



Car Wash Enterprise
15th W

4938

DATE: May 26, 1998

TOSCO MARKETING COMPANY QUARTERLY REPORT

Site No.: 5516 Address: 1800 15th Avenue West, Seattle (15th)
Tosco Environmental Manager: Mr. Timothy Johnson
Consulting Co./Contact Person: Shannon & Wilson, Inc., Mr. Michael Moore
Consultant Project No.: T-1488-12
Primary Agency/Regulatory ID No.: Washington Department of Ecology, LUST Incidence # 4938
Other Parties to Receive Copies: Mr. Victor Odermat, Car Wash Enterprises 15th W
Mr. Ben Amoah-Forsen, Ecology

RECEIVED

AUG 25 1998

DEPT. OF ECOLOGY

WORK PERFORMED THIS QUARTER [First - 1998]:

- On February 24, 1998, groundwater samples were collected from MW-6, -7, -8, and -10 (Figure 2). Samples were submitted to Columbia Analytical Services for WTPH-G/BTEX analysis.
- A monthly operations and maintenance (O&M) visit was conducted on March 4, 1998. Data collected included vapor extraction system and dilution flowrates, and FID and PID readings from the cat-ox inlet and outlet (stack) and the individual vapor lines.

WORK PROPOSED FOR NEXT QUARTER [Second - 1998]:

- Collect groundwater samples from MW-6, -7, -8, and -10 in May 1998 for WTPH-G/BTEX analysis.
- Continue monthly remediation system monitoring.

Current Phase of Project:	Monitoring/Remediation (pending)
Frequency of Sampling:	Quarterly
Frequency of Monitoring:	Quarterly (GW)/Monthly (O&M, pending)
Are LPH Present On-site:	No
Cumulative LPH Recovered to Date:	
LPH recovered This Quarter:	
Bulk Soil Removed to Date:	
Bulk Soil Removed This Quarter:	
Water Wells or Surface Waters w/in a 1000'	
Radius & Their Respective Directions (if known):	
Current Remediation Techniques:	
Permits for Discharge:	
Approximate Depth to Groundwater	Ranges from 6.01 to 6.51 feet bgs
Groundwater Gradient:	Southwest, 0.005 ft/ft
Maximum TPH-G/Benzene Concentrations:	1,200/60.0 µg/L (MW-7)

Discussion:

Contaminant concentrations in MW-6 remain below Washington Model Toxics Control Act (MTCA) Method A cleanup criteria. Gasoline-range hydrocarbon and benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations in MW-7 remain similar to previous sampling events, with most constituents above MTCA Method A cleanup levels. Gasoline-range hydrocarbon concentrations in MW-8 were above MTCA Method A cleanup criteria; the benzene concentration in MW-8 decreased dramatically from previous sampling events to levels below MTCA Method A cleanup criteria. Benzene concentrations in MW-10 remain the only contaminant above the MTCA Method A cleanup criteria. Overall, contaminant concentrations in MW-7, -8, and -10 exceeded MTCA Method A cleanup criteria. Analytical groundwater data is shown in Table 1. O&M system performance information is shown in Tables 2, 3, 4, and 5.

Summary of Unusual Activity:

No unusual observations were noted during groundwater sampling activities.

Agency Directive Requirements:

- Attachments:**
- Table 1 – Groundwater Sample Results
 - Table 2 – Effluent Water Sample Results
 - Table 3 – GW Extraction System Performance Data
 - Table 4 – SVE System Performance Data
 - Table 5 – SVE Well Performance Data
 - Figure 1 – Vicinity Map
 - Figure 2 – Site Plan
 - Figure 3 – Influent FID Concentrations and Cumulative TPH Recovered
 - Analytical Laboratory Report (Columbia Analytical Services)

Signed by:
Title:


