Rec'd 4/14/94

LANDAU
ASSOCIATES,
INC.
Geoenvironmental Engineering and Technologies

February 24, 1992

Boeing Environmental Affairs
P.O. Box 3707, M/S 7E-EJ
Seattle, WA 98124-2207

Attention: Mr. Charles R. Keller

RE: REPORT
GROUNDWATER SAMPLING—NOVEMBER 1991
E & H MONITORING WELLS
RENTON, WASHINGTON

## INTRODUCTION

This report summarizes the results of a groundwater sampling program conducted in November 1991 at the former E & H properties in Renton, Washington. The purpose of this report is to describe our field sampling activities and laboratory analytical program, present our findings regarding groundwater conditions, and present the laboratory chemical test results.

Soil and groundwater quality within the E & H properties was previously investigated by Landau Associates in the summer of 1989. Field work for the current groundwater sampling program was conducted at the site on November 25 and 26, 1991. Well locations are shown on the Site Plan (Figure 1). Groundwater from Wells LMW-1S, LMW-1D, LMW-2S, LMW-2D, LMW-4, and LMW-7 was sampled and analyzed, and groundwater elevations in those wells were measured. Groundwater was not encountered in Well LMW-6.

## GROUNDWATER CONDITIONS

Groundwater elevation measurements are summarized in Table 1. Shallow well groundwater elevation contours are shown on Figure 1 and indicate that groundwater flow is in a generally westerly direction. This is consistent with groundwater flow data available on a more regional basis.

## GROUNDWATER QUALITY

Groundwater sampling was performed by a team consisting of a Landau Associates geologist and engineer. A minimum of three well volumes was purged from each well prior to sampling. Groundwater samples to be analyzed for volatile organic compounds were collected using a stainless-steel bailer. For comparison purposes, an additional groundwater sample for volatile organic analysis was obtained from Well LMW-2D using a peristaltic pump and polyethylene tubing. Groundwater samples to be analyzed for toxic metals were obtained using a peristaltic pump and dedicated polyethylene tubing, and were field filtered prior to filling the

sample container. The samples were collected in appropriate containers, stored on ice, and delivered under chain of custody to the chemical testing laboratory.

Conventional parameters were measured in the field using calibrated instruments; these results are also summarized in Table 1. The stainless-steel bailer was decontaminated prior to sampling each well in a three-step process that consisted of: 1) washing with a solution of tap water and Alconox, 2) rinsing with tap water, and 3) rinsing with deionized water.

Groundwater was analyzed for volatile organic compounds using EPA Method 8240, and for toxic metals using the following methods: 1) EPA Method 6010 for all of the metals except mercury, and 2) EPA Method 7470 for mercury. Volatile organic compounds detected by laboratory chemical analysis are summarized in Table 2. The results of the laboratory chemical analyses for metals are summarized in Table 3. A rinsate sample was obtained during bailer decontamination and analyzed for volatile organic compounds. The rinsate sample was labeled LMW-8. Copies of the laboratory reports and chain-of-custody forms are included in Appendix A.

Vinyl chloride and toluene were detected at concentrations of 89 µg/L and an estimated 0.9 µg/L, respectively, in groundwater sampled from Well LMW-2D using the stainless-steel bailer. Vinyl chloride was detected at a concentration of 110 µg/L in groundwater sampled from Well LMW-2D using the peristaltic pump. Trace concentrations of 1,1-dichloroethane and chlorobenzene were detected in the groundwater samples from Well LMW-4. Low levels of acetone were detected in the groundwater sample from Well LMW-2S and the rinsate sample. According to the chemical testing laboratory, acetone is heavily used in the laboratory and the reported acetone levels may reflect laboratory contamination. Metals were not detected in the groundwater samples.

We trust that the information provided in this report satisfies your present needs. If you have any questions, please contact us.

Very truly yours,

LANDAU ASSOCIATES, INC.

