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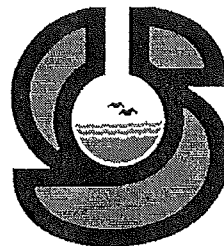
Sound Analytical Services, Inc.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

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TRANSMITTAL MEMORANDUM

DATE: July 10, 2000

TO: Ken Morgan
Ken Morgan
509 South Liberty
Port Angeles, WA 98362

PROJECT: AGNEW GROCERY

REPORT NUMBER: 90681

Enclosed are the test results for fifteen samples received at Sound Analytical Services on June 27, 2000.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,

Tom Watson
Project Manager

SOUND ANALYTICAL EPH / VPH

SAMPLE SUMMARY REPORTS
AND
WORKSHEETS

SOUND ANALYTICAL EPH / VPH SUMMARY REPORT

Client Sample ID: DG-1
Work Order 90681
Laboratory ID: 90681-01
Date Sampled: _____ Date Received: 6/27/00
Date Prepared: EPH 6/28/00 PAHs 6/28/00 VPH 6/28/00
Date Analyzed: EPH 6/29/00 PAHs 7/5/00 VPH 6/28/00
Matrix: solid % Solids: 93.72

ANALYTICAL RESULTS:

Non-Carcinogen - Human Health Hazard Index Compounds

<u>Compound</u>	<u>mg/kg</u>
Total Aliphatics	390
Total Aromatics *	370
Benzene	ND
Ethylbenzene	3.5
Toluene	ND
Xylenes	27

* Total aromatics is aromatic fractions + benzene - ethylbenzene, toluene & xylenes

Carcinogen - Human Health Risk Compounds

<u>Compound</u>	<u>mg/kg</u>	<u>PQL</u>
Benzene *	1	2
Total cPAHs *	0.06	0.13

* For compounds not detected, 1/2 PQL values are Substituted

Soil to Groundwater - Fate and Transport Fractions

<u>Aliphatic Fractions</u>	<u>mg/kg</u>
C5 - C6	ND
>C6 - C8	8.1
>C8 - C10	200
>C10 - C12	130
>C12 - C16	42
>C16 - C21	<u>5.7</u>
Total Aliphatic Fractions	390

<u>Aromatic Fractions</u>	<u>mg/kg</u>
>C8 - C10*	180
>C10 - C12	140
>C12 - C16	41
>C16 - C21	5.5
>C21 - C34	<u>ND</u>
Total Aromatic Fractions	370

* Does not include ethylbenzene and xylenes

HUMAN HEALTH SOILS CONTACT WORKSHEETS

CLIENT ID DG-1
LAB ID 90681-01

Non-Carcinogen--Hazard Index

Compound	Soil ppm	<u>Residential</u>			<u>Commercial</u>			<u>Industrial</u>		
		ORfD	Factor	Res. Mult.	HQ	Factor	Com. Mult.	HQ	Factor	Ind. Mult.
Total aliphatic	390	0.06	1.25E-05	2.08E-04	0.08	3.13E-06	5.21E-05	0.02	2.86E-07	4.77E-06
Total aromatic*	370	0.03	1.25E-05	4.17E-04	0.15	3.13E-06	1.04E-04	0.04	2.86E-07	9.53E-06
Benzene	0.0									
Ethylbenzene	3.5	0.10	1.25E-05	1.25E-04	0.00	3.13E-06	3.13E-05	0.00	2.86E-07	2.86E-06
Toluene	0.0	0.20	1.25E-05	6.25E-05	0.00	3.13E-06	1.56E-05	0.00	2.86E-07	1.43E-06
Xylenes	26.6	2.00	1.25E-05	6.25E-06	0.00	3.13E-06	1.56E-06	0.00	2.86E-07	1.43E-07

Hazard Index

0.24

0.06

0.01

* Total aromatic is total of aromatic fractions plus benzene minus ethylbenzene, toluene and xylenes

