HARTCROWSER

Earth and Environmental Technologies

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J-2296-01

RECEIVED
OCT 13 1989
ENVIRONMENTAL QUALITY
BOISE FIELD OFFICE

October 27, 1989

Potlatch Corporation
P. O. Box 386
St. Maries, Idaho 83861

Attn: Mr. Mike Fish

Re: Site Exploration Report
Avery Landing Site
Avery, Idaho

Dear Mr. Fish:

Hart Crowser, Inc., is pleased to submit this letter report for work completed to date at the Avery Landing site in Avery, Idaho. Our work was completed as outlined in Task 1 of our revised scope of work letter dated June 30, 1989. Additional water and product sampling was completed as discussed in our memorandum to Mr. Mike Fish of Potlatch Corporation dated September 15, 1989.

The scope of Task 1 work involved monitoring well installation, groundwater and free-phase hydrocarbon sampling, and laboratory analysis. Field sampling of

Installation of Monitoring Wells

Four monitoring wells were installed at the Avery Landing site on August 22 and 23, 1989. The Hart Crowser on-site representative was Bruce McDonald, Senior Staff Engineering Geologist. The subcontracted drillers were Soil Sampling Service of Puyallup, Washington. All drilling was completed with air rotary drilling methods. Monitoring well locations are shown on Figure 1. Well construction data are presented on Figures A-2 through A-5. A key displaying the symbols used to describe well installation logs is presented on Figure A-1.

Groundwater and Free-Phase Hydrocarbon Sampling

Groundwater samples were collected on August 23, 1989, from each of the four monitoring wells installed by Hart Crowser. Monitoring wells HC-1 and HC-3 had no noticeable sheen on purged water. Heavy sheens were observed on purged water from monitoring wells HC-2 and HC-4, a strong odor was noted from HC-4. Free-phase hydrocarbons were not present in any of the new wells at that time. Water samples from HC-1 and HC-3 were submitted to Analytical Resources Incorporated of Seattle, Washington, under contract with Hart Crowser, for analysis of total petroleum hydrocarbons (TPH) and dissolved metals (arsenic, cadmium, chromium, and lead).

MW's HC-1 through HC-4

metals. TPH was nondetectable in HC-1 and HC-3, all metals were also nondetectable except arsenic in HC-3 at 0.009 parts per million (ppm).

Water samples collected September 26, 1989, from HC-2 and HC-3, were analyzed for fuel hydrocarbons by Gas Chromatograph (EPA Method 8015) using the free-phase hydrocarbons from HC-4 as a standard. Fuel hydrocarbons were nondetectable in both samples.

Table 1 summarizes the groundwater analysis results. Laboratory data sheets may be found in Appendix B.

Free-phase Hydrocarbons

Analysis of free-phase hydrocarbons in HC-4 resulted in nondetectable concentrations of all PNA compounds, PCBs, and total halogenated hydrocarbons. All EP Tox metals were also nondetectable except for barium at 0.005 ppm. The flash point of the free-phase hydrocarbons is reported as greater than 210 degrees Fahrenheit. The sample was also analyzed for total metals: cadmium (not detected), chromium (1 ppm), lead (5 ppm), and arsenic (not detected).

application to the project site. No other conditions, express or implied, should be understood.

Any questions regarding this report are welcome and should be referred to Alex Tula, Project Manager.

Sincerely,

HART CROWSER, INC.

JERI L. MASSENGILL
Staff Geologist

ALEX TULA
Associate

JLM/AT:cmr/sde
LR22961A/JOBS

Attachments:
Table 1 - Groundwater Analysis Summary
Figure 1 - Site and Exploration Plan
Appendix A - Field Procedures
Figure A-1 - Key to Exploration Logs
Figure A-2 through A-5 - Well Construction Data for Monitoring Well HC-1 through HC-4
Appendix B - Laboratory Data Sheets
Analytical Resources Incorporated
and Spectra Laboratories, Inc.

