

January 10, 2001

RECEIVED

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DEPT OF ECOLOGY

Ms. Hillary Holt
Environmental Programs
King County Industrial Waste
Suite 200
130 Nickerson Street
Seattle, WA 98109-1658

Re: Annual Self-Monitoring Report

King County Industrial Waste Discharge Authorization Number 217-02

Dear Ms. Holt:

Attached is the Annual Self-Monitoring Report for the Groundwater Extraction System that discharges from the CHEMCENTRAL/Seattle facility in Kent in accordance with the requirements of the Discharge Authorization Number 217-02.

CHEMCENTRAL's consultant, Hart Crowser, Inc., performed the monthly sampling and prepared the report.

If you should have any questions, please feel free to contact Dave Heffner at Hart Crowser at 206-324-9530 or myself at 425-251-8500.

Sincerely,

Terry D. Wells General Manager

Attachment:

Annual Wastewater Discharge Self-Monitoring Report

Cc: (w/Attachment) CHEMCENTRAL Corp, Attn: Mr. Robert Garner

City of Kent, Attn: Mr. Gary Gill, City Engineer (2)

WA State Department of Ecology, Attn: Mr. Doug Knutson

ANNUAL WASTEWATER DISCHARGE SELF-MONITORING REPORT CHEMCENTRAL/SEATTLE FACILITY KENT, WASHINGTON

This report presents the results of self-monitoring conducted during 2000 under King County Industrial Waste (KCIW) Discharge Authorization 217-02, of the groundwater extraction system effluent at the CHEMCENTRAL/Seattle facility in Kent, Washington. This discharge authorization became effective May 2, 2000. The previous discharge authorization (DA No. 217) required that self-monitoring reports be submitted quarterly rather than annually. Therefore, monitoring conducted during January through March 2000 was documented in our Wastewater Discharge Self-Monitoring Report dated April 7, 2000. This report documents monitoring conducted during the remainder of the year (April through December 2000).

Shallow groundwater at the site contains low concentrations of organic chemicals (ketones, aromatics, and chlorinated organics). Groundwater infiltrates into five collection trenches, which are installed to depths of 8 to 10 feet. Collected water is pumped to an above-ground piping manifold by pumps installed in each of eight trench sumps. From the piping manifold, the water discharges to the sanitary sewer. [Note: Under previous discharge authorizations, treatment in an on-site air stripper was required prior to sewer discharge. The current authorization allows extracted groundwater to be discharged directly to sewer without treatment.]

Self-monitoring requirements of the current discharge authorization include the following:

- Measure effluent pH and record discharge volume on a monthly basis;
- ► Collect an effluent sample and analyze for benzene, toluene, and ethylbenzene on a monthly basis;
- Observe and report, if present, the following operating criteria: oil sheen, unusual color, visible turbidity, and odor of solvent, gasoline, or hydrogen sulfide;
- ► Sample, analyze, and report hydrogen sulfide, settleable solids, and explosivity if operating criteria are exceeded; and
- Submit an annual self-monitoring report that summarizes discharge volumes, sampling results, and observations.

DISCHARGE RATES AND VOLUMES

Discharge rates based on periodic totalizer readings are entered on the monthly Waste Discharge Self-Monitoring Reports for April through December 2000 (attached). Monthly averaged discharge rates and volumes are summarized in Table 1.

For the period April through December 2000, the totalizer recorded a total discharge volume of approximately 197,000 gallons, which corresponds to an average discharge rate of approximately 720 gallons per day. This discharge rate is small compared to previous years. The main reason for the difference is that previous discharge authorizations allowed surface water from the tank farm enclosure and SPCC area to be pumped to the air stripper and discharged to sewer along with extracted groundwater. The new discharge authorization (which became effective on May 2, 2000) does not allow sewer discharge of surface water from these (or any other) areas. In addition, there were apparent piping flow restrictions caused by large suspended solids (e.g., leaf debris), and a potential issue associated with the new flowmeter's flow sensor. A new flowmeter/totalizer (Vortex Model No. 5938-1-15) was installed on January 8, 2000, after the old unit failed in December 1999. (The new unit determines water flow rate based on pressure differences measured across a stationary flow sensor.) Following a dramatic decline in measured discharge flow rates during June/July 2000, an inspection identified two potential causes:

- A check valve in the main discharge line was found to be badly clogged, clearly impeding water flow; and
- 2) The new flow meter's flow sensor was found to be coated with a dark brown scummy material (possibly biological growth).

The check valve was removed, and the flow sensor was cleaned with a soft wet cloth. Upon restarting the system, flow rates increased dramatically. The problem was primarily attributed to the badly clogged check valve. It was not clear whether the material coating the flow sensor contributed significantly to the measured flow rate decline (i.e., by causing the sensor to detect lower-than-actual flow rates).

Another large decline in measured discharge flow rate was observed during October through December 2000. The flow sensor was found to be thinly coated with a brown scummy material on December 17, 2000, and was cleaned again. Upon inspection 2 weeks later, a plug of leaf debris was found wedged

Hart Crowser 1-2335-29 against the upstream side of the flow sensor, and the measured flow rate had declined still further. This plug was not present at the flow sensor on December 17, but may have been constricting water flow further upstream in the piping. It was again unclear whether the material coating the flow sensor had any impact on measured flow rates.

We will continue to evaluate system flow. In 2001, we plan to inspect and clean the flow sensor on a monthly basis.

EFFLUENT SAMPLE ANALYTICAL RESULTS AND OBSERVATIONS

Effluent samples were collected from the groundwater extraction system discharge line on a monthly basis to observe discharge parameters and analyze for constituents with KCIW discharge limits. Samples were submitted to Analytical Resources, Inc. (ARI) for analysis using EPA Method 602. Analytical results for benzene, toluene, and ethylbenzene are summarized in Table 2. Appendix A contains the analytical laboratory certificates. All analytical results for this period were below the respective KCIW discharge limits.

The monthly measurements of pH were within the limits of the discharge authorization (i.e., between 5 and 12 pH units), and are recorded on the Waste Discharge Self-Monitoring Reports (attached). The effluent samples did not exhibit any oil sheen, unusual color, significant turbidity, or odor of solvent, gasoline, or hydrogen sulfide. A reddish-brown to slight yellow tint was observed in most of the samples. This slight coloration is attributed to iron oxidation and associated biological growth.

This report was prepared according to the standard of care of our profession. No other warranty, express or implied, is made.

Sincerely,

HART CROWSER, INC.

DAVID A. HEFFNER, P.E.

David A. Hefrer

Associate Engineer

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Attachments:

Table 1 - Summary of Monthly Averaged Discharge Rates and Volumes

Table 2 - Analytical Results of Monthly Wastewater Effluent Sampling for Constituents with KCIW Discharge Limits

Waste Discharge Self-Monitoring Reports for April through December 2000

Appendix A - Sample Analytical Data Quality and Laboratory Certificates Analytical Resources, Inc.

Table 1 - Summary of Monthly Averaged Discharge Rates and Volumes

	Average	
	Discharge	Volume
	Rate	Discharged
Month (2000)	in gpd	in gallons
January	5,022	155,668
February	5,674	164,550
March	987	30,605
April	437	13,108
May	1,171	36,290
June	901	2 7, 032
July	47	1,446
August	1,649	51,117
September	1,381	41,424
October	683	21,170
November	134	4,020
December	39	1,214
April - December 2000 (Note 2)	716	196,821
January - December 2000	1,496	547,644

Notes:

- 1) Discharge volumes for January through April 2000 include surface water pumped from the tank farm enclosure and SPCC area. Pumping from these areas was discontinued in May, in accordance with the new discharge authorization that became effective May 2, 2000.
- April through December is the portion of 2000 covered by this report.
 Monitoring results for January through March 2000 were previously reported in our quarterly report dated April 7, 2000.