Carcinogen Risk

Compound	Soil ppm	<u>Residential</u>			<u>Commercial</u>			<u>Industrial</u>		
		OCPF	Res. Mult.	Risk	Com. Mult.	Risk		Ind. Mult.	Risk	
Benzene *	1.00	0.029	1.00E-06	2.90E-08	2.50E-07	7.25E-09		7.62E-08	2.21E-09	
Total cPAHs *	0.06	7.30	1.00E-06	4.60E-07	2.50E-07	1.15E-07		7.62E-08	3.50E-08	

* For parameters not detected 1/2 PQL values are substituted

FATE AND TRANSPORT - SOIL TO GROUNDWATER

"Raoult's Law" Worksheet

CLIENT ID DG-1

LAB ID 90681-01

COMPOUND	Soil mg/kg	MW g/mol	Moles mmol/kg	Mol Frac.	Solubility mg/l	Effect. Sol. mg/l	DF	Well Conc. mg/l
Aliphatics								
EC 5 - 6	0	81	0.0	0.00	2.8E+01	0.0E+00	20	0.0E+00
EC >6 - 8	8	100	0.1	0.01	4.2E+00	5.9E-02	20	2.9E-03
EC >8 - 10	200	130	1.5	0.27	3.3E-01	8.8E-02	20	4.4E-03
EC >10 - 12	130	160	0.8	0.14	2.6E-02	3.6E-03	20	1.8E-04
EC >12 - 16	42	200	0.2	0.04	5.9E-04	2.1E-05	20	1.1E-06
EC >16 - 21	6	270	0.0	0.00	1.0E-06	3.6E-09	20	1.8E-10
Aromatics								
Benzene	0.0	78	0.0	0.00	1.8E+03	0.0E+00	20	0.0E+00
Toluene	0.0	92	0.0	0.00	5.2E+02	0.0E+00	20	0.0E+00
EC >8 - 10*	210	120	1.8	0.30	6.5E+01	2.0E+01	20	9.8E-01
EC >10 - 12	140	130	1.1	0.19	2.5E+01	4.6E+00	20	2.3E-01
EC >12 - 16	41	150	0.3	0.05	5.8E+00	2.7E-01	20	1.4E-02
EC >16 - 21	6	190	0.0	0.00	5.1E-01	2.5E-03	20	1.3E-04
EC >21 - 35	0	240	0.0	0.00	6.6E-03	0.0E+00	20	0.0E+00
			5.8	1.00				1.2

* Includes ethylbenzene & xylenes

Well Conc. must be 1 mg/l or less for soil concentrations to be protective of Method A drinking water standard.

SOUND ANALYTICAL EPH / VPH SUMMARY REPORT

Client Sample ID: DG-2
Work Order: 90681
Laboratory ID: 90681-02
Date Sampled: _____ Date Received: 6/27/00
Date Prepared: EPH 6/28/00 PAHs 6/28/00 VPH 6/28/00
Date Analyzed: EPH 6/29/00 PAHs 7/5/00 VPH 6/28/00
Matrix: solid % Solids: 90.95

ANALYTICAL RESULTS:

Non-Carcinogen - Human Health Hazard Index Compounds

<u>Compound</u>	<u>mg/kg</u>
Total Aliphatics	760
Total Aromatics *	840
Benzene	ND
Ethylbenzene	12
Toluene	3
Xylenes	160

* Total aromatics is aromatic fractions + benzene - ethylbenzene, toluene & xylenes

Carcinogen - Human Health Risk Compounds

<u>Compound</u>	<u>mg/kg</u>	<u>PQL</u>
Benzene *	0.1	0.2
Total oPAHs *	0.07	0.14

* For compounds not detected, 1/2 PQL values are Substituted

Soil to Groundwater - Fate and Transport Fractions

<u>Aliphatic Fractions</u>	<u>mg/kg</u>
C5 - C6	ND
>C6 - C8	31
>C8 - C10	560
>C10 - C12	130
>C12 - C16	32
>C16 - C21	<u>5.6</u>
Total Aliphatic Fractions	760

