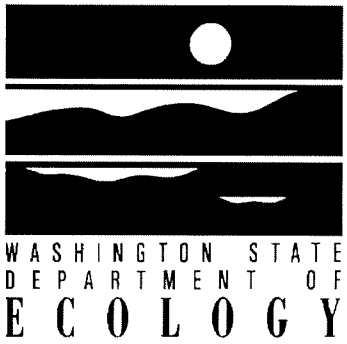

WEYERHAEUSER COMPANY, SNOQUALMIE FACILITY CLASS II INSPECTION, FEBRUARY 9 AND 16, 1993

Water Body No. WA-07-1100
94-23

February 1994

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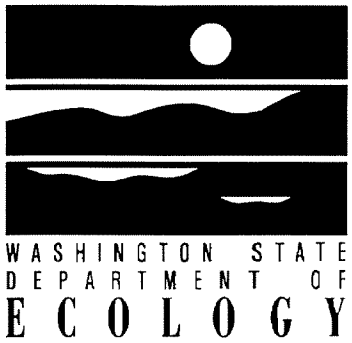

WEYERHAEUSER COMPANY, SNOQUALMIE FACILITY CLASS II INSPECTION, FEBRUARY 9 AND 16, 1993

By
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Marc Heffner

Environmental Investigations and Laboratory Services Program
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Olympia, Washington 98504-7710

February 1994

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TABLE OF CONTENTS

Page

ABSTRACT ii

INTRODUCTION 1

PROCEDURES 1

RESULTS AND DISCUSSION 4
- Quality Assurance/Quality Control 4
- Sampling Conditions 5
- Flow Measurement 5
- General Chemistry 6
- NPDES Permit Compliance 9
- Priority Pollutant Organics - Water 9
- Priority Pollutant Metals - Water 9
- Bioassays - Water 13
- Sediments 13
- Split Sample Analyses 16

RECOMMENDATIONS AND CONCLUSIONS 20
- Sampling Conditions 20
- Flow Measurements 20
- General Chemistry 21
- NPDES Permit Compliance 21
- Priority Pollutant Organics - Water 21
- Priority Pollutant Metals - Water 21
- Bioassays - Water 21
- Sediments 22
- Split Sample Analyses 22

REFERENCES 23

ABSTRACT

A Class II Inspection was conducted at the Weyerhaeuser Company Wood Products Division - Snoqualmie Facility (Weyco) on February 16, 1993. Sediment samples were collected from the inactive log pond on February 9, 1993. Due to an extended period of dry weather, the inspection objective to sample during run-off conditions could not be met. The discharge from the silvacel production facility into the log pond carried a heavy load of solids and oxygen demand parameters. The discharge from the log pond (001) met the limitations in the stayed NPDES permit, however, the silvacel facility discharge (002) exceeded the daily average but not the daily maximum limitations for TSS and BOD_5. Bioassay test results demonstrated only limited toxicity of the effluent to one test organism. The sediments contained a number of organic compounds and high levels of oil and grease. Bioassay test organisms were sensitive to the sediments. Recommendations to improve self-monitoring are made.

INTRODUCTION

A Class II Inspection was conducted at the Weyerhaeuser Company Wood Products Division - Snoqualmie Facility (Weyco) on February 16, 1993. Sediment samples were collected from the inactive log rafting storage pond on February 9, 1993. Conducting the inspection were Paul Stasch and Marc Heffner from the Ecology Toxics, Compliance and Ground Water Investigations Section. Russ Proffitt, the facility Safety/Environmental Coordinator, represented Weyco. Darla Wise and Carl Schumacher from the Weyerhaeuser Technology Center assisted with sample collection and took samples for Weyco analysis.

The facility is primarily used to kiln dry lumber. The facility also has a "silvacel" production operation which converts fibers from alder chips into a mulching stock used in the hydro-seeding industry. The silvacel was being operated 20 hours per day for four days per week. Other facilities on site include a maintenance shop, boiler, planer, and truck wash. Plant flows and runoff from the facility are routed to the inactive log pond. The pond outlet flows through a wetlands and eventually into the Snoqualmie River. Wastewater discharge is regulated by NPDES Permit No. WA-000173-2. The permit was issued on August 18, 1992, and expires on August 18, 1997. Provisions of the permit are under appeal to the Pollution Control Hearings Board and the effluent limitations have been stayed.

Specific objectives include:

1. determine compliance with NPDES permit limits during wet weather conditions;

2. assess plant self-monitoring program;

3. characterize effluent toxicity with chemical scans and with bioassays; and

4. assess pond sediment contamination and toxicity with chemical scans and with bioassays.

The inspection was designed to collect samples during wet weather conditions. Uncooperative weather and limited lab flexibility for date changes resulted in sample collection during atypical winter weather. An extended dry period coincided with the inspection period with only 0.24 inches of rain recorded during the first 16 days of February at Puget Power's Snoqualmie Falls hydroelectric facility (Barnes, 1993).

