

UST site # 8459

1975

UST # 1975
Unocal Station # 5472

DATE: January 6, 1999

**TOSCO MARKETING COMPANY
GROUNDWATER MONITORING REPORT**

entered on
4-20-99/SEK

Site No.: 5472 Address: 3460 1st Avenue South, Seattle, WA
Tosco Project Manager: Timothy D. Johnson
Consultant /Contact Person: Environmental Resolutions, Inc./John Meyer
Primary Agency/Regulatory ID No.: Washington State Department of Ecology

RECEIVED

WORK PERFORMED THIS QUARTER(S) [Fourth - 1998]:

- Monitored, purged, and sampled 10 groundwater monitoring wells

JAN 15 1999

WORK PROPOSED FOR NEXT QUARTER [First - 1999]:

- Monitor, purge, and sample 11 groundwater monitoring wells

DEPT. OF ECOLOGY

SUMMARY:

Frequency of Sampling Events:	<u>Quarterly</u>	(Quarterly, etc.)
Approximate Depth to Groundwater:	<u>3 to 7 ft</u>	(Measured Feet)
Groundwater Gradient:	<u>Northerly and Westerly</u>	(Direction)
	<u>0.008 ft/ft</u>	(Magnitude)
Maximum TPH-G/Benzene Concentrations:	<u>4,730/327</u>	(ppb)
Measurable Free Product Detected:	<u>No</u>	(Yes - ID wells(s)/No)
Free Product Recovered This Quarter:	<u>Unknown</u>	(gallons)
Cumulative Free Product Recovered to Date:	<u>Unknown</u>	(gallons)
Bulk Soil Removed This Quarter:	<u>None</u>	(cubic yards)
Water Wells or Surface Waters w/in a 2000'	<u>Unknown</u>	(Distance and)
Radius and Respective Direction:	<u>Unknown</u>	Direction)
Current Remedial Action:	<u>None</u>	(SVE/AS/P&T etc.)
Permits for Discharge:	<u>None</u>	(NPDES, POTW, etc.)

DISCUSSION:

- 6 of 10 wells sampled contained TPH or benzene concentrations exceeding MTCA Method A Cleanup Levels
- MW-8 was obstructed by surface water and could not be accessed

ATTACHMENTS:

Plate P-1 - Groundwater Sample Analyses Map, 12/14/98
Table 1 - Groundwater Analytical Results
Laboratory Reports and Chain of Custody Records
Field Data Records

Prepared By:



John K. Meyer, R.G.
Environmental Resolutions, Inc.

cc: Washington State Department of Ecology, NW Region
GeoEngineers, Dave Cook
Vasco Properties