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Table 2 - Analytical Results of Monthly Wastewater Effluent Sampling for Constituents with KCIW Discharge Limits

				Conc	entration in m	g/L		·	
	KCIW	6/1/2000	6/16/2000	7/18/2000	8/17/2000	9/18/2000	10/16/2000	11/15/2000	12/17/2000
Constituent ,	Discharge Limit	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample
Benzene	0.13	0.01	0.001 U	0.0082	0.0067	0.0069	0.0062	0.0052	0.0068
Toluene	1.5	0.48	0.60	0.081	0.037	0.0055	0.001 ∪	0.001 U	0.001 U
Ethylbenzene	1.4	0.06	0.04	0.0087	0.024	0.015	0.012	0.0073	0.0048

U Not detected at indicated detection limit.

Notes:

- 1) This table reports analytical results for sampling performed under Discharge Authorization 217-02, which became effective on May 2, 2000. Analytical results for sampling performed in 2000 under the previous discharge authorization are documented in CHEMCENTRAL's Quarterly Self-Monitoring Report dated April 7, 2000.
- 2) The constituents were analyzed using EPA Method 602. Laboratory certificates are provided in Appendix A.

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CHEMCENTRAL/Seattle

Department of Natural Resources

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Department of Natural Resources

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Sount irial V 130 Nickerson St., Suite 200 Seattle, WA 98109-1658 Phone (206) 263-3000 / FAX (206) 263-3001

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that allocate requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

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Signature of Principal Executive or Authorized Agent

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Signature of Principal Executive or Authorized Agent

1330 (Rev. 1/00)

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Sample Site No. Company Name

Department of Natural Resources

CHEMCENTRAL

Seattle

Month_ Permit/DA No.

August

DA 217-02

No. of Employees (per day) Average

301....

vVaste Discharge Sel. .: Ioi

<u>5</u>

ount rial W rau Nickerson St., Suite zūū Seattle, WA 98109-1658 Phone (206) 263-3000 / FAX (206) 263-3001

Maximum

Date

Average

Monthly Maximum Monthly Minimum

548 130

Total Monthly Flow (Gallons) 41,424

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6.9

Company Name Department of Natural Resources K... Cours CHEMCENTRAL

Sample Site No.

Sample Date

Sample Type

C (composite) or G (grab)

Cadmium, Cd

Chromium, Cr

Copper, Cu

Lead, Pb

Mercury, Hg

Nickel, NI

Sliver, Ag

Zinc, Zn

Cyanide, CN,A

Cyanide, CN,T

Fats, Oils and Grease (FOG)

Total Toxic Organics (TTO)

√check maximum

Elow (GPD) Industrial

<u>Notes</u> (Indicate Batch Discharges)

248

Other Parameters

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(circle)

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Waste Discharge Sel. Johntoring Report

Scattle

Permit/DA No.

DA 217-02 All units mg/1 unless otherwise noted Industry Type Chemical Distribution

Month September 20 00 No. of Employees (per day) Average. ax to: youn! Irial V 130 Nickerson St., Suite 200 Seattle, WA 98109-1658 Phone (206) 263-3000 / FAX (206) 263-3001

Maximum

Samples collected to observe I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for Cubmitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data tenting a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each hadronater tested. Ecology accredited laboratory for each erheter tested.

30

hischarge paramaters.

Signature of rincipal Executive or Authorized Agent

Date

Company Name Department of Natural Resources Co CHEMCENTRAL

Sample Site No.

Waste Distriarge Seir-iv10

Month_ PermivDA No.

October

DA 2

17-02

ri-o leput

20 00

No. of Employees (per day) Average

All units mg/l unless otherwise noted Industry Type Chemical Distribution

lickerson St., Suite 200 Seattle, WA 98109-1658 Phone (206) 263-3000 / FAX (206) 263-3001

Maximum

Please circle all permit violations Average Monthly Minimum Monthly Maximum Sample Date (circle) 1 27 26 25 24 23 22 21 20 19 18 17 6 ᇙ 4 ᆲ 12 10 6 S N 30 29 28 œ Sample Type C (composite) or G (grab) 83 Min. 皇 Cadmium, Cd Chromium, Cr Copper, Cu Lead, Pb Mercury, Hg Nickel, Ni Silver, Ag Zinc, Zn Cyanide, CN,A Cyanide, CN,T Fats, Oils and Grease (FOG) Total Toxic Organics (TTO) Other Parameters √check maximum 206 130 Elow (GPD) Industrial 130 206 683 Samples collecte Total Monthly Flow (Gallons) Clean Sensor discharge Notes (Indicate Batch Discharges) checked; no need to parameters, to abserve 21,170 I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data equiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested. er tested. Signature of Principal Executive or Authorized Agent Date

1330 (Rev. 1/00)

Average

Monthly Minlmum Monthly Maximum

62 206

Total Monthly Flow (Gallons)

4,020

30 29 28 27 8 25 2 23 123 2 20 19 **a** 17 16 5 7 13 12 ובׁ 10 Sample Site No. Company Name

CHEMCENTRAL

Scattle

Sample Date

(circle)

Sample Type C (composite)

or G (grab)

Cadmium, Cd

Chromium, Cr

Copper, Cu

Lead, Pb

Mercury, Hg

Nickel, Ni

Silver, Ag

Zinc, Zn

Cyanide, CN,A

Cyanide, CN,T

Fats, Oils and Grease (FOG)

Total Toxic Organics (TTO)

✓ check maximum

Elow (GPD) Industrial

Notes (Indicate Batch Discharges)

206

Other Parameters DA 2

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Waste Discharge Self-infonitoring Report

Month November

PermivDA No.

17.02

No. of Employees (per day) Average All units mg/I unless otherwise noted Industry Type Chemical Distribution

ax to

Journ trial 1 130 Nickerson St., Suite 200 Seattle, WA 98109-1658 Phone (206) 263-3000 / FAX (206) 263-3001

Maximum

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all state requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested. Ecology accredited laboratory for ea rameter tested. Signature of Principal Executive or Authorized Agent Date

Samples collected to observe discharge parameters

3

Company Name Sampie Site No. Please circle all permit violations Monthly Maximum Monthly Minimum Sample Date (circle) 29 27 26 25 24 沒 13 2 8 5 18 17 6 15 4 13 ぉ == 6 မြ 9 8 6 G ω Sample Type P) C (composite) or G (grab) 6.3 S CHEMCENTRAL, 모 Me X Cadmium, Cd Chromium, Cr Copper, Cu Lead, Pb Mercury, Hg Nickel, Ni Silver, Ag Zinc, Zn Cyanide, CN,A Cyanide, CN,T Month December 20 00 PermivDA No. Fats, Oils and Grease (FOG) Total Toxic Organics (TTO) DA 2 Other Parameters 7-02 √check maximum No. of Employees (per day) Average All units mg/l unless otherwise noted Industry Type Chewical Elow (GPD) Industrial 62 62 ω9 Samples collected upstream side of flow sensor. Total Monthly Flow (Gallons) Sensor discharge parameters, flow debris removed <u>Notes</u> (Indicate Batch Discharges) to **ebserve** from I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data equiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested. Date

Signature of Principal Executive or Authorized Agent

Department of Natural Resources

K.... Count

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130 Nickersun St., Suite 200 Seattle, WA 98109-1658 Phone (206) 263-3000 / FAX (206) 263-3001

1330 (Rev. 1/00)

APPENDIX A
SAMPLE ANALYTICAL DATA QUALITY
AND LABORATORY CERTIFICATES
ANALYTICAL RESOURCES, INC.

APPENDIX A SAMPLE ANALYTICAL DATA QUALITY AND LABORATORY CERTIFICATES ANALYTICAL RESOURCES, INC.

Wastewater Sample Analytical Data Quality Review

Eight water samples were collected between June 1 and December 17, 2000. The samples were submitted to Analytical Resources, Inc. of Seattle, Washington for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) (EPA Method 602). The following quality assurance/quality control parameters were evaluated:

- Holding times;
- Method blanks;
- Surrogate recoveries;
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs);
- · Reporting limits.