PROCEDURES

Ecology collected grab and composite samples at the 001, 002, Ditch-1, Ditch-2, truck wash and boiler discharges. Ecology pond discharge (001) and silvacel discharge (002) composite samples were collected with Isco composite samplers. The samplers were set up to collect equal volumes of sample every ten minutes for eight hours. Also, a grab composite sample of 001 was collected for bioassay analysis. Ecology sampling locations are described on Table 1 and identified on Figure 1.

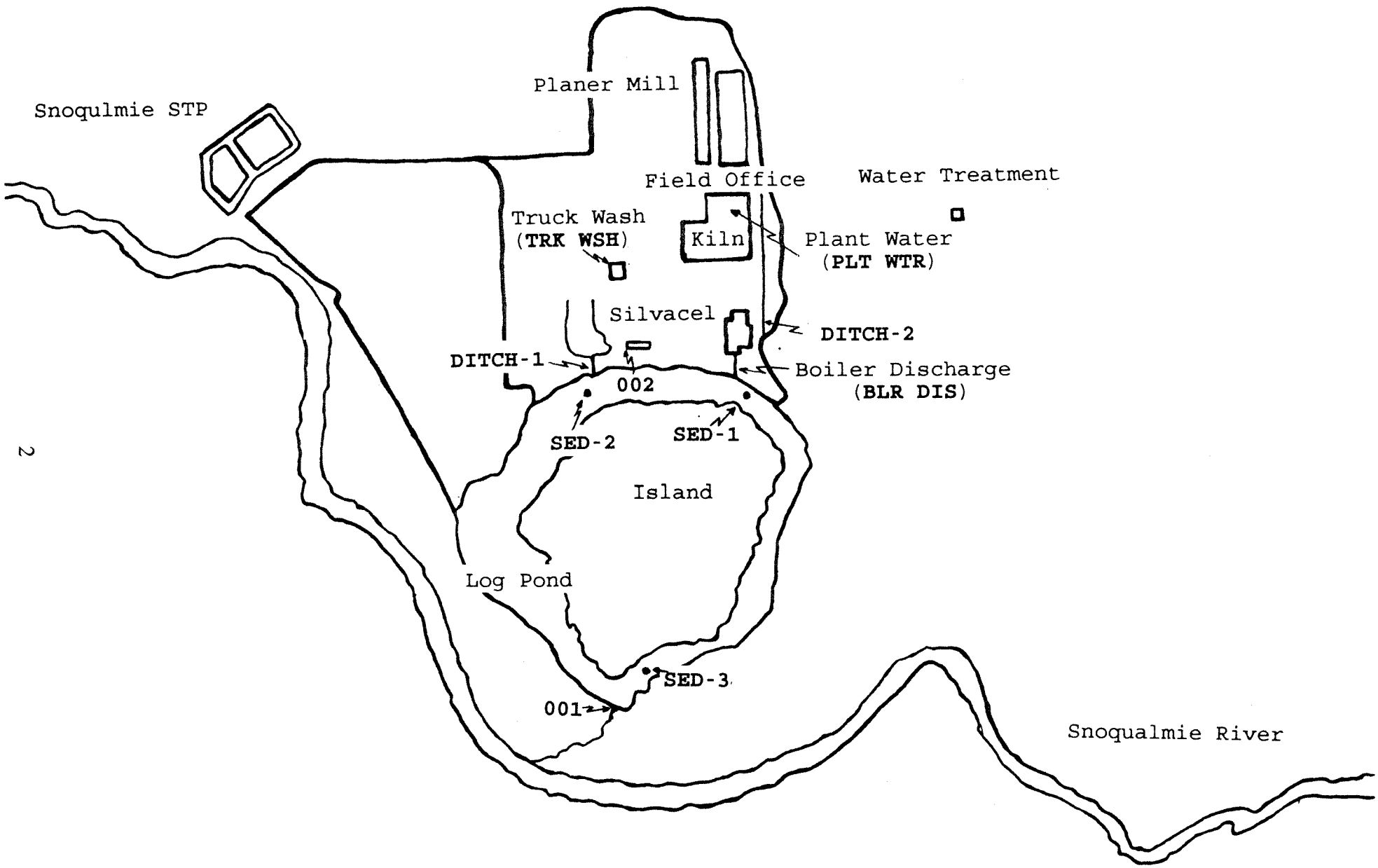

Figure 1 - Weyerhaeuser, Snoqualmie - Sampling Locations

Table 1. Sample Station Locations - Weyco (Snoqualmie), February 1993.

Plant Water (Plt Wtr) - sample collected from the tap in the field office snack room.

Silvacel Discharge (002) - samples collected from the trough next to the silvacel building approximately three feet upstream of the end of the trough. Sample was collected downstream of all discharges into the trough. Composite sample intake was suspended at mid-depth of the flow stream without a strainer.

Pond Discharge (001) - samples collected 4-6 feet upstream of the outlet weir. Composite sample strainer was suspended vertically approximately two inches below the water surface.

Truck Wash (Trk wsh) - sample collected at drainage through the first earthen dam downstream of the truck wash. The truck wash was not operating properly during the inspection (would not turn on). Six to eight nozzles were leaking water causing some flow in the ditch near the truck wash.

Boiler Discharge (Blr dis) - sample collected as the discharge dropped into the pond.

