PACCAR SIT 5.4.6.1

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102
FAX 206.328.5581
206.324.9530

J-1639-27

January 5, 1993

Mr. Robert Butler, P.E.
PACCAR Inc.
P.O. Box 1518
Bellevue, Washington 98009

Re: Report of Findings and Recommendations
Installation and Sampling of Two Wells West of Hot Spot U-1
PACCAR Site, Washington

Dear Bob:

This letter presents the findings and recommendations resulting from our installation and sampling of two wells located immediately west of hot spot U-1. This work was done as a continuation of the Phase IV cleanup. The Phase IV hot spot excavation at grid location U-1, south of Building 17, encountered petroleum hydrocarbon contamination in the soil. This contamination appeared to be present at the western extent of the excavation completed in October 1992. Because of the proximity of this hot spot to Garden Avenue and associated underground utilities, PACCAR chose to investigate the vertical and lateral extent of contamination by means of two borings, which were completed as groundwater monitoring wells and designated U1N and U1S.

On November 18, 1992, Hart Crowser advanced the two borings and installed the wells. We collected seven soil samples from each boring by continuous sampling from a depth of 6 to 20 feet. We developed the wells and collected one groundwater sample from each well and one product sample from the northernmost well, U1N. The groundwater sample from well U1N was collected using a peristaltic pump to avoid sample cross-contamination by the product layer. All samples were analyzed

for total petroleum hydrocarbons (TPH) by Method 8015-Modified in accordance with the analytical procedures used for other PACCAR Renton site cleanup work.

The remainder of this report is organized as follows:

- Soil Results;
- Groundwater Results;
- Recommendations; and
- Limitations.

Figure 1 at the end of the text shows the location of the two wells. Well U1N is the northernmost well and well U1S is the southernmost well. Appendix A provides the sampling procedures followed for this work, and the boring and monitoring well installation logs. Appendix B provides the laboratory analytical reports for this work.

## SOIL RESULTS

Soils encountered at borings U1N and U1S varied from very silty sand to very sandy gravel. TPH contamination encountered at U1N was evidenced by odor and sheen and was identified by laboratory analysis as diesel/fuel oil No. 2. Table 1 presents the analytical results for soil samples from the borings.

- At boring U1N, the sample collected from a depth of 6 to 8 feet had a TPH concentration of 12,000 mg/kg. This was the only soil sample with TPH concentrations exceeding the hot spot action level (HSAL) of 2,500 mg/kg.

- At boring U1N, the other samples had TPH concentrations ranging from 24 to 300 mg/kg. The deepest sample with TPH concentrations exceeding 200 mg/kg was collected from a depth of 14 to 16 feet. The Cleanup Action Plan for the PACCAR Renton site calls for soils with TPH concentrations less than the HSAL but exceeding 200 mg/kg as diesel to be capped with one foot of clean structural fill.

- At boring U1S, no TPH was detected in soil samples.

## GROUNDWATER RESULTS

TPH detected in groundwater samples from wells U1N and U1S and in a product sample from well U1N was identified by laboratory analysis as diesel/fuel oil No. 2.

- Floating product was observed in well U1N at the start of well development. After a 24-hour purge recovery period, the product had a thickness of 0.35 foot.
- The groundwater sample from well U1N had a TPH concentration of 2 mg/L.
- The groundwater sample from well U1S had a TPH concentration of 0.5 mg/L.

## RECOMMENDATIONS

Recommended boring and monitoring well locations are provided in the Work Plan for Additional Subsurface Investigation and Excavation at Hot Spot U-1, dated January 5, 1993. We recommend additional subsurface exploration to determine the extent of groundwater and soil contamination west and north of well U1N.

We also recommend limited additional excavation of soils exceeding the HSAL. The excavation of these soils will be limited by the proximity of Garden Avenue North and the associated utilities. It appears that TPH contamination may be limited to a depth of about eight feet. At that depth, extending the excavation westward toward Garden Avenue will involve careful shoring, backfilling, and compaction. At PACCAR's request we will make more detailed recommendations regarding the geotechnical aspects of this work in a separate technical memorandum.

## LIMITATIONS

Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of PACCAR Inc. for specific application to the

referenced property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

Any questions regarding our work and this letter report, the presentation of the information, and the interpretation of the data are welcome and should be referred to the project manager.

We trust that this report meets your needs. If you have any questions or comments regarding these results, please call.

Sincerely,

**HART CROWSER, INC.**

John T. Finn

**JOHN T. FINN, P.E.**
Associate

U1.LR

Attachments:
Table 1 - Summary of Laboratory Analytical Results for Soil Samples
Figure 1 - Site and Well Location Plan
Appendix A - Field Sampling and Exploration Methods
Appendix B - Laboratory Analytical Reports
Hart Crowser Chemistry Laboratory