<u>Aromatic Fractions</u>	<u>mg/kg</u>
>C8 - C10*	610
>C10 - C12	190
>C12 - C16	32
>C16 - C21	5.5
>C21 - C34	<u>ND</u>
Total Aromatic Fractions	840

* Does not include ethylbenzene and xylenes

HUMAN HEALTH SOILS CONTACT WORKSHEETS

CLIENT ID DG-2
LAB ID 90681-02

Non-Carcinogen--Hazard Index

Compound	Soil ppm	<u>Residential</u>			<u>Commercial</u>			<u>Industrial</u>		
		ORfD	Factor	Res. Mult.	HQ	Factor	Com. Mult.	HQ	Factor	Ind. Mult.
Total aliphatic	760	0.06	1.25E-05	2.08E-04	0.16	3.13E-06	5.21E-05	0.04	2.86E-07	4.77E-06
Total aromatic*	840	0.03	1.25E-05	4.17E-04	0.35	3.13E-06	1.04E-04	0.09	2.86E-07	9.53E-06
Benzene	0.0									
Ethylbenzene	12.0	0.10	1.25E-05	1.25E-04	0.00	3.13E-06	3.13E-05	0.00	2.86E-07	2.86E-06
Toluene	3.0	0.20	1.25E-05	6.25E-05	0.00	3.13E-06	1.56E-05	0.00	2.86E-07	1.43E-06
Xylenes	156.0	2.00	1.25E-05	6.25E-06	0.00	3.13E-06	1.56E-06	0.00	2.86E-07	1.43E-07
Hazard Index					0.51			0.13		0.01

* Total aromatic is total of aromatic fractions plus benzene minus ethylbenzene, toluene and xylenes

Carcinogen Risk

Compound	Soil ppm	<u>Residential</u>			<u>Commercial</u>			<u>Industrial</u>		
		OCPF	Res. Mult.	Risk	Com. Mult.	Risk		Ind. Mult.	Risk	
Benzene *	0.10	0.029	1.00E-06	2.90E-09	2.50E-07	7.25E-10		7.62E-08	2.21E-10	
Total cPAHs *	0.07	7.30	1.00E-06	5.11E-07	2.50E-07	1.28E-07		7.62E-08	3.89E-08	

* For parameters not detected 1/2 PQL values are substituted

FATE AND TRANSPORT - SOIL TO GROUNDWATER

"Raoult's Law" Worksheet

CLIENT ID DG-2

LAB ID 90681-02

COMPOUND	Soil mg/kg	MW g/mol	Moles mmol/kg	Mol Frac.	Solubility mg/l	Effect. Sol. mg/l	DF	Well Conc. mg/l
Aliphatics								
EC 5 - 6	0	81	0.0	0.00	2.8E+01	0.0E+00	20	0.0E+00
EC >6 - 8	31	100	0.3	0.02	4.2E+00	9.4E-02	20	4.7E-03
EC >8 - 10	560	130	4.3	0.31	3.3E-01	1.0E-01	20	5.1E-03
EC >10 - 12	130	160	0.8	0.06	2.6E-02	1.5E-03	20	7.6E-05
EC >12 - 16	32	200	0.2	0.01	5.9E-04	6.8E-06	20	3.4E-07
EC >16 - 21	6	270	0.0	0.00	1.0E-06	1.5E-09	20	7.5E-11
Aromatics								
Benzene	0.0	78	0.0	0.00	1.8E+03	0.0E+00	20	0.0E+00
Toluene	3.0	92	0.0	0.00	5.2E+02	1.2E+00	20	6.1E-02
EC >8 - 10*	778	120	6.5	0.47	6.5E+01	3.0E+01	20	1.5E+00
EC >10 - 12	190	130	1.5	0.11	2.5E+01	2.6E+00	20	1.3E-01
EC >12 - 16	32	150	0.2	0.02	5.8E+00	8.9E-02	20	4.5E-03
EC >16 - 21	6	190	0.0	0.00	5.1E-01	1.1E-03	20	5.3E-05
EC >21 - 35	0	240	0.0	0.00	6.6E-03	0.0E+00	20	0.0E+00
			13.8	1.00				1.7

* Includes ethylbenzene & xylenes

Well Conc. must be 1 mg/l or less for soil concentrations to be protective of Method A drinking water standard.