By: William D. Evans

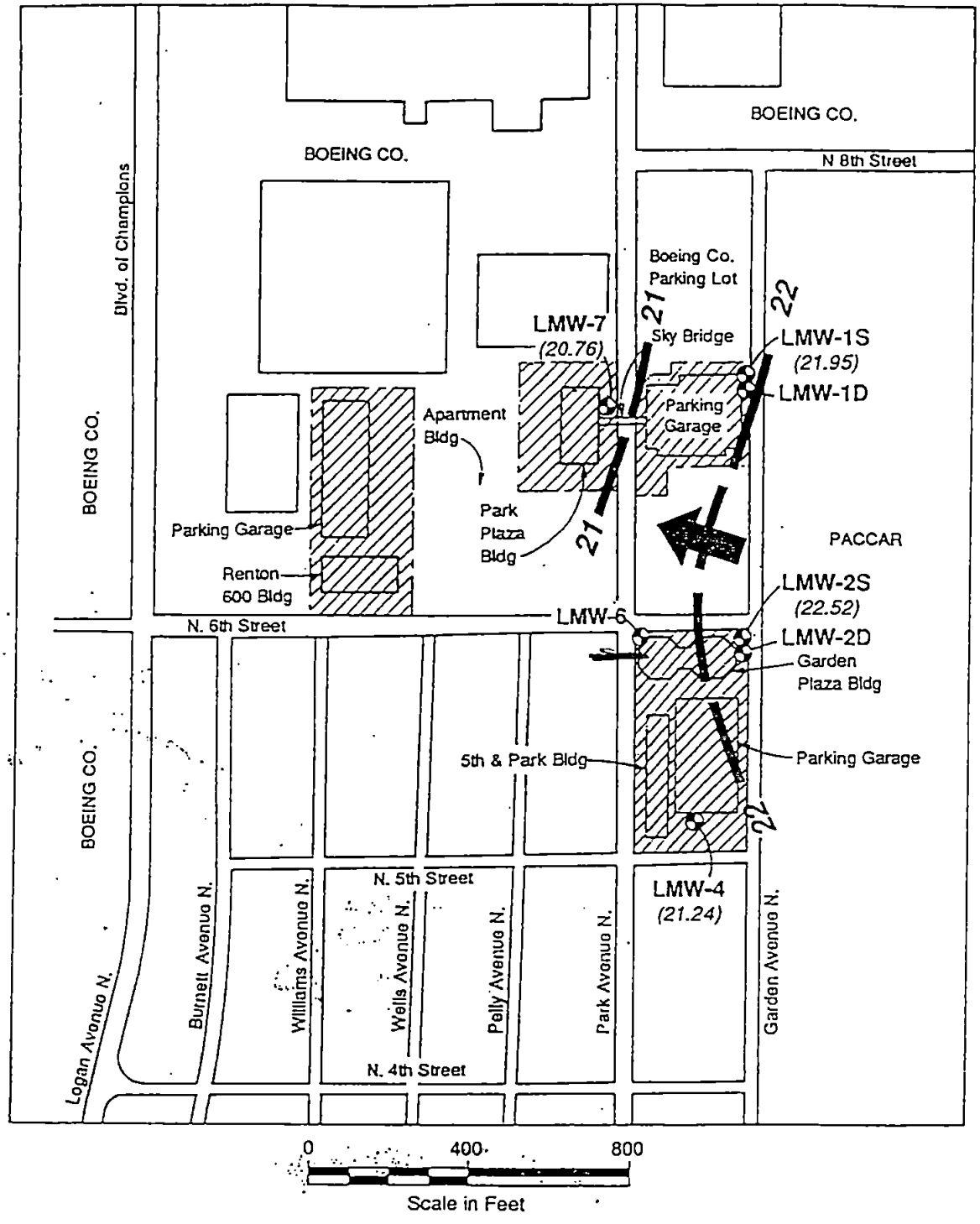
William D. Evans, CPG
Project Manager

and

J. Wade Gilbert

J. Wade Gilbert, P.E.
Senior Staff Geotechnical Engineer

WDE/JWG/sg




KEY

Former E&H Properties

Property Boundary

LMW-7 (20.76) Location and Identification of Monitoring Well or Well Point Installed by Landau Associates, Inc., 1989

Groundwater Elevation Measured on November 25 and 26, 1991

21 Groundwater Elevation Contour (Shallow Wells)

General Direction of Groundwater Flow

25 67.10 Boeing/E & H Properties/Renton Facility/GW Sampling Program/Report 2/92

Site Plan
E & H Monitoring Wells

Figure 1

TABLE 1

GROUNDWATER ELEVATIONS AND CONVENTIONAL PARAMETERS
E & H MONITORING WELLS

| Well Identifier | Depth to Water (ft)[a] | Elevation at Top of PVC Well Casing (ft)[b] | Groundwater Elevation (ft) | Conventional Parameters[c] | |
|---|---|---|---|---|---|
| | | | | pH | Conductivity (μmhos/cm) |
| LMW-1S | 6.35 | 28.30 | 21.95 | 6.4 | 648 |
| LMW-1D | 6.25 | 28.26 | 22.01 | 6.2 | 718 |
| LMW-2S | 4.61 | 27.13 | 22.52 | 6.7 | 541 |
| LMW-2D | 5.65 | 27.21 | 21.56 | 6.3 | 609 |
| LMW-4 | 3.37 | 24.61 | 21.24 | 6.4 | 333 |
| LMW-6 | (d) | 30.51 | (d) | (d) | (d) |
| LMW-7 | 6.98 | 27.74 | 20.76 | 6.3 | 612 |

(a) Measured on November 25, 1991 from top of PVC casing at wells LMW-1S through LMW-4. Measured on November 26, 1991 at well LMW-7.

(b) Elevations reference City of Renton datum (NGVD).

(c) Measured during groundwater sampling.

(d) Groundwater not encountered in well during groundwater measurement.

TABLE 2

SUMMARY OF GROUNDWATER CHEMICAL TEST RESULTS
DETECTED VOLATILE ORGANIC COMPOUNDS[a]
E & H MONITORING WELLS

| Sample ID[b] | Date | Acetone (µg/L) | Vinyl Chloride (µg/L) | Toluene (µg/L) | 1,1-Dichloroethane (µg/L) | Chlorobenzene (µg/L) |
|---|---|---|---|---|---|---|
| LMW-1S-B | 11/25/91 | 5.0 U[c] | 2.0 U | 1.0 U | 1.0 U | 1.0 U |
| LMW-1D-B | 11/25/91 | 5.0 U | 2.0 U | 1.0 U | 1.0 U | 1.0 U |
| LMW-2S-B | 11/25/91 | 11.0 | 2.0 U | 1.0 U | 1.0 U | 1.0 U |
| LMW-2D-B | 11/25/91 | 5.0 U | 89.0 | 0.9 J[d] | 1.0 U | 1.0 U |
| LMW-2D | 11/25/91 | 5.0 U | 110.0 | 1.0 U | 1.0 U | 1.0 U |
| LMW-4 | 11/25/91 | 5.0 U | 2.0 U | 1.0 U | 0.8 J | 1.3 |
| LMW-7 | 11/26/91 | 5.0 U | 2.0 U | 1.0 U | 1.0 U | 1.0 U |

(a) Determined by EPA Method 8240.

(b) The sample ID refers to the monitoring well identifier. The suffix "B" identifies samples obtained from wells LMW-1S, LMW-1D, LMW-2S, and LMW-2D using a stainless-steel bailer. Sample LMW-20 was collected using a peristaltic pump and dedicated polyethylene tubing. Samples LMW-4 and LMW-7 were collected using a stainless-steel bailer.

(c) "U" indicates compound was analyzed for, but not detected at the given detection limit.

(d) "J" indicates compound was detected at an estimated concentration less than the specified detection limit.