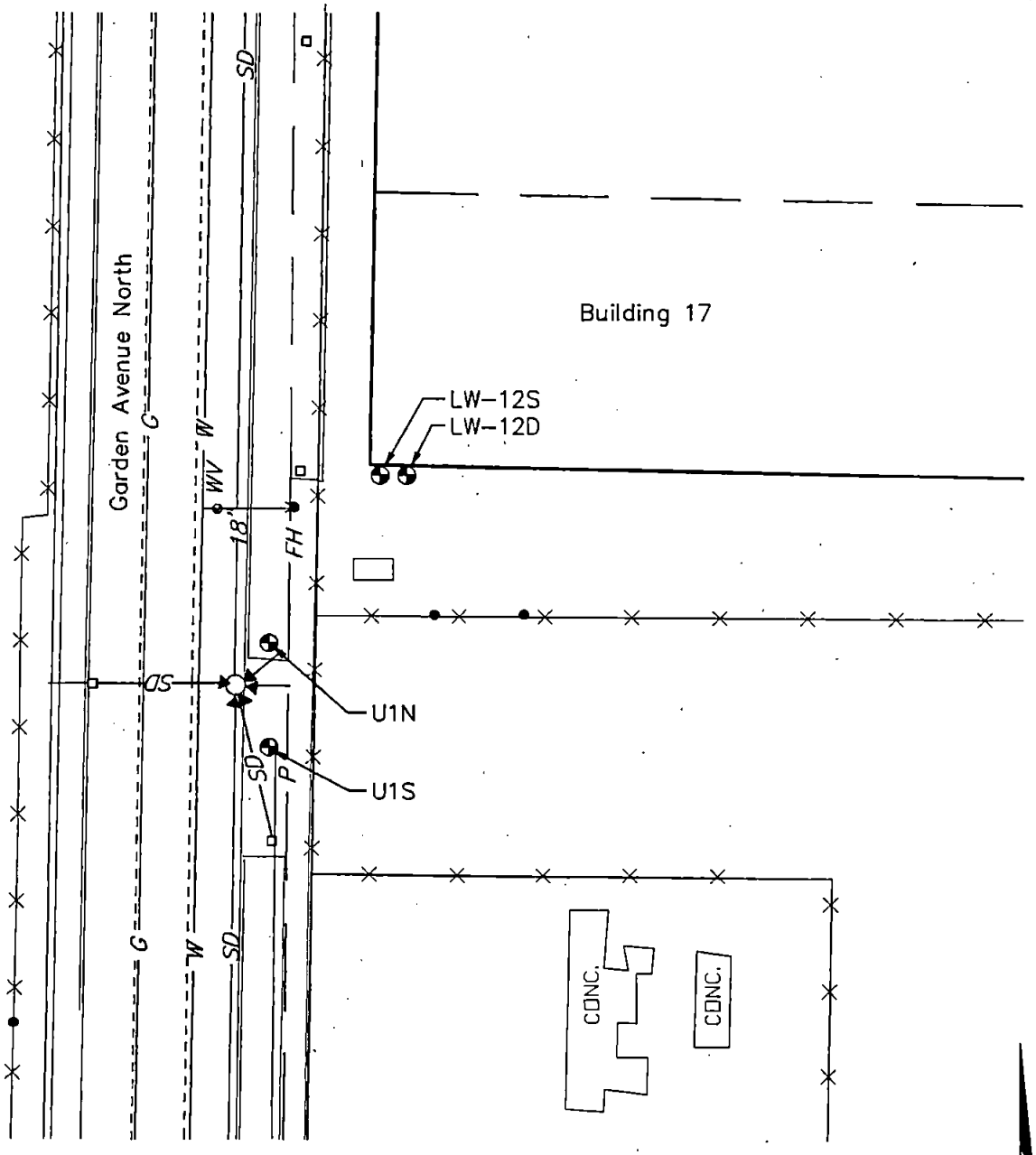
cc: (w/Attachments)
Matt Dalton; Dalton, Olmsted & Fuglevand
Claus Hackenberger, PACCAR Renton

**Table 1 - Summary of Laboratory Analytical Results for Soil Samples**

| Boring U1N | | Boring U1S | |
|---|---|---|---|
| Sample Depth in Feet | TPH by Method 8015 Concentration in mg/kg | Sample Depth in Feet | TPH by Method 8015 Concentration in mg/kg |
| 6 to 8 | 12,000 | 6 to 8 | ND |
| 8 to 8.5 | 54 | 8 to 10 | ND |
| 10 to 12 | 250 | 10 to 12 | ND |
| 12 to 14 | 230 | 12 to 14 | ND |
| 14 to 16 | 300 | 14 to 16 | ND |
| 16 to 18 | 120 | 16 to 18 | ND |
| 18 to 20 | 24 | 18 to 20 | ND |

ND = Not detected at laboratory detection limit of 10 mg/kg

# Site and Well Location Plan




U1N Existing Monitoring Well Location and Number

0 40 80

Scale in Feet

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J-1639-27 1/93

Figure 1

16392723 EJC 1/5/93 1=40 (base)85123tp1

# APPENDIX A
# FIELD SAMPLING AND EXPLORATION METHODS

## APPENDIX A
## FIELD SAMPLING AND EXPLORATION METHODS

The exploration program for this project included drilling, groundwater monitoring well installation, and groundwater sampling. The sampling and exploration locations are shown on Figure 1. The details regarding the different types of sampling are presented below.

### *Drilling, Soil Sampling, and Well Installations*

Two hollow-stem auger borings, designated U1N (North) and U1S (South) were drilled on November 18, 1992. The borings were completed to a depth of approximately 22 and 21 feet below the ground surface, respectively. The borings were advanced with a truck-mounted drill rig under subcontract to Hart Crowser, Inc., using an 8-inch-diameter hollow-stem auger. The drilling was accomplished under the continuous observation of an experienced geologist from our firm. Detailed field logs were prepared for the boring. The exploration logs (Figures A-2 and A-3) represent our interpretation of the drilling, excavation, sampling, and testing information. The depth where the soils or characteristics of the soils changed is noted. The change may be gradual. Soil samples recovered in the explorations were visually classified in the field in general accordance with the method presented on Figure A-1. A legend for the field log defining symbols and abbreviations utilized is also presented on Figure A-1. Samples were typically obtained at 2-foot-depth intervals using the Standard Penetration Test (SPT) procedures.