SOUND ANALYTICAL EPH / VPH SUMMARY REPORT

Client Sample ID: DG-3
Work Order: 90681
Laboratory ID: 90681-03
Date Sampled: _____ Date Received: 6/27/00
Date Prepared: EPH 6/28/00 PAHs 6/28/00 VPH 6/28/00
Date Analyzed: EPH 6/29/00 PAHs 7/5/00 VPH 6/29/00
Matrix: solid % Solids: 80.99

ANALYTICAL RESULTS:

Non-Carcinogen - Human Health Hazard Index Compounds

<u>Compound</u>	<u>mg/kg</u>
Total Aliphatics	ND
Total Aromatics *	1.3
Benzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND

* Total aromatics is aromatic fractions + benzene - ethylbenzene, toluene & xylenes

Carcinogen - Human Health Risk Compounds

<u>Compound</u>	<u>mg/kg</u>	<u>PQL</u>
Benzene *	0.13	0.25
Total cPAHs *	0.08	0.15

* For compounds not detected, 1/2 PQL values are Substituted

Soil to Groundwater - Fate and Transport Fractions

<u>Aliphatic Fractions</u>	<u>mg/kg</u>
C5 - C6	ND
>C6 - C8	ND
>C8 - C10	ND
>C10 - C12	ND
>C12 - C16	ND
>C16 - C21	ND
Total Aliphatic Fractions	ND

<u>Aromatic Fractions</u>	<u>mg/kg</u>
>C8 - C10*	1.3
>C10 - C12	ND
>C12 - C16	ND
>C16 - C21	ND
>C21 - C34	ND
Total Aromatic Fractions	1.3

* Does not include ethylbenzene and xylenes

HUMAN HEALTH SOILS CONTACT WORKSHEETS

CLIENT ID DG-3
LAB ID 90681-03

Non-Carcinogen--Hazard Index

Compound	Soil ppm	<u>Residential</u>			<u>Commercial</u>			<u>Industrial</u>		
		ORfD	Factor	Res. Mult.	HQ	Factor	Com. Mult.	HQ	Factor	Ind. Mult.
Total aliphatic	0	0.06	1.25E-05	2.08E-04	0.00	3.13E-06	5.21E-05	0.00	2.86E-07	4.77E-06
Total aromatic*	1	0.03	1.25E-05	4.17E-04	0.00	3.13E-06	1.04E-04	0.00	2.86E-07	9.53E-06
Benzene	0.0									
Ethylbenzene	0.0	0.10	1.25E-05	1.25E-04	0.00	3.13E-06	3.13E-05	0.00	2.86E-07	2.86E-06
Toluene	0.0	0.20	1.25E-05	6.25E-05	0.00	3.13E-06	1.56E-05	0.00	2.86E-07	1.43E-06
Xylenes	0.0	2.00	1.25E-05	6.25E-06	0.00	3.13E-06	1.56E-06	0.00	2.86E-07	1.43E-07
Hazard Index					0.00			0.00		0.00

* Total aromatic is total of aromatic fractions plus benzene minus ethylbenzene, toluene and xylenes

Carcinogen Risk

Compound	Soil ppm	<u>Residential</u>			<u>Commercial</u>			<u>Industrial</u>		
		OCPF	Res. Mult.	Risk	Com. Mult.	Risk	Ind. Mult.	Risk		
Benzene *	0.13	0.029	1.00E-06	3.77E-09	2.50E-07	9.43E-10	7.62E-08	2.87E-10		
Total cPAHs *	0.08	7.30	1.00E-06	5.62E-07	2.50E-07	1.41E-07	7.62E-08	4.28E-08		