Independent Action Report Update

Site Name: Chescol #5472

Inc. #: 1975 Date of Report: 1-6-99

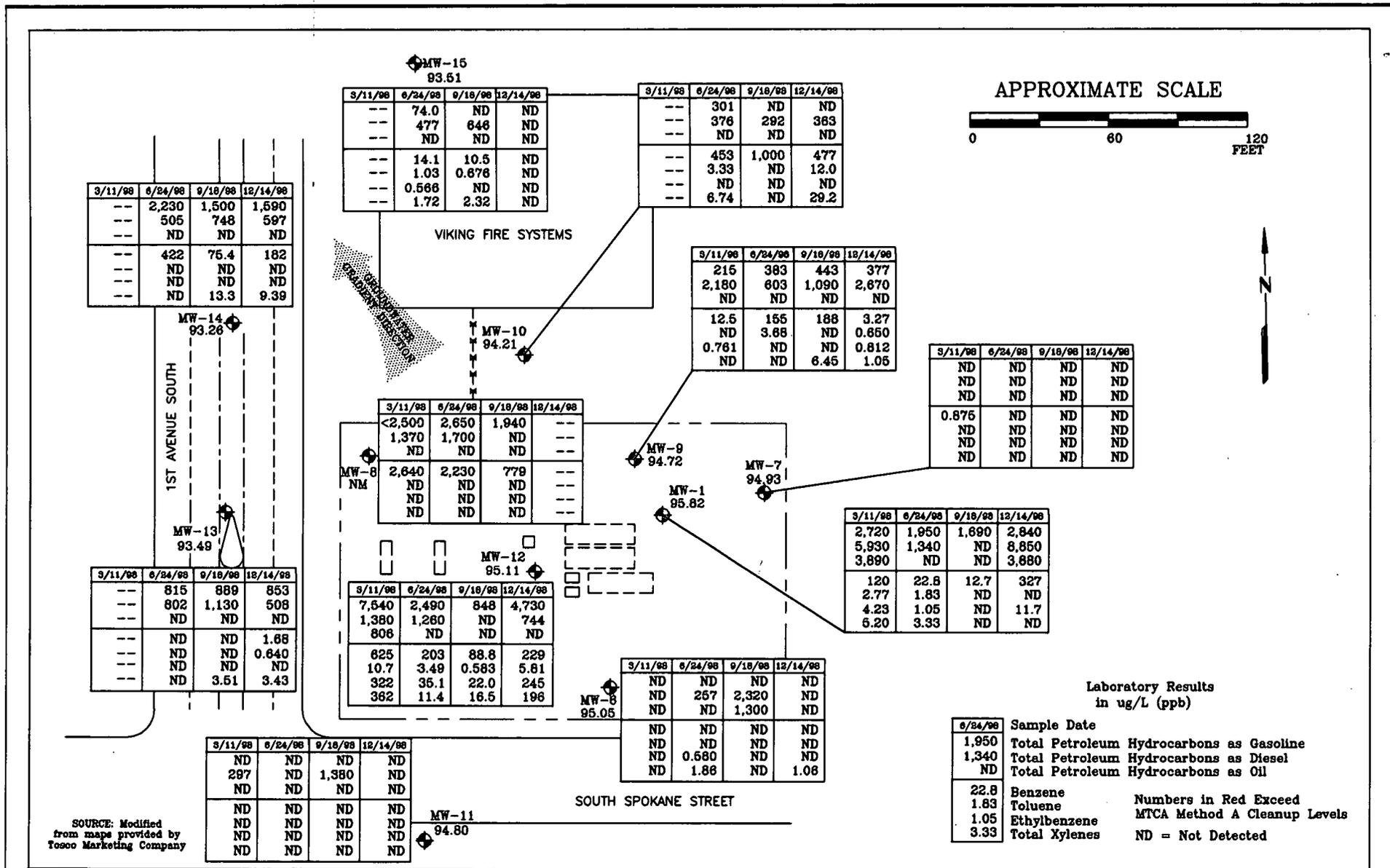
County: King Date Report Rec'd: 1-15-99

Reviewed by: Ben Amoah-Forson 3-23-99

Comments (e.g. free product, off site migration, Conc. Trend)

5 of 10 MWS show TPH
and/or BTEX above 'A'.
No active remediation
on site

Interim



SOURCE: Modified from maps provided by Tosco Marketing Company

FN 5472



GROUNDWATER SAMPLE ANALYSES MAP - 12/14/98

TOSCO FACILITY 5472
3460 1st Avenue South
Seattle, Washington

EXPLANATION

- MW-1 Groundwater Monitoring Well
- 93.27 Groundwater Elevation
- NM Not Measured

PROJECT NO.

31023

PLATE

P-1

DATE: 1/6/99

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Tosco Facility 5472
3460 1st Avenue South
Seattle, Washington
Page 1 of 3

Well Name	Sample Date	DTW	GW Elev.	TPH-G	TPH-D	TPH-O	B	T	E	X	Diss. Pb
MW-1 99.52	02/25/91	5.43	92.59	LPH	LPH	LPH	LPH	LPH	LPH	LPH	LPH
	10/19/92	7.20	92.60	LPH	LPH	LPH	LPH	LPH	LPH	LPH	LPH
	08/26/93	7.36	92.27	LPH	LPH	LPH	LPH	LPH	LPH	LPH	LPH
	10/13/94	8.23	91.55	LPH	LPH	LPH	LPH	LPH	LPH	LPH	LPH
	04/25/95	5.62	93.90	30,000	16,000	9,600	890	<4.0	340	290	--
	07/12/95	--	--	13,000	4,900	<8,000	1,000	<8.0	360	210	<2.0
	10/12/95	6.15	93.41	LPH	LPH	LPH	LPH	LPH	LPH	LPH	LPH
	01/22/96	5.10	94.35	LPH	LPH	LPH	LPH	LPH	LPH	LPH	LPH
	04/10/96	5.86	93.76	LPH	LPH	LPH	LPH	LPH	LPH	LPH	LPH
	07/29/96	5.83	93.69	6,700	6,210	2,960	753	5.50	169	22.6	--
	10/25/96	6.32	93.37	LPH	LPH	LPH	LPH	LPH	LPH	LPH	LPH
	03/05/97	4.96	94.56	4,240	3,860	2,100	114	<2.50	18.7	<5.00	--
	03/05/97 ^{NP}	4.96	94.56	8,160	634	<750	40.7	<2.50	68.9	15.3	--
	06/19/97	5.66	93.87	LPH	LPH	LPH	LPH	LPH	LPH	LPH	LPH
	09/16/97	6.56	92.96	LPH	LPH	LPH	LPH	LPH	LPH	LPH	LPH
	12/18/97	5.54	93.98	3,060	3,860	1,860	142	1.31	2.65	3.54	--
	3/11/98	5.14	94.38	2,720	6,930	3,890	120	2.77	4.23	5.20	--
	6/24/98	6.25	93.27	1,960	1,340	<750	22.8	1.83	1.05	3.33	--
9/18/98	6.86	92.66	1,690	<250	<750	12.7	<2.50	<2.50	<5.00	--	
12/14/98	3.70	95.82	2,840	8,860	3,880	327	<5.00	11.7	<10.0	--	
MW-6 99.67	02/25/91	5.69	92.50	--	--	--	<1.0	<1.0	<1.0	<1.0	--
	10/19/92	7.64	92.03	<1,000	<250	--	19	<1.0	<1.0	<1.0	8
	08/26/93	6.33	93.34	<100	<250	<750	<0.50	<0.50	<0.50	<0.50	<3
	10/13/94	7.90	91.77	<50	450	<750	<0.50	<0.50	<0.50	<1.0	40
	04/25/95	5.63	94.04	<50	330	1,300	<0.50	<0.50	<0.50	<1.0	<2.0