Associate

TABLE 1
GROUNDWATER SAMPLE RESULTS
BROWN BEAR CAR WASH--15TH
CIRCLE K SITE NO. 5516

Sample Number	Date Sampled	WTPH-G (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	DTW (feet)	GW Elev. (feet)
MW-1 (Casing Elevation = 13.96 feet)								
EMW1-GW	1/7/94	22,000	2,700	4,300	1,500	7,400	--	--
14880631	1/6/95	76,000	3,600	6,300	2,700	12,800	--	--
MW-2								
EMW2-GW	1/7/94	1,900	190	48	85	241	--	--
MW-3								
14880642	3/1/95	< 50	< 1.00	< 1.00	< 1.00	< 50	--	--
MW-4 (Casing Elevation = 14.46 feet)								
14880625	1/5/95	< 300	< 1.00	< 1.00	< 1.00	< 1.00	5.68	8.78
165507	10/31/95	< 50	< 0.5	< 1	< 1	< 1	5.99	8.47
14881163	12/19/96	< 50	42.5	< 1	< 1	< 1	5.78	8.68
14881177	11/3/97	< 50	1.8	< 1	< 1	< 1	5.75	8.71
MW-5 (Casing Elevation = 14.33 feet)								
14880626	1/5/95	< 300	< 1.00	< 1.00	< 1.00	< 1.00	5.45	8.88
165508	10/31/95	< 50	1.1	< 1	< 1	< 1	5.75	8.58
1481164	12/19/96	< 50	< 0.5	< 1	< 1	< 1	5.75	8.58
14881178	11/3/97	< 50	< 0.5	< 1	< 1	< 1	5.76	8.57
MW-6 (Casing Elevation = 14.16 feet)								
14880627	1/5/95	< 300	1.2	< 1.00	< 1.00	< 1.00	5.47	8.69
165509	10/31/95	6,300	3,100	< 1	876	1,340	5.57	8.59
14881146	3/19/96	1,250	198	< 1	122	9	5.81	8.35
14881149	6/18/96	250	< 0.5	< 1	26	1	6.11	8.05
14881160	9/25/96	130	< 0.5	< 1	7	< 1	6.70	7.46
14881165	12/19/96	< 50	< 0.5	< 1	1	< 1	5.85	8.31
14881169	4/21/97	< 50	< 0.5	< 1	< 1	< 1	5.43	8.73
14881173	8/21/97	90	< 0.5	< 1	< 1	< 1	7.41	6.75
14881179	11/3/97	110	< 0.5	< 1	< 1	< 1	5.86	8.30
14881184	2/24/98	< 250	< 0.5	< 1	< 1	< 1	6.26	7.90
MW-7 (Casing Elevation = 14.06 feet)								
14880628	1/5/95	820	13	2.2	4.7	3.1	5.73	8.33
165510	10/31/95	1,920	1,990	3	247	42	5.50	8.56
14881147	3/19/96	3,820	970	29	307	67	6.09	7.97
14881150	6/18/96	5,020	733	16	514	150	6.45	7.61
14881161	9/25/96	4,500	88.0	< 5	420	87	7.03	7.03
14881166	12/19/96	970	53.5	2	9	18	6.06	8.00
14881170	4/21/97	2,160	26.5	< 1	114	8	5.70	8.36
14881174	8/21/97	1,630	56.1	1	44	8	7.71	6.35
14881180	11/3/97	1,550	59.1	1	23	6	6.08	7.98
14881185	2/24/98	1,200	60.0	1	11	4	6.51	7.55
MTCA Cleanup Levels		1,000	5.0	40.0	30.0	20.0		

TABLE 1
GROUNDWATER SAMPLE RESULTS
BROWN BEAR CAR WASH--15TH
CIRCLE K SITE NO. 5516

Sample Number	Date Sampled	WTPH-G (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	DTW (feet)	GW Elev. (feet)
MW-8 (Casing Elevation = 13.83 feet)								
14880629	1/5/95	550	280	2.6	1.9	2.7	6.08	7.75
165511	10/31/95	330	355	1	2	4	6.00	7.83
14881148	3/19/96	610	1,340	5	2	3	6.29	7.54
14881151	6/18/96	1,160	4,400	42	56	42	6.69	7.14
14881162	9/25/96	1,440	2,200	13	152	96	7.24	6.59
14881167	12/19/96	2,040	1,410	3	231	175	6.34	7.49
14881171	4/21/97	1,380	257	< 1	81	41	5.95	7.88
14881175	8/21/97	910	39.0	< 1	19	13	7.45	6.38
14881181	11/3/97	980	19.3	1	8	9	6.22	7.61
14881186	2/24/98	1,000	2.9	< 1	< 1	7	6.41	7.42
MW-9 (Casing Elevation = 14.95 feet)								
14880630	1/5/95	< 300	< 1.00	< 1.00	< 1.00	< 1.00	5.66	9.29
MW-10 (Casing Elevation = 15.08 feet)								
14881168	12/19/96	230	366	41	1	3	5.80	9.28
14881172	4/21/97	< 50	13.9	< 1	< 1	< 1	4.88	10.20
14881176	8/21/97	50	37.4	2	< 1	< 1	6.08	9.00
14881182	11/3/97	< 50	195.0	< 1	1	< 1	5.74	9.34
14881183	2/24/98	< 250	16.0	< 1	< 1	< 1	6.01	9.07
MTCA Cleanup Levels		1,000	5.0	40.0	30.0	20.0		

NOTES:

WTPH-G = Washington Total Petroleum Hydrocarbons as Gasoline

DTW = Depth to water, measured from top of casing.

GW Elev. = Groundwater elevation, relative to arbitrary datum of 20 feet.

MTCA = Washington Model Toxics Control Act (MTCA) Method A.

ppb = parts per billion

< = Less than the indicated method reporting limit (MRL) or practical quantitation limit (PQL).

Boldface values indicate concentrations exceeding cleanup level.

**TABLE 2 - EFFLUENT WATER SAMPLE RESULTS
BROWN BEAR CAR WASH--15TH
TOSCO FACILITY NO. 2415**

Sample Number	Date Sampled	Total Lead (ppb)	WTPH-G (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)
Batch Tank (Pre-Treatment)							
14881155	7/15/96	--	25,100	668	125	1,450	4,490
Calculated	1997	--	76,000	1,000	7,000	3,000	13,000
14881184	3/4/98	--	1,000	130	9	17	160
Air Stripper Sump (Post-Treatment)							
14881156	7/15/96	--	1,400	25	2	40	156
Calculated	1997	--	7,600	100	700	300	1,300
14881185	3/4/98	--	830	64	10	9	140
Discharge Limits ^a			100,000 ^b	130	1,500	1,400	-- ^c

NOTES:

^a In accordance with Metro discharge authorization No. 524.

^b Discharge limits are for nonpolar fats, oil & grease; WTPH-G is accepted substitute.

^c No discharge limit prescribed for xylenes.

