RCRA REPORT
ADMINISTRATIVE RECORD
ITEM NUMBER
TOTAL NUMBER OF PAGES

WA 2917
1.5.93
8a

PROJECT MEMORANDUM

FILE COPY

DATE: January 5, 1993

TO: Joe Depner, Hydrogeologist

FROM: Nels Cone, Chemist

SUBJECT: DATA VALIDATION OF ANALYTICAL RESULTS FROM PIER 91 RCRA FACILITY INVESTIGATION, PROJECT 624878, DATA SET #7B

On October 1, 1992, soil samples were collected by Burlington Environmental Inc. (Burlington). Samples requesting PCB (EPA SW-846 Method 8080) and total metal analyses (EPA SW-846 Methods 3050, 6010, 7000) were submitted to Burlington Corporate Laboratory. Samples receiving volatile compound (EPA SW-846 Method 8240) analysis were submitted to Analytical Resources Inc. (ARI) of Seattle, Washington. I performed a review of the analytical results on samples CP-118-2-4 and CP-118-6-8.

Properly completed chain-of-custody forms were included, along with documented signatures from field to laboratory receipt. All holding times were clearly written and evaluated according to regulatory protocol (*National Functional Guidelines for Organic Data Review*, USEPA, 1990). Samples were shown as having been properly iced and received in good condition.

All samples received the requested analyses, and laboratory extraction/analysis times met the established guidelines with the exception of PCB analysis for sample CP-118-6-8. As required by regulatory directives this sample is considered as a concentration *estimate* only. Proper data qualifier flags accompanied all other analytical results as needed, and their use is consistent with USEPA guidelines.

For PCB and metal analyses, initial calibration verification (ICV) and continuing calibration verification (CCV) results displayed relative percent differences (RPD) consistently within analytical advisory range. Sample and method blank analyses displayed surrogate recoveries well within required QC limits. Matrix spike analyses and certified control standards (when provided) met the expected accuracy guidelines. Duplicate analyses, when performed, displayed appropriate RPDs and analytical precision.

Overall, the data quality objectives as defined in Table F-2 of the QAPP are met. Accordingly, this data set can be considered valid for its intended use.

NC/rlk/b42:1973b.mem

USEPA RCRA
3012492

42102

Burlington
Environmental

December 22, 1992

Joe Depner
Burlington Environmental Technical Services
7440 West Marginal Way South
Seattle, WA 98108

Project: Pier 91 Drilling, Project #624878, Task 7302
Burlington Environmental Corporate Laboratory Number: 42102

Dear Joe:

Two soil samples for the Pier 91 Drilling Project #624878 were received at our laboratory October 2, 1992. These samples were received in good condition. The samples were analyzed for total metals and PCBs at the Burlington Environmental Corporate Laboratory and Volatiles were anlayzed on the same samples by Analytical Resources Inc (ARI). This ARI sample set (B912) was batched with B858 (Burlington laboratory number 42061). The MS and MSD results from sample set B858 are included here for reference.

All samples were extracted and analyzed within EPA SW-846 required holding times, except for the PCB extraction performed on 42102-2. Analysis dates and extraction dates (as applicable) are included in the metals report and in the report from ARI. The PCBs were extracted and analyzed in batchs. These dates are tabulated below. All PCB surrogates recovered between 50% and 150%.

Laboratory Number(s)	GC Run Number(s)	Date(s) Extracted	Date(s) Analyzed
42102-1	DAFF and DAFG	10/09/92	10/15/92, 10/22/92
42102-2	DAFF and BAJO	10/30/92	11/6/92

All analyses were conducted according to EPA SW-846 Methods specified in the work plan. Additional analytical and quality control information is included in the attached analytical reports.

Sincerely,

Kathy E. Kreps

Kathy E. Kreps
Laboratory Manager
Burlington Environmental Inc.

enclosure

General Laboratory Report

Lab Number : 42102

Plant/Generator Name : BEI Technical Services, Project #624878 Task 7302
Sample Type : Soils; CP-118-2-4 & CP-118-6-8
Date of Receipt : 10/02/92 Analyst: BLW,BB,JLB,DKW
Date of Report : 12/21/92 QC Checked: _____
Parameters for Analysis: Total Metals, PCBs, Volatiles
Outside Lab : ARI Outside Lab Report No: B912

Data:

These two soil samples from the Pier 91 Drilling Project #624878, Task 7302, samples CP-118-2-4 and CP-118-6-8 were analyzed for PCBs and for Total Metals by the Burlington Environmental Corporate Laboratory and for Volatiles by Analytical Resources Inc. Copies of the results are attached.

Comments and Conclusions:

BURLINGTON ENVIRONMENTAL

210 West Sand Bank Road
P.O. Box 330
Columbia, IL 62236-0330
618/281-7173
618/281-5120 FAX

CHAIN-OF-CUSTODY RECORD

C.O.C. SERIAL NO. 6073

PROJECT NAME PIER 91 RFI
PROJECT NUMBER 624878 MAJOR TASK 7300
SAMPLERS J. PEALE
LAB DESTINATION BEI

SAMPLE NO.	DATE	TIME	COMP	GRAB	SAMPLE LOCATION	NO. OF CONTAINERS	TYPE OF ANALYSIS: TOTAL METALS	PCBs	VOCs					PRESERVATIVES: ICED	CHEMICALS ADDED	REMARKS (CHEMICAL ANALYSIS REQUEST FORM NUMBER IF APPLICABLE)
42102-1	10-1	1345		X	CP-118-2-4	2	X	X	X					X		
42102-2	10-1	1500		X	CP-118-6-8	2	X	X	X					X		

