237-05
Client Sample ID: B2

Date Collected: 12/03/91
Date Received : N/A

---------- WTPH-G ----------

Preparation Date: 12/06/91
Analysis Date : 12/06/91

GC Method: Purge and trap GC

| | Result | | SDL | |
|---|---|---|---|---|
| Gasoline Range..... | 43 | | 5.0 | mg/kg DB |
| Benzene..... | 0.05 | U | 0.05 | mg/kg DB |
| Toluene..... | 4.0 | U | 4.0 | mg/kg DB |
| Total Xylenes..... | 2.0 | U | 2.0 | mg/kg DB |
| Ethyl Benzene..... | 2.0 | U | 2.0 | mg/kg DB |

| Surrogate recoveries | % Rec | LCL | UCL |
|---|---|---|---|
| Trifluorotoluene..... | 92.0 | 50 | 150 |
| Bromofluorobenzene..... | 108 | 50 | 150 |

Analysis performed in accordance with Washington State Department of Ecology method WTPH-G.

Laucks 84 Years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Chemistry, Microbiology, and Technical Services

Lab Sample ID : 9112237-04
Client Sample ID: B1

Date Collected: 12/03/91
Date Received : N/A

---------- WTPH-G ----------

Preparation Date: 12/06/91
Analysis Date : 12/06/91

GC Method: Purge and trap GC

| | Result | | SDL | |
|---|---|---|---|---|
| Gasoline Range..... | 5.1 | | 5.0 | mg/kg DB |
| Benzene..... | 0.05 | U | 0.05 | mg/kg DB |
| Toluene..... | 4.0 | U | 4.0 | mg/kg DB |
| Total Xylenes..... | 2.0 | U | 2.0 | mg/kg DB |
| Ethyl Benzene..... | 2.0 | U | 2.0 | mg/kg DB |

| Surrogate recoveries | % Rec | LCL | UCL |
|---|---|---|---|
| Trifluorotoluene..... | 92.0 | 50 | 150 |
| Bromofluorobenzene..... | 90.0 | 50 | 150 |

Analysis performed in accordance with Washington State Department of Ecology method WTPH-G.

Laucks 84 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063
Chemistry, Microbiology and Technical Services

Lab Sample ID : 9112237-03
Client Sample ID: S3

Date Collected: 12/03/91
Date Received : N/A

---------- WTPH-G ----------

Preparation Date: 12/06/91
Analysis Date : 12/06/91

GC Method: Purge and trap GC

| | Result | | SDL | |
|---|---|---|---|---|
| Gasoline Range..... | 5.0 | U | 5.0 | mg/kg DB |
| Benzene..... | 0.05 | U | 0.05 | mg/kg DB |
| Toluene..... | 4.0 | U | 4.0 | mg/kg DB |
| Total Xylenes..... | 2.0 | U | 2.0 | mg/kg DB |
| Ethyl Benzene..... | 2.0 | U | 2.0 | mg/kg DB |

| Surrogate recoveries | % Rec | LCL | UCL |
|---|---|---|---|
| Trifluorotoluene..... | 91.0 | 50 | 150 |
| Bromofluorobenzene..... | 88.0 | 50 | 150 |

Analysis performed in accordance with Washington State Department of Ecology method WTPH-G.

Laucks 84 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063
Chemistry, Microbiology, and Technical Services

Lab Sample ID : 9112237-02
Client Sample ID: S2

Date Collected: 12/03/91
Date Received : N/A

---------- WTPH-G ----------

Preparation Date: 12/06/91
Analysis Date : 12/06/91

GC Method: Purge and trap GC

| | Result | | SDL | |
|---|---|---|---|---|
| Gasoline Range..... | 5.0 | U | 5.0 | mg/kg DB |
| Benzene..... | 0.05 | U | 0.05 | mg/kg DB |
| Toluene..... | 4.0 | U | 4.0 | mg/kg DB |
| Total Xylenes..... | 2.0 | U | 2.0 | mg/kg DB |
| Ethyl Benzene..... | 2.0 | U | 2.0 | mg/kg DB |

| Surrogate recoveries | % Rec | LCL | UCL |
|---|---|---|---|
| Trifluorotoluene..... | 95.0 | 50 | 150 |
| Bromofluorobenzene..... | 88.0 | 50 | 150 |

Analysis performed in accordance with Washington State Department of Ecology method WTPH-G.