Care was taken to thoroughly clean the sampler between each sample. After removal of the soil, the sampler was scrubbed with a brush and then rinsed with tap water.

To minimize contamination between samples, the following procedures were followed. Once the soil was removed from the split-spoon sampler, the sampler was scrubbed and rinsed in tap water. The stainless-steel spoon used to transfer the soil from the sampler to the jars was rinsed thoroughly in deionized water between samples. All wash water generated on-site was discarded on the ground at the site.

An HNU PI-101 photoionization meter with a 10.2 eV lamp was used to monitor levels of volatile organic compounds in the work area around the boring.

Two 4-inch-I.D. PVC monitoring wells (U1N and U1S) were installed (through the auger center) with a 10-foot screen as shown on the well construction diagrams on Figures A-2 and A-3. They consisted of a slotted 4-inch-I.D. PVC pipe with a 0.020-inch slot size. A Colorado 10-20 sand pack was installed around the screen and up to 2 feet above the top of the screen. A surface seal consisting of 2 feet of concrete was placed at the wellhead. The top of the well was encased with a flush-mounted tamper-proof steel cap.

***Groundwater Sampling***

Samples were collected from the monitoring wells after well development. Well U1S was bailed with a Teflon bailer using polypropylene line. Well U1N had free floating product; a sample of the groundwater 3 feet below the groundwater surface was collected by advancing a flexible tube through the product and pumping the groundwater using a peristaltic pump.

The groundwater at the wells was collected after a minimum of three casing volumes of water was purged from the wells. Purge water was barreled. A measurement of depth of groundwater was taken at the monitoring well using an electric well sounder. The reference measuring point for the readings was the top of the casing.

The samples were placed on ice upon collection and kept cool until delivered to the receiving laboratory under chain of custody procedures.



Attachments:
Figure A-1 - Key to Exploration Logs
Figures A-2 and A-3 - Boring Log and Construction Data for Monitoring Well U1N and U1S

# Key to Exploration Logs

## Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual–manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

## Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance.
Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

| SAND or GRAVEL Density | Standard Penetration Resistance (N) in Blows/Foot | SILT or CLAY Consistency | Standard Penetration Resistance (N) in Blows/Foot | Approximate Shear Strength in TSF |
|---|---|---|---|---|
| Very loose | 0 – 4 | Very soft | 0 – 2 | <0.125 |
| Loose | 4 – 10 | Soft | 2 – 4 | 0.125 – 0.25 |
| Medium dense | 10 – 30 | Medium stiff | 4 – 8 | 0.25 – 0.5 |
| Dense | 30 – 50 | Stiff | 8 – 15 | 0.5 – 1.0 |
| Very dense | >50 | Very stiff | 15 – 30 | 1.0 – 2.0 |
| | | Hard | >30 | >2.0 |

## Moisture

| | |
|---|---|
| Dry | Little perceptable moisture |
| Damp | Some perceptable moisture, probably below optimum |
| Moist | Probably near optimum moisture content |
| Wet | Much perceptable moisture, probably above optimum |

## Minor Constituents

| | Estimated Percentage |
|---|---|
| Not identified in description | 0 – 5 |
| Slightly (clayey, silty, etc.) | 5 – 12 |
| Clayey, silty, sandy, gravelly | 12 – 30 |
| Very (clayey, silty, etc.) | 30 – 50 |

## Legends

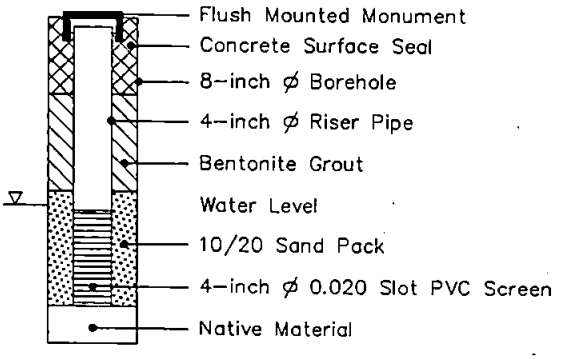
### Sampling Test Symbols

| BORING SAMPLES | | TEST PIT SAMPLES | |
|---|---|---|---|
| ⊠ | Split Spoon | ⊠ | Grab (Jar) |
| ⧅ | Shelby Tube | ⧄ | Bag |
| ▥ | Cuttings | ⧅ | Shelby Tube |
| ▯▯ | Core Run | | |
| * | No Sample Recovery | | |
| P | Tube Pushed, Not Driven | | |

### Test Symbols

| | |
|---|---|
| GS | Grain Size Classification |
| CN | Consolidation |
| TUU | Triaxial Unconsolidated Undrained |
| TCU | Triaxial Consolidated Undrained |
| TCD | Triaxial Consolidated Drained |
| QU | QU |
| DS | Direct Shear |
| K | Permeabilty |
| PP | Pocket Penetrometer<br>Approximate Compressive Strength in TSF |
| TV | Torvane<br>Approximate Shear Strength in TSF |
| CBR | California Bearing Ratio |
| MD | Moisture Density Relationship |
| AL | Atterberg Limits |
| | Water Content in Percent<br>Liquid Limit<br>Natural<br>Plastic Limit |
| PID | Photoionization Reading |