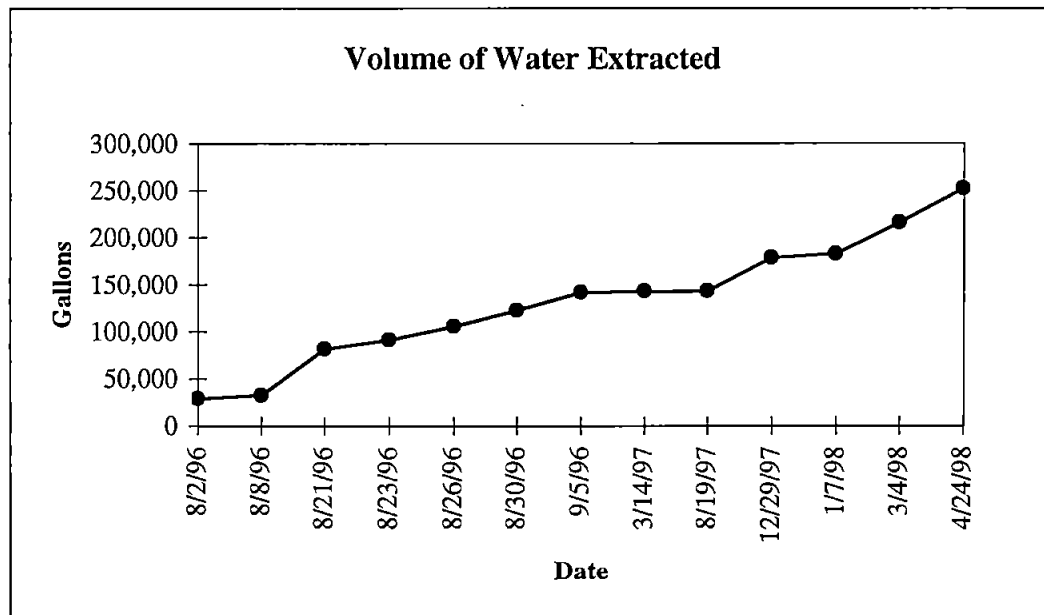
ppb = parts per billion = micrograms per liter (ug/l).

< = Below reporting limit, limit reported.

Boldface values exceed discharge limits.

TABLE 3
GW EXTRACTION SYSTEM PERFORMANCE DATA
BROWN BEAR CAR WASH--15th
TOSCO FACILITY NO. 5516

Date Sampled	Flowmeter Reading (cubic feet)	Flowmeter Reading (gal)	Vol H ₂ O Extracted (gal)	Flowrate (gpm)	Cum. Vol H ₂ O Extr. (gal)
8/2/96		28,600	12,710	2.94	28,600
8/8/96		31,970	3,370	0.39	31,970
8/21/96		81,230	49,260	2.63	81,230
8/23/96		90,580	9,350	3.25	90,580
8/26/96		105,530	14,950	3.46	105,530
8/30/96		122,360	16,830	2.92	122,360
9/5/96		141,190	18,830	2.18	141,190
3/14/97		142,860	1,670	0.01	142,860
8/19/97		142,860	0	0.00	142,860
12/29/97	4719	35,298	35,298	0.19	178,158
1/7/98	5272	39,435	4,136	0.32	182,295
3/4/98	9796	73,274	33,840	0.42	216,134
4/24/98	14603	109,230	35,956	0.49	252,090

**NOTES:**

Sewer Discharge Flowmeter replaced on 8/19/97.

TABLE 4
SVE SYSTEM PERFORMANCE DATA
BROWN BEAR CAR WASH--15th
TOSCO FACILITY NO. 5516

Sample Date	FID (ppm)	Flow Rate (scfm)	Mass Rem. ^a (lbs/day)	Avg. Rem. per Sample Period (lbs/day)	Total Rem. per Sample Period (lbs)	Cumulative Mass ^a Rem. (lbs)
7/15/96	3750	167	134.08	--	--	--
8/23/96	5050	209	225.70	--	--	--
3/10/98	529	140	15.87	120.8	158.7	159
4/24/98	420	113	10.17	13.0	457.5	616

NOTE:

FID = flame ionization detector

ppm = parts per million

scfm = standard cubic feet per minute

lbs = pounds

^a Mass removed is reported as hexane.

TABLE 5
SVE WELL PERFORMANCE DATA
BROWN BEAR CAR WASH--15TH
CIRCLE K SITE NO. 5516

Sample Date	R-1		R-2		R-3	
	PID (ppm)	Vacuum (in. H ₂ O)	PID (ppm)	Vacuum (in. H ₂ O)	PID (ppm)	Vacuum (in. H ₂ O)
3/4/98	271	--	232	--	280	--
4/24/98	344	--	260	--	310	--

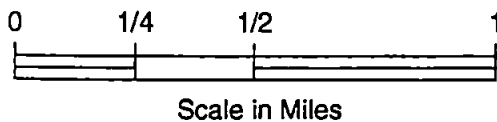
Sample Date	R-4		R-5		R-6	
	PID (ppm)	Vacuum (in. H ₂ O)	PID (ppm)	Vacuum (in. H ₂ O)	PID (ppm)	Vacuum (in. H ₂ O)
3/4/98	248	--	159	--	30	--
4/24/98	397	--	147	--	73	--

NOTE:

PID = photoionization detector

ppm = parts per million

in. H₂O = inches of water



NOTE

Map adapted from USGS metric topographic map of Seattle North, WA quadrangle, dated 1983.