	07/12/95	--	--	<50	550	1,200	<0.50	<0.50	<0.50	<1.0	<2.0
	10/12/95	6.50	93.17	<50	530	970	<0.50	<0.50	<0.50	<1.0	--
	01/22/96	5.08	94.59	<50	610	<750	<0.50	<0.50	<0.50	<1.0	--
	04/10/96	5.73	93.94	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	07/29/96	5.55	94.12	<5	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	10/25/96	6.25	93.42	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	03/05/97	5.09	94.58	<50	<250	<750	<0.5	<0.5	<0.5	<1.0	--
	03/05/97 ^{NP}	5.52	94.15	<50	<250	<750	<0.5	<0.5	<0.5	<1.0	--
	06/19/97 ^{NP}	5.52	94.15	<50	<250	<750	<0.5	<0.5	<0.5	<1.0	--
	09/16/97 ^{NP}	6.35	93.32	<50	<250	<750	<0.5	<0.5	<0.5	<1.0	--
	12/18/97	5.72	93.95	<50.0	269	<750	<0.500	<0.500	<0.500	<1.00	--
3/11/98	5.25	94.42	<50.0	<250	<750	<0.500	<0.500	<0.500	<1.00	--	
6/24/98	6.23	93.44	<50.0	257	<750	<0.500	<0.500	0.580	1.86	--	
9/18/98	6.44	93.23	<50.0	2,320	1,300	<0.500	<0.500	<0.500	<1.00	--	
12/14/98	4.62	95.05	<50.0	<250	<750	<0.500	<0.500	<0.500	1.06	--	
MW-7 98.50	02/25/91	4.33	92.68	--	--	--	11	<1.0	<1.0	<1.0	--
	10/19/92	5.98	92.52	<1,000	620	--	6	<1.0	<1.0	<1.0	<5
	08/26/93	6.16	92.34	<100	<250	<750	12	<0.50	<0.50	<0.50	<3
	10/13/94	6.56	91.94	<50	540	<750	3.3	<0.50	<0.50	<1.0	110
	04/25/95	4.45	93.05	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	<2.0
	07/12/95	--	--	<50	2,000	2,100	<0.50	<0.50	<0.50	<1.0	<2.0
	10/12/95	4.90	93.60	<50	<250	950	<0.50	<0.50	<0.50	<1.0	--
	01/22/96	3.89	94.61	<50	520	<750	1.5	<0.50	<0.50	<1.0	--
	04/10/96	4.63	93.87	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	07/29/96	4.55	93.95	<50	<250	<750	<0.50	<0.05	<0.05	<0.10	--
	10/25/96	4.98	93.52	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	03/05/97	3.94	94.56	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	03/05/97 ^{NP}	3.94	94.56	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	06/19/97 ^{NP}	4.57	93.93	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	09/16/97 ^{NP}	5.29	93.21	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	12/18/97	4.43	94.07	<50.0	357	<750	<0.500	<0.500	<0.500	<1.00	--
3/11/98	4.05	94.45	<50.0	<250	<750	0.875	<0.500	<0.500	<1.00	--	
6/24/98	4.91	93.59	<50.0	<250	<750	<0.500	<0.500	<0.500	<1.00	--	
9/18/98	5.67	92.83	<50.0	<250	<750	<0.500	<0.500	<0.500	<1.00	--	
12/14/98	3.57	94.93	<50.0	<250	<750	<0.500	<0.500	<0.500	<1.00	--	