### Groundwater Observations

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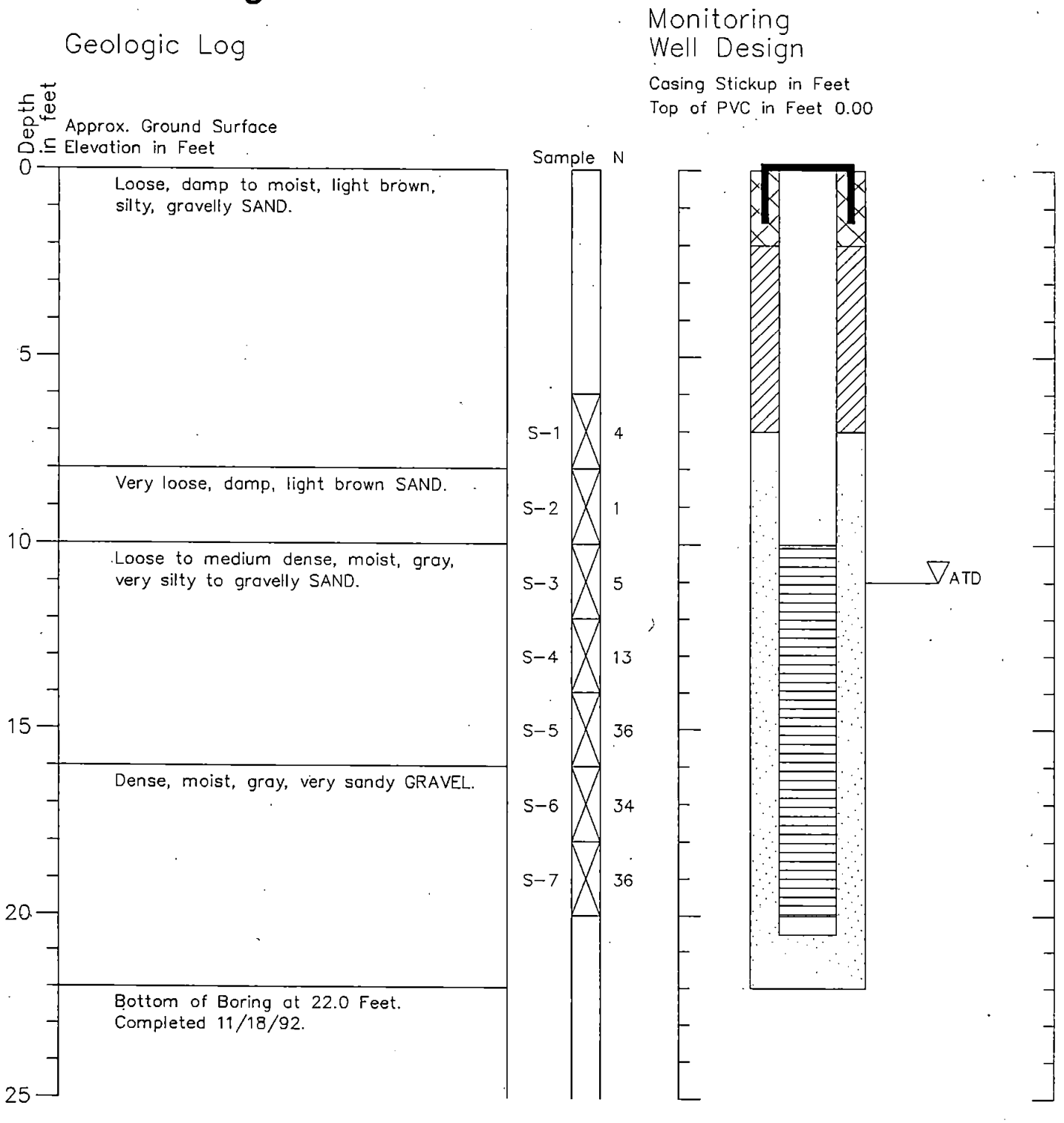
J-1639-27 12/92