Circle K Site No. 5516
Brown Bear Car Wash - 15th
Seattle, Washington

VICINITY MAP

May 1998

T-1488-20

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 1

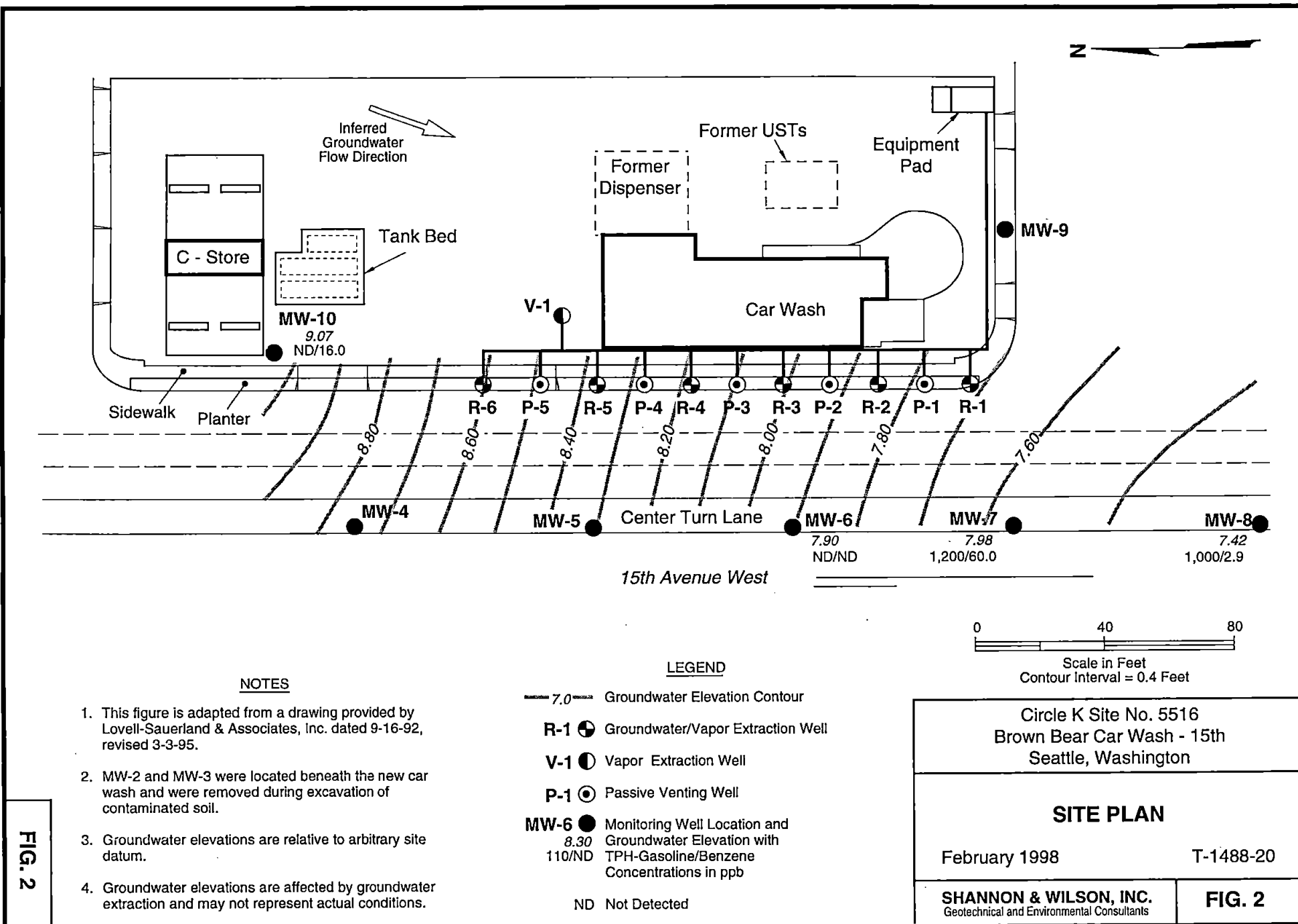
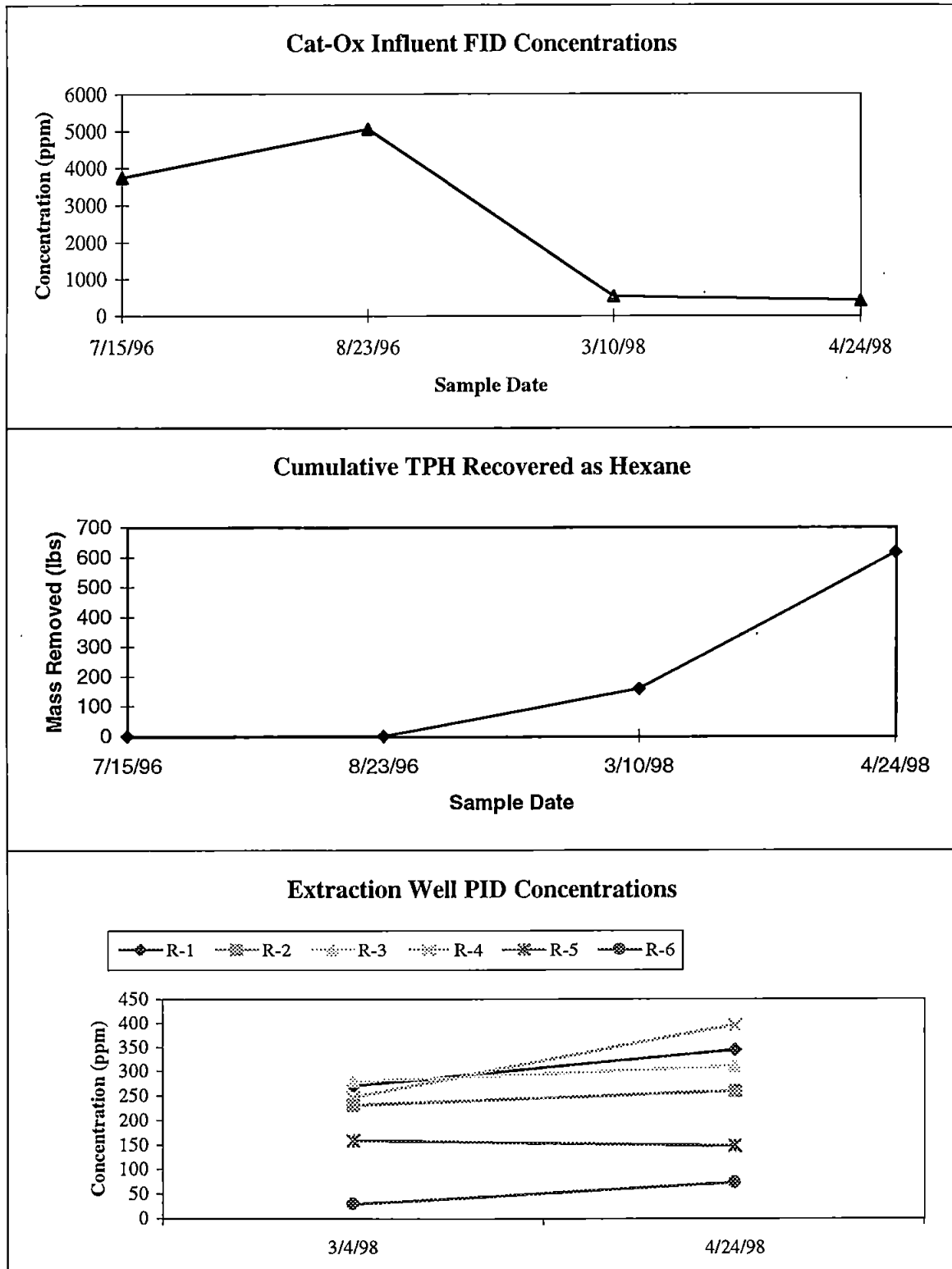
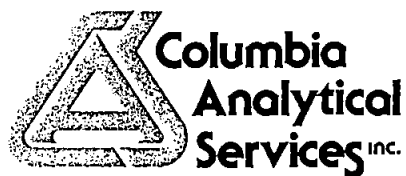