Site and Exploration Plan

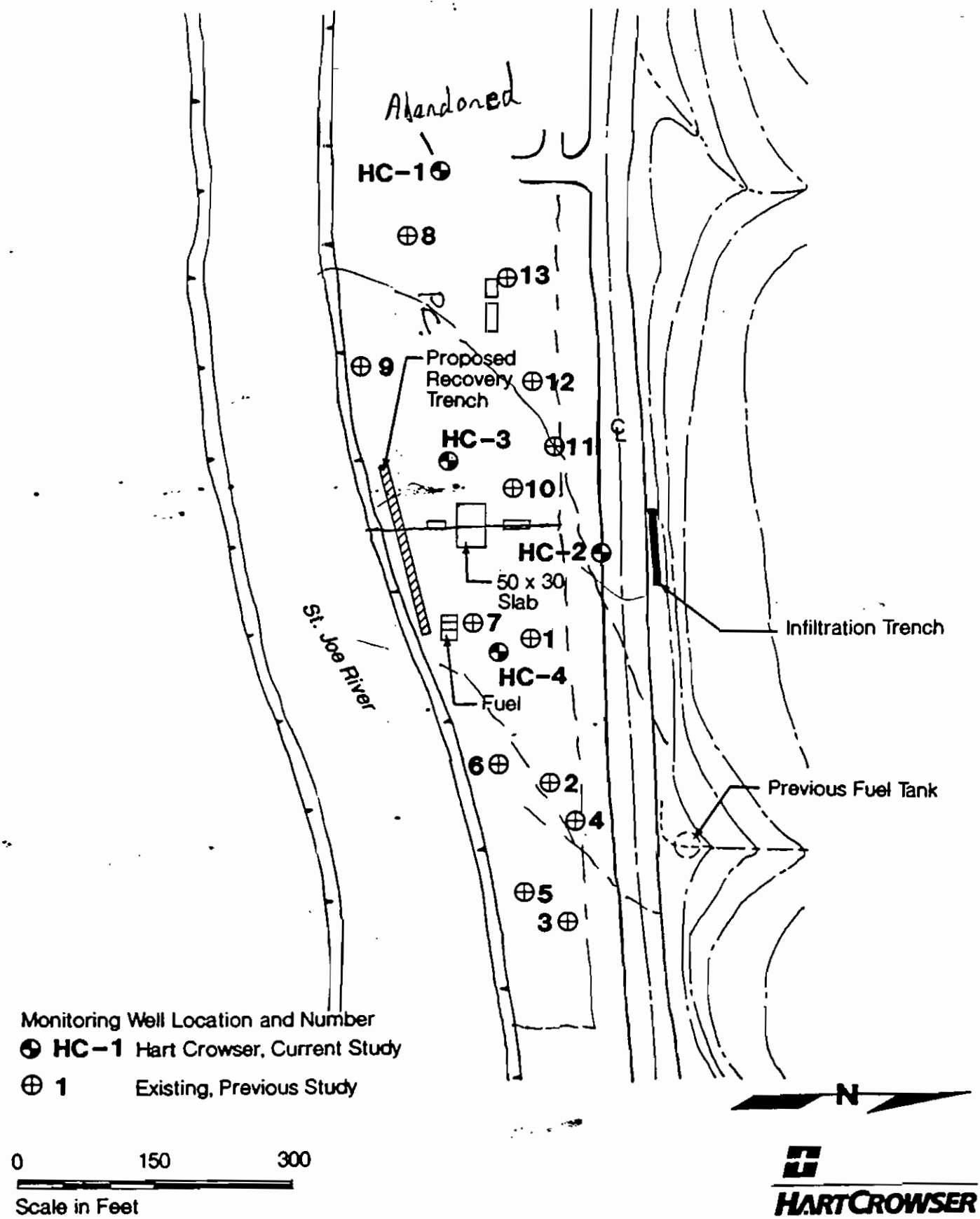

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Figure 1

the borehole to a depth of 1 foot below the surface. All wells have a concrete surface seal and are protected by either a flush or stickup locking steel monument. Well construction information is presented on Figures A-2 through A-5.