TABLE 3

SUMMARY OF GROUNDWATER CHEMICAL TEST RESULTS
PRIORITY POLLUTANT METALS
E & H MONITORING WELLS

| | | Analyte (mg/L) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID[a] | Date | Antimony[b] | Arsenic[b] | Cadmium[b] | Chromium[b] | Lead[b] | Mercury[c] | Selenium[b] | Silver[b] |
| LMW-1S | 11/25/91 | 0.05 U[d] | 0.05 U | 0.002 U | 0.005 U | 0.03 U | 0.0001 U | 0.05 U | 0.003 U |
| LMW-1D | 11/25/91 | 0.05 U | 0.05 U | 0.002 U | 0.005 U | 0.03 U | 0.0001 U | 0.05 U | 0.003 U |
| LMW-2S | 11/25/91 | 0.05 U | 0.05 U | 0.002 U | 0.005 U | 0.03 U | 0.0001 U | 0.05 U | 0.003 U |
| LMW-2D | 11/25/91 | 0.05 U | 0.05 U | 0.002 U | 0.005 U | 0.03 U | 0.0001 U | 0.05 U | 0.003 U |
| LMW-4 | 11/25/91 | 0.05 U | 0.05 U | 0.002 U | 0.005 U | 0.03 U | 0.0001 U | 0.05 U | 0.003 U |
| LMW-7 | 11/26/91 | 0.05 U | 0.05 U | 0.002 U | 0.005 U | 0.03 U | 0.0001 U | 0.05 U | 0.003 U |

(a) The sample ID refers to the monitoring well identifier. All metals samples were collected using a peristaltic pump with dedicated polyethylene tubing, and were field filtered.

(b) Determined by EPA Method 6010.

(c) Determined by EPA Method 7470.

(d) "U" indicates analyte was analyzed for, but not detected at the given detection limit.

APPENDIX A

# Laboratory Reports

LANDAU ASSOCIATES, INC.
Edmonds, WA (206) 778-0907
FAX (206)778-6409

# Chain-of-Custody Record

№ 1263

Date 11/26/91

Page 1 of 1

Project Renton CAH Job No. 25-67.1

Client Boeing EA; Charles Keller

Project Location Renton

Sampler's Name TOM COLLIGAN

| Sample No. | Date | Time | Location | No. of Containers | Testing Parameters: VOA | Metals | Observations/Comments |
|---|---|---|---|---|---|---|---|
| LMW-15-B | 11-25-91 | 1400 | | 2 | ✓ | ✓ | Metals = As, Sb, Cd, Cr, Pb, Hg, Se, Ag |
| LMW-10-B | " | 1355 | | 2 | ✓ | ✓ | |
| LMW-25-B | " | 1434 | | 2 | ✓ | ✓ | |
| LMW-20-B | " | 1430 | | 2 | ✓ | ✓ | |
| LMW-4 | " | 1700 | | 3 | ✓ | ✓ ✓ | |
| LMW-7 | 11-26-91 | 805 | | 3 | ✓ | ✓ ✓ | |
| LMW-8 | 11-25-91 | 1735 | | 3 | ✓ | ✓ ✓ | CALL Charles Keller at Boeing Environ Affairs for Control Number 393-4705 |
| TRIP BLANK | | | | 2 | ✓ | | |
| LMW-15 | 11-25-91 | 1335 | | 1 | | ✓ | |
| LMW-25 | " | 1125 | | 1 | | ✓ | |
| LMW-10 | " | 1315 | | 1 | | ✓ | |
| LMW-20 | " | 1025 | | 1 | | ✓ | Send Invoice to Above |

Special Shipment/Handling or Storage Requirements ICED

Method of Shipment HAND

| Relinquished by | Received by | Relinquished by | Received by |
|---|---|---|---|
| Signature: TOM COLLIGAN | Signature: JAN FOLKINS | Signature: | Signature: |
| Printed Name: TOM COLLIGAN | Printed Name: JAN FOLKINS | Printed Name: | Printed Name: |
| Company: LANDAU | Company: A.R.I. | Company: | Company: |
| Date: 11/26/91 Time: 1705 | Date: 11/26/91 Time: 1707 | Date: Time: | Date: Time: |

WHITE COPY - Project File YELLOW COPY - Laboratory PINK COPY - Client Representative

ART # 9529

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

**ORGANICS ANALYSIS DATA SHEET**
**Volatiles by Method 624/8240**

Lab ID: 1128MB
Matrix: Waters

**Sample: Method Blank**

QC Report No: 9529-Landau
Project No: 25-67.1
Renton E&H
VTSR: NA

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

Instrument: FINN III
Date Analyzed: 11/28/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | Vinyl Chloride | 2.0 U |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene Chloride | 2.0 U |
| 67-64-1 | Acetone | 5.0 U |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| 75-34-3 | 1,1-Dichloroethane | 1.0 U |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 1.0 U |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 1.0 U |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | Toluene | 1.0 U |
| 108-90-7 | Chlorobenzene | 1.0 U |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 107% |
| Bromofluorobenzene | 104% |
| d4-1,2-Dichloroethane | 94.7% |

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

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

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

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333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

**ORGANICS ANALYSIS DATA SHEET**
**Volatiles by Method 624/8240**

Lab ID: 9529A
Matrix: Waters

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

**Sample: LMW-1S-B**

QC Report No: 9529-Landau
Project No: 25-67.1
Renton E&H
VTSR: 11/26/91

Instrument: FINN III
Date Analyzed: 11/28/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | Vinyl Chloride | 2.0 U |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene Chloride | 2.0 U |
| 67-64-1 | Acetone | 5.0 U |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| 75-34-3 | 1,1-Dichloroethane | 1.0 U |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 1.0 U |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 1.0 U |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | Toluene | 1.0 U |
| 108-90-7 | Chlorobenzene | 1.0 U |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 107% |
| Bromofluorobenzene | 99.2% |
| d4-1,2-Dichloroethane | 96.5% |

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

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

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

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**ORGANICS ANALYSIS DATA SHEET**
**Volatiles by Method 624/8240**