Ditch-1 - sample collected as the ditch flowed into the pond. The sample was collected downstream of the oil/water separator but 30 feet upstream of the last oil boom. A sheen was observed downstream of the last boom.

Ditch-2 - sample collected at the flood gate before the ditch went underground. The ditch was dry upstream of the water treatment plant overflow input.

Sed-1 - sample collected 40-70 feet from shore in the area of the boiler house and ditch-2 outlets.

Sed-2 - sample collected 70-100 feet off the ditch one outlet.

Sed-3 - sample collected approximately 70 feet from shore and 20 feet east of the 001 outlet weir.

The Weyco 001 permit monitoring sample is a grab sample. The 002 permit sample is a hand composite consisting of six grab samples, one collected every two hours and 40 minutes, between 0800 and 2300. Ecology collected a four grab composite with equal volumes collected every two hours to approximate the Weyco sample. The late hour of completion and small volume available prevented splitting the actual Weyco 002 composite.

Sediments were collected using an Eckman pipe dredge. The pipe dredge was selected to collect the volume of sample needed in a reasonable time from the small boat that could be launched on the lagoon. A series of grab samples were collected and placed in a stainless

steel bucket. When an adequate volume was collected, the contents of the bucket were homogenized and placed in containers for analysis.

Samples collected, sampling times and parameters analyzed are summarized in Appendix A.

Samples for Ecology analysis were placed on ice and delivered to the Ecology Manchester Laboratory. Ecology analytical procedures and the laboratories doing the analysis are summarized in Appendix B.

RESULTS AND DISCUSSION

Quality Assurance/Quality Control

Sampling quality assurance/quality control (QA/QC) steps included priority pollutant cleaning of composite samplers and sediment sampling equipment prior to the inspection (Appendix B-1) and the submittal of a blind duplicate to the Manchester laboratory for analyses. Composite sample collection containers were iced to properly cool the samples as they were collected. All samples collected during the inspection were iced and received in good condition with chain of custody maintained. No holding times were exceeded for the analyses conducted.

Initial instrument calibrations met the minimum response criteria, with three minor exceptions for pesticide/PCB analyses. These exceptions did not affect the reported results (Feddersen, 1993). Continuing calibration verifications were generally within the relevant control limits. Minor exceptions were noted with the organic analyses but did not affect the results of the corresponding samples (Feddersen, 1993). They were properly qualified on the appropriate data tables.

Methylene chloride, acetone and di-n-butylphthalate were detected in some of the method blanks run for organic analyses. Those analytes which were detected in the samples at less than ten times the amount detected in the method blank were qualified with a "U" on the data tables (Feddersen, 1993). Procedural blanks associated with these samples showed no analytically significant levels of analytes.

Spike sample analyses demonstrated data presented on the tables are reasonable and acceptable.

Bioassay testing was subcontracted out to Parametrix, Inc. Holding times, control analysis, reference toxicant, and environmental conditions were acceptable with one exception. The laboratory expressed concern that their reference toxicant (phenol) results fell outside the acceptable range for the sediment Microtox test (Stinson, 1993). To check the validity of their results, the reference toxicant and samples 078096 and 078097 were reanalyzed. The retest with the reference toxicant was within the range of acceptability. The results of the two tests were similar to those already obtained.

The data generated by the analyses of these samples is considered reliable and can be used noting the qualifications on the tables.

Sampling Conditions

An extended dry period coincided with the inspection period with only 0.24 inches of rain recorded during the first sixteen days of February: 0.02 inches on February 9, 0.19 inches on February 10 and 0.03 inches on February 15 (Barnes, 1993). These measurements were recorded at Puget Power's Snoqualmie Falls hydroelectric generating facility.

The lack of rainfall had different effects on the samples collected.

1. Minimal effects should be noticed in the silvacel (002), plant water, boiler discharge, and sediment samples.

2. Ditch-1 had some flow but the solids that would be expected to enter the ditch from the gravel lots during runoff conditions were not visually detected. Ditch-2 flow was primarily water treatment plant overflow and treatment plant filter backwash. Parking lot runoff would also be expected in Ditch-2 during wet conditions.

3. The truck wash flow rate should not change much during wet or dry conditions. The truck wash was not operating during the inspection, only flow from several leaking nozzles occurred. Also, some upstream flow into the diked area of the ditch, serving as the truck wash settling basin, may be expected during wet weather, perhaps reducing the amount of solids settled in the quiescent zones. Solids deposition was noted in the area between the truck wash and the drainage ditch.

4. Effects of the extended dry period on the 001 discharge were most apparent. Water was not flowing over the discharge weir during the inspection. The only flow was occurring between the weir plate and the weir support structure. Mr. Proffitt noted that higher solids concentrations in the discharge seldom occur at flows less than 2 MGD. Flow at the time of the inspection was estimated at 0.07 MGD (Proffitt, 1993).

