Groundwater Sampling Report

Sampled: July 7, 2005
Submitted: July 20, 2005

Project Location:
1940 East 11th
Tacoma, WA 98421

Prepared For:
Bob Shea
633 North Mildred Street, F3
Tacoma, WA 98406

Prepared By:
Environmental Management Services
652 8th Avenue
Fox Island, WA 98333

EMS Project Personnel:
Stephen Spencer (253) 921-7069 – Direct – Principal
Mary Loftfield (425 260-1559 – Soil Scientist

PROJECT REVIEW

On July 7, 2005, Environmental Management Services (EMS) environmental scientist, Mary Loftfield collection of groundwater samples in cooperation with Adapt Engineering at the Shea Property Located at 1940 East 11th Tacoma. Based on inferred groundwater flow direction and laboratory sampling results, a contaminated groundwater plume from the former automotive tire service facility, located adjacent to the southeast of the Shea property, extends underneath the Shea property (the Site). The contamination was discovered on the southern adjacent property in March of 2004 when Environmental Associates, Inc. (EAI) performed a preliminary subsurface investigation at the request of Mr. Doug Dennis, owner of Revchem Plastics and prospective purchaser of the property. Tetrachloroethene (PCE) was discovered in groundwater collected from borings near a former parts cleaning station in northern portion of the Revchem Plastics property. Chlorinated solvents have historically been used as an automotive parts cleaner and degreaser. Four monitoring wells were installed on the site of the former automotive tire service facility.

On January 24, 2005, eight additional borings were placed with a Stratoprobe drill rig using a 4-foot stainless steel 2-inch diameter probe lined with PECT polyethylene liners. Six of these borings were in the driveway on the southwest portion of the Shea Property, adjacent to the north of the former automotive tire service facility. Soil boring samples from each boring were tested with a photoionization meter inserted into a small opening in a ziplock bag. All headspace samples were negative for volatile organic compounds.

Groundwater samples from the six borings were collected in VOA vials and analyzed for perchloroethylene (perc) and metabolites: trichloroethylene, cis- and trans-dichloroethylene, and vinyl chloride. This analysis was performed onsite by a Environmental Services Network Northwest (ESN) mobile laboratory following EPA method 8021-B on Shadmizu GC14A gas chromatograph. Chlorinated solvents were detected in some of the groundwater samples. Analytical results are attached. Four monitoring wells (MW-5 – MW-8) were installed on January 24, 2005 in the southwest Site driveway based on groundwater results from the six borings. Three of the monitoring wells were at area where PCE and metabolites were detected in the groundwater samples from the borings, and one at a location where none of the compounds were found (non-detect).

EMS returned to the Site on January 27, 2005 with Robert Roe, EAI Hydrogeologist, to survey the site, and develop and sample the monitoring wells. The site surveyed determined the depth to groundwater (6-8 feet) and the direction of groundwater flow (north). Subsequent analysis of the groundwater samples by Libby Environmental found tetrachloroethene and the chlorinated solvent's breakdown products (metabolites) in all four of the monitoring wells (MW-5 – MW-8).

contamination remained the same. The difference in the pattern of PCE and TCE contamination suggests that the groundwater plume may have spread out somewhat (wider east to west). This could be due to the slower groundwater flow in the summer months. It also should be remembered that the sampling protocol was changed between sampling events.

- Groundwater concentrations of the parent compounds, PCE and TCE, both solvents used for parts cleaning are highest in MW-8 and MW-7, while concentrations of their metabolites are highest in MW-6. This suggests that PCE and TCE are breaking down as the plume moves north. PCE and TCE are used in solvents partially because they don't breakdown in oxygen rich conditions. Oxygen concentrations in all the monitoring wells are very low and the lack of oxygen supports the anaerobic breakdown of these compounds.

- Concentrations of PCE in MW-6 through MW-8 are above MTCA-A cleanup levels for unrestricted land use. The same is true of TCE concentrations in MW-8.

SCHEDULED WORK / EVENTS

- Additional sampling to be scheduled
- Meeting between EMS and Robert Shea to determine course of action.

DELIVERABLES SUBMITTED

- Sampling Report – July 2005
- Analytical Results
- Water quality results
- Water quality worksheets

ISSUES FOR CLIENTS / NEW DEVELOPMENTS

- Groundwater contamination has not decreased since the January 2005 sampling. The evidence indicates that PCE contamination is moving from the driveway under the building.