FIGURE 3
INFLUENT CONCENTRATIONS AND CUMULATIVE TPH RECOVERED
BROWN BEAR CAR WASH--ISSAQUAH
TOSCO FACILITY NO. 2407





March 13, 1998

Service Request No: K9801279

David Laughlin
Shannon & Wilson, Inc.
400 North 34th Street, Suite 100
Seattle, WA 98103

Re: 15th Brown Bear/T-1488

Dear David:

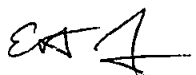
Enclosed are the results of the sample(s) submitted to our laboratory on March 2, 1998. For your reference, these analyses have been assigned our service request number K9801279.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 281.

Respectfully submitted,

Columbia Analytical Services, Inc.


Elizabeth Schneider
Project Chemist

ES/lj

Page 1 of 11

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
J	Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

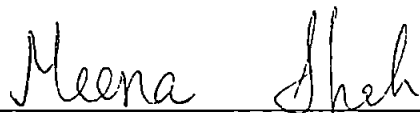
Client: TOSCO
Project: 15th Brown Bear/T-1488
Sample Matrix: Water

Service Request: K9801279
Date Collected: 2/24/98
Date Received: 3/2/98
Date Extracted: NA
Date Analyzed: 3/9-10/98

BTEX
EPA Methods 5030A/8020A
Units: µg/L (ppb)

Sample Name	Lab Code	Analyte:	Benzene	Toluene	Ethylbenzene	Total Xylenes
		Method Reporting Limit:	0.5	1	1	1
14881183	K9801279-001		16	ND	ND	ND
14881184	K9801279-002		ND	ND	ND	ND
14881185	K9801279-003		60	1	11	4
14881186	K9801279-004		2.9	ND	ND	7
Method Blank	K980309-MB		ND	ND	ND	ND

Approved By:



Date:

3-11-98

00003

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: TOSCO
Project: 15th Brown Bear/T-1488
Sample Matrix: Water

Service Request: K9801279
Date Collected: 2/24/98
Date Received: 3/2/98

Volatile Petroleum Products
Northwest TPH-Gx

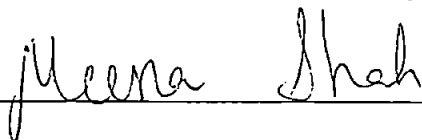
Sample Name: 14881183
Lab Code: K9801279-001
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/10/98	ND	
Naphtha Distillate	EPA 5030B	NWTPH-Gx	250	1	NA	3/10/98	ND	
Jet Fuel as JP-4	EPA 5030B	NWTPH-Gx	250	1	NA	3/10/98	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/10/98	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/10/98	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: _____