Lab ID: 9529B
Matrix: Waters

Sample: LMW-1D-B

QC Report No: 9529-Landau
Project No: 25-67.1
Renton E&H
VTSR: 11/26/91

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

Instrument: FINN III
Date Analyzed: 11/28/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | Vinyl Chloride | 2.0 U |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene Chloride | 2.0 U |
| 67-64-1 | Acetone | 5.0 U |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| 75-34-3 | 1,1-Dichloroethane | 1.0 U |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 1.0 U |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 1.0 U |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | Toluene | 1.0 U |
| 108-90-7 | Chlorobenzene | 1.0 U |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 105% |
| Bromofluorobenzene | 99.4% |
| d4-1,2-Dichloroethane | 96.5% |

Data Reporting Qualifiers

| | |
|---|---|
| Value | If the result is a value greater than or equal to the detection limit, report the value. |
| U | Indicates compound was analyzed for but not detected at the given detection limit. |
| J | Indicates an estimated value when result is less than specified detection limit. |
| B | This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination. |
| K | This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run. |
| M | Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters. |

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(206) 621-7523 (FAX)

**ORGANICS ANALYSIS DATA SHEET**
**Volatiles by Method 624/8240**

Lab ID: 9529C
Matrix: Waters

Sample: LMW-2S-B

QC Report No: 9529-Landau
Project No: 25-67.1
Renton E&H
VTSR: 11/26/91

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

Instrument: FINN III
Date Analyzed: 11/28/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | Vinyl Chloride | 2.0 U |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene Chloride | 2.0 U |
| 67-64-1 | Acetone | 11 |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| 75-34-3 | 1,1-Dichloroethane | 1.0 U |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 1.0 U |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 1.0 U |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | Toluene | 1.0 U |
| 108-90-7 | Chlorobenzene | 1.0 U |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 106% |
| Bromofluorobenzene | 99.9% |
| d4-1,2-Dichloroethane | 96.8% |

Data Reporting Qualifiers

| | |
|---|---|
| Value | If the result is a value greater than or equal to the detection limit, report the value. |
| U | Indicates compound was analyzed for but not detected at the given detection limit. |
| J | Indicates an estimated value when result is less than specified detection limit. |
| B | This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination. |
| K | This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run. |
| M | Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters. |

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**ORGANICS ANALYSIS DATA SHEET**
**Volatiles by Method 624/8240**

Lab ID: 9529D
Matrix: Waters

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

**Sample: LMW-2D-B**

QC Report No: 9529-Landau
Project No: 25-67.1
Renton E&H
VTSR: 11/26/91

Instrument: FINN III
Date Analyzed: 11/28/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | **Vinyl Chloride** | **89** |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene Chloride | 2.0 U |
| 67-64-1 | Acetone | 5.0 U |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| 75-34-3 | 1,1-Dichloroethane | 1.0 U |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 1.0 U |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 1.0 U |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | **Toluene** | **0.9 J** |
| 108-90-7 | Chlorobenzene | 1.0 U |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 105% |
| Bromofluorobenzene | 102% |
| d4-1,2-Dichloroethane | 99.9% |

Data Reporting Qualifiers

Value — If the result is a value greater than or equal to the detection limit, report the value.

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

J — Indicates an estimated value when result is less than specified detection limit.

B — This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K — This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M — Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

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**ORGANICS ANALYSIS DATA SHEET**
**Volatiles by Method 624/8240**

Lab ID: 9529E
Matrix: Waters

Sample: LMW-4

QC Report No: 9529-Landau
Project No: 25-67.1
Renton E&H
VTSR: 11/26/91

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

Instrument: FINN III
Date Analyzed: 11/29/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | Vinyl Chloride | 2.0 U |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene Chloride | 2.0 U |
| 67-64-1 | Acetone | 5.0 U |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| **75-34-3** | **1,1-Dichloroethane** | **0.8 J** |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 1.0 U |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 1.0 U |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | Toluene | 1.0 U |
| **108-90-7** | **Chlorobenzene** | **1.3** |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 104% |
| Bromofluorobenzene | 100% |
| d4-1,2-Dichloroethane | 99.9% |

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

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

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

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**ORGANICS ANALYSIS DATA SHEET**
**Volatiles by Method 624/8240**

Lab ID: 9529F
Matrix: Waters

Sample: LMW-7

QC Report No: 9529-Landau
Project No: 25-67.1
Renton E&H
VTSR: 11/26/91

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

Instrument: FINN III
Date Analyzed: 11/29/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | Vinyl Chloride | 2.0 U |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene Chloride | 2.0 U |
| 67-64-1 | Acetone | 5.0 U |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| 75-34-3 | 1,1-Dichloroethane | 1.0 U |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 1.0 U |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 1.0 U |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | Toluene | 1.0 U |
| 108-90-7 | Chlorobenzene | 1.0 U |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 105% |
| Bromofluorobenzene | 99.6% |
| d4-1,2-Dichloroethane | 96.9% |

Data Reporting Qualifiers

| | |
|---|---|
| Value | If the result is a value greater than or equal to the detection limit, report the value. |
| U | Indicates compound was analyzed for but not detected at the given detection limit. |
| J | Indicates an estimated value when result is less than specified detection limit. |
| B | This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination. |
| K | This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run. |
| M | Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters. |

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ORGANICS ANALYSIS DATA SHEET
Volatiles by Method 624/8240

Lab ID: 9529G
Matrix: Waters

Sample: LMW-8

QC Report No: 9529-Landau
Project No: 25-67.1
Renton E&H
VTSR: 11/26/91

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

Instrument: FINN III
Date Analyzed: 11/29/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | Vinyl Chloride | 2.0 U |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene Chloride | 2.0 U |
| 67-64-1 | Acetone | 6.0 |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| 75-34-3 | 1,1-Dichloroethane | 1.0 U |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 2.6 |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 2.8 |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | Toluene | 1.0 U |
| 108-90-7 | Chlorobenzene | 1.0 U |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 105% |
| Bromofluorobenzene | 101% |
| d4-1,2-Dichloroethane | 102% |

Data Reporting Qualifiers

Value — If the result is a value greater than or equal to the detection limit, report the value.