DISTRIBUTION LIST

- Bob Shea, Client - soundincrest@msn.com
- John Spencer, Spencer Loescher - jspencer@spencerloescher.com

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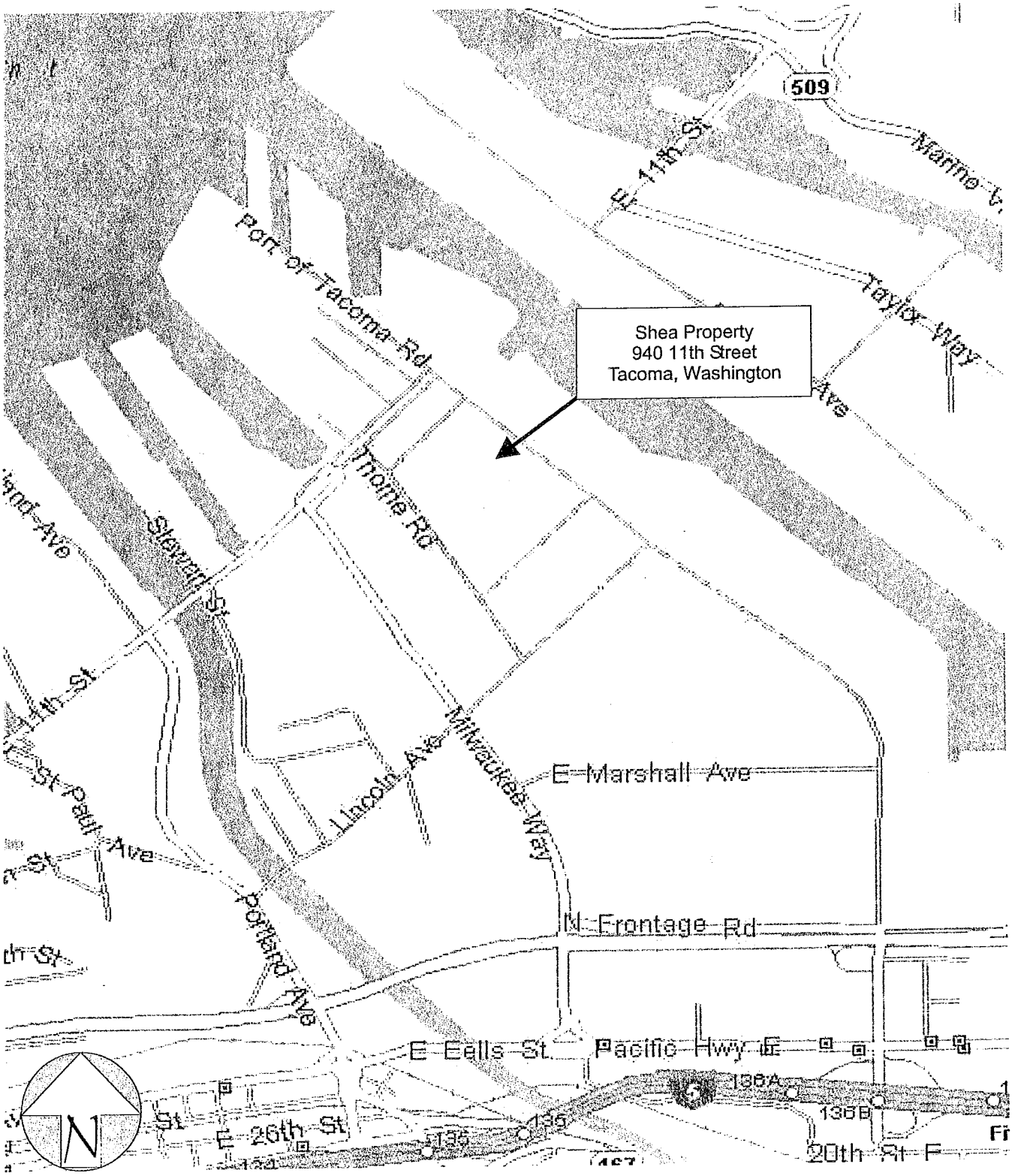
652-8th Avenue, Fox Island, Washington 98333
Phone: (253) 921-7059 Fax: (253) 549-2717 E-Mail: ems@emsgroupllc.com