MTCA Method A Cleanup Level
Continued on Page 2.

1,000^a 5 40 30 20 5

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Tosco Facility 5472
3460 1st Avenue South
Seattle, Washington
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Well Name	Sample Date	DTW	GW Elev.	TPH-G	TPH-D	TPH-O	B	T	E	X	Diss. Pb
MW-8 98.96	02/25/91	5.44	92.06	--	--	--	7	16	29	32	--
	10/19/92	7.17	91.79	4,900	330	--	7,200	32	610	1,600	<5
	08/26/93	6.91	92.05	7,500	660	--	16,000	410	800	670	<3
	10/13/94	7.40	91.56	2,200	740	1,200	19,000	<40	<40	63	4.6
	04/25/95	5.41	93.55	6,700	1,600	1,200	10,000	200	340	1,000	<2.0
	07/12/95	--	--	4,800	1,600	1,000	8,700	<8.0	130	690	<2.0
	10/12/95	6.48	92.48	3,800	1,600	1,100	11,000	16	18	69	--
	01/22/96	5.10	94.35	2,500	2,600	1,000	8,600	<20	<20	23	--
	04/10/96	5.63	93.33	2,300	2,000	750	3,400	<20	<20	21	--
	07/29/96	4.22	94.74	3,000	1,000	<750	8,660	<25.0	<25.0	<50.0	--
	10/25/96	6.03	92.93	3,600	<260	<750	3,600	<25.0	<25.0	50.3	--
	03/05/97	4.91	94.05	3,490	398	<750	3,970	<10.0	<10.0	<20.0	--
	03/05/97 ^{NP}	4.91	94.05	7,730	376	<750	830	<5.0	11.5	<10.0	--
	06/19/97 ^{NP}	5.46	93.50	6,220	621	<750	1,970	<12.5	13.1	<25.0	--
	09/16/97 ^{NP}	6.28	92.21	3,310	292	<750	4,380	<10	11.5	<20	--
	12/18/97	5.53	93.43	2,890	1,660	<750	4,890	<25.0	<25.0	<50.0	--
	3/11/98	5.14	93.82	<2,600	1,370	<750	2,640	<25.0	<25.0	<50.0	--
6/24/98	6.15	92.81	2,660	1,700	<750	2,230	<25.0	<25.0	<50.0	--	
9/18/98	6.56	92.40	1,940	<250	<750	779	<12.5	<12.5	<25.0	--	
12/14/98	Obstructed by surface water										
MW-9 98.66	02/25/91	4.55	92.62	--	--	--	14,100	19,400	1,300	10,320	--
	10/19/92	6.47	92.19	6,800	36,000	--	6,000	150	360	1,600	<5
	08/26/93	6.48	92.05	6,800	4,400	<750	7,100	100	630	1,300	<3
	10/13/94	7.00	91.66	2,700	4,100	<750	3,000	11	190	140	7.9
	04/25/95	4.70	93.96	6,300	2,600	1,000	360	3.7	210	310	<2.0
	07/12/95	--	--	1,600	2,600	1,300	68	<2.0	62	72	<2.0
	10/12/95	5.15	93.51	4,600	8,800	6,000	930	17	240	310	--
	01/22/96	4.06	94.60	4,000	9,200	1,900	110	<2.0	100	100	--
	04/10/96	4.86	93.80	3,800	3,000	1,000	170	<2.0	170	49	--
	07/29/96	4.71	93.95	1,600	990	890	1,060	<12.5	17.0	<25.0	--
	10/25/96	5.22	93.44	2,100	1,910	<750	697	9.31	9.91	<10.0	--
	03/05/97	4.11	94.55	1,030	22,400	2,240	49.4	<0.50	15.6	<1.0	--
	03/05/97 ^{NP}	4.11	94.55	2,120	8,160	1,060	48.4	<1.0	17.9	2.11	--
	06/19/97 ^{NP}	4.78	93.88	710	1,460	<750	104	<2.5	13.6	5.14	--
	09/16/97 ^{NP}	5.59	93.07	778	469	<750	664	6.27	2.27	4.61	--
	12/18/97	4.61	94.05	1,860	26,000	4,010	59.7	2.82	<2.50	<5.00	--
	3/11/98	4.19	94.47	216	2,180	<750	126	<0.500	0.761	<1.00	--
6/24/98	5.04	93.62	383	603	<750	166	3.68	<2.50	<5.00	--	
9/18/98	6.02	92.64	443	1,090	<750	188	<2.50	<2.50	6.45	--	
12/14/98	3.94	94.72	377	2,670	<750	3.27	0.650	0.812	1.05	--	
MW-10 99.62	02/25/91	--	--	4,200	<250	--	2,000	9.0	200	1,300	72
	10/19/92	7.52	92.10	--	--	--	--	--	--	--	--
	08/26/93	7.44	92.18	1,700	<250	<750	88	3.7	60	97	<3
	10/13/94	7.96	91.66	720	280	<750	730	6.1	1.1	160	26
	04/25/95	5.79	93.83	3,000	46	990	2,100	21	47	270	<2.0
	07/12/95	--	--	1,800	66	<750	2,600	27	<20	290	<2.0
	10/12/95	6.85	92.77	2,200	420	<750	2,100	19	7.8	99	--
	01/22/96	5.82	93.80	1,900	440	<750	1,200	12	23	39	--
	04/10/96	6.08	93.54	1,600	300	<750	920	19	15	60	--
	07/29/96	5.24	94.38	<2,500	260	<750	3,660	27.6	<25.0	<50.0	--
	10/25/96	--	--	--	--	--	--	--	--	--	--
	03/05/97	--	--	--	--	--	--	--	--	--	--
	06/19/97 ^{NP}	5.95	93.67	53	<250	<750	691	7.48	<5.0	20.3	--
	09/16/97 ^{NP}	6.80	92.82	736	<250	<750	1,170	9.747	3.11	18.2	--
	12/18/97	--	--	--	--	--	--	--	--	--	--
	3/11/98	--	--	--	--	--	--	--	--	--	--
	6/24/98	6.64	92.98	301	376	<750	463	3.33	<2.50	6.74	--
9/18/98	7.19	92.43	<1,000	292	<750	1,000	<10.0	<10.0	<20.0	--	
12/14/98	5.41	94.21	<1,000	363	<750	477	12.0	<10.0	29.2	--	

MTCA Method A Cleanup Level
Continued on Page 3.

1,000^a 5 40 30 20 5

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
Tosco Facility 5472
3460 1st Avenue South
Seattle, Washington
Page 3 of 3