* For parameters not detected 1/2 PQL values are substituted

FATE AND TRANSPORT - SOIL TO GROUNDWATER

"Raoult's Law" Worksheet

CLIENT ID DG-3

LAB ID 90681-03

COMPOUND	Soil mg/kg	MW g/mol	Moles mmol/kg	Mol Frac.	Solubility mg/l	Effect. Sol. mg/l	DF	Well Conc. mg/l
Aliphatics								
EC 5 - 6	0	81	0.0	0.00	2.8E+01	0.0E+00	20	0.0E+00
EC >6 - 8	0	100	0.0	0.00	4.2E+00	0.0E+00	20	0.0E+00
EC >8 - 10	0	130	0.0	0.00	3.3E-01	0.0E+00	20	0.0E+00
EC >10 - 12	0	160	0.0	0.00	2.6E-02	0.0E+00	20	0.0E+00
EC >12 - 16	0	200	0.0	0.00	5.9E-04	0.0E+00	20	0.0E+00
EC >16 - 21	0	270	0.0	0.00	1.0E-06	0.0E+00	20	0.0E+00
Aromatics								
Benzene	0.0	78	0.0	0.00	1.8E+03	0.0E+00	20	0.0E+00
Toluene	0.0	92	0.0	0.00	5.2E+02	0.0E+00	20	0.0E+00
EC >8 - 10*	1	120	0.0	1.00	6.5E+01	6.5E+01	20	3.3E+00
EC >10 - 12	0	130	0.0	0.00	2.5E+01	0.0E+00	20	0.0E+00
EC >12 - 16	0	150	0.0	0.00	5.8E+00	0.0E+00	20	0.0E+00
EC >16 - 21	0	190	0.0	0.00	5.1E-01	0.0E+00	20	0.0E+00
EC >21 - 35	0	240	0.0	0.00	6.6E-03	0.0E+00	20	0.0E+00
			0.0	1.00				3.3

* Includes ethylbenzene & xylenes

Well Conc. must be 1 mg/l or less for soil concentrations to be protective of Method A drinking water standard.

SOUND ANALYTICAL EPH / VPH SUMMARY REPORT

Client Sample ID:	<u>DG-6</u>				
Work Order	<u>90681</u>				
Laboratory ID:	<u>90681-06</u>				
Date Sampled:	<u> </u>	Date Received:	<u>6/27/00</u>		
Date Prepared:	EPH	<u>6/28/00</u>	PAHs	<u>6/28/00</u>	VPH <u>6/28/00</u>
Date Analyzed:	EPH	<u>6/29/00</u>	PAHs	<u>7/5/00</u>	VPH <u>6/28/00</u>
Matrix:	<u>solid</u>	% Solids:	<u>74.67</u>		

ANALYTICAL RESULTS:

Non-Carcinogen - Human Health Hazard Index Compounds

<u>Compound</u>	<u>mg/kg</u>
Total Aliphatics	7800
Total Aromatics *	2100
Benzene	ND
Ethylbenzene	17
Toluene	4.4
Xylenes	52

* Total aromatics is aromatic fractions + benzene - ethylbenzene, toluene & xylenes

Carcinogen - Human Health Risk Compounds

<u>Compound</u>	<u>mg/kg</u>	<u>PQL</u>
Benzene *	1.3	2.5
Total cPAHs *	0.08	0.17

* For compounds not detected, 1/2 PQL values are Substituted

Soil to Groundwater - Fate and Transport Fractions

<u>Aliphatic Fractions</u>	<u>mg/kg</u>
C5 - C6	ND
>C6 - C8	140
>C8 - C10	950
>C10 - C12	2800
>C12 - C16	3600
>C16 - C21	<u>350</u>
Total Aliphatic Fractions	7800

<u>Aromatic Fractions</u>	<u>mg/kg</u>
>C8 - C10*	420
>C10 - C12	600
>C12 - C16	990
>C16 - C21	34
>C21 - C34	<u>13</u>
Total Aromatic Fractions	2100