EMS Environmental Services	Site Location Map Shea Property 940 E. 11th Street Tacoma, Washington	Project No./Name: Shea - 002 Date: July 22, 2005 Drawn / Created By: S.Spencer Checked By: S.Spencer	Figure No.: 01

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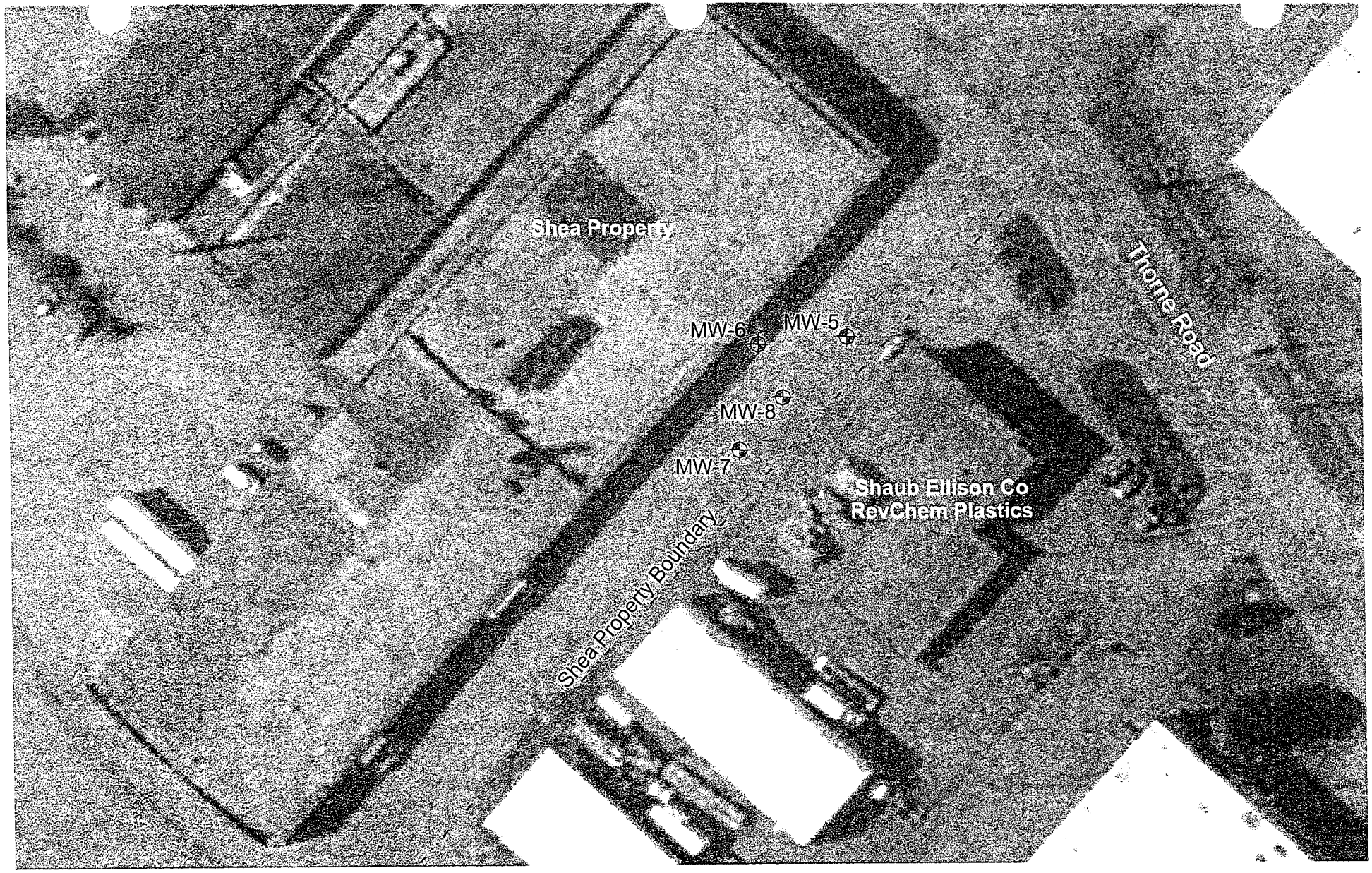