Date: 3-11-98

1S22/020597p

00004

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: TOSCO
Project: 15th Brown Bear/T-1488
Sample Matrix: Water

Service Request: K9801279
Date Collected: 2/24/98
Date Received: 3/2/98

Volatile Petroleum Products
Northwest TPH-Gx

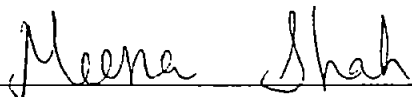
Sample Name: 14881184
Lab Code: K9801279-002
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
Naphtha Distillate	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
Jet Fuel as JP-4	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By:



Date:

3-11-98

1S22/020597p

00005

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: TOSCO
Project: 15th Brown Bear/T-1488
Sample Matrix: Water

Service Request: K9801279
Date Collected: 2/24/98
Date Received: 3/2/98

Volatile Petroleum Products
Northwest TPH-Gx

Sample Name: 14881185
Lab Code: K9801279-003
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/10/98	ND	
Naphtha Distillate	EPA 5030B	NWTPH-Gx	250	1	NA	3/10/98	ND	
Jet Fuel as JP-4	EPA 5030B	NWTPH-Gx	250	1	NA	3/10/98	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/10/98	1200	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/10/98	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: _____

Meena Shah

Date: 3-11-98

1S22/020597p

00006

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: TOSCO
Project: 15th Brown Bear/T-1488
Sample Matrix: Water

Service Request: K9801279
Date Collected: 2/24/98
Date Received: 3/2/98

Volatile Petroleum Products
Northwest TPH-Gx

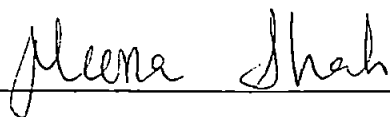
Sample Name: 14881186
Lab Code: K9801279-004
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
Naphtha Distillate	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
Jet Fuel as JP-4	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	1000	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By:



Date:

3-11-98

1S22/020597p

00007

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: TOSCO
Project: 15th Brown Bear/T-1488
Sample Matrix: Water

Service Request: K9801279
Date Collected: NA
Date Received: NA

Volatile Petroleum Products
Northwest TPH-Gx

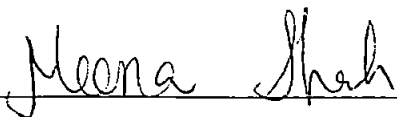
Sample Name: Method Blank
Lab Code: K980309-MB
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
Naphtha Distillate	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
Jet Fuel as JP-4	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	3/9/98	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: _____



Date: _____

3-11-98

00008

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: TOSCO
Project: 15th Brown Bear/T-1488
Sample Matrix: Water

Service Request: K9801279
Date Collected: 2/24/98
Date Received: 3/2/98
Date Extracted: NA
Date Analyzed: 3/9-10/98

Surrogate Recovery Summary
BTEX
EPA Methods 5030A/8020A

Sample Name	Lab Code	Percent Recovery 1,4-Difluorobenzene
14881183	K9801279-001	98
14881184	K9801279-002	97
14881185	K9801279-003	102
14881186	K9801279-004	99
Method Blank	K980309-MB	98

CAS Acceptance Limits: 70-130

Approved By: _____

Meena Shah

Date: _____

3-11-98

00009

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: TOSCO
Project: 15th Brown Bear/T-1488
Sample Matrix: Water

Service Request: K9801279
Date Collected: 2/24/98
Date Received: 3/2/98
Date Extracted: NA
Date Analyzed: 3/9-10/98

Surrogate Recovery Summary
Northwest TPH-Gx

Prep Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1,4-Difluorobenzene
14881183	K9801279-001		107
14881184	K9801279-002		99
14881185	K9801279-003		144
14881186	K9801279-004		137
Method Blank	K980309-MB		103

CAS Acceptance Limits: 50-150

Approved By: _____

Meena Shah

Date: _____

3-11-98

00010



303 Wellsian Way
Richland, WA 99352
(509) 946-6309

Page 1 of 1
Laboratory CAS
Attn:

Analysis Parameters/Sample Container Description
(include preservative if used)

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>T-1484</u>		Total Number of Containers <u> </u>		Signature: <u>[Signature]</u> Time: <u>1800</u>		Signature: <u> </u> Time: <u> </u>		Signature: <u> </u> Time: <u> </u>	
Project Name: <u>15th BROWN BEAR</u>		COC Seals/Intact? Y/N/NA <u> </u>		Printed Name: <u>JOEY HENDERSON</u> Date: <u>2-26-90</u>		Printed Name: <u> </u> Date: <u> </u>		Printed Name: <u> </u> Date: <u> </u>	
Contact: <u>DAVID LAUGHLIN</u>		Received Good Cond./Cold <u> </u>		Company: <u>S&W</u>		Company: <u> </u>		Company: <u> </u>	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u> </u>							
Sampler: <u>JOEY HENDERSON</u>		(attach shipping bill, if any)							
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turn Around Time: <u>STANDARD</u>				Signature: <u>[Signature]</u> Time: <u>9:00</u>		Signature: <u> </u> Time: <u> </u>		Signature: <u> </u> Time: <u> </u>	
Special Instructions: <u>please fax results</u>				Printed Name: <u>AMY GOWAN</u> Date: <u>3-2</u>		Printed Name: <u> </u> Date: <u> </u>		Printed Name: <u> </u> Date: <u> </u>	
				Company: <u>CAS</u>		Company: <u> </u>		Company: <u> </u>	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report Yellow - w/shipment - for consignee files									