BTEX. All required holding times were met. No method blank contamination was detected. Surrogate recoveries were within control limits. LCS/LCSD recoveries and LCS/LCSD RPDs were within control limits. Reporting limits were acceptable. The data are acceptable for use as reported.

F:\docs\jobs\233529\CCkciwrep.doc

June 14, 2000

Dave Heffner Hart Crowser, Inc. 1910 Fairview Ave. East Seattle, WA 98102

RE: Client Project: Chem Central

ARI Job: BS08

Dear Dave:

Please find enclosed the original chain-of-custody (COC) record and the final results for a sample from the project referenced above. Analytical Resources, Inc. (ARI) accepted five water samples in good condition on June 1, 2000. There were no discrepancies between the COC and the sample containers' labels.

The samples were analyzed for volatile organic compounds referencing US EPA method 8260 and BTEX compounds referencing US EPA method 602 as requested.

There were no analytical complications noted.

A copy of this report and the supporting data will remain on file with ARI. Please feel free to contact me at your convenience if you have any questions.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mary Lou Fox Project Manager

marylou@arilabs.com

206-389-6155

Enclosures cc: File: BS08

MLF/mlf

Chain of Custody Record & Laboratory Analysis Request

V

Analytical Resources, Incorporated Analytical Chemists and Consultants 400 Ninth Avenue North Seattle, WA 98109-4708

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Sample ID	Sample Date	Time	Sample Matrix	No Con- tainers	3									
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Sample No: Method Blank



Lab Sample ID: BS08MB

QC Report No: BS08-Hart Crowser

LIMS ID: 00-8601

Project: Chem Central

Matrix: Water

2335-24

Date Sampled: NA

Date Received: NA

Data Release Authorized: C# Reported: 06/13/00

Date analyzed: 06/07/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	1.0 U
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	1.0 U
	m,p-Xylene	1.0 U
95-47-6	o-Xylene	1.0 U

BETX 8020 Surrogate Recovery

Trifluorotoluene 98.7% Bromobenzene

Data Qualifiers

- Indicates compound was analyzed for, but not detected at the given detection limit.
- J Indicates an estimated value when that result is less than the calculated detection limit.
- Ε Indicates a value above the linear range of the detector. Dilution Required
- s Indicates no value reported due to saturation of the detector.
- .D Indicates the surrogate was diluted out.
- Found in associated method blank.
- Y Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- Indicates no recovery due to interferences.

FORM-1 BETX

Sample No: ES-1



Lab Sample ID: BS08A

QC Report No: BS08-Hart Crowser

LIMS ID: 00-8601

Project: Chem Central

2335-24

Matrix: Water

Date Sampled: 06/01/00

Date Received: 06/01/00

Data Release Authorized: (# Reported: 06/13/00

Date analyzed: 06/07/00

Volume Purged: 5.0 mL

Dilution: 1:10

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	10
108-88-3	Toluene	480
100-41-4	Ethylbenzene	60
	m,p-Xylene	370
95-47-6	o-Xylene	92

BETX 8020 Surrogate Recovery

Trifluorotoluene 93.5% Bromobenzene 106%

- Indicates compound was analyzed for, but not detected at the U given detection limit.
- Indicates an estimated value when that result is less than the J calculated detection limit.
- Indicates a value above the linear range of the detector. E Dilution Required
- Indicates no value reported due to saturation of the detector. S
- Indicates the surrogate was diluted out.D
- Found in associated method blank. В
- Indicates a raised reporting limit due to matrix interferences. Y The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- Indicates compound was not analyzed. NA
- Indicates no recovery due to interferences. NR

ORGANICS ANALYSIS DATA SHEET BETX by EPA Method 602M



Lab Sample ID: BS08LCS

LIMS ID: 00-8601 Matrix: Water QC Report No: BS08-Hart Crowser

Project: Chem Central

2335-24

Data Release Authorized: (#
Reported: 06/13/00 4/15/~

LCS/LCSDUPLICATE ANALYSIS

Date Analyzed: 06/07/00

CONSTITUENT		SPIKE FOUND	SPIKE ADDED	% Rec	% RPD
Lab Control	Sample				
To] Eth m, <u>j</u>	nzene Luene nylbenzene p-Xylene Kylene	25.2 27.6 28.6 57.6 28.7	25.0 25.0 25.0 50.0 25.0	101% 110% 114% 115% 115%	
LCDuplicate					
Ber	nzene	27.9	25.0	112%	10.2%
Tol	uene	28.7	25.0	115%	3.9%
Eth	ylbenzene	29.5	25.0	118%	3.1%
m, p	o-Xylene	59.9	50.0	120%	3.9%
0-3	(ylene	29.7	25.0	119%	3.4%

BETX SURROGATE REC	LCS	LCSD
Trifluorotoluene	107%	93.8%
Bromobenzene	113%	97.0%

Values reported in parts per billion (ug/L)

BETX SPIKE CONTROL LIMITS

Percent Recovery 75-130%



WATER BETX SYSTEM MONITORING COMPOUND SUMMARY

Matrix: Water

QC Report No: BS08

LIMS ID	Lab ID	Client ID	TFT	BB	TOT OUT
00-8601MB	06070 0M B	Method Blank	99%	101%	0
00-8601LC	060700LC	Lab Control	107%	113%	0
00-8601LCD	BS08LCD	LCDuplicate	94%	97%	0
00-8601	BS08A	ES-1	94%	106%	ο,

		MB/LCS	SAMPLE
		QC LIMITS	QC LIMITS
(TFT)	= Trifluorotoluene	(60-130)	(60-130)
(BB)	= Bromobenzene	(60-130)	(60-130)

ADVISORY LIMITS

- # Column to be used to flag recovery values
- * Values outside of required QC limits
- D System Monitoring Compound diluted out

Page 1 for BS08

FORM-II BETX



June 26, 2000

Dave Heffner Hart Crowser, Inc. 1910 Fairview Ave. East Seattle, WA 98102

RE: Client Project: Chem Central 2335-24

ARI Job: BT69

Dear Dave:

Please find enclosed the original chain-of-custody (COC) record and the final results for a sample from the project referenced above. Analytical Resources, Inc. (ARI) accepted one water sample in good condition on June 16, 2000. There were no discrepancies between the COC and the sample containers' labels.

The sample was analyzed BTEX compounds referencing US EPA method 602 as requested.

There were no analytical complications noted.

A copy of this report and the supporting data will remain on file with ARI. Please feel free to contact me at your convenience if you have any questions.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mary Low Fox
Project Manager
marylou@arilabs.com

206-389-6155

Enclosures cc: File: BT69

MLF/mlf

Analytical Chemists and Consultants Chain of Custody Record & Laboratory Analysis Request 400 Ninth Avenue North Seattle, WA 98109-4708 Page ____ of ____ Turn Around Requested: _ 206-621-6490 206-621-7523 (fax) Proj Name: Unemcentral Report to: Analyses Requested Notes/Comments Proj Number: Company: Sampler: Address: Shipping Method: Phone: Fax: AirBill: Sample Sample Sample No Con-Date Time Matrix tainers Sample ID 6/16/00 9/5 H20 Relinquished; Relinquished: Relinquished: Special Instructions/Notes (Signature) (Signature) Printed name: Printed name: Company: Company: Company: Date: Time: Date: Time: 950 Received by: Received b Received by: Printed name: Printed name: Number of Coolers: Company: Company: Cooler Temp(s):

Date:

Time:

Time:

Date:

Analytical Resources, Incorporated

COC Seals Intact?

Bottles Intact?