Flow Measurement

Darla Wise of Weyco conducted flow measurements at the facility on February 10, 1993. Her results are presented in Appendix C. An Ecology estimate of the 002 flow was made by measuring velocity of floating particles in the trough and multiplying by the flow area (12" wide by 2.75" deep). The Ecology flow estimate was 0.12 MGD while the Weyco estimate was 0.16 MGD. Silvacel flow rates are thought to be fairly constant. Demonstrating flow rate consistency (such as measuring flow depth in the channel when collecting samples or installing a flow meter) is recommended.

The 001 discharge flow is measured at a 48 inch rectangular weir (Proffitt, 1993). At the time of the inspection, water was not flowing over the weir because the weir was damaged and discharge was low. The weir plate had separated from the weir support structure, enabling the small discharge to pour through the gap between the metal plate and the reinforced concrete.

Forty-eight inch weirs are recommended for flows ranging from 0.77-24.3 MGD (Grant, 1989). The flow at the time of the inspection was an estimated 0.07 MGD (Proffitt, 1993). A smaller weir to measure typical flows may be appropriate. It is recommended that the effluent weir be repaired or replaced.

Based on the Weyco flow estimates for Outfalls A, B and C provided by Ms. Wise, the flow from the pond at the time of the inspection was approximately 1.5 MGD less than the flow entering the pond from all discharges entering the pond combined (Appendix C). Water loss from the system is attributed to infiltration and evaporation.

General Chemistry

The general chemistry analytical results are presented on Table 2.

The analyses of Plant Water and the discharge of Ditch-2 show these streams to be relatively uncontaminated. This is to be expected considering the plant water is treated supply water and Ditch-2 consists primarily of the water treatment plant bypass.

The boiler discharge was also relatively clean. However, it had the highest NH_3-N and NO_2-NO_3-N concentrations detected during the inspection (1.54 mg/L and 4.5 mg/L, respectively).

The Truck Wash and Ditch-1 samples had moderate levels of total suspended solids. The Ditch-1 discharge had oil and grease detected at a concentration of 8 mg/L and a moderate TOC concentration (171 mg/L).

The 002 (Silvacel) discharge was the most contaminated of the waste streams sampled. Total solids (TS) and total suspended solids (TSS) concentrations were high. Biochemical oxygen demand (BOD_5), chemical oxygen demand (COD) and total organic carbon (TOC) were also high at 841 mg/L, 2,580 mg/L and 569 mg/L, respectively. Total phenolics were detected at concentrations of 19.7 and 20.4 mg/L. These results are to be expected considering the nature of the untreated industrial process wastewaters involved.

The 001 discharge from the log pond was characterized by low total suspended solids and BOD_5 concentrations. Total phenolics were at a concentration of 2.8 mg/L. Oil and grease was not detected.

Table 2 – Ecology General Chemistry Results – Weyco (Snoqualmie), February 1993.

Parameter	Location:	Plnt Wtr	002–1	002–2	002–E	002–W	Runoff	001–1	001–2	001–E
	Type:	grab	grab	grab	E–comp	W–comp	dup	grab	grab	E–comp
	Date:	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16
	Time:	1325	0930	1420	0800–1600	**		1000	1500	0830–1630
	Lab Log #:	088080	088081	088082	088083	088084	088094	088085	088086	088087
GENERAL CHEMISTRY										
Conductivity (umhos/cm)		87.5			196	200	197			138
Alkalinity (mg/L CaCO3)		34.7			58	58.2	57.8			46.6
Hardness (mg/L CaCO3)		36.4			89.3	86.7	91.8			46.9
Grain Size										
Gravel (+10 mesh)										
Sand (20–230 mesh)										
Silt (4–8 phi)										
Clay (9–10 phi)										
TS (mg/L)					1950	1980				159
TNVS (mg/L)					128	121				74
TSS (mg/L)		1 U	708	917	774	674	762	6	6	8
TNVSS (mg/L)					35	26				3
Settleable Slds (ml/L/hr)										0.2 U
% Solids										
% Volatile Solids										
BOD5 (mg/L)					841	847				5
COD (mg/L)					2,580	2,580	2,210			19.4
TOC (water mg/L)		28	752	464	569	589	583	8.9	9.4	9.7
TOC (soil mg/Kg– % dry)										
NH3–N (mg/L)		0.01			0.33	0.34	0.38			0.08
NO2+NO3–N (mg/L)		0.73			0.62	0.64	0.59			0.49
Total–P (mg/L)		0.01			1.86	1.88	1.91			0.08
Oil and Grease (mg/L)			25	11				1 U	1 U	
Oil and Grease (mg/Kg – dry)										
F–Coliform MF (#/100mL)								1 U	1 U	
Phenolics Total(water–mg/L)					20.4	19.7				2.8
Phenolics Total(soil–mg/Kg – dry)										
FIELD OBSERVATIONS										
Temperature (C)		6.0	12.4	11.1				4.3	5.0	
Temp–cooled (C)*+					4.5	4.2				1.5
pH (SU)		7.6	7.5	7.4		6.9		7.2	7.7	7.1
Chlorine (mg/L)		0.2								

*+ Temperature of the iced or refrigerated composite sample.
U The analyte was not detected at the reported result.
** Equal volumes collected at 0920, 1115, 1340, and 1540.
E–comp Ecology composite sample.
W–comp Weyco composite sample.
Plnt wtr Plant water.
001 Pond outlet.
002 Silvacel discharge.
Runoff Blind duplicate of 002–E.