Well Name	Sample Date	DTW	GW Elev.	TPH-G	TPH-D	TPH-O	B	T	E	X	Diss. Pb
MW-11	02/25/91	--	--	--	--	--	--	--	--	--	--
99.70	10/19/92	7.97	91.73	<1,000	<250	--	<0.1	<1.0	<1.0	<1.0	<5
	08/26/93	7.59	92.11	<100	<250	<750	<0.50	<0.50	<0.50	<0.50	<3
	10/13/94	8.20	91.50	<50	300	1,100	<0.50	<0.50	<0.50	<1.0	<2.0
	04/25/95	6.00	93.70	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	<2.0
	07/12/95	--	--	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	<2.0
	10/12/95	7.0	92.70	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	01/22/96	--	--	--	--	--	--	--	--	--	--
	04/10/96	5.97	93.73	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	07/29/96	5.84	93.86	<50	<250	<750	<0.50	<0.50	<0.50	<0.10	--
	10/25/96	6.55	93.15	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	03/05/97	5.41	94.29	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	03/05/97 ^{NP}	5.41	94.29	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	06/19/97 ^{NP}	5.81	93.89	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	09/16/97 ^{NP}	6.31	93.39	<50	<250	<750	<0.50	<0.50	<0.50	<1.0	--
	12/18/97	6.21	93.49	<50.0	285	<750	<0.500	<0.500	<0.500	<1.00	--
	3/11/98	5.55	94.15	<50.0	297	<750	<0.500	<0.500	<0.500	<1.00	--
	6/24/98	6.32	93.38	<50.0	<250	<750	<0.500	<0.500	<0.500	<1.00	--
	9/18/98	6.35	93.35	<50.0	1,380	<750	<0.500	<0.500	<0.500	<1.00	--
	12/14/98	4.90	94.80	<50.0	<250	<750	<0.500	<0.500	<0.500	<1.00	--
MW-12	02/25/91	--	--	--	--	--	--	--	--	--	--
100.32	10/19/92	8.37	91.95	8,600	830	--	7,500	1,800	180	1,810	<5
	08/26/93	8.11	92.21	--	--	--	--	--	--	--	--
	10/13/94	8.66	91.66	18,000	3,000	<750	3,300	91	1,100	360	<2.0
	04/25/95	6.40	93.92	32,000	2,600	2,000	1,700	41	470	1,100	<2.0
	07/12/95	--	--	14,000	8,500	<8,000	3,500	100	1,000	2,100	<2.0
	10/12/95	7.45	92.87	7,400	2,800	1,300	940	7.5	310	740	--
	01/22/96	7.70	92.62	33,000	1,700	1,100	1,400	250	1,200	3,300	--
	04/10/96	6.53	93.79	20,000	1,300	<750	390	7.7	690	940	--
	07/29/96	6.24	94.08	16,100	1,400	<750	3,300	<25.0	636	1,320	--
	10/25/96	7.08	93.24	9,900	290	<750	2,660	<25.0	492	1,040	--
	03/05/97	5.78	94.54	17,900	372	<750	662	727	15	1,610	--
	03/05/97 ^{NP}	5.78	94.54	14,500	431	<750	637	<10.0	646	968	--
	06/19/97 ^{NP}	6.45	93.87	14,900	656	<750	335	<10.0	625	657	--
	09/16/97 ^{NP}	7.30	93.02	8,460	656	<750	685	<10.0	344	248	--
	12/18/97	6.48	93.84	9,390	1,490	916	490	10.8	362	666	--
	3/11/98	5.98	94.34	7,640	1,380	806	626	10.7	322	362	--
	6/24/98	7.15	93.17	2,490	1,260	<750	203	3.49	35.1	11.4	--
	9/18/98	7.49	92.83	848	<250	<750	88.8	0.583	22.0	16.5	--
	12/14/98	5.21	95.11	4,730	744	<750	229	5.81	245	196	--
MW-13	6/24/98	7.80	92.44	816	802	<750	<2.50	<2.50	<2.50	<5.00	--
100.24	9/18/98	8.16	92.08	889	1,130	<750	<2.25	<1.25	<1.25	3.51	--
	12/14/98	6.75	93.49	853	608	<750	1.68	0.640	<0.500	3.43	--
MW-14	6/24/98	7.60	92.34	2,230	606	<750	422	<10.0	<10.0	<20.0	--
99.94	9/18/98	8.03	91.91	1,600	748	<750	75.4	<2.50	<2.50	13.3	--
	12/14/98	6.68	93.26	1,690	697	<750	182	<2.50	<2.50	9.39	--
MW-15	6/24/98	6.52	92.77	74.0	477	<750	14.1	1.03	0.566	1.72	--
99.29	9/18/98	7.06	92.23	<50.0	646	<750	10.5	0.676	<0.500	2.32	--
	12/14/98	5.78	93.51	<50.0	<250	<750	<0.500	<0.500	<0.500	<1.00	--
MTCA Method A Cleanup Level				1,000 ^a		5	40	30	20	5	

EXPLANATION:

All concentrations in ug/L (ppb).

Wellhead elevations taken from prior consultant's reports.

DTW = Depth to water in feet below top of casing.

GW Elev. = Groundwater elevation relative to top of casing elevations; Corrected for free product where applicable using a specific gravity of 0.75.

TPH-G = Total Petroleum Hydrocarbons as Gasoline by Ecology Method WTPH-G.

TPH-D and TPH-O = Total Petroleum Hydrocarbons as Diesel and Oil, respectively, by Ecology Method WTPH-D (extended).

B = Benzene; T = Toluene; E = Ethylbenzene; X = Total Xylenes.

BTEX = Aromatic compounds by EPA Method 8020.

Diss. Pb = Dissolved Lead by EPA Method 7421.

LPH = Liquid-phase petroleum hydrocarbons present; no sample collected.

-- = Not sampled.

< = Less than the stated laboratory reporting limit.

^{NP} = Sample collected without purging.

^a Total Petroleum Hydrocarbons.

Samples collected from MW-13, MW-14, and MW-15 on 6/24/98 identified as MW-B, MW-A, and MW-C, respectively, on laboratory report.

October 1994 results are for total lead.

Shaded values equal or exceed MTCA Method A Cleanup Levels.

Data collected before 12/18/97 are taken from prior consultants.



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ERI 1921 Edmonds Drive SE Renton, WA 98055	Project: TOSCO #5472 Project Number: 31023 Project Manager: John Meyer	Sampled: 12/14/98 Received: 12/15/98 Reported: 1/4/99 09:27
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Summary Report*

(Please refer to the Analytical Report for a thorough review of the complete data set.)

Method	Analyte	Units	MW-1 Water 12/14/98 B812346-01	MW-6 Water 12/14/98 B812346-02	MW-7 Water 12/14/98 B812346-03	MW-9 Water 12/14/98 B812346-04	MW-10 Water 12/14/98 B812346-05
WTPH-G/8021	Gasoline Range Hydrocarbons	ug/l	2840	<50.0	<50.0	377	<1000
"	Benzene	"	327	<0.500	<0.500	3.27	477
"	Toluene	"	<5.00	<0.500	<0.500	0.650	12.0
"	Ethylbenzene	"	11.7	<0.500	<0.500	0.812	<10.0
"	Xylenes (total)	"	<10.0	1.06	<1.00	1.05	29.2
WTPH-D	Diesel Range Hydrocarbons	mg/l	8.85	<0.250	<0.250	2.67	0.363
"	Heavy Oil Range Hydrocarbons	"	3.88	<0.750	<0.750	<0.750	<0.750

Method	Analyte	Units	MW-11 Water 12/14/98 B812346-06	MW-12 Water 12/14/98 B812346-07	MW-13 Water 12/14/98 B812346-08	MW-14 Water 12/14/98 B812346-09	MW-15 Water 12/14/98 B812346-10
WTPH-G/8021	Gasoline Range Hydrocarbons	ug/l	<50.0	4730	853	1590	<50.0
"	Benzene	"	<0.500	229	1.68	182	<0.500
"	Toluene	"	<0.500	5.81	0.640	<2.50	<0.500
"	Ethylbenzene	"	<0.500	245	<0.500	<2.50	<0.500
"	Xylenes (total)	"	<1.00	196	3.43	9.39	<1.00
WTPH-D	Diesel Range Hydrocarbons	mg/l	<0.250	0.744	0.508	0.597	<0.250
"	Heavy Oil Range Hydrocarbons	"	<0.750	<0.750	<0.750	<0.750	<0.750

North Creek Analytical - Bothell

Matthew Essig, Project Manager

*The Summary Report is a subset of the final Analytical Report and does not include substantial supportive information such as quality control data; this report accurately summarizes sample results for your convenience only.