Water Level Measurements

Water level measurements were made for each boring at the time water was first observed during drilling, and immediately prior to placement of the well screen. Subsequent sets of water level measurements were made of all wells installed. These were made before well development and sampling.

Water levels were measured to an accuracy of 0.01 foot using an Olympic Model 300 Electric Well Probe and a decimally graduated tape measure. The tip of the well probe was routinely rinsed with deionized water between wells in order to prevent chemical cross contamination.

Well Development

Development of wells was accomplished by hand bailing. Wells were developed by purging at least four casing volumes of water to remove the fine-grained silt and sand and suspended clay from the well bottom. The wells retained a slight degree of turbidity after development with the exception of HC-3 which remained very turbid.

Groundwater and Free-Phase Hydrocarbon Sampling for Chemical Analysis

Groundwater samples were obtained from the 4 monitoring wells on August 23, 1989. Free-phase hydrocarbon from HC-4 and groundwater samples from HC-2 and HC-3 were collected on September 26, 1989.

Groundwater samples from monitoring wells were obtained using a stainless steel or teflon bailer. To obtain representative groundwater samples, at least 3 casing volumes of water were purged prior to actual sampling. Water was then poured from the bailer into appropriate laboratory provided bottles.

Key to Exploration Logs

Sample Descriptions

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 in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance 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 perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content
Wet	Much perceptible 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

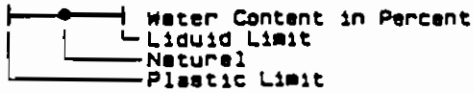
Sampling

BORING SAMPLES

- ⊠ Split Spoon
- ⊘ Shelby Tube
- ▥ Cuttings
- ◫ 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	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits



Ground Water Observations

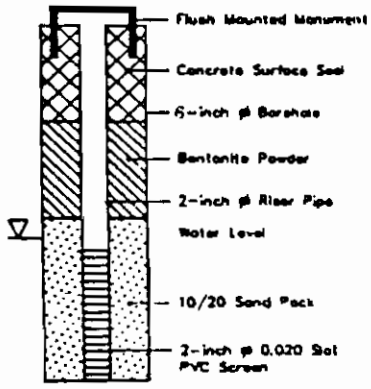


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Figure A-1

Boring Log and Construction Data for Monitoring Well HC-2

Geologic Log

Depth in feet

Approx. Ground Surface Elevation in Feet

0

Boring drilled with air-rotary equipment.
No samples recovered during drilling.