RELINQUISHED BY

SIGNATURE	DATE	TIME
J. Peale	10-2	1230

RECEIVED BY

SIGNATURE	DATE	TIME
Kathy Kreps	10/2/92	1230

SHIPPING NOTES

LAB NOTES

BE-34 (1/92)

PCB Laboratory Report

Lab Number : 42102

Plant/Generator Name : / BEI TECHNICAL SERVICES, PJ#624878 TASK73
Sample Type : SOILS
Date of Receipt : 10/02/92 Analyst: BLW,BB,JLB,DKW
Date of Report : 11/25/92 QC Checked: Kathy Kiepes 11/25/92
Outside Lab : NONE Outside Lab Report No:
Number of Samples : 2

Run #	Sample ID	Code Numbers	# Drums in Composite	Aroclor #	Total PCB (ppm)
DAFG60	42102-1	CP-118-2-4		1260	0.16
BAJO74	42102-2	CP-118-6-8		1254, 1260	0.14
DAFF66	B10092-3	BLANK			<0.1
DAFF75	QC1248	QC (ADVISORY RANGE 12-45ppm)		1248	21.
DAFG82	42306-24	V-EML-E-37F-6			<1.0
DAFG83	42306-24	DUPE (RPD=0%)			<1.0
BAJO70		5.0 PPM CCV		1248	5.3
BAJO71		5.0 PPM CCV		1254	5.6
DAFF53		5.0 PPM CCV		1254	4.8
DAFF65		5.0 PPM CCV		1254	5.0
DAFG53		5.0 PPM CCV		1254	5.2
DAFG65		5.0 PPM CCV		1254	4.5

Analyst - Della Kay Wilson

Instruments - Hewlett Packard 5890/5890 Series II G.C.s

Burlington
Environmental

PCB QC Information for Technical Services Projects

Laboratory Number(s)	GC Run Number(s)	Date(s) Extracted	Date(s) Analyzed
42102-1	DAFF72, DAFG60	10/9/92	10/15/92, 10/22/92
-2	DAFF110, BAJ074	10/30/92	11/6/92

Note any surrogate recoveries outside of 50 - 150% below:

Laboratory Number(s)	Surrogate Used	Surrogate Recovery
	TCMX or 5-BAC	
	TCMX or 5-BAC	
	TCMX or 5-BAC	
	TCMX or 5-BAC	
	TCMX or 5-BAC	
	TCMX or 5-BAC	
	TCMX or 5-BAC	
	TCMX or 5-BAC	
	TCMX or 5-BAC	

Metals Laboratory Report

Lab Number : 42102

Plant/Generator Name : BEI TECHNICAL SERVICES, PJ#624878 TASK7302
Sample Type : SOILS
Date of Receipt : 10/02/92 Analyst: BLW, BB, JLB
Date of Report : 11/05/92 QC Checked: JLB 11/05/92
Parameters for Analysis: TOTAL METALS
Outside Lab : NONE Outside Lab Report No:

METALS BY SW-846 3050, 6010, 7000.

Metals:	42102-1 CP-118-2-4	42102-2 CP-118-6-8	METHOD BLANK IN MG/L
Silver	<0.42	<0.38	<0.010
Arsenic	1.0	1.3	<0.010
Barium	14.4	22.0	<0.20
Beryllium	<0.21	0.37	<0.005
Cadmium	<0.21	0.22	<0.005
Chromium	12.4	26.0	<0.010
Copper	5.2	12.9	<0.025
Mercury	<0.019	<0.019	<0.0002
Nickel	18.6	27.5	<0.040
Lead	5.6	32.1	<0.003
Selenium	<0.42	<0.40	<0.005
Zinc	18.9	38.9	<0.020
Dry Weight	90.8%	90.1%	

Comments and Conclusions:

RESULTS ARE REPORTED AS MG/KG DRY WEIGHT.
DATES ANALYSED:10/3/92, 10/20/92, 10/21/92, 10/22/92.
MERCURY ANALYSED: 10/21/92.

Metals Laboratory Report

Lab Number : 42102

Plant/Generator Name : BEI TECHNICAL SERVICES, PJ#624878 TASK7302
Sample Type : SOILS
Date of Receipt : 10/02/92 Analyst: BLW, BB, JLB
Date of Report : 11/05/92 QC Checked: 11/5/92
Parameters for Analysis: TOTAL METALS
Outside Lab : NONE Outside Lab Report No:

METALS BY SW-846 3050, 6010, 7000.

Metals:	42102-1 MS % RECOVERY	42102-1 MSD % RECOVERY
Silver	66.7	69.5
Arsenic	80.2	75.6
Barium	93.8	93.1
Beryllium	101.4	102.0
Cadmium	98.1	96.6
Chromium	98.8	87.3
Copper	88.6	92.2
Mercury	75.6	90.6
Nickel	90.0	89.7
Lead	81.0	85.2
Selenium	31.9	30.2
Zinc	84.3	89.2

Comments and Conclusions:

RESULTS ARE REPORTED AS % RECOVERY.

Metals Laboratory Report

Lab Number : 42102Q

Plant/Generator Name : PIER 91 DRILLING PROJECT #624878 TASK 7302
Sample Type : SOILS
Date of Receipt : 10/02/92 Analyst: BLW, BB, JLB
Date of Report : 11/05/92 QC Checked: BRB 11/5/92
Parameters for Analysis: TOTAL METALS
Outside Lab : NONE Outside Lab Report No:

METALS BY SW-846 3050, 6010, 7000.