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

J — Indicates an estimated value when result is less than specified detection limit.

B — This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K — This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M — Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

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ORGANICS ANALYSIS DATA SHEET
Volatiles by Method 624/8240

Lab ID: 9529H
Matrix: Waters

Sample: Trip Blank

QC Report No: 9529-Landau
Project No: 25-67.1
Renton E&H
VTSR: 11/26/91

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

Instrument: FINN III
Date Analyzed: 11/29/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | Vinyl Chloride | 2.0 U |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene:Chloride | 2.0 U |
| 67-64-1 | Acetone | 5.0 U |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| 75-34-3 | 1,1-Dichloroethane | 1.0 U |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 1.0 U |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 1.0 U |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | Toluene | 1.0 U |
| 108-90-7 | Chlorobenzene | 1.0 U |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 105% |
| Bromofluorobenzene | 102% |
| d4-1,2-Dichloroethane | 99.6% |

Data Reporting Qualifiers

Value — If the result is a value greater than or equal to the detection limit, report the value.

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

J — Indicates an estimated value when result is less than specified detection limit.

B — This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K — This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M — Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

# EXPLANATION OF INORGANIC DATA REPORT CODES

The columns labeled 'PREP', 'C', and 'M' contain important information about your analyses. The codes are defined below.

## PREPARATION CODES

These 3-letter codes describe methods used to prepare samples for analysis:

AEN USEPA, Metals in air filters
AHM ARI, Mercury in air filters
AHN ARI, Metals in air filters
ANN NIOSH 7300, Metals in air filters
CAN AOAC (1984) 25.024, Metals in earthenware
DE6 EPA 600/4-79-020 218.5, Cr(VI) in water
DMM DMN followed by TMM, Dissolved mercury
DMN Filtered through .45u filter, Dissolved metals
EW6 EWN followed by DE6
EWM EWN followed by TMM
EWN USEPA SW-846 1310, EP Toxicity
FHP ARI, Metals in tissue ($HNO_3/HClO_4$)
FPP PSEP, Metals in tissue ($HNO_3/HClO_4$)
FRM Journal, Mercury in tissue
FRN Journal, Metals in tissue ($HNO_3/H_2O_2$)
KRN ARI, Concentration by coprecipitation
LEM USEPA, TCLP followed by TMM
LEN USEPA, TCLP Extraction
MHM ARI, Mercury in miscellaneous materials
MHN ARI, Metals in miscellaneous materials
OAM ARI, Mercury in oil, grease or tar
OAN ARI, Metals in oil, grease or tar
PHM ARI, Mercury in wipes
PHN ARI, Metals in wipes
RCC USEPA CLP, Water digestion, HCl matrix
RCN USEPA CLP, Water digestion, $HNO_3$ matrix
REC EPA 600/4-79-020 4.1.4, HCl matrix
REI EPA 600/4-79-020 200.7 and 9.4
REN EPA 600/4-79-020 4.1.4, $HNO_3$ matrix
RMA EPA 600/4-79-020 206.2
RWC USEPA SW-846 3005
SCC USEPA CLP, Soil digestion, HCl matrix
SCM USEPA CLP, Mercury in soil
SCN USEPA CLP, Soil digestion, $HNO_3$ matrix
SEM EPA 600/4-79-020 245.5, Mercury in soil
SHF ARI, Metals in soil, HF digestion
SRL Journal, Lithium meta-borate fusion
SPF PSEP, Metals in sediment, HF digestion
SSC Standard Methods 302C, Sb/Sn in soil
SSN Standard Methods 302C, Soil digestion
SSS Standard Methods 302C, Ti in soil
SW6 USEPA SW-846 3060, Cr(VI) in soil
SWC USEPA SW-846 3050, HCl matrix
SWN USEPA SW-846 3050, $HNO_3$ matrix
SWR USEPA SW-846 Modified 3005, Sb by GFAAS
TEC EPA 600/4-79-020 4.1.3, HCl matrix
TEG EPA 600/4-79-020 272.1, Silver in water
TEI EPA 600/4-79-020 200.7 and 9.3
TEN EPA 600/4-79-020 4.1.3, $HNO_3$ matrix
THG ARI, Silver in photographic solutions
TMM EPA 600/4-79-020 245.1, Mercury in water
TSC Standard Methods 302C, Sb/Sn in water
TSN Standard Methods 302D
TSS Standard Methods 302E, Ti in water
TWC USEPA SW-846 3010, HCl matrix
TWG USEPA SW-846 7760, Silver in water
TWN USEPA SW-846 3020, $HNO_3$ matrix
WMN EPA 600/4-79-020, Preserved, undigested water
XSC Standard Methods 302B

## CONCENTRATION CODES

These codes are used to qualify reported concentrations:

U No analyte was detected. The reported value is the lower limit of detection.