ANALYTICAL RESOURCES INCORPORATED

Sample No: Method Blank

Lab Sample ID: BT69MB

QC Report No: BT69-Hart Crowser

LIMS ID: 00-9685

Project: Chem Central

Matrix: Water

2335-24

Date Sampled: NA

Date Received: NA

Data Release Authorized: 617
Reported: 06/24/00 G/M/M

Date analyzed: 06/22/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	1.0 U
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	1.0 U
	m,p-Xylene	1.0 U
95-47-6	o-Xylene	1.0 U

BETX 8020 Surrogate Recovery

Trifluorotoluene 101% Bromobenzene 97.5%

- U Indicates compound was analyzed for, but not detected at the given detection limit.
- J Indicates an estimated value when that result is less than the calculated detection limit.
- E Indicates a value above the linear range of the detector. Dilution Required
- S Indicates no value reported due to saturation of the detector.
- D Indicates the surrogate was diluted out.
- B Found in associated method blank.
- Y Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- NR Indicates no recovery due to interferences.

Sample No: ES-1



Lab Sample ID: BT69A

QC Report No: BT69-Hart Crowser

LIMS ID: 00-9685

Project: Chem Central

Matrix: Water

2335-24

Date Sampled: 06/16/00

Date Received: 06/16/00

Data Release Authorized: Of

Reported: 06/24/00

Date analyzed: 06/22/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	1.0 U
108-88-3	Toluene	600 E
100-41-4	Ethylbenzene	40
	m,p-Xylene	220 E
95-47-6	o-Xylene	73

BETX 8020 Surrogate Recovery

Trifluorotoluene 103% Bromobenzene 98.3%

- Indicates compound was analyzed for, but not detected at the given detection limit.
- J Indicates an estimated value when that result is less than the calculated detection limit.
- Indicates a value above the linear range of the detector. Dilution Required
- S Indicates no value reported due to saturation of the detector.
- Indicates the surrogate was diluted out.
- В Found in associated method blank.
- Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- Indicates no recovery due to interferences.



Sample No: ES-1

DILUTION

Lab Sample ID: BT69A

QC Report No: BT69-Hart Crowser

LIMS ID: 00-9685

Project: Chem Central

Matrix: Water

2335-24

Date Sampled:

06/16/00

Date Received: 06/16/00

Data Release Authorized: (1) Reported: 06/24/00

Date analyzed: 06/22/00

Volume Purged: 5.0 mL

Dilution: 1:40

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	40 U
108-88-3	Toluene	600
100-41-4	Ethylbenzene	44
	m,p-Xylene	220
95-47-6	o-Xylene	74

BETX 8020 Surrogate Recovery

Trifluorotoluene 95.6% Bromobenzene 92.3%

- Indicates compound was analyzed for, but not detected at the Ü given detection limit.
- Indicates an estimated value when that result is less than the J calculated detection limit.
- E Indicates a value above the linear range of the detector. Dilution Required
- S Indicates no value reported due to saturation of the detector.
- ..D Indicates the surrogate was diluted out.
- В Found in associated method blank.
- Y Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- NR Indicates no recovery due to interferences.

ORGANICS ANALYSIS DATA SHEET BETX by EPA Method 602M



Lab Sample ID: BT69LCS

LIMS ID: 00-9685 Matrix: Water QC Report No: BT69-Hart Crowser

Project: Chem Central 2335-24

Data Release Authorized: (

Reported: 06/24/00

appla

LCS/LCSDUPLICATE ANALYSIS

Date Analyzed: 06/22/00

CONSTITUENT	r	SPIKE FOUND	SPIKE ADDED	ዩ REC	% RPD
Lab Control	l Sample				
Ве	enzene	23.9	25.0	95.6%	
To	oluene	23.4	25.0	93.6%	
Et	hylbenzene	23.3	25.0	93.2%	
m,	p-Xylene	47.5	50.0	95.0%	
0-	-Xylene	23.1	25.0	92.4%	
LCDuplicate	2				
Ве	enzene	22.9	25.0	91.6%	4.3%
To	oluene	23.0	25.0	92.0%	1.7%
Et	hylbenzene	23.2	25.0	92.8%	0.4%
m,	p-Xylene	47.4	50.0	94.8%	0.2%
0-	-Xylene	23.1	25.0	92.4%	0.0%

BETX SURROGATE REC	LCS	LCSD
Trifluorotoluene	105%	103%
Bromobenzene	101%	101%

Values reported in parts per billion (ug/L)

BETX SPIKE CONTROL LIMITS

Percent Recovery 75-130%



July 28, 2000

Dave Heffner Hart Crowser, Inc. 1910 Fairview Ave. East Seattle, WA 98102

RE: Client Project: Chem Central 2335-24

ARI Job: BW56

Dear Dave:

Please find enclosed the original chain-of-custody (COC) record and the final results for a sample from the project referenced above. Analytical Resources, Inc. (ARI) accepted one water sample in good condition on July 18, 2000. There were no discrepancies between the COC and the sample containers' labels.

The sample was analyzed BTEX compounds referencing US EPA method 602 and ARI SOPs as requested.

There were no analytical complications noted.

A copy of this report and the supporting data will remain on file with ARI. Please feel free to contact me at your convenience if you have any questions.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mary Lou Fox

Project Manager

The for

marylou@arilabs.com

206-389-6155

Enclosures cc: File: BT69

MLF/mlf



Chain of Custody Record & Laboratory Analysis Request

Page ___ of ___ Turn Around Requested: ____STD



Analytical Resources, Incorporated Analytical Chemists and Consultants 400 Ninth Avenue North Seattle, WA 98109-4708 206-621-6490 206-621-7523 (fax)

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Sample No: ES-1



Lab Sample ID: BW56A

LIMS ID: 00-11664

Matrix: Water

QC Report No: BW56-Hart Crowser

Project: Chem Central

2335-24

Date Sampled: 07/18/00

Date Received: 07/18/00

Data Release Authorized:

Reported: 07/24/00

Date analyzed: 07/19/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	<u> </u>
71-43-2	Benzene	8.2
108-88-3	Toluene	81
	Ethylbenzene	8.7
100-41-4	m,p-Xylene	85
95-47-6	o-Xylene	14

BETX 8020 Surrogate Recovery

Trifluorotoluene 100% Bromobenzene

- Indicates compound was analyzed for, but not detected at the U given detection limit.
- Indicates an estimated value when that result is less than the J calculated detection limit.
- Indicates a value above the linear range of the detector. E Dilution Required
 - Indicates no value reported due to saturation of the detector. S
- Indicates the surrogate was diluted out. ...D
- Found in associated method blank. В
- Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- Indicates compound was not analyzed.
- Indicates no recovery due to interferences. NR



Sample No: Method Blank

Lab Sample ID: BW56MB

QC Report No: BW56-Hart Crowser

LIMS ID: 00-11664

Project: Chem Central

Matrix: Water

2335-24

Date Sampled: NA

Date Received: NA

Data Release Authorized: 6/t

Reported: 07/24/00

Date analyzed: 07/19/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	1.0 · ប
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	1.0 U
	m,p-Xylene	1.0 U
95-47 - 6	o-Xylene	1.0 U

BETX 8020 Surrogate Recovery

Trifluorotoluene 95.7% 97.5% Bromobenzene

- U Indicates compound was analyzed for, but not detected at the given detection limit.
- J Indicates an estimated value when that result is less than the calculated detection limit.
- Indicates a value above the linear range of the detector. E Dilution Required
- Indicates no value reported due to saturation of the detector. S
- .D Indicates the surrogate was diluted out.
- В Found in associated method blank.
- Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- Indicates compound was not analyzed. NA
- Indicates no recovery due to interferences. NR