Figure A-1

# Boring Log and Construction Data for Monitoring Well U1N




1. Refer to Figure A–1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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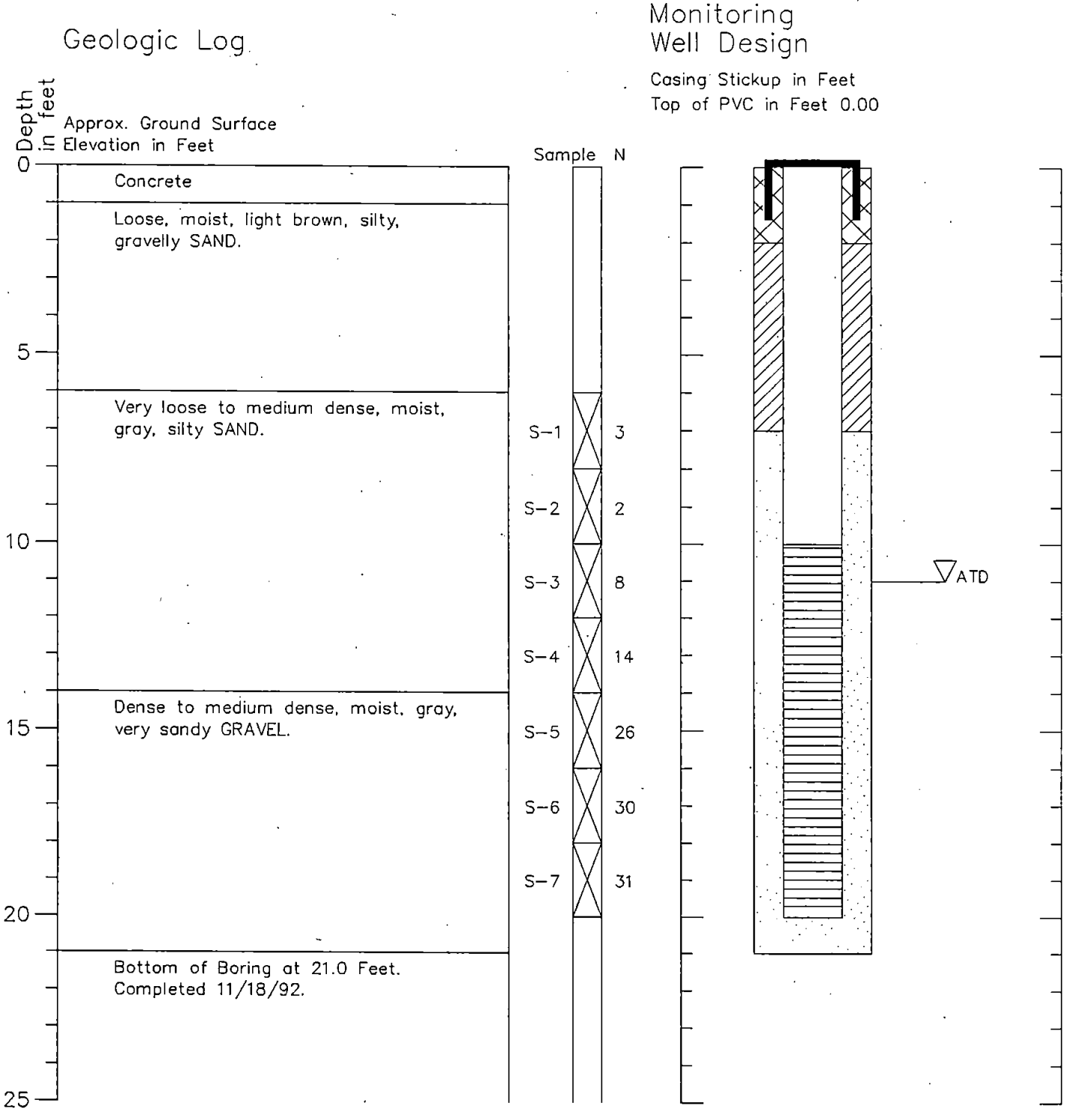
Figure A-2

# Boring Log and Construction Data for Monitoring Well U1S




1. Refer to Figure A–1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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J-1639-27 11/92

Figure A-3

# APPENDIX B
# LABORATORY ANALYTICAL REPORTS
# HART CROWSER CHEMISTRY LABORATORY

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Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102
FAX 206.328.5581
206.324.9530

# CHEMISTRY LABORATORY ANALYTICAL REPORT

January 2, 1993

Cathy Kiley, Hart Crowser Sr. Staff Environmental Chemist

RE: Paccar Phase IV, J-1639-27, Sequence BC

Attached are the compiled results from analyses conducted on samples received November 20, 1992. We performed extractions and analyses as indicated:

| | Matrix | Quantity | Date Extracted | Date Analyzed |
|---|---|---|---|---|
| ► TPH-ID | Soil | 14 | 11/24/92 | 11/24/92 |

This report contains the following:

- ► Analytical results for soil samples presented on a dry weight basis.
- ► Data qualifiers.
- ► Results for method blanks.
- ► Recoveries for spiked samples.
- ► Differences for duplicate analyses.
- ► Recoveries for laboratory control sample.
- ► Copies of chain of custody forms.

**HART CROWSER, INC.**

James Herndon

**JAMES HERNDON**
Laboratory Manager
Washington State Department of Ecology
Laboratory Accreditation Number C134

**Analytical Results**

Results in ppm (mg/kg or mg/L)

| Compound | U1N-S-1 | U1N-S-2 | U1N-S-3 |
|---|---|---|---|
| Matrix | Soil | Soil | Soil |
| % Moisture | 19% | 15% | 20% |
| Gasoline | 10 U | 10 U | 10 U |
| Kensol | 10 U | 10 U | 10 U |
| Kerosene/Jet A | 10 U | 10 U | 10 U |
| Stoddard Solvent | 10 U | 10 U | 10 U |
| Diesel/Fuel Oil #2 | 12,000 | 23 | 250 |
| Bunker C | 10 U | 10 U | 10 U |
| Oil | 10 U | 31 | 10 U |
| Unknown | 10 U | 10 U | 10 U |
| Total TPH Concentration | 12,000 | 54 | 250 |
| 2-Fluorobiphenyl (surr #1) | M | 89% | 111% |
| o-Terphenyl (surr #2) | M | 88% | 99% |
| Hexacosane - nC26 (surr #3) | 101% | 89% | 99% |

**Analytical Results, continued**

Results in ppm (mg/kg or mg/L)

| Compound | U1N-S-4 | U1N-S-5 | U1N-S-6 |
|---|---|---|---|
| Matrix | Soil | Soil | Soil |
| % Moisture | 14% | 7% | 7% |
| Gasoline | 10 U | 10 U | 10 U |
| Kensol | 10 U | 10 U | 10 U |
| Kerosene/Jet A | 10 U | 10 U | 10 U |
| Stoddard Solvent | 10 U | 10 U | 10 U |
| Diesel/Fuel Oil #2 | 230 | 300 | 120 |
| Bunker C | 10 U | 10 U | 10 U |
| Oil | 10 U | 10 U | 10 U |
| Unknown | 10 U | 10 U | 10 U |
| Total TPH Concentration | 230 | 300 | 120 |
| 2-Fluorobiphenyl (surr #1) | 122% | 100% | 86% |
| o-Terphenyl (surr #2) | 100% | 99% | 102% |
| Hexacosane - nC26 (surr #3) | 100% | 99% | 100% |