5

10

15

20

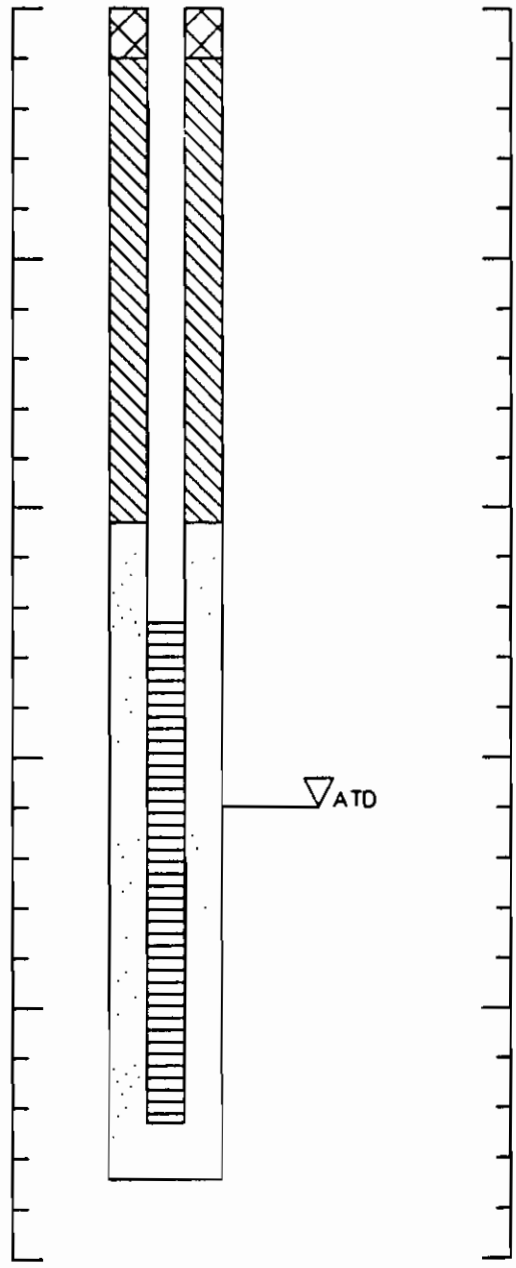
25

Bottom of Boring at 23.4 Feet.
Completed 8/23/89.

Sample N

Monitoring Well Design

Casing Stickup in Feet
Top of PVC in Feet 0.00



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-3

Boring Log and Construction Data for Monitoring Well HC-4

Geologic Log

Depth in feet

Approx. Ground Surface Elevation in Feet

Sample N

0

Boring drilled with air-rotary equipment.
No samples recovered during drilling.

5

10

15

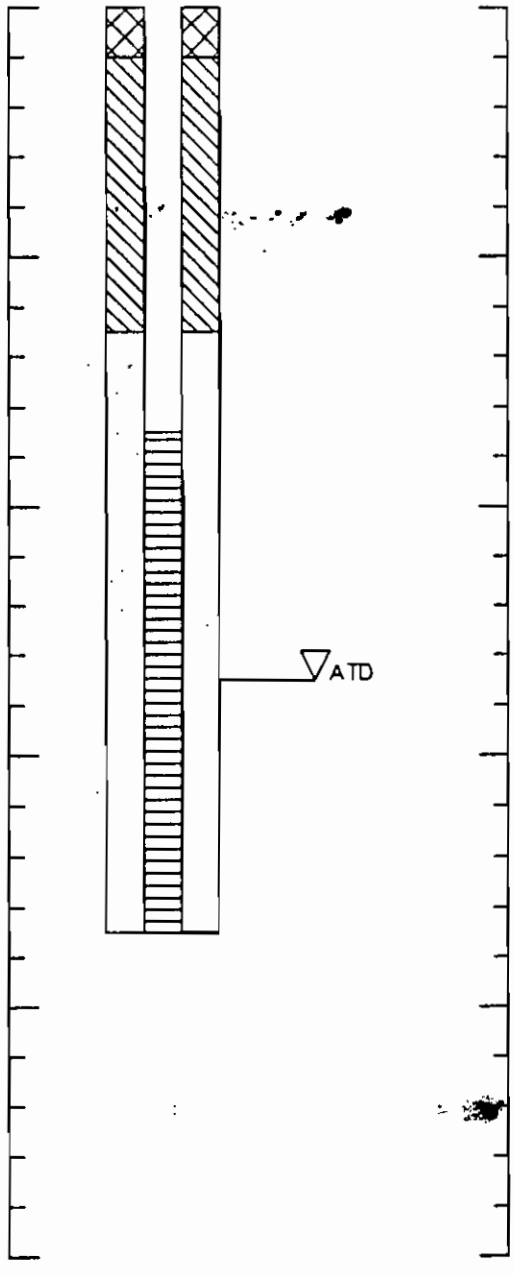
Bottom of Boring at 18.5 Feet.
Completed 8/22/89.