Table 2 (cont.) – Ecology General Chemistry Results – Weyco (Snoqualmie), February 1993.

Parameter	Location:	001–W	001–GC	Trk wsh	Blr dis	Ditch–1	Ditch–2	Sed–1	Sed–2	Sed–3
	Type:	grab	gr–comp	grab	grab	grab	grab	grab	grab	grab
	Date:	2/16	2/16	2/16	2/16	2/16	2/16	2/9	2/9	2/9
	Time:	1700	***	1535	1100	1130	1050	1345–1405	1305–1320	1210–1225
	Lab Log #:	088088	088089	088090	088091	088092	088093	078095	078096	078097
GENERAL CHEMISTRY										
Conductivity (umhos/cm)		139		119	338	239	85.7			
Alkalinity (mg/L CaCO3)		47.3	46.4	51.5	90.6	106	34.9			
Hardness (mg/L CaCO3)		46.6	46.6	51.7	132	109	35			
Grain Size										
	Gravel (+10 mesh)							1	0	0
	Sand (20–230 mesh)							28	19	9
	Silt (4–8 phi)							65	72	59
	Clay (9–10 phi)							6	9	32
TS (mg/L)		170								
TNVS (mg/L)		71								
TSS (mg/L)		8	6	104	15	141	3			
TNVSS (mg/L)		4								
Settleable Slds (ml/L/hr)		0.2 U								
% Solids								21.6	7.6	26.1
% Volatile Solids								19.1	60.5	11.3
BOD5 (mg/L)		4								
COD (mg/L)		22.9								
TOC (water mg/L)		9.7		18.5	17.7	171	55.3			
TOC (soil mg/Kg– % dry)								14.1	9.0	5.4
NH3–N (mg/L)		0.08		0.46	1.54	0.56	0.01 U			
NO2+NO3–N (mg/L)		0.49		0.30	4.5	0.29	0.60			
Total–P (mg/L)		0.07		0.13	0.43	0.40	0.02			
Oil and Grease (mg/L)				1	1	12	1 U			
Oil and Grease (mg/Kg – dry)								2,490	7,500	2,320
F–Coliform MF (#/100mL)										
Phenolics Total(water–mg/L)		2.9				8				
Phenolics Total(soil–mg/Kg – dry)								11.2	1.2	0.72
FIELD OBSERVATIONS										
Temperature (C)		4.5		4.5	12.5	5.8	1.9			
Temp–cooled (C)*+										
pH (SU)		7.4		7.2	7.9	7.2	7.1			
Chlorine (mg/L)					<0.1					

*+	Temperature of the iced or refrigerated composite sample.
U	The analyte was not detected at the reported result.
***	Equal volumes collected with 1000 and 1500 grab samples.
001	Pond outlet.
Trk wsh	Truck wash runoff.
Blr dis	Boiler discharge.
Sed	Pond sediment.

NPDES Permit Compliance

A comparison of the Ecology inspection data and the NPDES permit effluent limitations is provided on Table 3. Permit compliance of the 001 discharge was good. No violations of the permitted parameters were noted. The discharge of outfall 002 exceeded the BOD_5 and TSS daily average limit but not the daily maximum effluent limitations. The dry weather conditions facilitated permit compliance at the 001 discharge, but likely had little effect on the water quality observed in the 002 discharge. It should be noted that the NPDES permit effluent limitations were appealed by Weyerhaeuser and a stay was granted by the Pollution Control Hearings Board.

Priority Pollutant Organics - Water

Acetone was the most frequently detected volatile organic (VOA) compound in the water samples (Table 4). Acetone is a commonly used laboratory chemical, so the source(s) of the low concentrations observed is often inconclusive. It was detected in five of seven samples at concentrations ranging from 7.1 - 20 ug/L. Chloroform was detected in four of seven samples at concentrations ranging from 1.3 - 3.7 ug/L. The sample from Ditch-1 had the greatest number of VOAs detected (6). In addition to acetone and chloroform; benzene, toluene, ethylbenzene and total xylenes were detected in low concentrations (7.5 ug/L or less).

Base neutral acids (BNA) compounds were also detected. Benzyl alcohol and benzoic acid were detected in the 002 and Ditch-1 discharges. Benzyl alcohol concentrations ranged from 58 - 285 ug/L. Benzoic acid concentrations ranged from 18 - 77 ug/L. The higher concentrations were observed in the 002 discharge sample.

The results of priority pollutant organics and other target analytes detected are provided on Table 4. All target analytes and their respective detection limits are provided in Appendix D. As many as 21 tentatively identified compounds were detected. Estimated concentrations ranged from 3 - 300 ug/L. Tentatively identified compounds and their estimated concentrations are provided in Appendix E.

Priority Pollutant Metals - Water

Several priority pollutant metals were detected in the water samples (Table 4). Arsenic, copper and zinc were detected in all samples. Lead and cadmium were detected in five of six samples. Metals concentrations were generally higher in the 002 discharge and Ditch-1 samples than in other contributing streams. The concentration of cadmium was highest in the 001-W grab sample and exceeded the chronic water quality criterion for freshwater for that metal by a slight margin (USEPA, 1986).