Laucks 84 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063
Chemistry, Microbiology and Technical Services

Lab Sample ID : 9112237-01
Client Sample ID: S1

Date Collected: 12/03/91
Date Received : N/A

---------- WTPH-G ----------

Preparation Date: 12/06/91
Analysis Date : 12/06/91

GC Method: Purge and trap GC

| | Result | | SDL | |
|---|---|---|---|---|
| Gasoline Range..... | 5.0 | U | 5.0 | mg/kg DB |
| Benzene..... | 0.18 | J | 0.05 | mg/kg DB |
| Toluene..... | 4.0 | U | 4.0 | mg/kg DB |
| Total Xylenes..... | 2.0 | U | 2.0 | mg/kg DB |
| Ethyl Benzene..... | 2.0 | U | 2.0 | mg/kg DB |

| Surrogate recoveries | % Rec | LCL | UCL |
|---|---|---|---|
| Trifluorotoluene..... | 94.0 | 50 | 150 |
| Bromofluorobenzene..... | 88.0 | 50 | 150 |

Analysis performed in accordance with Washington State Department of Ecology method WTPH-G.

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Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063
Chemistry, Microbiology and Technical Services

Lab Sample ID : 9112237-06
Client Sample ID: B3

Date Collected: 12/03/91
Date Received : N/A

---------- WTPH-G ----------

Preparation Date: 12/06/91
Analysis Date : 12/06/91

GC Method: Purge and trap GC

| | Result | | SDL | |
|---|---|---|---|---|
| Gasoline Range..... | 80 | | 50 | mg/kg DB |
| Benzene..... | 0.05 | U | 0.05 | mg/kg DB |
| Toluene..... | 4.0 | U | 4.0 | mg/kg DB |
| Total Xylenes..... | 11 | | 2.0 | mg/kg DB |
| Ethyl Benzene..... | 2.0 | U | 2.0 | mg/kg DB |

| Surrogate recoveries | % Rec | | LCL | UCL |
|---|---|---|---|---|
| Trifluorotoluene..... | 98.0 | | 50 | 150 |
| Bromofluorobenzene..... | 172 | * | 50 | 150 |

Comments: The BTEX's were reported from the 1:100 dilution and the gasoline result is from the 1:1000 dilution.

Analysis performed in accordance with Washington State Department of Ecology method WTPH-G.

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Chemistry, Microbiology, and Technical Services

Lab Sample ID : 9112237-09
Client Sample ID: P1

Date Collected: 12/03/91
Date Received : N/A

---------- WTPH-G ----------

Preparation Date: 02/06/91
Analysis Date : 12/06/91

GC Method: Purge and trap GC

| | Result | | SDL | |
|---|---|---|---|---|
| Gasoline Range..... | 200 | | 50 | mg/kg DB |
| Benzene..... | 0.05 | U | 0.05 | mg/kg DB |
| Toluene..... | 4.0 | U | 4.0 | mg/kg DB |
| Total Xylenes..... | 8.8 | | 2.0 | mg/kg DB |
| Ethyl Benzene..... | 2.0 | U | 2.0 | mg/kg DB |

| Surrogate recoveries | % Rec | LCL | UCL |
|---|---|---|---|
| Trifluorotoluene..... | 92.0 | 50 | 150 |
| Bromofluorobenzene..... | 114 | 50 | 150 |

Comments: The BTEX's were reported from the 1:100 dilution and the gasoline result is from the 1:1000 dilution.

Analysis performed in accordance with Washington State Department of Ecology method WTPH-G.

Laucks 84 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Chemistry, Microbiology, and Technical Services

APPENDIX B

Matrix Spike/Matrix Spike Duplicates Report

Laucks 84 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063
Chemistry, Microbiology and Technical Services

Quality Control Report
MS/MSD Report for Work Order 9112237

| MS/MSD Name | Sample Fractions Verified | MS/MSD Sample | Analyte | Percent Recovery MS | MSD | RPD | Cont. Limits LCL | UCL | RPD |
|---|---|---|---|---|---|---|---|---|---|
| K120691_ICPS01 | 1-6,9 | 9112237-04 | Lead | 98 | 98 | 0 | 75 | 125 | 20 |

* = Value Exceeds Control Limit
RPD = Relative Percent Difference
LCL = Lower Control Limit
UCL = Upper Control Limit
-1 for recovery value indicates that recovery could not be calculated

An MS/MSD pair can validate the results for more than one work order. For this reason, results for analytes not requested on this work order may appear in this MS/MSD report.

Laucks 84 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Chemistry, Microbiology, and Technical Services

Quality Control Report
Method Blanks for Work Order 9112237

| Blank Name | Samples Verified | Test Description | Result | | Units | Control Limit |
|---|---|---|---|---|---|---|
| B120591_OG_S02 | -7,8,10 | IR Total Recoverable Oil and Grease | 20 | U | mg/kg DB | 40 |
| B120691_ICP_S01 | 1-6,9 | Lead | 10 | U | mg/kg DB | 20 |

Method blank results for multi-analyte tests appear directly after this report.