**Analytical Results, continued**

Results in ppm (mg/kg or mg/L)

| Compound | U1N-S-7 | U1S-S-1 | U1S-S-2 |
|---|---|---|---|
| Matrix | Soil | Soil | Soil |
| % Moisture | 8% | 21% | 25% |
| Gasoline | 10 U | 10 U | 10 U |
| Kensol | 10 U | 10 U | 10 U |
| Kerosene/Jet A | 10 U | 10 U | 10 U |
| Stoddard Solvent | 10 U | 10 U | 10 U |
| Diesel/Fuel Oil #2 | 24 | 10 U | 10 U |
| Bunker C | 10 U | 10 U | 10 U |
| Oil | 10 U | 10 U | 10 U |
| Unknown | 10 U | 10 U | 10 U |
| Total TPH Concentration | 24 | - | - |
| 2-Fluorobiphenyl (surr #1) | 96% | 86% | 88% |
| o-Terphenyl (surr #2) | 99% | 93% | 98% |
| Hexacosane - nC26 (surr #3) | 98% | 93% | 99% |

**Analytical Results, continued**

Results in ppm (mg/kg or mg/L)

| Compound | U1S-S-3 | U1S-S-4 | U1S-S-5 |
|---|---|---|---|
| Matrix | Soil | Soil | Soil |
| % Moisture | 22% | 21% | 6% |
| Gasoline | 10 U | 10 U | 10 U |
| Kensol | 10 U | 10 U | 10 U |
| Kerosene/Jet A | 10 U | 10 U | 10 U |
| Stoddard Solvent | 10 U | 10 U | 10 U |
| Diesel/Fuel Oil #2 | 10 U | 10 U | 10 U |
| Bunker C | 10 U | 10 U | 10 U |
| Oil | 10 U | 10 U | 10 U |
| Unknown | 10 U | 10 U | 10 U |
| Total TPH Concentration | - | - | - |
| 2-Fluorobiphenyl (surr #1) | 82% | 94% | 86% |
| o-Terphenyl (surr #2) | 93% | 97% | 95% |
| Hexacosane - nC26 (surr #3) | 93% | 96% | 95% |

**Analytical Results, continued**

Results in ppm (mg/kg or mg/L)

| Compound | U1S-S-6 | Duplicate U1S-S-6 | U1S-S-7 |
|---|---|---|---|
| Matrix | Soil | Soil | Soil |
| % Moisture | 12% | 12% | 5% |
| Gasoline | 10 U | 10 U | 10 U |
| Kensol | 10 U | 10 U | 10 U |
| Kerosene/Jet A | 10 U | 10 U | 10 U |
| Stoddard Solvent | 10 U | 10 U | 10 U |
| Diesel/Fuel Oil #2 | 10 U | 10 U | 10 U |
| Bunker C | 10 U | 10 U | 10 U |
| Oil | 10 U | 10 U | 10 U |
| Unknown | 10 U | 10 U | 10 U |
| Total TPH Concentration | - | - | - |
| 2-Fluorobiphenyl (surr #1) | 91% | 90% | 90% |
| o-Terphenyl (surr #2) | 99% | 102% | 99% |
| Hexacosane - nC26 (surr #3) | 98% | 103% | 99% |

**Data Qualifiers**

U Not detected at indicated detection limit.
\- Below detection limit.
J Estimated value below detection limit.
B Also detected in associated method blank.
M Unable to calculate recovery due to matrix interference.
n/t Test not performed.
n/a Not applicable.
Surr Surrogate compound.

**Method Blanks**

Results in ppm (mg/kg or mg/L)

| Compound | |
|---|---|
| Matrix | Soil |
| Gasoline | 10 U |
| Kensol | 10 U |
| Kerosene/Jet A | 10 U |
| Stoddard Solvent | 10 U |
| Diesel/Fuel Oil #2 | 10 U |
| Bunker C | 10 U |
| Oil | 10 U |
| Unknown | 10 U |
| Total TPH Concentration | - |
| 2-Fluorobiphenyl (surr #1) | 91% |
| o-Terphenyl (surr #2) | 97% |
| Hexacosane - nC26 (surr #3) | 98% |

**Spikes**

% Recovery

| Compound | MS U1N-S-7 | MSD U1N-S-7 | MS U1S-S-7 | MSD U1S-S-7 |
|---|---|---|---|---|
| Matrix | Soil | Soil | Soil | Soil |
| Kerosene/Jet A | 97% | 98% | 76% | 87% |
| 2-Fluorobiphenyl (surr #1) | 116% | 88% | 112% | 113% |
| o-Terphenyl (surr #2) | 97% | 95% | 98% | 99% |
| Hexacosane - nC26 (surr #3) | 95% | 95% | 97% | 98% |

**Duplicates**

Relative % Difference

| Compound | U1N-S-7 | U1S-S-7 |
|---|---|---|
| Matrix | Soil | Soil |
| Kerosene/Jet A | -1% | -14% |

**Laboratory Control Sample**

% Recovery

| Compound | |
|---|---|
| Matrix | Soil |
| Kerosene/Jet A | 96% |
| 2-Fluorobiphenyl (surr #1) | 126% |
| o-Terphenyl (surr #2) | 95% |
| Hexacosane - nC26 (surr #3) | 94% |