Again, target analytes and their respective detection limits are provided in Appendix D.

Table 3 – NPDES Permit Limitation/Ecology Inspection Data Comparison – Weyco (Snoqualmie) – February 1993.

Outfall 001		NPDES Permit Limitations Daily Average	Daily Maximum	Location:	001-E	001-1	001-2
				Type:	comp	grab	grab
				Date:	2/16	2/16	2/16
				Lab Log #:	088087	088085	088086
Suspended Solids	mg/L	28	78		8	6	6
	(lbs/Day)		1585		4.7*	3.5*	3.5*
Settleable Solids (Imhoff Cone)	ml/L		0.1		0.2 U		
BOD5	mg/L	9	20		5		
	(lbs/Day)		228		2.9*		
Oil and Grease	mg/L	10	15			1 U	1 U
pH (SU)		Shall not be outside the range of 6.0 – 9.0				7.2	7.7

Outfall 002		NPDES Permit Limitations Daily Average	Daily Maximum	Location:	002-E	002-1	002-2
				Type:	comp	grab	grab
				Date:	2/16	2/16	2/16
				Lab Log #:	088083	088081	088082
Suspended Solids (lbs/1000 lbs production)		8.35	15.55		9.5+	8.7+	11.2+
BOD5 (lbs/1000 lbs production)		5.55	10.6		10.3+		
pH (SU)		Shall not be outside the range of 6.0 – 9.0				7.5	7.4

* Loadings based on a flow of 0.07 MGD.
\+ Loadings based on a flow of 0.16 MGD and a daily average production of 54.5 tons.
U The analyte was not detected at or above the reported result.

Table 4 – Ecology VOA, BNA and Pesticide/PCB Results – Weyco (Snoqualmie), February 1993.

Parameter	Location:	Plnt Wtr	002–1	002–2	002–E	002–W	001–1	001–2	001–E	EPA Water Quality Criteria Summary	
	Type:	grab	grab	grab	E–comp	W–comp	grab	grab	E–comp		
	Date:	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	Acute	Chronic
	Time:	1325	0930	1420	0800–1600	**	1000	1500	0830–1630	Fresh	Fresh
	Lab Log #:	088080	088081	088082	088083	088084	088085	088086	088087		
VOA Compounds		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	(ug/L)	(ug/L)
Acetone			20	13			U	U			
Carbon Disulfide			U	U			U	U			
Chloroform			3.1	3.7			U	U		28,900 *	1,240 *
2–Butanone (MEK)			U	U			U	U			
Benzene			U	U			U	U		5,300 *	
Toluene			U	U			U	U		17,500 *	
Ethylbenzene			U	U			U	U		32,000 *	
Total Xylenes			U	U			U	U			
BNA Compounds										(ug/L)	(ug/L)
Phenol					U				U	10,200 *	2,560 *
Benzyl Alcohol					285				U		
2–Methylphenol					U				U		
4–Methylphenol					U				U		
Benzoic Acid					77				U		
Naphthalene					U				U	2,300 *	620 *
2–Methylnaphthalene					U				U		
Acenaphthylene					U				U		
Dibenzofuran					U				U		
Fluorene					U				U		
Phenanthrene					U				U		
Anthracene					U				U		
Fluoranthene					U				U	3,980 *	
Pyrene					U				U		
Benzo(a)Anthracene					U				U		
Chrysene					U				U		
Bis(2–Ethylhexyl)Phthalate					U				U	940 *(i)	3 *(i)
BenzoFluoranthene					U				U		
Benzo(a)Pyrene					U				U		
					U						
Metals		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L		
Antimony		U			U	U				9,000 *	1,600 *
Arsenic		1.3 P			3.4 P	2.9 P			3.6		
	Pentavalent									850	48
	Trivalent									360	190
Beryllium		U			U	U				130 *	5.3 *
Cadmium		U			0.24 P	0.63			0.20	3.9 +	1.1 +
Chromium		U			U	U					
	Hexavalent									16	11
	Trivalent									1737 +	207 +
Copper		12 P			31	42			5.7	18 +	12 +
Lead		U			5.9	23.3			1.4	82 +	3.2 +
Mercury		U			U	U				2.4	0.012
Nickel		12 P			U	U				1,418 +	158 +
Selenium		U			U	U				260	35
Silver		U			U	U				4.1 +	0.12
Thallium		U			U	U				1,400 *	40 *
Zinc		32 P			114	125			20	117 +	106 +

Table 4 (cont.) – Ecology VOA, BNA and Pesticide/PCB Results – Weyco (Snoqualmie), February 1993.