ORGANICS ANALYSIS DATA SHEET BETX by EPA Method 602M



Lab Sample ID: BW56LCS

LIMS ID: 00-11664

Matrix: Water

QC Report No: BW56-Hart Crowser

Project: Chem Central

2335-24

Data Release Authorized: (M

Reported: 07/24/00

Malla

LCS/LCSDUPLICATE ANALYSIS

Date Analyzed: 07/19/00

CONSTITUENT	SPIKE FOUND	SPIKE ADDED	% Rec	% RPD
Lab Control Sample				
Benzene	24.0	25.0	96.0%	
Toluene	25.6	25.0	102%	
Ethylbenzene	25.9	25.0	104%	
m,p-Xylene	51.2	50.0	102%	
o-Xylene	25.4	25.0	102%	
LCDuplicate				
Benzene	22.4	25.0	89.6%	6.9%
Toluene	24.9	25.0	99.6%	2.8%
Ethylbenzene	24.4	25.0	97.6%	6.0%
m,p-Xylene	49.3	50.0	98.6%	3.8%
o-Xylene	24.0	25.0	96.0%	5.7%

BETX SURROGATE REC	LCS	LCSD
Trifluorotoluene	97.3%	94.0%
Bromobenzene	102%	99.4%

Values reported in parts per billion (ug/L)

BETX SPIKE CONTROL LIMITS

Percent Recovery 75-130%



WATER BETX SYSTEM MONITORING COMPOUND SUMMARY

Matrix: Water QC Report No: BW56

LIMS ID	Lab ID	Client ID	TFT	BB	TOT OUT
00-11664MB 00-11664LC 00-11664LCI	071900LC	Method Blank Lab Control LCDuplicate ES-1	96% 97% 94% 105%	98% 102% 99% 100%	0 0 0

	MB/LCS QC LIMITS	SAMPLE QC LIMITS
(TFT) = Trifluorotoluene	(60-130)	(60-130)
(BB) = Bromobenzene	(60-130)	(60-130)

ADVISORY LIMITS

- # Column to be used to flag recovery values
- Values outside of required QC limits
- D System Monitoring Compound diluted out

Page 1 for BW56

FORM-II BETX



August 31, 2000

Dave Heffner Hart Crowser, Inc. 1910 Fairview Ave. East Seattle, WA 98102

RE: Client Project: Chem Central

ARI Job: CA30

Dear Dave:

Please find enclosed the original chain-of-custody (COC) record and the final results for a sample from the project referenced above. Analytical Resources, Inc. (ARI) accepted five water samples in good condition on August 18, 2000. There were no discrepancies between the COC and the sample containers' labels.

The samples were analyzed for volatile organic compounds referencing US EPA method 8260 and BTEX compounds referencing US EPA method 602 as requested.

No analytical complications were noted.

A copy of this report and the supporting data will remain on file with ARI. Please feel free to contact me at your convenience if you have any questions.

Sincerely,

ANALYTICAL RESOURCES, INC.

May Lou Fox

Mary Lou Fox
Project Manager

marylou@arilabs.com

206-389-6155

Enclosures cc: File: CA30

MLF/mlf

CA 30 00-14101 00

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Analytical Resources, Incorporated Analytical Chemists and Consultants 400 Ninth Avenue North Seattle, WA 98109-4708 206-621-6490 206-621-7523 (fax)

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Sample No: Method Blank



Lab Sample ID: CA30MB

QC Report No: CA30-Hart Crowser

LIMS ID: 00-14101

Project: Chem Central

Matrix: Water

2335-24

Date Sampled:

Date Received:

Data Release Authorized: clr

Reported: 08/29/00

Date analyzed: 08/22/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	<u>Value</u>
71-43-2	Benzene	1.0 U
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	1.0 U
	m,p-Xylene	1.0 U
95-47-6	o-Xylene	1.0 U

BETX 8020 Surrogate Recovery

Trifluorotoluene 111% Bromobenzene 99.3%

- U Indicates compound was analyzed for, but not detected at the given detection limit.
- Indicates an estimated value when that result is less than the calculated detection limit.
- Ε Indicates a value above the linear range of the detector. Dilution Required
- Indicates no value reported due to saturation of the detector. S
- .D Indicates the surrogate was diluted out.
- В Found in associated method blank.
- Y Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- Indicates no recovery due to interferences.

Sample No: ES-1



Lab Sample ID: CA30A

QC Report No: CA30-Hart Crowser

LIMS ID: 00-14101

Project: Chem Central

Matrix: Water

Date Sampled: 08/17/00

2335-24

Date Received: 08/18/00

Data Release Authorized: 0 1/ Reported: 08/29/00

Date analyzed: 08/22/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
	-	
71-43-2	Benzene	6.7
108-88-3	Toluene	37 .
100-41-4	Ethylbenzene	24
	m,p-Xylene	82
95-47-6	o-Xylene	30

BETX 8020 Surrogate Recovery

Trifluorotoluene 114% Bromobenzene 103%

- Indicates compound was analyzed for, but not detected at the U given detection limit.
- Indicates an estimated value when that result is less than the J calculated detection limit.
- Indicates a value above the linear range of the detector. Е Dilution Required
- s Indicates no value reported due to saturation of the detector.
- Ď Indicates the surrogate was diluted out.
- В Found in associated method blank.
- Indicates a raised reporting limit due to matrix interferences. Y The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- Indicates no recovery due to interferences.

ORGANICS ANALYSIS DATA SHEET BETX by EPA Method 602M



Lab Sample ID: CA30LCS

LIMS ID: 00-14101

Matrix: Water

QC Report No: CA30-Hart Crowser

Project: Chem Central

2335-24

LCS/LCSDUPLICATE ANALYSIS

Date Analyzed: 08/22/00

CONSTITU	ENT	SPIKE FOUND	SPIKE ADDED	% REC	% RPD
Lab Cont	rol Sample				
	Benzene Toluene Ethylbenzene m,p-Xylene o-Xylene	25.0 26.5 26.6 53.3 26.0	25.0 25.0 25.0 50.0 25.0	100% 106% 106% 107% 104%	
LCDuplic	ate				
	Benzene Toluene Ethylbenzene m,p-Xylene o-Xylene	25.8 26.2 27.0 54.2 26.2	25.0 25.0 25.0 50.0 25.0	103% 105% 108% 108% 105%	3.1% 1.1% 1.5% 1.7% 0.8%

BETX SURROGATE REC	LCS	LCSD
Trifluorotoluene	104%	101%
Bromobenzene	99.0%	99.0%

Values reported in parts per billion (ug/L)

BETX SPIKE CONTROL LIMITS

Percent Recovery 75-130%



WATER BETX SYSTEM MONITORING COMPOUND SUMMARY

Matrix: Water

QC Report No: CA30

LIMS ID	Lab ID	Client ID	TFT	ВВ	TOT OUT
00-14101MB 00-14101LC 00-14101LCI	082200LC	Method Blank Lab Control LCDuplicate	111% 104% 101%	99% 99% 99%	0 0 0
00-14101	CA30A	ES-1	114%	103%	O

	MB/LCS	SAMPLE
	QC LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(77-116)
(BB) = Bromobenzene	(80-108)	(85-120)

Limits Updated - 12/01/99

- Column to be used to flag recovery values
- Values outside of required QC limits
- System Monitoring Compound diluted out

Page 1 for CA30

FORM-II BETX



September 29, 2000

Dave Heffner Hart Crowser, Inc. 1910 Fairview Ave. East Seattle, WA 98102

RE: Client Project: Chem Central

ARI Job: CE29

Dear Dave:

Please find enclosed the original chain-of-custody (COC) record and the final results for a sample from the project referenced above. Analytical Resources, Inc. (ARI) accepted one water sample in good condition on September 18, 2000. There were no discrepancies between the COC and the sample containers' labels.

The sample was analyzed for BTEX compounds referencing US EPA method 602, as requested.

No analytical complications were noted.