# Sample Custody Record

DATE 11/19/92 PAGE 1 OF 2

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699

JOB NUMBER 1639-27 LAB NUMBER

PROJECT MANAGER J. Finn

PROJECT NAME PACCAR Phase IV

SAMPLED BY: J. Bromley

| LAB NO. | SAMPLE | TIME | STATION | MATRIX | TESTING: 8015 Mod | NO. OF CONTAINERS | OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS |
|---|---|---|---|---|---|---|---|
| UIN | S-1 | 11/18/92 | HC-UIN | Soil | / | 1 | For all: Certified Analyses |
| | S-2 | | | | / | 1 | Quant. w/ Phenanthrene |
| | S-3 | | | | / | 1 | |
| | S-4 | | | | / | 1 | |
| | S-5 | | | | / | 1 | |
| | S-6 | | | | / | 1 | |
| | S-7 | | | | / | 1 | |

| RELINQUISHED BY | DATE | RECEIVED BY | DATE |
|---|---|---|---|
| SIGNATURE: John Bromley | 11/19 | SIGNATURE: Valery Ivanov | 11/20/92 |
| PRINTED NAME: John Bromley | TIME | PRINTED NAME: VALERY IVANOV | TIME |
| COMPANY: Hart Crowser | | COMPANY: HC | 10:00 |

| RELINQUISHED BY | DATE | RECEIVED BY | DATE |
|---|---|---|---|
| SIGNATURE | | SIGNATURE | |
| | TIME | | TIME |
| PRINTED NAME | | PRINTED NAME | |
| COMPANY | | COMPANY | |

TOTAL NUMBER OF CONTAINERS: 7

METHOD OF SHIPMENT: Hand Deliver

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS

DISTRIBUTION:

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3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT
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# Sample Custody Record

DATE 11/19/92 PAGE 2 OF 2

HART CROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699

JOB NUMBER 1639-27 LAB NUMBER

PROJECT MANAGER J FINN

PROJECT NAME PACCAR Phase IV

SAMPLED BY: J. Bromley

| LAB NO. | SAMPLE | TIME | STATION | MATRIX | TESTING: 8015 Mod | NO. OF CONTAINERS | OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS |
|---|---|---|---|---|---|---|---|
| | | | | | | | For all: |
| U15 | S-1 | 11/19 | HC-U15 | Soil | / | 1 | Certified Analyses |
| | S-2 | | | | / | 1 | Quant w/Phenanthrene |
| | S-3 | | | | / | 1 | |
| | S-4 | | | | / | 1 | |
| | S-5 | | | | / | 1 | |
| | S-6 | | | | / | 1 | |
| | S-7 | | | | / | 1 | |

| RELINQUISHED BY | DATE | RECEIVED BY | DATE |
|---|---|---|---|
| John Bromley | 11/19 | Valery Ivanov | 10/20/92 |
| SIGNATURE | | SIGNATURE | |
| John Bromley | TIME | Valery Ivanov | TIME |
| PRINTED NAME | | PRINTED NAME | |
| Hart Crowser | | UC | 10:02 |
| COMPANY | | COMPANY | |

| RELINQUISHED BY | DATE | RECEIVED BY | DATE |
|---|---|---|---|
| | | | |
| SIGNATURE | | SIGNATURE | |
| | TIME | | TIME |
| PRINTED NAME | | PRINTED NAME | |
| COMPANY | | COMPANY | |

TOTAL NUMBER OF CONTAINERS 7

METHOD OF SHIPMENT Hand Deliver

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS

DISTRIBUTION:

1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY
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4. LABORATORY TO RETURN WHITE COPY TO HART CROWSER

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Earth and Environmental Technologies

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Seattle, Washington 98102
FAX 206.328.5581
206.324.9530

# CHEMISTRY LABORATORY ANALYTICAL REPORT

January 4, 1993

Cathy Kiley, Hart Crowser Sr. Staff Environmental Chemist

RE: Paccar Phase IV, J-1639-27, Sequence BF

Attached are the compiled results from analyses conducted on samples received December 7, 1992. We performed extractions and analyses as indicated:

| | Matrix | Quantity | Date Extracted | Date Analyzed |
|---|---|---|---|---|
| ► TPH-ID | Water | 2 | 12/09/92 | 12/09/92 |
| ► TPH-ID | Product | 1 | 12/09/92 | 12/09/92 |

This report contains the following:

- Analytical results for water and product samples.
- Data qualifiers.
- Results for method blanks.
- Differences for duplicate analyses.
- Recoveries for laboratory control sample.
- Copies of chain of custody forms.

**HART CROWSER, INC.**

James Herndon

**JAMES HERNDON**
Laboratory Manager
Washington State Department of Ecology
Laboratory Accreditation Number C134

**Analytical Results**

Results in ppm (mg/kg or mg/L)

| Compound | U1-N-2 | U-1-S | Duplicate U-1-S | U-1-N |
|---|---|---|---|---|
| Matrix | Water | Water | Water | Product |
| Gasoline | 0.2 U | 0.2 U | 0.2 U | 1,000 U |
| Kensol | 0.4 U | 0.4 U | 0.4 U | 1,000 U |
| Kerosene/Jet A | 0.4 U | 0.4 U | 0.4 U | 1,000 U |
| Stoddard Solvent | 0.2 U | 0.2 U | 0.2 U | 1,000 U |
| Diesel/Fuel Oil #2 | 2 | 0.5 | 0.5 | 76,000 |
| Bunker C | 0.4 U | 0.4 U | 0.4 U | 1,000 U |
| Oil | 0.4 U | 0.4 U | 0.4 U | 1,000 U |
| Unknown | 0.4 U | 0.4 U | 0.4 U | 1,000 U |
| Total TPH Concentration | 2 | 0.5 | 0.5 | 76,000 |
| 2-Fluorobiphenyl (surr #1) | 116% | 112% | 114% | 129% |
| o-Terphenyl (surr #2) | 99% | 107% | 108% | 105% |
| Hexacosane - nC26 (surr #3) | 99% | 107% | 106% | 106% |

**Data Qualifiers**

U Not detected at indicated detection limit.
\- Below detection limit.
J Estimated value below detection limit.
B Also detected in associated method blank.
M Unable to calculate recovery due to matrix interference.
n/t Test not performed.
n/a Not applicable.
Surr Surrogate compound.