A method blank can validate more than one analyte on more than one work order. The method blanks in this report may validate analytes not determined on this work order, but nonetheless determined in the associated blank.

Because they validate more than one work order, method blank results are not always reported in the same concentration units used for sample results.

blank exceeds control limit

Laucks 84 yrs
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Chemistry, Microbiology and Technical Services

# APPENDIX C

## Blank Spike Recovery Report

Blank Spike Recovery Report

Method WTPH-G, Purge and Trap

The following aqueous blank spikes were analyzed throughout the project.

| Spike Name | Spiking Analyte | Percent Recovery | Control Limits |
|---|---|---|---|
| S1206WTG.WC2 | Gasoline | 91 | 20-160 |

# APPENDIX 2

## REPORT OF LABORATORY ANALYSIS

Analytical Services, Inc.
12277 134th Court NE Redmond, Washington 98052
(206) 820-4551 (fax) 820-6337



March 16, 1992

Steve Miles, Project Manager
Glacier Environmental
12521 Evergreen Dr.
Suite A
Mukilteo, WA 98275

Dear Steve:

Enclosed are the results of the analyses of samples submitted on March 2, 1992 from Project 92007/Mickelson Automotive.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Cynthia L. Rezania
Senior Chemist

CLR:tmh

Enclosures

Date of Report: March 16, 1992
Samples Submitted: March 2, 1992
Lab Traveler: 03-001
Project: 92007/Mickelson Automotive

Matrix: Soil

**HYDROCARBON IDENTIFICATION**
**BY METHOD WTPH-HCID**

| Sample # | GC Characterization | Surr. Recovery |
|---|---|---|
| 92007-HCID | The chromatogram indicates the presence of hydrocarbons in the Gasoline range(toluene-C12), and in the Lubricant range(>C24). | S |
| Method Blank | <20 ppm Gasoline<br><50 ppm Diesel Fuel<br><100 pmm Motor Oil | 107% |

S-Surrogate Recovery data not available due to the necessary dilution of the sample.

Date of Report: March 16, 1992
Samples Submitted: March 2, 1992
Lab Traveler: 03-001
Project: 92007/Mickelson Automotive

Matrix: Soil
Units: ppm

**Analysis by WTPH-418.1**

| Sample # | Dilution Factor | Total Petroleum Hydrocarbons |
|---|---|---|
| 92007-B1 | 5 | 40 |
| 92007-S1 | 5 | 650 |
| 92007-S2 | 5 | 55 |
| Quality Assurance | | |
| Method Blank | | <25 |
| 92007-B1 (Duplicate) | 5 | 40 |

Date of Report: March 16, 1992
Samples Submitted: March 2, 1992
Lab Traveler: 03-001
Project: 92007/Mickelson Automotive

Matrix: Soil
Units: ppb

**ANALYSIS BY EPA 8020 & WTPH-G**
**(PURGE & TRAP)**

| Sample #: | 92007-B1 | 92007-S1 | 92007-S2 |
|---|---|---|---|
| Dilution Factor | 50 | 50 | 50 |
| **Analyte:** | | | |
| Benzene | <50 | <50 | <50 |
| Toluene | <50 | 81[B,J] | <50 |
| Ethylbenzene | <50 | <50 | <50 |
| m- & p-Xylene | <50 | 240[B,J] | <50 |
| o-Xylene | <50 | 490 | <50 |
| Gas Units: ppm | | | |
| TPH/Gas | <25 | 38 | <25 |
| Surr. Recovery | 97% | 83% | 79% |

B-The analyte indicated was also found in the blank sample.

J-The value indicated was below the practical quantitation limit.

Date of Report: March 16, 1992
Samples Submitted: March 2, 1992
Lab Traveler: 03-001
Project: 92007/Mickelson Automotive

Matrix: Soil
Units: ppb

**ANALYSIS BY EPA 8020 & WTPH-G**
**(PURGE & TRAP)**

**QUALITY CONTROL**

| Batch Sample #: | Method Blank | 02-071-8 Original | 02-071-8 Duplicate | 02-071-8 Matrix Spike @ 1000 ppb | 02-071-8 M Spike. Duplicate |
|---|---|---|---|---|---|
| Dil.Fact. | 50 | 50 | 50 | | |
| **Analyte:** | | | | | |
| Benzene | <50 | <50 | <50 | 84% | 83% |
| Toluene | 90[J] | 310 | 330 | 83% | 91% |
| Ethylbenzene | <50 | 170[J] | 180[J] | 85% | 98% |
| m- & p-Xylene | 90[J] | 1,700 | 1,800 | A | A |
| o-Xylene | <50 | 830 | 890 | 76% | 127%[a] |
| Gas Units: ppm | | | | | |
| TPH/Gas | <25 | 36 | 45 | --- | --- |
| Surr. Recovery | 92% | 83% | 88% | 89% | 85% |

a-Matrix Spike RPD out of control due to matrix effects; RPD=50%.
A-Matrix Spike data not required due to high sample concentration.
J-The value indicated was below the practical quantitation limit.