NORTH CREEK ANALYTICAL

Environmental Laboratory Services

BOTHELL ■ (425) 481-9200 ■ FAX 485-2992
SPOKANE ■ (509) 924-9200 ■ FAX 924-9290
PORTLAND ■ (503) 906-9200 ■ FAX 906-9210

Shannon and Wilson - Seattle
400 N. 34th Street, Ste 100
Seattle, WA 98103

Project: Brown Bear 15th
Project Number: T-1448-18
Project Manager: David Laughlin

Sampled: 3/10/98
Received: 3/11/98
Reported: 3/16/98 16:27

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
14881187	B803254-01	Air	3/10/98
14881188	B803254-02	Air	3/10/98
14881189	B803254-03	Air	3/10/98

North Creek Analytical, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document.
This analytical report must be reproduced in its entirety.*

Joy B Chang, Project Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508
East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
9405 S.W. Nimbus Avenue Beaverton, OR 97008-7132

Page 1 of 5



NORTH CREEK ANALYTICAL

Environmental Laboratory Services

BOTHELL ■ (425) 481-9200 ■ FAX 485-2992
SPOKANE ■ (509) 924-9200 ■ FAX 924-9290
PORTLAND ■ (503) 906-9200 ■ FAX 906-9210

Shannon and Wilson - Seattle
400 N. 34th Street, Ste 100
Seattle, WA 98103

Project: Brown Bear 15th
Project Number: T-1448-18
Project Manager: David Laughlin

Sampled: 3/10/98
Received: 3/11/98
Reported: 3/16/98 16:27

Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX in Air by WTPH-G and EPA 8021B North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
14881187				B803254-01			Air	
Gasoline Range Hydrocarbons	0380363	3/13/98	3/13/98		50.0	2250	mg/m ³ Air	
Benzene	"	"	"		0.500	47.5	"	
Toluene	"	"	"		0.500	27.3	"	
Ethylbenzene	"	"	"		0.500	13.8	"	
Xylenes (total)	"	"	"		1.00	98.7	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		150	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		125	"	
Gasoline Range Hydrocarbons (v/v)	"	"	"		11.8	529	ppmv	
Benzene (v/v)	"	"	"		0.154	14.6	"	
Toluene (v/v)	"	"	"		0.131	7.13	"	
Ethylbenzene (v/v)	"	"	"		0.113	3.12	"	
Xylenes, total (v/v)	"	"	"		0.227	22.4	"	
14881188				B803254-02			Air	
Gasoline Range Hydrocarbons	0380363	3/13/98	3/13/98		10.0	18.2	mg/m ³ Air	
Benzene	"	"	"		0.100	ND	"	
Toluene	"	"	"		0.100	0.180	"	
Ethylbenzene	"	"	"		0.100	0.113	"	
Xylenes (total)	"	"	"		0.200	1.53	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		108	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		115	"	
Gasoline Range Hydrocarbons (v/v)	"	"	"		2.36	4.29	ppmv	
Benzene (v/v)	"	"	"		0.0308	ND	"	
Toluene (v/v)	"	"	"		0.0261	0.0470	"	
Ethylbenzene (v/v)	"	"	"		0.0227	0.0256	"	
Xylenes, total (v/v)	"	"	"		0.0454	0.347	"	
14881189				B803254-03			Air	
Gasoline Range Hydrocarbons	0380363	3/13/98	3/13/98		50.0	542	mg/m ³ Air	
Benzene	"	"	"		0.500	25.1	"	
Toluene	"	"	"		0.500	9.00	"	
Ethylbenzene	"	"	"		0.500	1.93	"	
Xylenes (total)	"	"	"		1.00	5.75	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		124	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		111	"	
Gasoline Range Hydrocarbons (v/v)	"	"	"		11.8	128	ppmv	
Benzene (v/v)	"	"	"		0.154	7.73	"	
Toluene (v/v)	"	"	"		0.131	2.35	"	

North Creek Analytical, Inc.

*Refer to end of report for text of notes and definitions.

Joy B Chang, Project Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508
East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132

Page 2 of 5



NORTH CREEK ANALYTICAL

Environmental Laboratory Services

BOTHELL ■ (425) 481-9200 ■ FAX 485-2992
SPOKANE ■ (509) 924-9200 ■ FAX 924-9290
PORTLAND ■ (503) 906-9200 ■ FAX 906-9210

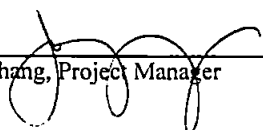
Shannon and Wilson - Seattle
400 N. 34th Street, Ste 100
Seattle, WA 98103

Project: Brown Bear 15th
Project Number: T-1448-18
Project Manager: David Laughlin

Sampled: 3/10/98
Received: 3/11/98
Reported: 3/16/98 16:27

Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX in Air by WTPH-G and EPA 8021B
North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
14881189 (continued)				B803254-03			Air	
Ethylbenzene (v/v)	0380363	3/13/98	3/13/98		0.113	0.438	ppmv	
Xylenes, total (v/v)	"	"	"		0.227	1.30	"	