## METHOD CODES

These codes signify the instrumental technique used for analysis:

CVA Cold Vapor Atomic Absorption Spectrophotometry
FLA Flame Atomic Absorption Spectrophotometry
GFA Graphite Furnace Atomic Absorption Spectrophotometry
ICP Inductively Coupled Plasma Atomic Emission Spectrometry

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
12/05/91
16:02:44

Client: Landau
Contact: Tom Colligen
Project: Renton E&H
ID number: LMW-4
Description:
Sampled: / /
Received: 11/26/91
Matrix: Water

ARI job number: 9529
ARI sample number: E

Released by:

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

| CAS Number | Analyte | Concentration | C | Prep | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.05 mg/L | U | TWN | ICP |
| 7440-38-2 | Arsenic | 0.05 mg/L | U | TWN | ICP |
| 7440-43-9 | Cadmium | 0.002 mg/L | U | TWN | ICP |
| 7440-47-3 | Chromium | 0.005 mg/L | U | TWN | ICP |
| 7439-92-1 | Lead | 0.03 mg/L | U | TWN | ICP |
| 7439-97-6 | Mercury | 0.0001 mg/L | U | TMM | CVA |
| 7782-49-2 | Selenium | 0.05 mg/L | U | TWN | ICP |
| 7440-22-4 | Silver | 0.003 mg/L | U | TWN | ICP |

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
12/05/91
16:02:46

Client: Landau
Contact: Tom Colligen
Project: Renton E&H
ID number: LMW-4
Description: Laboratory Duplicate
Sampled: / /
Received: 11/26/91
Matrix: Water

ARI job number: 9529
ARI sample number: EDUP

Released by:

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

| CAS Number | Analyte | Concentration | C | Prep | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.05 mg/L | U | TWN | ICP |
| 7440-38-2 | Arsenic | 0.05 mg/L | U | TWN | ICP |
| 7440-43-9 | Cadmium | 0.002 mg/L | U | TWN | ICP |
| 7440-47-3 | Chromium | 0.005 mg/L | U | TWN | ICP |
| 7439-92-1 | Lead | 0.03 mg/L | U | TWN | ICP |
| 7439-97-6 | Mercury | 0.0001 mg/L | U | TMM | CVA |
| 7782-49-2 | Selenium | 0.05 mg/L | U | TWN | ICP |
| 7440-22-4 | Silver | 0.003 mg/L | U | TWN | ICP |

ANALYTICAL RESOURCES, INC.
Matrix Duplicate Quality Control Report

Client: Landau

Client's sample ID: LMW-4

ARI sample ID: 9529 EDUP

Units: mg/L

| Analyte | Meth | Original Sample | Matrix Duplicate | RPD | Control Limit | Q |
|---|---|---|---|---|---|---|
| Antimony | ICP | U 0.05 | U 0.05 | 0.0 | ± 0.05 | L |
| Arsenic | ICP | U 0.05 | U 0.05 | 0.0 | ± 0.05 | L |
| Cadmium | ICP | U 0.002 | U 0.002 | 0.0 | ± 0.002 | L |
| Chromium | ICP | U 0.005 | U 0.005 | 0.0 | ± 0.005 | L |
| Lead | ICP | U 0.03 | U 0.03 | 0.0 | ± 0.03 | L |
| Mercury | CVA | U 0.0001 | U 0.0001 | 0.0 | ±0.0001 | L |
| Selenium | ICP | U 0.05 | U 0.05 | 0.0 | ± 0.05 | L |
| Silver | ICP | U 0.003 | U 0.003 | 0.0 | ± 0.003 | L |

RPD = Relative percent difference

'Q' codes: '*' = control limit not met
'L' = RPD not valid, alternate limit = ± detection limit

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
12/05/91
16:02:49

Client: Landau
Contact: Tom Colligen
Project: Renton E&H
ID number: LMW-4
Description: Matrix Spike
Sampled: / /
Received: 11/26/91
Matrix: Water

ARI job number: 9529
ARI sample number: ESPK

Released by:

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

| CAS Number | Analyte | Concentration | C | Prep | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 1.28 mg/L | | TWN | ICP |
| 7440-38-2 | Arsenic | 2.45 mg/L | | TWN | ICP |
| 7440-43-9 | Cadmium | 0.097 mg/L | | TWN | ICP |
| 7440-47-3 | Chromium | 0.245 mg/L | | TWN | ICP |
| 7439-92-1 | Lead | 0.97 mg/L | | TWN | ICP |
| 7439-97-6 | Mercury | 0.0010 mg/L | | TMM | CVA |
| 7782-49-2 | Selenium | 2.45 mg/L | | TWN | ICP |
| 7440-22-4 | Silver | 0.249 mg/L | | TWN | ICP |

ANALYTICAL RESOURCES, INC.
Matrix Spike Quality Control Report

Client: Landau

Client's sample ID: LMW-4

ARI sample ID: 9529 ESPK

Units: mg/L

| Analyte | Meth | Sample | Matrix Spike | Spike Added | %R | Control Limit | Q |
|---|---|---|---|---|---|---|---|
| Antimony | ICP | 0 | 1.28 | 2.50 | 51.2 | 75-125% | N |
| Arsenic | ICP | 0 | 2.45 | 2.50 | 98.0 | 75-125% | |
| Cadmium | ICP | 0 | 0.097 | 0.100 | 97.0 | 75-125% | |
| Chromium | ICP | 0 | 0.245 | 0.250 | 98.0 | 75-125% | |
| Lead | ICP | 0 | 0.97 | 1.00 | 97.0 | 75-125% | |
| Mercury | CVA | 0 | 0.0010 | 0.0010 | 100.0 | 75-125% | |
| Selenium | ICP | 0 | 2.45 | 2.50 | 98.0 | 75-125% | |
| Silver | ICP | 0 | 0.249 | 0.25 | 99.6 | 75-125% | |

%R = Percent recovery

'Q' codes: 'N' = control limit not met
'H' = %R not valid, sample concentration too high

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
12/05/91
16:02:51

Client: Landau
Contact: Tom Colligen
Project: Renton E&H
ID number: LMW-7
Description:
Sampled: / /
Received: 11/26/91
Matrix: Water

ARI job number: 9529
ARI sample number: F

Released by:

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

| CAS Number | Analyte | Concentration | C | Prep | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.05 mg/L | U | TWN | ICP |
| 7440-38-2 | Arsenic | 0.05 mg/L | U | TWN | ICP |
| 7440-43-9 | Cadmium | 0.002 mg/L | U | TWN | ICP |
| 7440-47-3 | Chromium | 0.005 mg/L | U | TWN | ICP |
| 7439-92-1 | Lead | 0.03 mg/L | U | TWN | ICP |
| 7439-97-6 | Mercury | 0.0001 mg/L | U | TMM | CVA |
| 7782-49-2 | Selenium | 0.05 mg/L | U | TWN | ICP |
| 7440-22-4 | Silver | 0.003 mg/L | U | TWN | ICP |