N

MW-7 Monitoring Well Location and ID

40.0 20.0 0 40.0

APPROXIMATE SCALE IN FEET

EMS Environmental Services

Well Location Map
Shea Property
1940 E. 11th Street
Tacoma, Washington

Project No./Name: Shea - 002

Date: July 22, 2005
Drawn / Created By: S.Spencer
Checked By: S.Spencer

Figure No.: 03

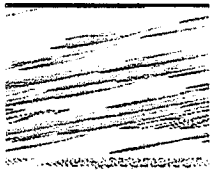

Table 1 - Sampling Results
Monitoring Well MW-5
Brown & Haley building
1940 East 11th
Tacoma, WA 98421

July 22, 2005

Monitoring Well ID	Date Sampled	Chlorinated Solvents by Method 8260 ug/l (ppb)											Depth To Water (ft)	Ground Water Elevation	Top Of Casing (ft)
		Vinyl Chloride	Chloroethane	1,1-Dichloroethene	Methlyene Chloride	trans-1,2-Dichlorethene	1,1-Dichloroethane	CIS 1,2-Dichloroethene	1,2-Dichloroethene	1,1,1-Trichloroethane	Trichloroethene	Tetrachloroethene (PCE)			
MW-5	01/31/05	<0.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.8	6.06	5.27	11.33
	07/11/05	<0.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5.9	6.21	5.12	11.33

8260B = EPA method for volatile organic compounds (Chlorinated Solvents)
<1.0 = Concentrations were not detected above the laboratory reporting limit
ug/L = Micrograms per liter
p = Purge sampling methods were used
NM = Not measured.

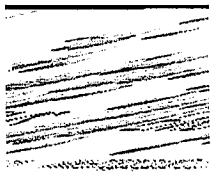

Table 1 - Sampling Results
Monitoring Well MW-7
Brown & Haley building
1940 East 11th
Tacoma, WA 98421

July 22, 2005

Monitoring Well ID	Date Sampled	Chlorinated Solvents by Method 8260 ug/l (ppb)											Depth To Water (ft)	Ground Water Elevation	Top Of Casing (ft)
		Vinyl Chloride	Chloroethane	1,1-Dichloroethene	Methlyene Chloride	trans-1,2-Dichlorethene	1,1-Dichloroethane	CIS 1,2-Dichloroethene	1,2-Dichloroethene	1,1,1-Trichloroethane	Trichloroethene	Tetrachloroethene			
MW-7	01/31/05	<0.2	<1.0	<1.0	<1.0	<1.0	<1.0	2.8	<1.0	<1.0	<1.0	2.7	5.98	5.66	11.64
	07/11/05	<0.2	<1.0	<1.0	<1.0	<1.0	<1.0	2.3	<1.0	<1.0	3.1	27	6.11	5.53	11.64

8260B = EPA method for volatile organic compounds (Chlorinated Solvents)
<1.0 = Concentrations were not detected above the laboratory reporting limit
ug/L = Micrograms per liter
p = Purge sampling methods were used
NM = Not measured.

Table 2 - Water Quality Field Measurements
Monitoring Wells
Brown & Haley building
1940 East 11th
Tacoma, WA 98421

July 7, 2005

Monitoring Well ID	Date Sampled	Volume purged		Field Measurements						
		gallons	casing volumes removed	pH	Conductivity millivolts (mV)	temperature °C	dissolved oxygen mg/L	turbidity	color	Odor/Sheen
MW-5	07/07/05	1.1	0.8	7.53	-30.7	17.1	1.48	NM	clear	none
MW-6	07/07/05	1.2	0.9	7.68	-39.8	17.2	1.21	NM	clear--light	organic odor
MW-7	07/07/05	0.9	0.6	7.80	-45.6	17.3	1.22	NM	clear	none
MW-8	07/07/05	1.3	1.0	7.12	-7.7	16.9	1.1	NM	light	none

ug/L = Micrograms per liter
p = Purge sampling methods were used
NM = Not measured.