Metals:	% RECOVERY ICV	CCV	CCV	CCV
Silver		100.5	100.2	
Arsenic	104.4	101.6	100.0	94.4
Barium		102.6	101.9	
Beryllium		101.0	102.1	
Cadmium		104.9	108.0	
Chromium		104.1	104.9	
Copper		100.1	100.5	
Nickel		103.6	106.5	
Lead		102.4	103.9	
Selenium	95.0	104.4	96.0	92.4
Zinc		99.2	100.4	

Comments and Conclusions:

RESULTS ARE PERCENT RECOVERY.
SAMPLES DIGESTED AND RUN WITH LAB #42061.

BURLINGTON ENVIRONMENTAL

210 West Sand Bank Road
P.O. Box 330
Columbia, IL 62236-0330
618/281-7173
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CHAIN-OF-CUSTODY RECORD

C.O.C. SERIAL NO. 107

PROJECT NAME PIER 9 RFI
PROJECT NUMBER 624878 MAJOR TASK 7302
SAMPLERS J. PEALS
LAB DESTINATION BET

SAMPLE NO.	DATE	TIME	COMP	GRAB	SAMPLE LOCATION	NO. OF CONTAINERS	TYPE OF ANALYSIS: TOTAL METALS	PCBs	VOCs					PRESERVATIVES: ICED	CHEMICALS ADDED	REMARKS (CHEMICAL ANALYSIS REQUEST FORM NUMBER IF APPLICABLE)
42102-1	10-1	1345		X	CP-118-2-4	2	X	X	X					X		
42102-2	10-1	1500		X	CP-118-6-8	2	X	X	X					X		

RELINQUISHED BY SIGNATURE	DATE	TIME	RECEIVED BY SIGNATURE	DATE	TIME
[signature]	10-2	1230	Kathy Kreps	10/2/92	1230

SHIPPING NOTES

LAB NOTES

BE-34 (1/92)

10/13 4-21-02 SOILS ~~LCP~~ GFAA, CV

LAB# 10/20-21-22 DATE(S) ANALIZED:

MG/KG DRY WT DIG run w/ 42061

ANALYTE	PBS46	%R	-1	-2		%R MS	%R MSD			
Ag 2			<0.42	<0.38		66.7	69.5			
As 3	19.7	131.3	1.0	1.3		80.2	75.6			
4										
Ba 5			14.4	22.0		93.8	93.1			
6										
Be 7			<0.21	0.37		101.4	102.0			
8										
Cd 9			<0.21	0.72		98.1	96.6			
10										
Cr 11			13.4	26.0		98.8	87.3			
12										
Cu 13			5.2	12.9		88.6	92.2			
14										
Ni 15			18.6	27.5		90.0	89.7			
16										
Pb 17			5.6	32.1		81.0	85.2			
18										
Se 19	84.5	92.9	<0.42	<0.40		31.9	30.2			
20										
Zn 21			18.9	38.9		84.3	89.2			
22	003-50									
Hg 23	4.87	81.2	<0.019	<0.019		75.6	90.6			
24										
%TS 25			90.8	90.1						
26			91.8							
27										
28										
29										
30										
31										

AMPAD EFFICIENCY LINE 22-206

DATE: 10/13/92

LAB# H2102

0/42061

ICP QC (ICV, CCV)

ANALYST JWB

UNITS: % Recovery

ANALYTE	ICV	CCV	3 ICV	4 CCV	5	6	7	8	9
Ag	100.5	100.2							
As	101.6	100.0	104.4	94.4					
Ba	102.6	101.9							
Be	101.0	102.1							
Cd	104.9	108.0							
Cr	104.1	104.9							
Cu	100.1	100.5							
Ni	103.6	106.5							
Pb	102.4	103.9							
Se	104.4	96.0	95.0	92.4					
Zn	99.2	100.4							

AMPAD EFFICIENCY LINE 22-206

GFAA

10/20
10/21
10/22

RESULTS IN Mg/L
IN SOLUTION
LAB # 42102

PB + PPS-46 ARE FROM 42061 GROUP

	1 DB	2 PPS-46	342102-1	4 -1MS	5 1-MSD	6 2	7	8	9	
As 1	<10.0 ~~<0.010~~	110.3	24.56	57.0	55.56	32.88				
2										
Se 3	<5.0	473.3	x2 <	3.19	3.03	x2 <				
4										
FACTOR		178.57	42.37	41.67	40.98	39.68				
6										
7										
8										
9										
10			RESULTS ARE IN Mg/Kg							
11			DRY Wt.							
12										
13	PPS-46	T.V.	42102-1	-1MS	ADD	%R	1MSD	ADD	%R	-2
As 14	19.70	15.0	1.04	2.38	1.67	80.2%	2.28	1.64	75.6%	1.30
15										
Se 16	84.52	91.0	<0.42 ~~<0.21~~	0.133	0.417	31.9%	0.124	0.4098	30.2%	<0.40 ~~<0.2~~
17										
18										
19										
20				IN	ug/L					
21		As				Se				
22	ICV	104.38	TV = 100.0		ICV	13.28	TV = 14.0			
23	CCV	25.41			CCV	26.07				
24		25.00				24.02				
25		23.56				23.14				
26										
27										
28										
29										
30										
31										

AMPAD EFFICIENCY LINE 22-206

10/13/92

File 91
C/2102
mg/kg Dry/wt.