* Does not include ethylbenzene and xylenes

HUMAN HEALTH SOILS CONTACT WORKSHEETS

CLIENT ID DG-6
LAB ID 90681-06

Non-Carcinogen--Hazard Index

Compound	Soil ppm	<u>Residential</u>			<u>Commercial</u>			<u>Industrial</u>		
		ORfD	Factor	Res. Mult.	HQ	Factor	Com. Mult.	HQ	Factor	Ind. Mult.
Total aliphatic	7800	0.06	1.25E-05	2.08E-04	1.63	3.13E-06	5.21E-05	0.41	2.86E-07	4.77E-06
Total aromatic*	2100	0.03	1.25E-05	4.17E-04	0.88	3.13E-06	1.04E-04	0.22	2.86E-07	9.53E-06
Benzene	0.0									<u>0.02</u>
Ethylbenzene	17.0	0.10	1.25E-05	1.25E-04	0.00	3.13E-06	3.13E-05	0.00	2.86E-07	2.86E-06
Toluene	4.4	0.20	1.25E-05	6.25E-05	0.00	3.13E-06	1.56E-05	0.00	2.86E-07	1.43E-06
Xylenes	52.0	2.00	1.25E-05	6.25E-06	<u>0.00</u>	3.13E-06	1.56E-06	<u>0.00</u>	2.86E-07	1.43E-07
Hazard Index					2.50			0.63		0.06

* Total aromatic is total of aromatic fractions plus benzene minus ethylbenzene, toluene and xylenes

Carcinogen Risk

Compound	Soil ppm	<u>Residential</u>			<u>Commercial</u>			<u>Industrial</u>		
		OCPF	Res. Mult.	Risk	Com. Mult.	Risk	Ind. Mult.	Risk		
Benzene *	1.30	0.029	1.00E-06	3.77E-08	2.50E-07	9.43E-09	7.62E-08	2.87E-09		
Total cPAHs *	0.08	7.30	1.00E-06	6.13E-07	2.50E-07	1.53E-07	7.62E-08	4.67E-08		

* For parameters not detected 1/2 PQL values are substituted

FATE AND TRANSPORT - SOIL TO GROUNDWATER

"Raoult's Law" Worksheet

CLIENT ID DG-6

LAB ID 90681-06

COMPOUND	Soil mg/kg	MW g/mol	Moles mmol/kg	Mol Frac.	Solubility mg/l	Effect. Sol. mg/l	DF	Well Conc. mg/l
Aliphatics								
EC 5 - 6	0	81	0.0	0.00	2.8E+01	0.0E+00	20	0.0E+00
EC >6 - 8	140	100	1.4	0.02	4.2E+00	9.6E-02	20	4.8E-03
EC >8 - 10	950	130	7.3	0.12	3.3E-01	3.9E-02	20	2.0E-03
EC >10 - 12	2800	160	17.5	0.29	2.6E-02	7.4E-03	20	3.7E-04
EC >12 - 16	3600	200	18.0	0.29	5.9E-04	1.7E-04	20	8.7E-06
EC >16 - 21	350	270	1.3	0.02	1.0E-06	2.1E-08	20	1.1E-09
Aromatics								
Benzene	0.0	78	0.0	0.00	1.8E+03	0.0E+00	20	0.0E+00
Toluene	4.4	92	0.0	0.00	5.2E+02	4.1E-01	20	2.0E-02
EC >8 - 10*	489	120	4.1	0.07	6.5E+01	4.3E+00	20	2.2E-01
EC >10 - 12	600	130	4.6	0.08	2.5E+01	1.9E+00	20	9.4E-02
EC >12 - 16	990	150	6.6	0.11	5.8E+00	6.3E-01	20	3.1E-02
EC >16 - 21	34	190	0.2	0.00	5.1E-01	1.5E-03	20	7.5E-05
EC >21 - 35	13	240	0.1	0.00	6.6E-03	5.9E-06	20	2.9E-07
			61.1	1.00				0.4

* Includes ethylbenzene & xylenes

Well Conc. must be 1 mg/l or less for soil concentrations to be protective of Method A drinking water standard.