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number: A59711-3
Client: Libby Environmental
Client Project Name: Shea
Client Project Number: na
Date received: 07/11/05

Analytical Results

8260B, µg/L		MTH BLK	LCS	MW5	MW6	MW7	MW8
Matrix	Water	Water	Water	Water	Water	Water	Water
Date analyzed	Reporting Limits	07/11/05	07/11/05	07/11/05	07/11/05	07/11/05	07/11/05
Chloromethane	1.0	nd		nd	nd	nd	nd
Vinyl chloride(*)	0.2	nd		nd	0.48	nd	nd
Chloroethane	1.0	nd		nd	nd	nd	nd
Trichlorofluoromethane	1.0	nd		nd	nd	nd	nd
1,1-Dichloroethene	1.0	nd		nd	nd	nd	nd
Methylene chloride	1.0	nd		nd	nd	nd	nd
trans-1,2-Dichloroethene	1.0	nd		nd	6.7	nd	1.2
1,1-Dichloroethane	1.0	nd		nd	nd	nd	nd
2,2-Dichloropropane	1.0	nd		nd	nd	nd	nd
cis-1,2-Dichloroethene	1.0	nd		nd	64	2.3	7.5
Chloroform	1.0	nd		nd	nd	nd	nd
1,1,1-Trichloroethane	1.0	nd		nd	nd	nd	nd
Carbontetrachloride	1.0	nd		nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd		nd	nd	nd	nd
1,2-Dichloroethane(EDC)	1.0	nd		nd	nd	nd	nd
Trichloroethene	1.0	nd	111%	1.0	2.8	3.1	7.4
1,2-Dichloropropane	1.0	nd		nd	nd	nd	nd
Bromodichloromethane	1.0	nd		nd	nd	nd	nd
cis-1,3-Dichloropropene	1.0	nd		nd	nd	nd	nd
trans-1,3-Dichloropropene	1.0	nd		nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd		nd	nd	nd	nd
Tetrachloroethene	1.0	nd		5.9	9.7	27	79
1,3-Dichloropropane	1.0	nd		nd	nd	nd	nd
Dibromochloromethane	1.0	nd		nd	nd	nd	nd
Chlorobenzene	1.0	nd	89%	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd		nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd		nd	nd	nd	nd
2-Chlorotoluene	1.0	nd		nd	nd	nd	nd
4-Chlorotoluene	1.0	nd		nd	nd	nd	nd
1,3-Dichlorobenzene	1.0	nd		nd	nd	nd	nd
1,4-Dichlorobenzene	1.0	nd		nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd		nd	nd	nd	nd
*-instrument detection limits							
Surrogate recoveries							
Dibromofluoromethane		87%	80%	81%	85%	87%	80%
Toluene-d8		103%	94%	109%	98%	87%	98%
1,2-Dichloroethane-d4		112%	129%	106%	121%	114%	119%
4-Bromofluorobenzene		128%	125%	111%	111%	112%	107%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
Acceptable Recovery limits: 70% TO 130%

ADVANCED ANALYTICAL

Chain of Custody Record

Page 1 of 1

Laboratory Job #:

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(425) 497-0110 fax: (425) 497-8089
aachemlab@yahoo.com

Client: EMS, LLC

Project Manager: Mary

Address:

Phone: 253-421-7054 Fax: 253-

Project Name: ~~Hecht~~ Shea Tac

Project Number:

Collector: Mary Loftfield

Date of collection: 7-7-2005

	Sample ID	Time	Matrix	Container type	8260 Volatiles	8021B Volatiles	BTEX	BTEX/NWTPH-Gx	NWTPH-Gx	NWTPH-Dx	NWTPH-HCID	8270 Semivolatiles	8270 PAH	8082 PCbs	8081 Pesticides	RCRA 8 Metals	Lead	Notes, comments	# of containers
1	MW 5		H2O	Vial	X													Cl solvents	
2	MW 6				X													15K Steve	
3	MW 7				X														
4	MW 8				X														
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			

Relinquished by:	Date/Time	Received by:	Date/Time
Mary Loftfield	7/7/05	Shy L Chitt	7.7.05
Relinquished by:	Date/Time	Received by:	Date/Time

Sample receipt info:

Total # of containers:

Condition (temp, °C)

Seals (intact?, Y/N)

Comments:

Turnaround time:

Same day O

24 hr O

48 hr O

Standard O