Date of Report: March 16, 1992
Samples Submitted: March 2, 1992
Lab Traveler: 03-001
Project: 92007/Mickelson Automotive

Matrix: Soil

## RESULTS OF DRY WEIGHT

| Sample # | Moisture |
|---|---|
| 92007-HCID | 13% |
| 92007-B1 | 8% |
| 92007-S1 | 10% |
| 92007-S2 | 18% |

# CHAIN OF CUSTODY RECORD

ANALYTICAL SERVICES, INC.
12277 134th Ct. NE, Suite 200
Redmond, WA 98052
(206) 820-4551 fax 820-6337

03-001

Client: Glacier Environmental Svcs.
Project Manager: Steve Miles
Project #: 92007
Project Name: Nickelson Automotive

| dash | Sample Number | Date Sampled | Type | # Jars | Analysis Required | Comments |
|---|---|---|---|---|---|---|
| | 92007-HCID | 2-28-92 | Soil | 1 902 | WTPH - HCID | Rush |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | 92007-B1 | 2-28-92 | Soil | 1 902 | } Hold pending results | |
| | 92007-S1 | 2-28-92 | Soil | 1 902 | } of 92007-HCID | |
| | 92007 S2 | 2-28-92 | Soil | 1 902 | } (anticipate WTPH 418.1 Mod.) | Rush |
| | | | | | | |
| | | | | | | |
| | WTPH418.1 AND WTPH-GAS/BTEX ADDED 3/2 STEVE MILES SJL | | | | | |
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|---|---|---|---|---|
| Relinquished: Steve Miles | date: 3/2/92 | Recieved by: Cynthia J Runyan | date: 3/2/92 | |
| Firm: GES | time: | Firm: ASI | time: 8:50AM. | |
| Relinquished: | date: | Recieved by: | date: | |

Analytical Services, Inc.
12277 134th Court NE Redmond, Washington 98052
(206) 820-4551 (fax) 820-6337



March 17, 1992

Steve Miles, Project Manager
Glacier Environmental
12521 Evergreen Dr.
Suite A
Mukilteo, WA 98275

Dear Steve:

Enclosed are the results of the analyses of the sample submitted on March 6, 1992 from Project 92-007/All Vovo.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Karl J. Englert
Senior Scientist

KJE:tmh

Enclosures

Date of Report: March 17, 1992
Sample Submitted: March 6, 1992
Lab Traveler: 03-010
Project: 92-007/All Vovo

Matrix: Soil

**HYDROCARBON IDENTIFICATION**
**BY METHOD WTPH-HCID**

| Sample # | GC Characterization | Surr. Recovery |
|---|---|---|
| 92007-HCID-2 | The chromatogram indicates the presence of hydrocarbons in the Gasoline range(C6-C11). | 122% |
| Method Blank | <20 ppm Gasoline<br><50 ppm Diesel Fuel<br><100 ppm Motor Oil | 118% |

Date of Report: March 17, 1992
Sample Submitted: March 6, 1992
Lab Traveler: 03-010
Project: 92-007/All Vovo

Matrix: Soil

## RESULTS OF DRY WEIGHT

| Sample # | Moisture |
|---|---|
| 92007-HCID-2 | 10% |

03-010

# CHAIN OF CUSTODY RECORD

GLACIER ENVIRONMENTAL SVCS.

ANALYTICAL SERVICES, INC.
12277 134th Ct. NE, Suite 200
Redmond, WA 98052
(206) 820-4551 fax 820-6337

Client: FOR: MICKELSON AUTOMOTIVE

Project Manager: STEVE MILES

Project #: 92-007

Project Name: ALL VOVO

| dash | Sample Number | Date Sampled | Type | # Jars | Analysis Required | Comments |
|---|---|---|---|---|---|---|
| | 92007-HCID-2 | 3-4-92 | Soil | 1 9oz | WTPH - HCID | RUSH! |
| | | | | | | |
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|---|---|---|---|---|---|
| Relinquished: | David deSousa | date: | 3/6/92 | Received by: | Teresa Stetson | date: | 3/6/92 |
| Firm: | D.E.S. | time: | 9:08 | Firm: | Analytical Services Inc. | time: | 9:08 |
| Relinquished: | | date: | | Received by: | | date: | |