	1	2	3 MS	4 ADDED	5	6	7 MSD	8 ADDED	9	10
Ag	<0.42		1.40	2.10	66.7		1.41	2.03	69.5	<0.38
As										
Be	14.4		93.2	84.0	93.8		90.1	81.3	93.1 ~~102.0~~	22.0
Se	<0.21		2.13	2.10	101.4		2.07	2.03	102.0	0.37
Cd	<0.21		2.06	2.10	98.1		1.96	2.03	96.6	0.22
Cr	12.4		20.7	8.4	98.8		19.5	8.13	87.3	26.0
Cu	5.2		14.5	10.5	88.6		14.6	10.16	92.2	12.9
Hg										
Ni	18.6		37.5	21.0	90.0		36.8	20.3	89.7	27.5
Pb	5.6		22.6	21.0	81.0		22.9	20.3	85.2	32.1
Se										
Zn	18.9		36.6	21.0	81.3		37.0	20.3	89.2	38.9

Pier 91 SOILS
42102
mg/L in digest

dig. w/ 42061

	CCV	2-1	2-1MS	4	5	6-1MSD	7	8	9-2	CCV
Ag 1	100.5	<	.0334			.0346			<	100.2
2										
As 3										
4										
Ba 5	102.6	.3399	2.217			2.217			.5776	101.9
6										
Be 7	101.0	<	.0507			.0508			.0097	102.1
8										
Cd 9	101.9	<	.0490			.0483			.0057	108.0
10										
Cr 11	104.1	.2921	.4935			.4807			.6818	104.9
12										
Cu 13	100.1	.1231	.3453			.3591			.3370	100.5
14										
Hg 15										
16										
Ni 17	103.6	.4389	.8916			.9045			.7217	106.5
18										
Pb 19	102.4	.1333	.5368			.5639			.8405	103.9
20										
Se 21										
22										
Zn 23	99.2	.4463	.8709			.9104			1.018	100.4
24										
Dry factor 25		42.37	42.02			40.65			38.17	
26										
27										
28										
29										
30										
31										

AMPAD EFFICIENCY LINE 12-206

06 November 1992

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

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

Kathy Kreps
Burlington Environmental
2203 Airport Way South
Suite 400
Seattle, WA 98134

RE: Client Project: 624878, Pier 91;
ARI Job #B912

Dear Kathy:

Please find enclosed the results for the above referenced project. Your sample was received in good condition with no discrepancies in the paperwork. Analysis proceeded without incident. Please note that because the samples had to be run at medium levels, the 0.7 detection level for Tetrachloroethene was not met. This data is batched with ARI job # B858. I have enclosed a copy of the B858 ms and msd in this package.

All raw data and a copy of this report will be kept on file by ARI should you need any further information regarding this project.

If you have any questions, please feel free to contact me at any time. You can reach me directly by calling 340-2866, ext. #118.

Sincerely,

ANALYTICAL RESOURCES, INC.

Suzanne Kitch

Suzanne Kitch
Project Coordinator

enclosures

cc: file B912

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
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ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Lab ID: B912D2
Matrix: Soils/Sediments

Data Release Authorized:
Report: 11/04/92 MAC:D sk

Sample: 42102-2

QC Report No: B912 - Burlington
Project: Pier 91

VTSR: 10/07/92

Instrument: FINN 1
Date Analyzed: 10/13/92

Amount Analyzed: 0.037 gm (Dry Weight)
Percent Moisture: 10.3%

CAS Number		µg/Kg
74-87-3	Chloromethane	270 U
74-83-9	Bromomethane	270 U
75-01-4	Vinyl Chloride	270 U
75-00-3	Chloroethane	270 U
75-09-2	Methylene Chloride	270 U
67-64-1	Acetone	680 U
75-15-0	Carbon Disulfide	140 U
75-35-4	1,1-Dichloroethene	140 U
75-34-3	1,1-Dichloroethane	140 U
156-60-5	Trans-1,2-Dichloroethene	140 U
156-59-2	Cis-1,2-Dichloroethene	140 U
67-66-3	Chloroform	140 U
107-06-2	1,2-Dichloroethane	140 U
78-93-3	2-Butanone	680 U
71-55-6	1,1,1-Trichloroethane	140 U
56-23-5	Carbon Tetrachloride	140 U
108-05-4	Vinyl Acetate	140 U
75-27-4	Bromodichloromethane	140 U
78-87-5	1,2-Dichloropropane	140 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	140 U
79-01-6	Trichloroethene	140 U
124-48-1	Dibromochloromethane	140 U
79-00-5	1,1,2-Trichloroethane	140 U
71-43-2	Benzene	140 U
10061-02-6	trans-1,3-Dichloropropene	140 U
110-75-8	2-Chloroethylvinylether	140 U
75-25-2	Bromoform	140 U
108-10-1	4-Methyl-2-Pentanone	680 U
591-78-6	2-Hexanone	680 U
127-18-4	Tetrachloroethene	140 U
79-34-5	1,1,2,2-Tetrachloroethane	140 U
108-88-3	Toluene	140 U
108-90-7	Chlorobenzene	140 U
100-41-4	Ethylbenzene	140 U
100-42-5	Styrene	140 U
1330-20-7	**Total Xylenes**	**520 M**
75-69-4	Trichlorofluoromethane	270 U
76-13-1	1,1,2-Trichlorotrifluoroethane	270 U

Surrogate Recoveries

d8-Toluene	92.3%
Bromofluorobenzene	98.0%
d4-1,2-Dichloroethane	95.2%

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
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 Purge & Trap GC/MS