Parameter	Location:	001-W	Trk wsh	Blr dis	Ditch-1	Sed-1	Sed-2	Sed-3	EPA Water Quality Criteria Summary	
	Type:	grab	grab	grab	grab	grab	grab	grab		
	Date:	2/16	2/16	2/16	2/16	2/9	2/9	2/9	Acute	Chronic
	Time:	1700	1535	1100	1130	1345-1405	1305-1320	1210-1225	Fresh	Fresh
	Lab Log #:	088088	088090	088091	088092	078095	078096	078097		
VOA Compounds		ug/L	ug/L	ug/L	ug/L	ug/Kg - dry	ug/Kg - dry	ug/Kg - dry	(ug/L)	(ug/L)
Acetone			8.6	7.1	13	U	U	U		
Carbon Disulfide			U	U	U	U	U	7.5		
Chloroform			U	2.1	1.3	U	U	U	28,900 *	1,240 *
2-Butanone (MEK)			U	U	U	46 J	81 J	38 J		
Benzene			U	U	0.6 J	U	U	U	5,300 *	
Toluene			U	U	7.5	U	9800 J	U	17,500 *	
Ethylbenzene			U	U	0.7 J	U	U	U	32,000 *	
Total Xylenes			U	U	3.0	U	50 J	U		
BNA Compounds									(ug/L)	(ug/L)
Phenol						U 3500	U	U	10,200 *	2,560 *
Benzyl Alcohol					58	U	U	U		
2-Methylphenol						U 270	U	U		
4-Methylphenol						U 2400	2300	590		
Benzoic Acid					18	U	U	U		
Naphthalene						U 2000	U	170 J	2,300 *	620 *
2-Methylnaphthalene						U 180 J	U	170 J		
Acenaphthylene						U 850	U	U		
Dibenzofuran						U 400	U	U		
Fluorene						U 220	U	U		
Phenanthrene						U 1700	550	340		
Anthracene						U 240	U	U		
Fluoranthene						U 2300	620	270	3,980 *	
Pyrene						U 1200 J	360 J	250		
Benzo(a)Anthracene						U 230 J	U	U		
Chrysene						U 350 J	U	120 J		
Bis(2-Ethylhexyl)Phthalate						U 300 J	590	400	940 *(i)	3 *(i)
BenzoFluoranthene						U 520 J	U	U		
Benzo(a)Pyrene						U 210 J	U	U		
Metals		ug/L	ug/L	ug/L	ug/L	ug/Kg-dry	ug/Kg-dry	ug/Kg-dry		
Antimony		U				U	U	U	9,000 *	1,600 *
Arsenic		3.5 P			8.9 P	26.4	5.38	15.3		
	Pentavalent								850	48
	Trivalent								360	190
Beryllium		U				U 0.61	0.25	0.65	130 *	5.3 *
Cadmium		2.15			0.17 P	1.9	0.76 P	1.0 P	3.9 +	1.1 +
Chromium		U				U 48.1 J	19.0 J	51.9 J		
	Hexavalent								16	11
	Trivalent								1737 +	207 +
Copper		7.7 P			12 P	106 J	40.2 J	77.0 J	18 +	12 +
Lead		2.1 P			3.7 P	76.8	11	20.3	82 +	3.2 +
Mercury		U				U 0.356	0.074 P	0.10 P	2.4	0.012
Nickel		U				U 48.3	22.1	59.6	1,418 +	158 +
Selenium		U				U	U	U	260	35
Silver		U				U 1.2	U	U	4.1 +	0.12
Thallium		U				U	U	U	1,400 *	40 *
Zinc		34 P			109	320	150	153	117 +	106 +

Bioassays - Water

Bioassay testing of Ceriodaphnia dubia, fathead minnow, rainbow trout and Selenastrum capricornum documented no adverse effects of the 001 effluent to the test organisms. Microtox did demonstrate a sensitivity to the 001 effluent with an EC_{50} estimated at 56.8% effluent. Bioassay test results are provided on Table 5.

Sediments

The Weyerhaeuser inactive log pond is 66 acres in size and roughly circular in shape with a 74 acre island in the center. A small 4.3 acre lake is located on the island. The pond (also known as Borst Lake) was formerly fed by pumping from the Snoqualmie River (Wolcott, 1965). The majority of the pond is approximately eight feet deep. The eastern side of the log pond had a section where cattails colonized the shallows, obstructing flow. The cattail marsh was to the east of the 001 discharge. This resulted in a counter clockwise flow from the facility to the 001 discharge. The sediment sampling locations are depicted on Figure 1 and described on Table 1.

Sediments near the 001 discharge (Sed-3) had a muddy consistency. The station (Sed-2) off the primary outfall (Ditch-1) into the log pond contained a fair amount of sawdust/ woodwaste. The station (Sed-1) near the parking lot drain/boiler discharge area more closely resembled Sed-2. Grain size distribution measurements support these observations (Table 2).

All three sediment samples had fairly low percent solids. Sed-2 had the lowest solids content at 7.6%. Sed-3 had the highest at 26.1%. All three sediment samples are characterized by substantial oil and grease concentrations, with Sed-2 the highest at 7,500 mg/Kg dry weight. Sed-1 had the highest concentration of total phenolics at 11.2 mg/Kg dry weight.

Priority pollutant organic content of the sediment samples varied (Table 4).