**Method Blanks**

Results in ppm (mg/kg or mg/L)

| Compound | | |
|---|---|---|
| Matrix | Water | Product |
| Gasoline | 0.2 U | 1,000 U |
| Kensol | 0.4 U | 1,000 U |
| Kerosene/Jet A | 0.4 U | 1,000 U |
| Stoddard Solvent | 0.2 U | 1,000 U |
| Diesel/Fuel Oil #2 | 0.4 U | 1,000 U |
| Bunker C | 0.4 U | 1,000 U |
| Oil | 0.4 U | 1,000 U |
| Unknown | 0.4 U | 1,000 U |
| Total TPH Concentration | - | - |
| 2-Fluorobiphenyl (surr #1) | 125% | 97% |
| o-Terphenyl (surr #2) | 123% | 99% |
| Hexacosane - nC26 (surr #3) | 125% | 99% |

**Duplicates**

Relative % Difference

| Compound | U-1-S |
|---|---|
| Matrix | Water |
| Total TPH Concentration | 11% |

**Laboratory Control Sample**

% Recovery

| Compound | |
|---|---|
| Matrix | Water |
| Kerosene/Jet A | 92% |
| 2-Fluorobiphenyl (surr #1) | 157% |
| o-Terphenyl (surr #2) | 118% |
| Hexacosane - nC26 (surr #3) | 118% |

BF

# Sample Custody Record

DATE 12-7-92 PAGE 1 OF 1

HARTCROWSER

Hart Crowsér, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699

JOB NUMBER 1639-27 LAB NUMBER H.C.

PROJECT MANAGER Finn

PROJECT NAME Paccar

SAMPLED BY:

| LAB NO. | SAMPLE | TIME | STATION | MATRIX | TESTING: TPH 8015 Mod | TESTING: HCID 3 WTPH | NO. OF CONTAINERS | OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS |
|---|---|---|---|---|---|---|---|---|
| | U-1-S | | | Water | X | | 1 | 24-48 HRS |
| | U-1-N | | Product | ↓ | X | ✱ MCK 12/7/92 | 2 | VOA on Hold (U1-N) |
| | | | | | ↑ MCK 12/9/92 | | | |

| RELINQUISHED BY | DATE | RECEIVED BY | DATE |
|---|---|---|---|
| SIGNATURE: Brian Sullivan | 12/7/92 | SIGNATURE: Mary Catherine Kiley | 12/7/92 |
| PRINTED NAME: Brian Sullivan | TIME: 1600 | PRINTED NAME: Mary Catherine Kiley | TIME: 1600 |
| COMPANY: H.C. | | COMPANY: HC | |
| RELINQUISHED BY | DATE | RECEIVED BY | DATE |
| SIGNATURE: | | SIGNATURE: Valery Ivanov | 12/7 |
| PRINTED NAME: | TIME: | PRINTED NAME: Valery Ivanov | TIME: 4:05 pm |
| COMPANY: | | COMPANY: HC | |

TOTAL NUMBER OF CONTAINERS: 3

METHOD OF SHIPMENT: Hand

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS: S-3

DISTRIBUTION:

1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY
2. RETURN PINK COPY TO PROJECT MANAGER
3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT
4. LABORATORY TO RETURN WHITE COPY TO HART CROWSER

# Sample Custody Record

DATE 12/8/92 PAGE 1 OF 1

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699

JOB NUMBER 1639-27 LAB NUMBER

PROJECT MANAGER J. FINN

PROJECT NAME PACCAR.

SAMPLED BY: S. SIEBERT

| LAB NO. | SAMPLE | TIME | STATION | MATRIX | TESTING: TPH 8015 MOD. | NO. OF CONTAINERS | OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS |
|---|---|---|---|---|---|---|---|
| ~~UIN~~ | ~~S-1~~ | 2:30 | U1N | WATER | X | 1 | QUANTIFY w/PHENANTHRENE |
| | U1-N-2 | | | | | | 24 HR T.A.T. |
| | | | | | | | |
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| RELINQUISHED BY | DATE | RECEIVED BY | DATE |
|---|---|---|---|
| SIGNATURE: [signature] | 12/8/92 | SIGNATURE: | |
| PRINTED NAME: STEPHEN SIEBERT | TIME | PRINTED NAME: | TIME |
| COMPANY: HART CROWSER | 4:50 | COMPANY: | |

| RELINQUISHED BY | DATE | RECEIVED BY | DATE |
|---|---|---|---|
| SIGNATURE: | | SIGNATURE: Valery Ivanov | 12/8 |
| PRINTED NAME: | TIME | PRINTED NAME: VALERY IVANOV | TIME |
| COMPANY: | | COMPANY: HC | 4:50 pm |

TOTAL NUMBER OF CONTAINERS: 1

METHOD OF SHIPMENT: HAND CARRY

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS

DISTRIBUTION:

1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY
2. RETURN PINK COPY TO PROJECT MANAGER
3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT
4. LABORATORY TO RETURN WHITE COPY TO HART CROWSER