Joy B Chang, Project Manager

Shannon and Wilson - Seattle 400 N. 34th Street, Ste 100 Seattle, WA 98103	Project: Brown Bear 15th Project Number: T-1448-18 Project Manager: David Laughlin	Sampled: 3/10/98 Received: 3/11/98 Reported: 3/16/98 16:27
--	--	--

Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX in Air by WTPH-G and EPA 8021B/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0380363										
Blank										
Gasoline Range Hydrocarbons										
Benzene	3/13/98			ND	mg/m ³ Air	10.0				
Toluene	"			ND	"	0.100				
Ethylbenzene	"			ND	"	0.100				
Xylenes (total)	"			ND	"	0.200				
Surrogate: 4-BFB (FID)	"	9.60		9.61	"	50.0-150	100			
Surrogate: 4-BFB (PID)	"	9.60		10.0	"	50.0-150	104			
Gasoline Range Hydrocarbons (v/v)	"			ND	ppmv	2.36				
Benzene (v/v)	"			ND	"	0.0308				
Toluene (v/v)	"			ND	"	0.0261				
Ethylbenzene (v/v)	"			ND	"	0.0227				
Xylenes, total (v/v)	"			ND	"	0.0454				
LCS										
0380363-BS1										
Benzene	3/13/98	2.00		1.75	mg/m ³ Air	60.0-140	87.5			
Toluene	"	2.00		1.89	"	60.0-140	94.5			
Ethylbenzene	"	2.00		1.87	"	60.0-140	93.5			
Xylenes (total)	"	6.00		5.79	"	60.0-140	96.5			
Surrogate: 4-BFB (PID)	"	9.60		10.7	"	50.0-150	111			
LCS										
0380363-BS2										
Gasoline Range Hydrocarbons	3/13/98	100		80.1	mg/m ³ Air	50.0-150	80.1			
Surrogate: 4-BFB (FID)	"	9.60		11.2	"	50.0-150	117			
LCS Dup										
0380363-BSD1										
Benzene	3/13/98	2.00		1.68	mg/m ³ Air	60.0-140	84.0	20.0	4.08	
Toluene	"	2.00		1.80	"	60.0-140	90.0	20.0	4.88	
Ethylbenzene	"	2.00		1.76	"	60.0-140	88.0	20.0	6.06	
Xylenes (total)	"	6.00		5.45	"	60.0-140	90.8	20.0	6.09	
Surrogate: 4-BFB (PID)	"	9.60		10.8	"	50.0-150	112			
Duplicate										
0380363-DUP1 B803254-01										
Gasoline Range Hydrocarbons	3/13/98		2250	2270	mg/m ³ Air			30.0	0.885	
Surrogate: 4-BFB (FID)	"	9.60		14.7	"	50.0-150	153			1



NORTH CREEK ANALYTICAL

Environmental Laboratory Services

BOTHELL ■ (425) 481-9200 ■ FAX 485-2992
SPOKANE ■ (509) 924-9200 ■ FAX 924-9290
PORTLAND ■ (503) 906-9200 ■ FAX 906-9210

Shannon and Wilson - Seattle
400 N. 34th Street, Ste 100
Seattle, WA 98103

Project: Brown Bear 15th
Project Number: T-1448-18
Project Manager: David Laughlin

Sampled: 3/10/98
Received: 3/11/98
Reported: 3/16/98 16:27

Notes and Definitions

#	Note
---	------

1	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
---	--

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

Recov. Recovery

RPD Relative Percent Difference

North Creek Analytical, Inc.

Joy B Chang, Project Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508
East 11115 Montgomery, Suite B, Spokane, WA 99206-4776

Page 5 of 5

B803254



CHAIN OF CUSTODY RECORD

Page 1 of 1
 Laboratory NORTH CREEK
 Attn: _____

400 N 34th Street, Suite 100
 Seattle, WA 98103
 (206) 632-8020

11500 Olive Blvd., Suite 276
 St. Louis, MO 63141
 (314) 872-8170

2055 Hill Road
 Fairbanks, AK 99709
 (907) 479-0600

5430 Fairbanks Street, Suite 3
 Anchorage, AK 99518
 (907) 561-2120

303 Wollan Way
 Richland, WA 99352
 (509) 946-6309

Analysis Parameters/Sample Container Description (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab							Total Number of Containers	Remarks/Matrix
14881187	B803254-01	1045	3-10-98	x	x	WTPH-6						1	AIR
14881188	02	1100	"	x	x							1	"
14881189	03	1115	"	x	x							1	"

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: T-1488-18		Total Number of Containers: 3		Signature: [Signature] Time: 1615		Signature: [Signature] Time: 1630		Signature: [Signature] Time: 1705	
Project Name: BROWN BEAR / SK		COC Seals/Intact? Y/N/NA		Printed Name: [Signature] Date: 3-10-98		Printed Name: [Signature] Date: 3/11/98		Printed Name: [Signature] Date: 3/11/98	
Contact: DAVID LAUGHLIN		Received Good Cond./Cold		JOEY HENDERSON		KBarker		KBarker	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: NCA COURIER		Company: S+W, INC.		Company: NCA		Company: NCA	
Sampler: JOEY HENDERSON		(attach shipping bill, if any)							
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turn Around Time: STANDARD				Signature: [Signature] Time: 1705		Signature: _____ Time: _____		Signature: _____ Time: _____	
Special Instructions: please fax results				Printed Name: B. Dightman Date: 3/11/98		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
				Company: NCA		Company: _____		Company: _____	

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - Job File