Lab ID: B912E
Matrix: Soils/Sediments

Data Release Authorized:
Report: 11/04/92 MAC:D sk

Sample: 42102-1

QC Report No: B912 - Burlington
Project: Pier 91

VTSR: 10/07/92

Instrument: FINN 1
Date Analyzed: 10/13/92

Amount Analyzed: 0.038 gm (Dry Weight)
Percent Moisture: 7.6%

CAS Number		µg/Kg
74-87-3	Chloromethane	260 U
74-83-9	Bromomethane	260 U
75-01-4	Vinyl Chloride	260 U
75-00-3	Chloroethane	260 U
75-09-2	Methylene Chloride	260 U
67-64-1	Acetone	660 U
75-15-0	Carbon Disulfide	130 U
75-35-4	1,1-Dichloroethene	130 U
75-34-3	1,1-Dichloroethane	130 U
156-60-5	Trans-1,2-Dichloroethene	130 U
156-59-2	Cis-1,2-Dichloroethene	130 U
67-66-3	Chloroform	130 U
107-06-2	1,2-Dichloroethane	130 U
78-93-3	2-Butanone	660 U
71-55-6	1,1,1-Trichloroethane	130 U
56-23-5	Carbon Tetrachloride	130 U
108-05-4	Vinyl Acetate	130 U
75-27-4	Bromodichloromethane	130 U
78-87-5	1,2-Dichloropropane	130 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	130 U
79-01-6	Trichloroethene	130 U
124-48-1	Dibromochloromethane	130 U
79-00-5	1,1,2-Trichloroethane	130 U
71-43-2	Benzene	130 U
10061-02-6	trans-1,3-Dichloropropene	130 U
110-75-8	2-Chloroethylvinylether	130 U
75-25-2	Bromoform	130 U
108-10-1	4-Methyl-2-Pentanone	660 U
591-78-6	2-Hexanone	660 U
127-18-4	Tetrachloroethene	130 U
79-34-5	1,1,2,2-Tetrachloroethane	130 U
108-88-3	**Toluene**	**130 M**
108-90-7	Chlorobenzene	130 U
100-41-4	**Ethylbenzene**	**1900**
100-42-5	Styrene	130 U
1330-20-7	**Total Xylenes**	**6700**
75-69-4	Trichlorofluoromethane	260 U
76-13-1	1,1,2-Trichlorotrifluoroethane	260 U

Surrogate Recoveries

d8-Toluene	94.6%
Bromofluorobenzene	98.9%
d4-1,2-Dichloroethane	92.6%

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.

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Consultants

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

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Lab ID: 1013mb
Matrix: Soils/Sediments

Data Release Authorized:
Report: 11/04/92 MAC:D sk

Sample: Method Blank

QC Report No: B912 - Burlington
Project: Pier 91

VTSR: NA

Instrument: FINN 1
Date Analyzed: 10/13/92

Amount Analyzed: 0.05 gm (Dry Weight Equivalent)
Percent Moisture: NA

CAS Number		µg/Kg
74-87-3	Chloromethane	200 U
74-83-9	Bromomethane	200 U
75-01-4	Vinyl Chloride	200 U
75-00-3	Chloroethane	200 U
75-09-2	Methylene Chloride	200 U
67-64-1	Acetone	500 U
75-15-0	Carbon Disulfide	100 U
75-35-4	1,1-Dichloroethene	100 U
75-34-3	1,1-Dichloroethane	100 U
156-60-5	Trans-1,2-Dichloroethene	100 U
156-59-2	Cis-1,2-Dichloroethene	100 U
67-66-3	Chloroform	100 U
107-06-2	1,2-Dichloroethane	100 U
78-93-3	2-Butanone	500 U
71-55-6	1,1,1-Trichloroethane	100 U
56-23-5	Carbon Tetrachloride	100 U
108-05-4	Vinyl Acetate	100 U
75-27-4	Bromodichloromethane	100 U
78-87-5	1,2-Dichloropropane	100 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	100 U
79-01-6	Trichloroethene	100 U
124-48-1	Dibromochloromethane	100 U
79-00-5	1,1,2-Trichloroethane	100 U
71-43-2	Benzene	100 U
10061-02-6	trans-1,3-Dichloropropene	100 U
110-75-8	2-Chloroethylvinylether	100 U
75-25-2	Bromoform	100 U
108-10-1	4-Methyl-2-Pentanone	500 U
591-78-6	2-Hexanone	500 U
127-18-4	Tetrachloroethene	100 U
79-34-5	1,1,2,2-Tetrachloroethane	100 U
108-88-3	Toluene	100 U
108-90-7	Chlorobenzene	100 U
100-41-4	Ethylbenzene	100 U
100-42-5	Styrene	100 U
1330-20-7	Total Xylenes	200 U
75-69-4	Trichlorofluoromethane	200 U
76-13-1	1,1,2-Trichlorotrifluoroethane	200 U

Surrogate Recoveries

d8-Toluene	102%
Bromofluorobenzene	103%
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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Seattle, WA 98109-5187
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(206) 621-7523 (FAX)

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Lab ID: B858B
Matrix: Soils/Sediments