20

25

Monitoring Well Design

Casing Stickup in Feet
Top of PVC in Feet 0.00



1. Refer to Figure A-1 for explanation of descriptions and symbols.
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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-5

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
09/05/89
10:58:34

Client: HART CROWSER
Contact: SCOTT FERRIS
Project: POTLATCH CORP
ID number: HC-1
Description:
Sampled: / /
Matrix: WATER

ARI job number: 3540
ARI sample number: A

Released by: NRW

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	Prep	M
7440-38-2	Arsenic	0.001 mg/L	L	DMN	GFA
7440-43-9	Cadmium	0.002 mg/L	L	DMN	ICP
7440-47-3	Chromium	0.005 mg/L	L	DMN	ICP
7439-92-1	Lead	0.001 mg/L	L	DMN	GFA

ANALYTICAL RESOURCES INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

DATA REPORT SHEET
Product Analysis

CLIENT:Hart Crowser
ARI JOB #: 284503747
VTSR: 09/28/89
PROJECT: 2296-02
Avery Landing

ARI SAMPLE #	CLIENT SAMPLE #	Product (ppm)
3747 A	MW-2/S-1	50 UJ
3747 B	MW3/S-1	50 UJ
3747 MB	Method Blank	50 UJ

DATA QUALIFIER

U Indicates compound analyzed for but not detected at the given detection limit.

J Indicates value is estimated, based on results of client-supplied product which was used for a standard.

Date Release Authorized: _____
Report prepared 10/27/89 - MAC:B

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-518
(206) 621-6490
(206) 621-7523 (FAX)

ORGANICS ANALYSIS DATA SHEET
PCB Analysis

QC Report: 3747-Hart Crowser
Project No: 2296-02/Avery Landing
Date Received: 09/28/89

Matrix: Oil

Data Release Authorized
Report prepared: 10/04/89 - MAC:C

Sulfur Cleaned: NO
Alumina Cleaned: NO
GPC Cleaned: NO

Reported in ppm (mg/Kg)

Sample #:	**Method Blk.**	**MW-4/S-1**
ARI Lab ID:	*3747MB*	*3747C*
Date Extracted:	*10/03/89*	*10/03/89*
Date Analyzed:	*10/03/89*	*10/03/89*
Sample Weight:	*5.0 g*	*5.04 g*
Dilution:	*1:40*	*1:40*
1016/1242	1.0 U	2.0 U
1248	1.0 U	2.0 U
1254	1.0 U	2.0 U
1260	1.0 U	2.0 U
DBC %Rec	*55%*	*78%*

Data Reporting Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

NR Indicates compound not reported due to chromatographic interference and/or dilution.

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Analytical
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333 Ninth Ave. North
Seattle, WA 98109-5
(206) 621-6490
(206) 621-7523 (FAX

ORGANICS ANALYSIS DATA SHEET- PNA by GC-FID

Lab Sample ID: 1003MB
Matrix: Product

Sample No: Method Blank
QC Report No: 3747-Hart Crowser
VTSR: 09/28/89

Date Extracted: 10/03/89
Date Analyzed: 10/05/89
Conc/Dil Factor: 1:10
Dry Weight: 4.0 grams

Data Release Authorized:
PORT PREPARED: MAC:C - C.G.. (10/05/89)

Reported in ppm(mg/kg)

CAS Number		mg/kg
91-20-3	Naphthalene	2.0 U
208-96-8	Acenaphthylene	2.0 U
83-32-9	Acenaphthene	2.0 U
86-73-7	Fluorene	2.0 U
85-01-8	Phenanthrene	2.0 U
120-12-7	Anthracene	2.0 U
206-44-0	Fluoranthene	2.0 U
129-00-0	Pyrene	2.0 U
56-55-3	Benzo(a)Anthracene	2.0 U
218-01-9	Chrysene	2.0 U
205-99-2	Benzo(b)Fluoranthene &	
207-08-9	Benzo(k)Fluoranthene	3.0 U
50-32-8	Benzo(a)Pyrene	3.0 U
193-39-5	Indeno(1,2,3-cd)Pyrene	5.0 U
53-70-3	Dibenz(a,h)Anthracene	5.0 U
191-24-2	Benzo(ghi)Perylene	6.0 U

SURROGATE PERCENT RECOVERY

Terphenyl	**109%**

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NA — Indicates compound not analyzed.

NR — Indicates compound not reported due to dilution and/or matrix interference.