A copy of this report and the supporting data will remain on file with ARI. Please feel free to contact me at your convenience if you have any questions.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mary Lou Fox Project Manager marylou@arilabs.com 206-389-6155

Enclosures cc: File: CE29

MLF/sl



Analytical Resources, Incorporated Analytical Chemists and Consultants 400 Ninth Avenue North Seattle, WA 98109-4708 206-621-6490 206-621-7523 (fax)

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Sample No: Method Blank



Lab Sample ID: CE29MB

QC Report No: CE29-Hart Crowser

LIMS ID: 00-17114

Project: Chem Central

Matrix: Water

2335-29

Date Sampled:

NA

Date Received: NA

Data Release Authorized: () Reported: 09/28/00

Volume Purged: 5.0 mL

Dilution: 1:1

Date analyzed: 09/22/00

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	1.0 U
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	1.0 U
	m,p-Xylene	1.0 Ŭ
95-47-6	o-Xylene	1.0 U

BETX 8020 Surrogate Recovery

Trifluorotoluene 102% Bromobenzene 94.8%

- Indicates compound was analyzed for, but not detected at the given detection limit.
- Indicates an estimated value when that result is less than the calculated detection limit.
- Ε Indicates a value above the linear range of the detector. Dilution Required
- Indicates no value reported due to saturation of the detector. S
- Indicates the surrogate was diluted out. D
- Found in associated method blank.
- Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- Indicates no recovery due to interferences.

Sample No: ES-1



Lab Sample ID: CE29A

QC Report No: CE29-Hart Crowser

LIMS ID: 00-17114

Project: Chem Central

Matrix: Water

2335-29

Date Sampled: 09/18/00

Date Received: 09/18/00

Data Release Authorized: (4

Reported: 09/28/00

Date analyzed: 09/23/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	6.9
108-88-3	Toluene	5.5
100-41-4	Ethylbenzene	15
	m,p-Xylene	56
95-47-6	o-Xylene	17

BETX 8020 Surrogate Recovery

99.4% Trifluorotoluene Bromobenzene 93.4%

- Indicates compound was analyzed for, but not detected at the Ħ given detection limit.
- Indicates an estimated value when that result is less than the J calculated detection limit.
- Indicates a value above the linear range of the detector. Ε Dilution Required
- Indicates no value reported due to saturation of the detector.
- Indicates the surrogate was diluted out. D'
- Found in associated method blank.
- Indicates a raised reporting limit due to matrix interferences. Y The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- Indicates no recovery due to interferences.

ORGANICS ANALYSIS DATA SHEET BETX by EPA Method 602M



Lab Sample ID: CE29LCS

LIMS ID: 00-17114

Matrix: Water

QC Report No: CE29-Hart Crowser

Project: Chem Central

2335-29

Data Release Authorized: (#

Reported: 09/28/00

9/23/n

LCS/LCSDUPLICATE ANALYSIS

Date Analyzed: 09/22/00

CONSTITUENT	SPIKE FOUND	SPIKE ADDED	% REC	% RPD
Lab Control Sample				
Benzene Toluene	24.7 24.4	25.0 25.0	98.8% 97.6%	
Ethylbenzene	23.4	25.0	93.6%	
m,p-Xylene o-Xylene	46.0 23.3	50.0 25.0	92.0% 93.2%	
LCDuplicate				
Benzene	25.5	25.0	102%	3.2%
Toluene	24.6	25.0	98.4%	0.8%
Ethylbenzene	24.1	25.0	96.4%	2.9%
m,p-Xylene	47.4	50.0	94.8%	3.0%
o-Xylene	23.9	25.0	95.6%	2.5%

BETX SURROGATE REC	LCS	LCSD
Trifluorotoluene	107%	107%
Bromobenzene	97.0%	101%

Values reported in parts per billion (ug/L)

BETX SPIKE CONTROL LIMITS

Percent Recovery 75-130%



WATER BETX SYSTEM MONITORING COMPOUND SUMMARY

Matrix: Water

QC Report No: CE29

LIMS ID	Lab ID	Client ID	TFT	ВВ	TOT OUT
00-17114MB	092200MB	Method Blank	102%	95%	0
00-17114LC	092200LC	Lab Control	107%	97%	0
00-17114LC	DCE29LCD	LCDuplicate	107%	101%	0
00-17114	CE29A	ES-1	99%	93%	0

	MB/LCS	SAMPLE
	QC LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(77-116)
(BB) = Bromobenzene	(80-108)	(85-120)

Limits Updated - 12/01/99

- # Column to be used to flag recovery values
- * Values outside of required QC limits
- D System Monitoring Compound diluted out

Page 1 for CE29

October 27, 2000

Dave Heffner Hart Crowser, Inc. 1910 Fairview Ave. East Seattle, WA 98102

RE: Client Project: Chem Central

ARI Job: CI16

Dear Dave:

Please find enclosed the original chain-of-custody (COC) record and the final results for a sample from the project referenced above. Analytical Resources, Inc. (ARI) accepted one water sample in good condition on October 16, 2000. There were no discrepancies between the COC and the sample containers' labels.

The sample was analyzed for BTEX compounds referencing US EPA method 602, as requested.

No analytical complications were noted.

A copy of this report and the supporting data will remain on file with ARI. Please feel free to contact me at your convenience if you have any questions.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mary Lou Fox
Project Manager
marylou@arilabs.com

206-389-6155

Enclosures cc: File: Cl16

MLF/sl

5,0°C OU 19591 CI16

Page ___ of ___

Chain of Custody Record & Laboratory Analysis Request

Turn Around Requested: ____

Analytical Resources, Incorporated Analytical Chemists and Consultants 400 Ninth Avenue North Seattle, WA 98109-4708 206-621-6490 206-621-7523 (fax)

Report to: Dave Heffner	Proj Nami Proj Numi Sampler:	e: Oh	emle	uppel	1			— Ana	ılvses	Requ	ested		•		Notes/Comments
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ANALYTICAL RESOURCES INCORPORATED

Sample No: Method Blank

Lab Sample ID: CI16MB

QC Report No:

CI16-Hart Crowser

LIMS ID: 00-19591

Project: Chem Central

Matrix: Water

2335-29

Date Sampled:

Date Received: NA

l: NA

Data Release Authorized: (17
Reported: 10/26/00

Date analyzed: 10/20/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value		
71-43-2	Benzene	1.0 U		
108-88-3	Toluene	1.0 U		
100-41-4	Ethylbenzene	1.0 U		
	m,p-Xylene	1.0 U		
95-47-6	o-Xylene	1.0 U		

BETX 8020 Surrogate Recovery

Trifluorotoluene 104% Bromobenzene 104%

- U Indicates compound was analyzed for, but not detected at the given detection limit.
- J Indicates an estimated value when that result is less than the calculated detection limit.
- E Indicates a value above the linear range of the detector.
 Dilution Required
- S Indicates no value reported due to saturation of the detector.
- D Indicates the surrogate was diluted out.
- B Found in associated method blank.
- Y Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- NR Indicates no recovery due to interferences.

ANALYTICAL RESOURCES INCORPORATED

Sample No: ES-1

Lab Sample ID: CI16A

QC Report No: CI16-Hart Crowser

LIMS ID: 00-19591

Project: Chem Central

Matrix: Water

2335-29

Date Sampled: 10/16/00

Date Received: 10/16/00

Data Release Authorized: N Reported: 10/26/00

Date analyzed: 10/20/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
	-	
71-43-2	Benzene	6.2
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	12
	m,p-Xylene	44
95-47-6	o-Xylene	12

BETX 8020 Surrogate Recovery

Trifluorotoluene 103% Bromobenzene 102%

- Indicates compound was analyzed for, but not detected at the given detection limit.
- J Indicates an estimated value when that result is less than the calculated detection limit.
- E Indicates a value above the linear range of the detector. Dilution Required
- Indicates no value reported due to saturation of the detector. S
- \mathbf{D} Indicates the surrogate was diluted out.
- В Found in associated method blank.
- Y Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- Indicates no recovery due to interferences.