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
12/05/91
16:02:53

Client: Landau
Contact: Tom Colligen
Project: Renton E&H
ID number: LMW-8
Description:
Sampled: / /
Received: 11/26/91
Matrix: Water

ARI job number: 9529
ARI sample number: G

Released by:

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

| CAS Number | Analyte | Concentration | C | Prep | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.05 mg/L | U | TWN | ICP |
| 7440-38-2 | Arsenic | 0.05 mg/L | U | TWN | ICP |
| 7440-43-9 | Cadmium | 0.002 mg/L | U | TWN | ICP |
| 7440-47-3 | Chromium | 0.018 mg/L | | TWN | ICP |
| 7439-92-1 | Lead | 0.03 mg/L | U | TWN | ICP |
| 7439-97-6 | Mercury | 0.0001 mg/L | U | TMM | CVA |
| 7782-49-2 | Selenium | 0.05 mg/L | U | TWN | ICP |
| 7440-22-4 | Silver | 0.003 mg/L | U | TWN | ICP |

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
12/05/91
16:02:56

Client: Landau
Contact: Tom Colligen
Project: Renton E&H
ID number: LMW-15
Description:
Sampled: / /
Received: 11/26/91
Matrix: Water

ARI job number: 9529
ARI sample number: I

Released by:

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

| CAS Number | Analyte | Concentration | C | Prep | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.05 mg/L | U | TWN | ICP |
| 7440-38-2 | Arsenic | 0.05 mg/L | U | TWN | ICP |
| 7440-43-9 | Cadmium | 0.002 mg/L | U | TWN | ICP |
| 7440-47-3 | Chromium | 0.005 mg/L | U | TWN | ICP |
| 7439-92-1 | Lead | 0.03 mg/L | U | TWN | ICP |
| 7439-97-6 | Mercury | 0.0001 mg/L | U | TMM | CVA |
| 7782-49-2 | Selenium | 0.05 mg/L | U | TWN | ICP |
| 7440-22-4 | Silver | 0.003 mg/L | U | TWN | ICP |

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
12/05/91
16:27:58

Client: Landau
Contact: Tom Colligen
Project: Renton E&H
ID number: LMW-25
Description:
Sampled: / /
Received: 11/26/91
Matrix: Water

ARI job number: 9529
ARI sample number: J

Released by:

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

| CAS Number | Analyte | Concentration | C | Prep | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.05 mg/L | U | TWN | ICP |
| 7440-38-2 | Arsenic | 0.05 mg/L | U | TWN | ICP |
| 7440-43-9 | Cadmium | 0.002 mg/L | U | TWN | ICP |
| 7440-47-3 | Chromium | 0.005 mg/L | U | TWN | ICP |
| 7439-92-1 | Lead | 0.03 mg/L | U | TWN | ICP |
| 7439-97-6 | Mercury | 0.0001 mg/L | U | TMM | CVA |
| 7782-49-2 | Selenium | 0.05 mg/L | U | TWN | ICP |
| 7440-22-4 | Silver | 0.003 mg/L | U | TWN | ICP |

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
12/05/91
16:03:01

Client: Landau
Contact: Tom Colligen
Project: Renton E&H
ID number: LMW-1D
Description:
Sampled: / /
Received: 11/26/91
Matrix: Water

ARI job number: 9529
ARI sample number: K

Released by:

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

| CAS Number | Analyte | Concentration | C | Prep | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.05 mg/L | U | TWN | ICP |
| 7440-38-2 | Arsenic | 0.05 mg/L | U | TWN | ICP |
| 7440-43-9 | Cadmium | 0.002 mg/L | U | TWN | ICP |
| 7440-47-3 | Chromium | 0.005 mg/L | U | TWN | ICP |
| 7439-92-1 | Lead | 0.03 mg/L | U | TWN | ICP |
| 7439-97-6 | Mercury | 0.0001 mg/L | U | TMM | CVA |
| 7782-49-2 | Selenium | 0.05 mg/L | U | TWN | ICP |
| 7440-22-4 | Silver | 0.003 mg/L | U | TWN | ICP |

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
12/05/91
16:03:03

Client: Landau
Contact: Tom Colligen
Project: Renton E&H
ID number: LMW-2D
Description:
Sampled: / /
Received: 11/26/91
Matrix: Water

ARI job number: 9529
ARI sample number: L

Released by:

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

| CAS Number | Analyte | Concentration | C | Prep | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.05 mg/L | U | TWN | ICP |
| 7440-38-2 | Arsenic | 0.05 mg/L | U | TWN | ICP |
| 7440-43-9 | Cadmium | 0.002 mg/L | U | TWN | ICP |
| 7440-47-3 | Chromium | 0.005 mg/L | U | TWN | ICP |
| 7439-92-1 | Lead | 0.03 mg/L | U | TWN | ICP |
| 7439-97-6 | Mercury | 0.0001 mg/L | U | TMM | CVA |
| 7782-49-2 | Selenium | 0.05 mg/L | U | TWN | ICP |
| 7440-22-4 | Silver | 0.003 mg/L | U | TWN | ICP |

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
12/05/91
16:03:05

Client: Landau
Contact: Tom Colligen
Project: Renton E&H
ID number:
Description: Method Blank
Sampled: / /
Received: / /
Matrix: Water