Data Release Authorized:
Report: 10/27/92 MAC:X jjr

Sample: 42061-2

QC Report No: B858 - Burlington Env.
Project: 624878
Pier 91
VTSR: 10/01/92

Instrument: FINN 1
Date Analyzed: 10/02/92

Amount Analyzed: 0.036 gm (Dry Weight)
Percent Moisture: 13.8%

CAS Number		µg/Kg
74-87-3	Chloromethane	280 U
74-83-9	Bromomethane	280 U
75-01-4	Vinyl Chloride	280 U
75-00-3	Chloroethane	280 U
75-09-2	Methylene Chloride	370 B
67-64-1	Acetone	690 U
75-15-0	Carbon Disulfide	140 U
75-35-4	1,1-Dichloroethene	140 U
75-34-3	1,1-Dichloroethane	350
156-60-5	Trans-1,2-Dichloroethene	140 U
156-59-2	Cis-1,2-Dichloroethene	140 U
67-66-3	Chloroform	140 U
107-06-2	1,2-Dichloroethane	140 U
78-93-3	2-Butanone	2900 UJ
71-55-6	1,1,1-Trichloroethane	140 U
56-23-5	Carbon Tetrachloride	140 U
108-05-4	Vinyl Acetate	140 U
75-27-4	Bromodichloromethane	140 U
78-87-5	1,2-Dichloropropane	140 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	140 U
79-01-6	Trichloroethene	140 U
124-48-1	Dibromochloromethane	140 U
79-00-5	1,1,2-Trichloroethane	140 U
71-43-2	Benzene	320
10061-02-6	trans-1,3-Dichloropropene	140 U
110-75-8	2-Chloroethylvinylether	140 U
75-25-2	Bromoform	140 U
108-10-1	4-Methyl-2-Pentanone	690 U
591-78-6	2-Hexanone	690 U
127-18-4	Tetrachloroethene	740
79-34-5	1,1,2,2-Tetrachloroethane	140 U
108-88-3	Toluene	9500
108-90-7	Chlorobenzene	280 UJ
100-41-4	Ethylbenzene	2900
100-42-5	Styrene	420 UJ
1330-20-7	Total Xylenes	20000
75-69-4	Trichlorofluoromethane	280 U
76-13-1	1,1,2-Trichlorotrifluoroethane	950

Surrogate Recoveries

d8-Toluene	84.4%
Bromofluorobenzene	90.7%
d4-1,2-Dichloroethane	84.1%

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 Purge & Trap GC/MS

Lab ID: B858Bms
Matrix: Soils/Sediments

Sample: 42061-2
Matrix Spike
QC Report No: B858 - Burlington Env.
Project: 624878
Pier 91
VTSR: 10/01/92

Data Release Authorized:
Report: 10/27/92 MAC:X jjr

Instrument: FINN 1
Date Analyzed: 10/02/92

Amount Analyzed: 0.034 gm (Dry Weight)
Percent Moisture: 13.8%

CAS Number		µg/Kg
74-87-3	Chloromethane	290 U
74-83-9	Bromomethane	290 U
75-01-4	Vinyl Chloride	290 U
75-00-3	Chloroethane	290 U
75-09-2	Methylene Chloride	290 U
67-64-1	Acetone	730 U
75-15-0	Carbon Disulfide	150 U
75-35-4	1,1-Dichloroethene	-
75-34-3	**1,1-Dichloroethane**	**270**
156-60-5	Trans-1,2-Dichloroethene	150 U
156-59-2	Cis-1,2-Dichloroethene	150 U
67-66-3	Chloroform	150 U
107-06-2	1,2-Dichloroethane	150 U
78-93-3	2-Butanone	1800 UJ
71-55-6	1,1,1-Trichloroethane	150 U
56-23-5	Carbon Tetrachloride	150 U
108-05-4	Vinyl Acetate	150 U
75-27-4	Bromodichloromethane	150 U
78-87-5	1,2-Dichloropropane	150 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	150 U
79-01-6	Trichloroethene	-
124-48-1	Dibromochloromethane	150 U
79-00-5	1,1,2-Trichloroethane	150 U
71-43-2	Benzene	-
10061-02-6	trans-1,3-Dichloropropene	150 U
110-75-8	2-Chloroethylvinylether	150 U
75-25-2	Bromoform	150 U
108-10-1	4-Methyl-2-Pentanone	730 U
591-78-6	2-Hexanone	730 U
127-18-4	**Tetrachloroethene**	**890**
79-34-5	1,1,2,2-Tetrachloroethane	150 U
108-88-3	Toluene	-
108-90-7	Chlorobenzene	-
100-41-4	**Ethylbenzene**	**2500**
100-42-5	Styrene	440 UJ
1330-20-7	**Total Xylenes**	**18000**
75-69-4	Trichlorofluoromethane	290 U
76-13-1	**1,1,2-Trichlorotrifluoroethane**	**700**

Surrogate Recoveries

d8-Toluene	86.1%
Bromofluorobenzene	93.1%
d4-1,2-Dichloroethane	84.9%

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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(206) 621-7523 (FAX)

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Lab ID: B858Bmsd
Matrix: Soils/Sediments

Sample: 42061-2
Matrix Spike Dup.
QC Report No: B858 - Burlington Env.
Project: 624878
Pier 91
VTSR: 10/01/92