ORGANICS ANALYSIS DATA SHEET BETX by EPA Method 602M



Lab Sample ID: CI16LCS

LIMS ID: 00-19591

Matrix: Water

QC Report No: CI16-Hart Crowser

Project: Chem Central

2335-29

Data Release Authorized: (Reported: 10/26/00

LCS/LCSDUPLICATE ANALYSIS

Date Analyzed: 10/20/00

CONSTITU	ENT	SPIKE FOUND	SPIKE ADDED	% REC	% RPD
Lab Cont	rol Sample				
	Benzene Toluene Ethylbenzene m,p-Xylene o-Xylene	21.0 27.2 25.2 49.4 25.3	25.0 25.0 25.0 50.0 25.0	84.0% 109% 101% 98.8% 101%	·
LCDuplica	ate				
	Benzene Toluene Ethylbenzene m,p-Xylene o-Xylene	26.1 26.9 25.6 50.0 26.1	25.0 25.0 25.0 50.0 25.0	104% 108% 102% 100% 104%	21.7% 1.1% 1.6% 1.2% 3.1%

BETX SURROGATE REC	LCS	LCSD
Trifluorotoluene	111%	106%
Bromobenzene	108%	109%

Values reported in parts per billion (ug/L)

BETX SPIKE CONTROL LIMITS

Percent Recovery 75-130%



WATER BETX SYSTEM MONITORING COMPOUND SUMMARY

Matrix: Water QC Report No: CI16

LIMS ID	Lab ID	Client ID	TFT	вв	TOT OUT
00-19591MB	102000MB	Method Blank	104%	104%	0
00-19591LC	102000LC	Lab Control	111%	108%	0
00-19591LC	DCI16LCD	LCDuplicate	106%	109%	0
00-19591	CI16A	ES-1	103%	102%	0

	MB/LCS	SAMPLE
	QC LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(77-116)	(80-120)
(BB) = Bromobenzene	(85-120)	(80-108)

Limits Updated - 12/01/99

- # Column to be used to flag recovery values
- * Values outside of required QC limits
- D System Monitoring Compound diluted out

Page 1 for CI16

FORM-II BETX

November 29, 2000

Dave Heffner Hart Crowser, Inc. 1910 Fairview Ave. East Seattle, WA 98102

RE: Client Project: J-2335-29 Chem Central

ARI Job: CL57

Dear Dave:

Please find enclosed the original chain-of-custody (COC) record and the final results for a sample from the project referenced above. Analytical Resources, Inc. (ARI) accepted ten water samples in good condition on November 15, 2000. A sample with ID of **HC-9D** was listed on the chain-of-custody. No vials with this ID were received. But three vials labeled **HC-8D** were received, but not listed on the COC. The client confirmed the correct ID to be **HC-8D** and the sample was logged in for analysis under this ID.

The samples were analyzed for volatile organic compounds referencing US EPA method 8260 and BTEX compounds referencing US EPA method 602 as requested.

No analytical complications were noted.

A copy of this report and the supporting data will remain on file with ARI. Please feel free to contact me at your convenience if you have any questions.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mary Lou Fox Project Manager marylou@arilabs.com

206-389-6155

Enclosures cc: File: CL57

MLF/mlf

mpre Custody ne				HARTCROM	/SER	Phone: 206-324-9530 FAX: 206-3	328-55
B J-2335-29 LAB NI ROJECT NAME _ Chem Ce ART CROWSER CONTACT Dav	imber utal e Heffie		260 23 BTEX	REQUESTED ANALYSIS		OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS	
AMPLED BY: J. Browle	4_		ê 00°			Z	
B NO. SAMPLE ID DESCRIPTIO	DATE TIME	MATRIX		 			
HC-4D	11/15/50	Water		 		3	-
He-4	1,1				_	3	
HC-2				 	_	3	
HC-3						3	
HL-6D					_	3	
HC-9				_	- 	3	
HC-10	_ _			 		3	
HC-8						3 & LABELS READ HE -	8 D,
XHL-9D						3	
ES-I	_ 7					2	
Tripolical							
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			COOLER NO.:	STORAGE L	OCATION:	TURNAROUND TIME:	
SIGNATURE TIME	SIGNATURE	TIME	-			☐ 24 HOURS ☐ 1 WEEK ☐ 48 HOURS STANDARD	
PRINT NAME	PRINT NAME		See Lab Work	Order No tract Requirements		□ 72 HOURS OTHER	

Sample No: Method Blank



Lab Sample ID: CL57MB

QC Report No: CL57-Hart Crowser

LIMS ID: 00-21926

Project: Chem Central

Matrix: Water

J-2335-29

Date Sampled:

Date Received: NA

Data Release Authorized:

Reported: 11/28/00

Volume Purged: 5.0 mL

Dilution: 1:1

Date analyzed: 11/22/00

Reported in ppb (ug/L)

CAS Number	Analyte	<u>Value</u>
71-43-2	Benzene	1.0 U
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	1.0 U
	m,p-Xylene	1.0 U
95-47-6	o-Xylene	1.0 U

BETX 8020 Surrogate Recovery

Trifluorotoluene 94.5% Bromobenzene 96.1%

- U Indicates compound was analyzed for, but not detected at the given detection limit.
- J Indicates an estimated value when that result is less than the calculated detection limit.
- E Indicates a value above the linear range of the detector.

 Dilution Required
- S Indicates no value reported due to saturation of the detector.
- D Indicates the surrogate was diluted out.
- B Found in associated method blank.
- Y Indicates a raised reporting limit due to matrix interferences.

 The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- NR Indicates no recovery due to interferences.

Sample No: ES-1



Lab Sample ID: CL57K

QC Report No: CL57-Hart Crowser

LIMS ID: 00-21926

Project: Chem Central

Matrix: Water

J-2335-29

Date Sampled: 11/15/00

Date Received: 11/15/00

Data Release Authorized:

Reported: 11/28/00

Volume Purged: 5.0 mL

Dilution: 1:1

Date analyzed: 11/23/00

Reported in ppb (ug/L)

CAS Number	Analyte	Value		
77 42 0	7	5.2		
71-43-2	Benzene	5.2		
108-88-3	Toluene	1.0 U		
100-41-4	Ethylbenzene	7.3		
	m,p-Xylene	35		
95-47-6	o-Xylene	11		

BETX 8020 Surrogate Recovery

Trifluorotoluene 98.6% Bromobenzene 90.6%

- Indicates compound was analyzed for, but not detected at the U given detection limit.
- Indicates an estimated value when that result is less than the calculated detection limit.
- Indicates a value above the linear range of the detector. Ε Dilution Required
- Indicates no value reported due to saturation of the detector. S
- Indicates the surrogate was diluted out. D
- В Found in associated method blank.
- Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- Indicates compound was not analyzed. NA
- Indicates no recovery due to interferences.

ORGANICS ANALYSIS DATA SHEET BETX by EPA Method 602M



Lab Sample ID: CL57LCS

LIMS ID: 00-21926

Matrix: Water

QC Report No: CL57-Hart Crowser

Project: Chem Central

J-2335-29

Data Release Authorized: Reported: 11/28/00 (100)

LCS/LCSDUPLICATE ANALYSIS

Date Analyzed: 11/22/00

CONSTITUENT	SPIKE FOUND	SPIKE ADDED	ୃ REC	% RPD	
Lab Control Sample					
Benzene	26.2	25.0	105%		
Toluene	26.0	25.0	104%		
Ethylbenzene	25.3 .	25.0	101%		
m,p-Xylene	50.2	50.0	100%		
o-Xylene	25.1	25.0	100%		
LCDuplicate					
Benzene	22.8	25.0	91.2%	13.9%	
Toluene	26.1	25.0	104%	0.4%	
Ethylbenzene	25.3	25.0	101%	0.0%	
m,p-Xylene	50.3	50.0	101%	0.2%	
o-Xylene	25.2	25.0	101%	0.4%	

BETX SURROGATE REC	LCS	LCSD
Trifluorotoluene	98.5%	99.2%
Bromobenzene	101%	102%

Values reported in parts per billion (ug/L)