ARI job number: 9529
ARI sample number: MB

Released by: _____

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

| CAS Number | Analyte | Concentration | C | Prep | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.05 mg/L | U | TWN | ICP |
| 7440-38-2 | Arsenic | 0.05 mg/L | U | TWN | ICP |
| 7440-43-9 | Cadmium | 0.002 mg/L | U | TWN | ICP |
| 7440-47-3 | Chromium | 0.005 mg/L | U | TWN | ICP |
| 7439-92-1 | Lead | 0.03 mg/L | U | TWN | ICP |
| 7439-97-6 | Mercury | 0.0001 mg/L | U | TMM | CVA |
| 7782-49-2 | Selenium | 0.05 mg/L | U | TWN | ICP |
| 7440-22-4 | Silver | 0.003 mg/L | U | TWN | ICP |

LANDAU ASSOCIATES, INC.
Edmonds, WA (206) 778-0907
FAX (206)778-6409

# Chain-of-Custody Record

№ 1265

Date 11/26/91

Page 1 of 1

Project Renton ~~Well 26~~ EH Job No. OH-Equip

Client

Project Location Well 20

Sampler's Name Tom Colligan

| Sample No. | Date | Time | Location | No. of Containers | Testing Parameters: VOA (8240) | Observations/Comments |
|---|---|---|---|---|---|---|
| LMW-2D | 11/25 | 1015 | | 2 | 1 | Simple results sent to T. Colligan, Landau. SEND INVOICE TO SAMC SEND Lab reports to Tom Colligan, Landau & Copy of results to Chuck Keller |

Special Shipment/Handling or Storage Requirements I(ce)

Method of Shipment HAND

| Relinquished by | Received by | Relinquished by | Received by |
|---|---|---|---|
| Signature | Signature | Signature | Signature |
| Printed Name T.J. Colligan | Printed Name JON HOPKINS | Printed Name | Printed Name |
| Company LANDAU | Company PARAMETRIX | Company | Company |
| Date 11/26/91 Time 1703 | Date 11/26/91 Time 1703 | Date Time | Date Time |

390

WHITE COPY - Project File YELLOW COPY - Laboratory PINK COPY - Client Representative

DOT. # 9527

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

**ORGANICS ANALYSIS DATA SHEET**
**Volatiles by Method 624/8240**

Lab ID: 1128MB
Matrix: Waters

**Sample: Method Blank**

QC Report No: 9527-Landau
Project No: OH-Equip
Renton E&H
VTSR: NA

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

Instrument: FINN III
Date Analyzed: 11/28/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | Vinyl Chloride | 2.0 U |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene Chloride | 2.0 U |
| 67-64-1 | Acetone | 5.0 U |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| 75-34-3 | 1,1-Dichloroethane | 1.0 U |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 1.0 U |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 1.0 U |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | Toluene | 1.0 U |
| 108-90-7 | Chlorobenzene | 1.0 U |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 107% |
| Bromofluorobenzene | 104% |
| d4-1,2-Dichloroethane | 94.7% |

Data Reporting Qualifiers

Value — If the result is a value greater than or equal to the detection limit, report the value.

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

J — Indicates an estimated value when result is less than specified detection limit.

B — This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K — This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M — Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL
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INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ORGANICS ANALYSIS DATA SHEET
Volatiles by Method 624/8240

Lab ID: 9527A
Matrix: Waters

Sample: LMW-2D

QC Report No: 9527-Landau
Project No: OH-Equip
Renton E&H
VTSR: 11/26/91

Data Release Authorized: _____
*Report prepared 12/2/91 - MAC:K kas*

Instrument: FINN III
Date Analyzed: 11/29/91

Amount Purged: 5 mls
Conc/Dil: 1 to 1

| CAS Number | | µg/L |
|---|---|---|
| 74-87-3 | Chloromethane | 2.0 U |
| 74-83-9 | Bromomethane | 2.0 U |
| 75-01-4 | Vinyl Chloride | 110 |
| 75-00-3 | Chloroethane | 2.0 U |
| 75-09-2 | Methylene Chloride | 2.0 U |
| 67-64-1 | Acetone | 5.0 U |
| 75-15-0 | Carbon Disulfide | 1.0 U |
| 75-35-4 | 1,1-Dichloroethene | 1.0 U |
| 75-34-3 | 1,1-Dichloroethane | 1.0 U |
| 156-60-5 | Trans-1,2-Dichloroethene | 1.0 U |
| 156-59-2 | Cis-1,2-Dichloroethene | 1.0 U |
| 67-66-3 | Chloroform | 1.0 U |
| 107-06-2 | 1,2-Dichloroethane | 1.0 U |
| 78-93-3 | 2-Butanone | 5.0 U |
| 71-55-6 | 1,1,1-Trichloroethane | 1.0 U |
| 56-23-5 | Carbon Tetrachloride | 1.0 U |
| 75-27-4 | Bromodichloromethane | 1.0 U |
| 75-69-4 | Trichlorofluoromethane | 2.0 U |

| CAS Number | | µg/L |
|---|---|---|
| 78-87-5 | 1,2-Dichloropropane | 1.0 U |
| 10061-02-6 | Trans-1,3-Dichloropropene | 1.0 U |
| 79-01-6 | Trichloroethene | 1.0 U |
| 124-48-1 | Dibromochloromethane | 1.0 U |
| 79-00-5 | 1,1,2-Trichloroethane | 1.0 U |
| 71-43-2 | Benzene | 1.0 U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1.0 U |
| 75-25-2 | Bromoform | 1.0 U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5.0 U |
| 591-78-6 | 2-Hexanone | 5.0 U |
| 127-18-4 | Tetrachloroethene | 1.0 U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1.0 U |
| 108-88-3 | Toluene | 1.0 U |
| 108-90-7 | Chlorobenzene | 1.0 U |
| 100-41-4 | Ethylbenzene | 1.0 U |
| 100-42-5 | Styrene | 1.0 U |
| 1330-20-7 | Total Xylenes | 2.0 U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | | 2.0 U |

**Surrogate Recoveries**

| | |
|---|---|
| d8-Toluene | 106% |
| Bromofluorobenzene | 103% |
| d4-1,2-Dichloroethane | 98.7% |

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

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

J Indicates an estimated value when result is less than specified detection limit.

B This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.