Data Release Authorized:
Report: 10/27/92 MAC:X jjr

Instrument: FINN 1
Date Analyzed: 10/02/92

Amount Analyzed: 0.036 gm (Dry Weight)
Percent Moisture: 13.8%

CAS Number		µg/Kg
74-87-3	Chloromethane	280 U
74-83-9	Bromomethane	280 U
75-01-4	Vinyl Chloride	280 U
75-00-3	Chloroethane	280 U
75-09-2	**Methylene Chloride**	**450 B**
67-64-1	Acetone	700 U
75-15-0	Carbon Disulfide	140 U
75-35-4	1,1-Dichloroethene	-
75-34-3	**1,1-Dichloroethane**	**320**
156-60-5	Trans-1,2-Dichloroethene	140 U
156-59-2	Cis-1,2-Dichloroethene	140 U
67-66-3	Chloroform	140 U
107-06-2	1,2-Dichloroethane	140 U
78-93-3	2-Butanone	2500 UJ
71-55-6	1,1,1-Trichloroethane	140 U
56-23-5	Carbon Tetrachloride	140 U
108-05-4	Vinyl Acetate	140 U
75-27-4	Bromodichloromethane	140 U
78-87-5	1,2-Dichloropropane	140 U

CAS Number		µg/Kg
10061-01-5	cis-1,3-Dichloropropene	140 U
79-01-6	Trichloroethene	-
124-48-1	Dibromochloromethane	140 U
79-00-5	1,1,2-Trichloroethane	140 U
71-43-2	Benzene	-
10061-02-6	trans-1,3-Dichloropropene	140 U
110-75-8	2-Chloroethylvinylether	140 U
75-25-2	Bromoform	140 U
108-10-1	4-Methyl-2-Pentanone	700 U
591-78-6	2-Hexanone	700 U
127-18-4	**Tetrachloroethene**	**790**
79-34-5	1,1,2,2-Tetrachloroethane	140 U
108-88-3	Toluene	-
108-90-7	Chlorobenzene	-
100-41-4	**Ethylbenzene**	**2700**
100-42-5	Styrene	420 UJ
1330-20-7	**Total Xylenes**	**19000**
75-69-4	Trichlorofluoromethane	280 U
76-13-1	**1,1,2-Trichlorotrifluoroethane**	**870**

Surrogate Recoveries

d8-Toluene	85.1%
Bromofluorobenzene	91.5%
d4-1,2-Dichloroethane	85.7%

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)

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

ARI Job No: B858

Client: Burlington Env.
Project: 624878

Sample No: 42061-2

COMPOUND	SPIKE ADDED (µg/Kg)	SAMPLE CONC (µg/Kg)	MS CONC (µg/Kg)	MS % REC	QC LIMITS REC
1,1-Dichloroethene	7350	0	11000	150	59-172
Trichloroethene	7350	0	8280	113	62-137
Benzene	7350	324	8490	111	66-142
Toluene	7350	9490	16400	94.0	59-139
Chlorobenzene	7350	0	8490	116	60-133

COMPOUND	SPIKE ADDED (µg/Kg)	MSD CONC (µg/Kg)	MSD % REC	% RPD	Q C LIMITS RPD	Q C LIMITS REC
1,1-Dichloroethene	6940	10000	144	4.1	22	59-172
Trichloroethene	6940	7700	111	1.8	24	62-137
Benzene	6940	8040	111	0.0	21	66-142
Toluene	6940	16400	99.6	-5.8	21	59-139
Chlorobenzene	6940	7760	112	3.5	21	60-133

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

Asterisked values outside QC Limits

Comments: *QC Limits taken from CLP OLM01.6 (June 1991)*

DBP

Report prepared: *10/27/92 MAC:X jjr*

FORM III VOA-2

BURLINGTON ENVIRONMENTAL
2203 Airport Way South, Suite 400
Seattle, WA 98134
206-223-0500 • FAX: 223-7791

Chain of Custody/ Laboratory Analysis Request

DATE 10-7-92 PAGE 1 OF 1

PROJECT P91 #624878
CLIENT INFO CONTACT K. KRIEPS
CHEMPRO DIVISION/GENERATOR NAME
TELEPHONE # 223-7797
SAMPLERS NAME PHONE #
SAMPLERS SIGNATURE

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	PCB's 608/8080	TPH (circle method) 418.1 or 8015	BETX (circle method) 8240 or 8020	F-LISTED SOLVENTS 8240	TCLP F-LISTED SOLVENTS 1311/8240	TCLP METALS D004-11	METALS (TOTAL) As. Ba. Cd. Cr. Cu. Pb. Ni. Hg. Ag. Se. Tl. Sb. Zn	TCLP ORGANICS (specify methods) • VOA's 8240 • BNA's 8270 • Pesticides 8080 • Herbicides 8150	DISCHARGE TESTING	OTHER (Specify)						NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1 CP-116-2-4	10-5	945	42153-1	soil		X																1	
2 CP-116-6-8	10-5	1045	42153-2	soil		X																1	
CP-916-6-8	10-5	1045	42153-3	soil		X																1	
4.																							
5																							
6																							
7.																							
8.																							

Relinquished By	Relinquished By	Relinquished By
T. Clous		
Signature T. Clous	Signature	Signature
Printed Name BET	Printed Name	Printed Name
Firm 10-7-92 10:25	Firm	Firm
Date/Time	Date/Time	Date/Time

Received By	Received By	Received By
Jan Felkins		
Signature JAN FELKINS	Signature	Signature
Printed Name HAIRE	Printed Name	Printed Name
Firm 10/7/92 13:00	Firm	Firm
Date/Time	Date/Time	Date/Time

SPECIAL INSTRUCTIONS/COMMENTS:

P91 project levels

Cooler Temp. 12°C

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

(LAB-200 Rev. 10.90)

BURLINGTON ENVIRONMENTAL
2203 Airport Way South, Suite 400
Seattle, WA 98134
206-223-0500 • FAX: 223-7791