BETX SPIKE CONTROL LIMITS

Percent Recovery



WATER BETX SYSTEM MONITORING COMPOUND SUMMARY

Matrix: Water

QC Report No: CL57

LIMS ID Lab ID	Client ID	TFT	BB	TOT OUT
00-21926MB 112200MB 00-21926LC 112200LC 00-21926LCDCL57LCD 00-21926 CL57K	Method Blank Lab Control LCDuplicate ES-1	94% 98% 99% 99%	96% 101% 102% 91%	0 0 0

	MB/LCS	SAMPLE
	QC LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(77-116)	(80-120)
(BB) = Bromobenzene	(85-120)	(80-108)

Limits Updated - 12/01/99

- # Column to be used to flag recovery values
- Values outside of required QC limits
- D System Monitoring Compound diluted out

Page 1 for CL57

January 4, 2001

Dave Heffner Hart Crowser, Inc. 1910 Fairview Ave. East Seattle, WA 98102

RE: Client Project: Chem Central

ARI Job: CP19

Dear Dave:

Please find enclosed the original chain-of-custody (COC) record and the final results for a sample from the project referenced above. Analytical Resources, Inc. (ARI) accepted one water sample in good condition on December 19, 2001. There were no discrepancies between the COC and the sample containers' labels.

The sample was analyzed for BTEX compounds referencing US EPA method 602, as requested.

No analytical complications were noted.

A copy of this report and the supporting data will remain on file with ARI. Please feel free to contact me at your convenience if you have any questions.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mary Lou Fox

Project Manager marylou@arilabs.com

Many Lon Fix

206-389-6155

Enclosures cc: File: CP19

MLF/mlf

Sample Custody Record Samples Shipped to: ARI



Harτ crowser, inc. 1910 Fairview Avenue East Seattle, Washington 98102-3699 Phone: 206-324-9530 FAX: 206-328-5581

100 5	-2335-2	9 1000	ILIMDED		1	7)		REQU	JESTE	D ANA	ALYSIS	S			S	
PROJECT I	NAME Chrowser CONTAC	en cens	Browley	D. Heff		REQUESTED ANALYSIS				NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS					
LAB NO.	SAMPLE ID	DESCRIPTION	ON DATE	TIME MAT	⊦`					+		 		_		
	HC-EF-1	3/17	12/17/00	Was	er /										3	
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RELINQUI	I Ished by	DATE	RECEIVED BY	DA1		SPECIA				NG O	R	1	<u> </u>		3	TOTAL NUMBER OF CONTAINERS
I ANTONOLINE	Browley	. TIME	MANUTAL MANUTAN	12/16 CgW TIM	4100	STORAC	SE REQI	JIREME	ENTS:						.cu	MPLE RECEIPT INFORMATION ISTODY SEALS: YES □NO □N/A
COMPANY		6747	COMPANY COMPANY	1-74											\	OOD CONDITION YES □NO MPERATURE IPMENT METHOD: □HAND
RELINQU	ISHED BY	DATE	RECEIVED BY	DAT	—	50015					CTC		10617	1011		COURIER DOVERNIGHT
SIGNATURE		TIME	SIGNATURE	TIM		COOLE	K NO.:	-			210	KAGE	LOCAT	ION:		RNAROUND TIME: 24 HOURS
PRINT NAM		_	PRINT NAME			See Lab										48 HOURS LI STANDARD 72 HOURS OTHER
COMPANY		1	COMPANY			for Other Contract Requirements			$I \Box$	12 HOURS VIHER						

Sample No: Method Blank



Lab Sample ID: CP19MB

QC Report No: CP19-Hart Crowser

LIMS ID: 00-24539

Project: Chem Central

Matrix: Water

J-2335-29

Date Sampled: NA

Reported: 12/21/00 UR 12/21/00

Date Received: NA

Date analyzed: 12/20/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number Analyte		<u>.</u>	Value	!
71-43-2	Benzene	,	1.0 U	ľ
108-88-3	Toluene	•	1.0 U	ľ
100-41-4	Ethylbenzene		1.0 U	ľ
	m,p-Xylene		1.0 U	ľ
95-47-6	o-Xylene		1.0 U	ľ

BETX 8020 Surrogate Recovery

Trifluorotoluene 102% Bromobenzene 108%

- U Indicates compound was analyzed for, but not detected at the given detection limit.
- Indicates an estimated value when that result is less than the calculated detection limit.
- Е Indicates a value above the linear range of the detector. Dilution Required
- Indicates no value reported due to saturation of the detector. s
- Indicates the surrogate was diluted out. D
- Found in associated method blank.
- Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- Indicates compound was not analyzed. NA
- NR Indicates no recovery due to interferences.

Sample No: HC-EFF-12/17



Lab Sample ID: CP19A

QC Report No: CP19-Hart Crowser

LIMS ID: 00-24539

Project: Chem Central

Matrix: Water

J-2335-29

Date Sampled: 12/17/00

Date Received: 12/19/00

Data Release Authorized:

Reported: 12/21/00

Date analyzed: 12/20/00

Volume Purged: 5.0 mL

Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	6.8
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	4.8
	m,p-Xylene	28
95-47-6	o-Xylene	6.7

BETX 8020 Surrogate Recovery

Trifluorotoluene 110% Bromobenzene 111%

- Indicates compound was analyzed for, but not detected at the U given detection limit.
- Indicates an estimated value when that result is less than the calculated detection limit.
- Indicates a value above the linear range of the detector. Dilution Required
- S, Indicates no value reported due to saturation of the detector.
- Indicates the surrogate was diluted out. ַתַּ
- Found in associated method blank. В
- Indicates a raised reporting limit due to matrix interferences. Y The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- Indicates no recovery due to interferences.

ORGANICS ANALYSIS DATA SHEET BETX by EPA Method 602M



Lab Sample ID: CP19LCS

LIMS ID: 00-24539

Matrix: Water

QC Report No: CP19-Hart Crowser

Project: Chem Central

J-2335-29

Data Release Authorized:

Reported: 12/21/00

in 12/31/60

LCS/LCSDUPLICATE ANALYSIS

Date Analyzed: 12/20/00

CONSTITUE	ent	SPIKE FOUND	SPIKE ADDED	% REC	% RPD
Lab Conti	rol Sample				
	Benzene	28.2	25.0	113%	
	Toluene	25.6	25.0	102%	
	Ethylbenzene	25.1	25.0	100%	
	m,p-Xylene	50.7	50.0	101%	
	o-Xylene	24.9	25.0	99.6%	
LCDuplica	ate				
	Benzene	25.4	25.0	102%	10.4%
	Toluene	24.9	25.0	99.6%	2.8%
	Ethylbenzene	24.7	25.0	98.8%	1.6%
	m,p-Xylene	50.0	50.0	100%	1.4%
	o-Xylene	24.9	25.0	99.6%	0.0%

BETX SURROGATE REC	LCS	LCSD
Trifluorotoluene	112%	106%
Bromobenzene	111%	109%

Values reported in parts per billion (ug/L)

BETX SPIKE CONTROL LIMITS

Percent Recovery 75-130%

FORM-III



WATER BETX SYSTEM MONITORING COMPOUND SUMMARY

Matrix: Water QC Report No: CP19

LIMS ID	Lab ID	Client ID	TFT	ВВ	TOT OUT
00-24539MB	122000MB	Method Blank	102%	108%	0
00-24539LC	122000LC	Lab Control	112%	111%	0
00-24539LC	DCP19LCD	LCDuplicate	106%	109%	0
00-24539	CP19A	HC-EFF-12/17	110%	111%	0

	MB/LCS	SAMPLE
	QC LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(60-130)	(60-130)
(BB) = Bromobenzene	(60-130)	(60-130)

ADVISORY LIMITS

- # Column to be used to flag recovery values
- * Values outside of required QC limits
- D System Monitoring Compound diluted out

Page 1 for CP19

FORM-II BETX