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ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
MW-1	B812346-01	Water	12/14/98
MW-6	B812346-02	Water	12/14/98
MW-7	B812346-03	Water	12/14/98
MW-9	B812346-04	Water	12/14/98
MW-10	B812346-05	Water	12/14/98
MW-11	B812346-06	Water	12/14/98
MW-12	B812346-07	Water	12/14/98
MW-13	B812346-08	Water	12/14/98
MW-14	B812346-09	Water	12/14/98
MW-15	B812346-10	Water	12/14/98

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*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.*

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ERI 1921 Edmonds Drive SE Renton, WA 98055	Project: TOSCO #5472 Project Number: 31023 Project Manager: John Meyer	Sampled: 12/14/98 Received: 12/15/98 Reported: 1/4/99 09:27
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Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
				B812346-01			Water	
MW-1 Gasoline Range Hydrocarbons	1280630	12/22/98	12/22/98		500	2840	ug/l	
Benzene	"	"	"		5.00	327	"	
Toluene	"	"	"		5.00	ND	"	
Ethylbenzene	"	"	"		5.00	11.7	"	
Xylenes (total)	"	"	"		10.0	ND	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		108	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		112	"	
				B812346-02			Water	
MW-6 Gasoline Range Hydrocarbons	1280630	12/22/98	12/22/98		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	1.06	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		96.7	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		102	"	
				B812346-03			Water	
MW-7 Gasoline Range Hydrocarbons	1280630	12/22/98	12/22/98		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		98.5	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		104	"	
				B812346-04			Water	
MW-9 Gasoline Range Hydrocarbons	1280630	12/22/98	12/22/98		50.0	377	ug/l	
Benzene	"	"	"		0.500	3.27	"	
Toluene	"	"	"		0.500	0.650	"	
Ethylbenzene	"	"	"		0.500	0.812	"	
Xylenes (total)	"	"	"		1.00	1.05	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		106	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		104	"	
				B812346-05			Water	
MW-10 Gasoline Range Hydrocarbons	1280630	12/22/98	12/22/98		1000	ND	ug/l	
Benzene	"	"	"		10.0	477	"	

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

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ERI 1921 Edmonds Drive SE Renton, WA 98055	Project: TOSCO #5472 Project Number: 31023 Project Manager: John Meyer	Sampled: 12/14/98 Received: 12/15/98 Reported: 1/4/99 09:27
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Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
MW-10 (continued)			B812346-05		Water			
Toluene	1280630	12/22/98	12/22/98		10.0	12.0	ug/l	
Ethylbenzene	"	"	"		10.0	ND	"	
Xylenes (total)	"	"	"		20.0	29.2	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		101	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		107	"	
MW-11			B812346-06		Water			
Gasoline Range Hydrocarbons	1280630	12/22/98	12/22/98		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		93.8	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		102	"	
MW-12			B812346-07		Water			
Gasoline Range Hydrocarbons	1280630	12/22/98	12/22/98		250	4730	ug/l	
Benzene	"	"	"		2.50	229	"	
Toluene	"	"	"		2.50	5.81	"	
Ethylbenzene	"	"	"		2.50	245	"	
Xylenes (total)	"	"	"		5.00	196	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		131	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		124	"	
MW-13			B812346-08		Water			
Gasoline Range Hydrocarbons	1280630	12/22/98	12/22/98		50.0	853	ug/l	
Benzene	"	"	"		0.500	1.68	"	
Toluene	"	"	"		0.500	0.640	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	3.43	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		184	%	1
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		137	"	
MW-14			B812346-09		Water			
Gasoline Range Hydrocarbons	1280630	12/22/98	12/22/98		250	1590	ug/l	
Benzene	"	"	"		2.50	182	"	
Toluene	"	"	"		2.50	ND	"	
Ethylbenzene	"	"	"		2.50	ND	"	

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

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ERI 1921 Edmonds Drive SE Renton, WA 98055	Project: TOSCO #5472 Project Number: 31023 Project Manager: John Meyer	Sampled: 12/14/98 Received: 12/15/98 Reported: 1/4/99 09:27
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Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
MW-14 (continued)				B812346-09			Water	
Xylenes (total)	1280630	12/22/98	12/22/98		5.00	9.39	ug/l	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		109	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		115	"	
MW-15				B812346-10			Water	
Gasoline Range Hydrocarbons	1280630	12/22/98	12/22/98		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (FID)	"	"	"	50.0-150		97.5	%	
Surrogate: 4-BFB (PID)	"	"	"	50.0-150		103	"	



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ERI
 1921 Edmonds Drive SE
 Renton, WA 98055