Chain of Custody/ Laboratory Analysis Request

DATE 10-7-92 PAGE 1 OF 1

PROJECT Pier 91 # 624878
CLIENT INFO. CONTACT K. Kreps
CHLMPRO DIVISION/GENERATOR NAME
TELEPHONE # 223-7791
SAMPLERS NAME PHONE #
SAMPLERS SIGNATURE

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS:625/8270	VOLATILE ORGANICS GC/MS:624/8240	PCB's 608/8080	TPH (circle method) 418.1 or 8015	BETX (circle method) 8240 or 8020	F-LISTED SOLVENTS 8240	TCLP F-LISTED SOLVENTS 1311:8240	TCLP METALS D004-11	METALS (TOTAL) As. Ba. Cd. Cr. Cu. Pb. Ni. Hg. Ag. Se. Tl. Sb. Zn	TCLP ORGANICS (specify methods) • VOA's 8240 • BNA's 8270 • Pesticides 8080 • Herbicides 8150	DISCHARGE TESTING	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1 CP-118-2-4	10-1	1345	421024	Soil		X											1	
2 CP-118-6-8	10-1	1500	42102-2	Soil		X											1	
3.																		
4.																		
5																		
6.																		
7.																		
8																		

Relinquished By	Relinquished By	Relinquished By
Signature T. Clous	Signature	Signature
Printed Name BEP	Printed Name	Printed Name
Firm 10-7-92 10:25	Firm	Firm
Date/Time	Date/Time	Date/Time

Received By	Received By	Received By
Signature Jan Fellkins	Signature	Signature
Printed Name JRI	Printed Name	Printed Name
Firm 10/7/92 13:00	Firm	Firm
Date/Time	Date/Time	Date/Time

SPECIAL INSTRUCTIONS/COMMENTS:

P91 Projects levels

cooler temp. 12°C

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

(LAB-200 Rev. 10/90)

B.R.I. # 8917

BURLINGTON ENVIRONMENTAL
2203 Airport Way South, Suite 400
Seattle, WA 98134
206-223-0500 • FAX: 223-7791

Chain of Custody/ Laboratory Analysis Request

DATE 10-7-92 PAGE 1 OF 1

PROJECT Pier 91 # 624878
CLIENT INFO. CONTACT K. Kreps
CHEMPRO DIVISION/GENERATOR NAME
TELEPHONE # 223-7791
SAMPLERS NAME PHONE #
SAMPLERS SIGNATURE

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	PCB's 608/8080	TPH (circle method) 418.1 or 8015	BETX (circle method) 8240 or 8020	F-LISTED SOLVENTS 8240	TCLP F-LISTED SOLVENTS 1311/8240	TCLP METALS D004-11	METALS (TOTAL) As, Ba, Cd, Cr, Cu, Pb, Ni, Hg, Ag, Se, Tl, Sb, Zn	TCLP ORGANICS (specify methods) • VOA's 8240 • BNA's 8270 • Pesticides 8080 • Herbicides 8150	DISCHARGE TESTING	OTHER (Specify)						NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. CP-118-2-4	10-1	1345	42102-1	Soil		X																1	
2. CP-118-6-8	10-1	1500	42102-2	Soil		X																1	
3.																							
4.																							
5.																							
6.																							
7.																							
8.																							

Relinquished By	Relinquished By	Relinquished By
Signature T. Claus	Signature	Signature
Printed Name BEI	Printed Name	Printed Name
Firm 10-7-92 10:25	Firm	Firm
Date/Time	Date/Time	Date/Time
Received By	**Received By**	**Received By**
Signature	Signature	Signature
Printed Name	Printed Name	Printed Name
Firm	Firm	Firm
Date/Time	Date/Time	Date/Time

SPECIAL INSTRUCTIONS/COMMENTS:

P91 Projects levels

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

(LAB-200 Rev. 10/90)

Client: Burlington Env.	Project #:	
	Project: Pier 91	
Client Contact: Kathy Krepo	PO#:	Logged in by: Shelby

Sample Acknowledgement

Page 1 of 1

ARI Job Number: B912	
VTSR: 10/7/92	Turn-Around: 11/7/92
	Requested TA:

Billing Address: Burl. ENV.

Date of Transmittal: 10/12/92

Time: 14:53

Addressee: Kathy Krepo

Company: Burl. ENV.

Fax No:

Phone No:

Analytical Resources, Inc.
(206) 621-6490
(206) 621-7523 - fax

Following is a list of samples received and logged in at ARI:
Please verify information listed.
If there are discrepancies, contact ARI Lab Contact.

ARI Lab Contact: Suzanne Kotch
(Please call this person with questions.)

	SMO/CLIENT SAMPLE ID:	ARI ID NO	Sample Matrix	#Bottles per sample
1	42153-1	A	Soil	1-2oz.gl. ~~1-4oz tnll gl~~
2	-2	B		
3	-3	C		1-2oz.gl.
4	42102-2	D		1-4oz.tnll/gl
5	-1	E		
6				
7				
8				
9				
10				

NO Samples	Matrix	Parameter	Meth No	Estimated Cost Per Sample	Estimated Extended Costs
5	H2O	VOA	8240	200.00	1000.00
				TOTAL	$1000.00

THIS IS NOT AN INVOICE

ARI 06/1/90

NOTE Unless arrangements for storage/archiving are made for this project, water samples will be disposed of 60 days (VOA waters 30 day's) after sample receipt. (Opened volatile waters will be disposed of after analysis). Soil samples will be disposed of 90 days after sample receipt (VOA soils will be 60 days).