Project: TOSCO #5472
 Project Number: 31023
 Project Manager: John Meyer

Sampled: 12/14/98
 Received: 12/15/98
 Reported: 1/4/99 09:27

Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended) North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
				<u>B812346-01</u>				
MW-1							<u>Water</u>	
Diesel Range Hydrocarbons	1280488	12/17/98	12/22/98		1.25	8.85	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		3.75	3.88	"	
Surrogate: 2-FBP	"	"	"	50.0-150		56.3	%	
				<u>B812346-02</u>				
MW-6							<u>Water</u>	
Diesel Range Hydrocarbons	1280488	12/17/98	12/18/98		0.250	ND	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.750	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		51.4	%	
				<u>B812346-03</u>				
MW-7							<u>Water</u>	
Diesel Range Hydrocarbons	1280488	12/17/98	12/18/98		0.250	ND	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.750	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		66.1	%	
				<u>B812346-04</u>				
MW-9							<u>Water</u>	
Diesel Range Hydrocarbons	1280488	12/17/98	12/22/98		0.250	2.67	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.750	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		54.7	%	
				<u>B812346-05</u>				
MW-10							<u>Water</u>	
Diesel Range Hydrocarbons	1280488	12/17/98	12/18/98		0.250	0.363	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.750	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		84.8	%	
				<u>B812346-06</u>				
MW-11							<u>Water</u>	
Diesel Range Hydrocarbons	1280488	12/17/98	12/18/98		0.250	ND	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.750	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		62.3	%	
				<u>B812346-07</u>				
MW-12							<u>Water</u>	
Diesel Range Hydrocarbons	1280488	12/17/98	12/18/98		0.250	0.744	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.750	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		91.7	%	
				<u>B812346-08</u>				
MW-13							<u>Water</u>	
Diesel Range Hydrocarbons	1280488	12/17/98	12/18/98		0.250	0.508	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.750	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		62.0	%	

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

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ERI	Project: TOSCO #5472	Sampled: 12/14/98
1921 Edmonds Drive SE	Project Number: 31023	Received: 12/15/98
Renton, WA 98055	Project Manager: John Meyer	Reported: 1/4/99 09:27

Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended)
North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
MW-14				<u>B812346-09</u>			<u>Water</u>	
Diesel Range Hydrocarbons	1280488	12/17/98	12/18/98		0.250	0.597	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.750	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		110	%	
MW-15				<u>B812346-10</u>			<u>Water</u>	
Diesel Range Hydrocarbons	1280488	12/17/98	12/18/98		0.250	ND	mg/l	
Heavy Oil Range Hydrocarbons	"	"	"		0.750	ND	"	
Surrogate: 2-FBP	"	"	"	50.0-150		54.3	%	



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ERI	Project: TOSCO #5472	Sampled: 12/14/98
1921 Edmonds Drive SE	Project Number: 31023	Received: 12/15/98
Renton, WA 98055	Project Manager: John Meyer	Reported: 1/4/99 09:27

Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX 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: 1280630			Date Prepared: 12/22/98			Extraction Method: EPA 5030B (P/T)				
Blank			1280630-BLK1							
Gasoline Range Hydrocarbons	12/22/98			ND	ug/l	50.0				
Benzene	"			ND	"	0.500				
Toluene	"			ND	"	0.500				
Ethylbenzene	"			ND	"	0.500				
Xylenes (total)	"			ND	"	1.00				
Surrogate: 4-BFB (FID)	"	48.0		45.7	"	50.0-150	95.2			
Surrogate: 4-BFB (PID)	"	48.0		49.1	"	50.0-150	102			
LCS			1280630-BS1							
Gasoline Range Hydrocarbons	12/22/98	500		480	ug/l	70.0-130	96.0			
Surrogate: 4-BFB (FID)	"	48.0		50.6	"	50.0-150	105			
Duplicate			1280630-DUP1 B812346-04							
Gasoline Range Hydrocarbons	12/22/98		377	357	ug/l			25.0	5.45	
Surrogate: 4-BFB (FID)	"	48.0		47.2	"	50.0-150	98.3			
Matrix Spike			1280630-MS1 B812346-03							
Benzene	12/22/98	10.0	ND	10.7	ug/l	70.0-130	107			
Toluene	"	10.0	ND	9.98	"	70.0-130	99.8			
Ethylbenzene	"	10.0	ND	10.2	"	70.0-130	102			
Xylenes (total)	"	30.0	ND	28.2	"	70.0-130	94.0			
Surrogate: 4-BFB (PID)	"	48.0		49.4	"	50.0-150	103			
Matrix Spike Dup			1280630-MSD1 B812346-03							
Benzene	12/22/98	10.0	ND	10.2	ug/l	70.0-130	102	15.0	4.78	
Toluene	"	10.0	ND	9.91	"	70.0-130	99.1	15.0	0.704	
Ethylbenzene	"	10.0	ND	9.84	"	70.0-130	98.4	15.0	3.59	
Xylenes (total)	"	30.0	ND	29.5	"	70.0-130	98.3	15.0	4.47	
Surrogate: 4-BFB (PID)	"	48.0		48.7	"	50.0-150	101			



NORTH CREEK ANALYTICAL

Environmental Laboratory Services

BOTHELL ■ (425) 420-9200 ■ FAX 420-9210
 SPOKANE ■ (509) 924-9200 ■ FAX 924-9290
 PORTLAND ■ (503) 906-9200 ■ FAX 906-9210

ERI 1921 Edmonds Drive SE Renton, WA 98055	Project: TOSCO #5472 Project Number: 31023 Project Manager: John Meyer	Sampled: 12/14/98 Received: 12/15/98 Reported: 1/4/99 09:27
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Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended)/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: 1280488			Date Prepared: 12/17/98			Extraction Method: EPA 3510C/600 Series				
Blank			1280488-BLK1							
Diesel Range Hydrocarbons	12/17/98			ND	mg/l	0.250				
Heavy Oil Range Hydrocarbons	"			ND	"	0.750				
Surrogate: 2-FBP	"	0.332		0.255	"	50.0-150	76.8			
LCS			1280488-BS1							
Diesel Range Hydrocarbons	12/17/98	2.00		1.47	mg/l	60.0-140	73.5			
Surrogate: 2-FBP	"	0.332		0.173	"	50.0-150	52.1			
Duplicate			1280488-DUP1			B812346-03				
Diesel Range Hydrocarbons	12/18/98		ND	ND	mg/l				44.0	
Heavy Oil Range Hydrocarbons	"		ND	ND	"				44.0	
Surrogate: 2-FBP	"	0.626		0.349	"	50.0-150	55.8			
Duplicate			1280488-DUP2			B812346-04				
Diesel Range Hydrocarbons	12/18/98		2.67	3.18	mg/l				44.0	17.4
Heavy Oil Range Hydrocarbons	"		ND	ND	"				44.0	
Surrogate: 2-FBP	"	0.632		0.433	"	50.0-150	68.5			2



NORTH CREEK ANALYTICAL

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ERI 1921 Edmonds Drive SE Renton, WA 98055	Project: TOSCO #5472 Project Number: 31023 Project Manager: John Meyer	Sampled: 12/14/98 Received: 12/15/98 Reported: 1/4/99 09:27
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Notes and Definitions

#	Note
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- | | |
|--------|--|
| 1 | The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample. |
| 2 | Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit. |
| 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 - Bothell

Matthew Essig, 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



TOSCO CHAIN OF CUSTODY REPORT

B812346

TOSCO INFORMATION

Facility Number: 5472 1st
 Site Address: 3460 1st Ave S
 City, State, ZIP: SEATTLE, WA
 Site Release Number:
 Tosco Manager: TIM JOHNSON
 CERT INFO: (check one) Evaluation Remediation
 Detection Demolition Closure Miscellaneous

CONSULTANT INFORMATION

Firm: ERI Project# 31023
 Address: 1921 EDWARDS DR SE
RENTON, WA 98055
 Phone: (425) 227-0280 Fax: 10225
 Project Manager: JOHN MEYER
 Sample Collection by: JOHN MEYER

Chain of Custody Record #:
 Quality Assurance Data Level:
 A B
 A: Standard Summary
 B: Standard + Chromatograms
 Laboratory Turnaround Days:
 10 5 3 2 1

SAMPLE IDENTIFICATION	SAMPLING DATE / TIME	MATRIX (W.S.O)	# OF CONTAINERS
1. <u>MW-1</u>	<u>12/14/98</u>	<u>W</u>	<u>3</u>
2. <u>MW-6</u>	↓	↓	↓
3. <u>MW-7</u>			
4. <u>MW-9</u>			
5. <u>MW-10</u>			
6. <u>MW-11</u>			
7. <u>MW-12</u>			
8. <u>MW-13</u>			
9. <u>MW-14</u>			
10. <u>MW-15</u>			

○ OR ○ WA ○ AK ○ NW Series		TPH-HCID	TPH-Gas	BTEX EPA 8021 Mod.	TPH-Gas + BTEX	TPH-Diesel	TPH-Diesel Extended	TPH-Diesel-Ext. w/SG Cleanup	Halogen. Volatiles EPA 8021	Pesticides/PCBs or PCBs Only	GC/MS Volatiles EPA 8260	GC/MS Semi Vols. EPA 8270	PAH's: 8270 SIM or 8310	Lead:	Total or Dissolved TCLP or RCRA Metals (8)
				X	X	X	X								
				X	X	X	X								
				X	X	X	X								
				X	X	X	X								
				X	X	X	X								
				X	X	X	X								
				X	X	X	X								
				X	X	X	X								
				X	X	X	X								

NCA SAMPLE NUMBER

Relinquished by: John Meyer Firm: ERI Date & Time: 12/14/98
 Received by: Cathy Nichols Firm: NCA Date & Time: 12/15/98

Final Report Approval

Were all requested results provided? yes no Define
 Were results within requested turnaround? yes no "No" on back
 Final Approval Signature: _____
 Firm: _____ Date: _____

GROUNDWATER SAMPLING - FIELD LOG

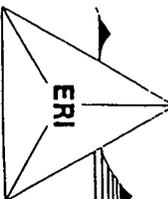
Client Name: Town 5477
 Location: 1st Ave / 9th Ave
 Field Crew: [Signature]

ERI Job No. 31023
 Field Cleaning Performed: _____
 Analysis: _____

Date: 12/14/98

Page 1 of 1

* - Case Volume = $(d_{well} - d_{water})_{in} \times F$ where F =
 0.163 for a 2" inside diameter well casing
 0.652 for a 4" inside diameter well casing
 1.467 for a 6" inside diameter well casing



ENVIRONMENTAL RESOLUTIONS, INC.

Well No.	Time	Depth Water (ft.)	Depth Well (ft.)	Case Dia. (in)	Case Vol* gal	Purge Vol. (gal)	Conduct. μ S/CM (X1000)	Temp. Deg F	pH	TURB. NTU	PID PPH	Comments
1		3.70	18	2	2							
6		4.62	18	2	2	6	0.51	54.0	6.92			
7		3.57	17	2	2	6	0.74	54.1	6.95			
8			19	2	2	6						Obstructed by surface water
9		3.94	20	2	2	6	0.19	53.6	7.67			
10		5.41	20	2	2	3						Dry c 3
11		4.90	20	2	2	6	0.27	61.3	7.40			
12		5.21	20	4	10	30	0.61	52.7	7.10			
13		6.75	15	2	2	6	0.51	61.5	7.41			
14		6.68	15	2	2	6	0.49	46.8	7.50			
15		5.78	15	2	2	3						Dry c 3g

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