Few VOA compounds were detected. VOA concentrations were lower than the BNA compounds detected with one exception. Toluene was detected in Sed-2 at a concentration of 9,800 ug/kg dry weight. This sample also had the highest concentration of oil and grease detected in the three sediment samples. Toluene is a common constituent of many petroleum products, and its presence in association with the high oil and grease content of the sample is not unexpected.

Most organics detected were phenolic or polynuclear aromatic (PNA) compounds detected in the BNA scan. Sed-1 contained the highest concentrations and number of BNA compounds detected in the three sediment samples. A total of 17 different BNAs were detected. Of these, phenol (3,500 ug/Kg dry weight) and 4-methylphenol (2,400 ug/Kg dry weight) were found in the highest concentrations. This correlates well with the total phenolics result of 11.2 mg/Kg dry weight (Table 2).

Table 5 – Effluent Bioassay Results – Weyco (Snoqualmie) – February 1993.

Ceriodaphnia dubia - Chronic Renewal Toxicity Test

Sample #088089	# Tested *	Percent Survival	Mean # Young per Original Female
Control	10	90	15.8
6.25 % Effluent	10	90	18.5
12.5 % Effluent	10	100	19.9
25 % Effluent	10	100	17.8
50 % Effluent	10	100	21.8
100 % Effluent	10	100	17.0

* 10 replicates of 1 organism

LC50 = > 100% Effluent
NOEC for survival = 100% Effluent
NOEC for reproduction = 100% Effluent

Fathead Minnow (Pimephales promelas) - Chronic Renewal Toxicity Test

Sample #088089	# Tested *	Percent Survival	Mean dry weight of organisms (ug)
Control	30	97.5	0.38
6.25 % Effluent	30	97.5	0.37
12.5 % Effluent	30	90.0	0.37
25 % Effluent	30	90.0	0.42
50 % Effluent	30	92.5	0.42
100 % Effluent	30	92.5	0.41

* 3 replicates of 10 organisms

LC50 = >100% Effluent
NOEC for survival = 100% Effluent
NOEC for growth = 100% Effluent

Table 5 (cont.) – Effluent Bioassay Results – Weyco (Snoqualmie) – February 1993.

Rainbow Trout (Oncorhynchus mykiss) - Static Acute Toxicity Test

Sample #088089	# Tested *	Percent Survival
Control	30	100%
100% Effluent	30	100%

* 3 replicates of 10 organisms

NOEC = 100% Effluent

Selenastrum capricornutum - Chronic Growth Test* (Sample #088089)

* 3 replicates

NOEC = 100% Effluent

Microtox - Toxicity Test* (Sample # 088089)

* 2 replicates

EC50 = >45% (Laboratory estimates the EC50 to be 56.8% using Microtox software)

NOEC - no observable effects concentration
LOEC - lowest observable effects concentration
LC50 - lethal concentration for 50% of the organisms
EC50 - effect concentration for 50% of the organisms

Priority pollutant organic analyses of B and L landfill leachate, a wood waste landfill near the Tacoma tideflats, showed some similarities to the sediments in the pond (Johnson and Norton, 1985). Two of the three compounds (4-methylphenol and phenol) detected at the highest concentrations in the leachate were the two compounds detected in the highest concentrations in the sediments. Decomposition of wood waste in the landfill and at the bottom of the log pond is likely to produce the same organic compounds. However, the third compound (benzoic acid) detected in the leachate was not detected in any of the sediment samples. None of the specific BNA target compounds detected in the sediments were detected in the composite water sample of the 001 discharge.

Target analytes and their respective detection limits are provided in Appendix D. As many as 21 tentatively identified compounds were detected. They ranged in concentrations from 4700 - 77,000 ug/Kg dry weight. Tentatively identified compounds and their estimated concentrations are provided in Appendix E.

Bioassay testing of Hyalella azteca and Microtox demonstrated a sensitivity of these test organisms to the pond sediments (Table 6). Sed-3 demonstrated the greatest adverse effect with EC_{50} for Microtox at 3.2%. Interestingly, Sed-1 had the highest concentrations of BNA and polynuclear aromatic compounds, yet it demonstrated the least toxicity to Microtox. But Sed-1 and Sed-3 showed significant toxicity to Hyalella azteca - 74% survival in both sediments.

Split Sample Analyses

The comparison of Ecology laboratory general chemistry results from Ecology and Weyco 001 and 002 discharge samples was generally good (Table 7). Ecology analyses of the 002 discharge hand-composite and automatic composite samples indicate the Weyco hand composite samples are representative. Ecology analyses of the Weyco 001 grab sample correlated very well with the Ecology grab and composite sample results. At higher flow rates, when discharge quality is more susceptible to change, a grab-composite sample (flow proportional volumes every two hours for eight hours) of the 001 discharge for permit monitoring is suggested.

The comparison of the NPDES permit parameter results reported by the Ecology and Weyco laboratories was also generally good. A few minor exceptions were noted with some of the 002 TSS results.

Split sample results for most non-permit parameters were also generally good (Table 7 and Appendix F). Differences in one or two individual sample results were noted for several parameters, including TOC, TS, TNVS, alkalinity, toluene and mercury. Notable differences occurred in total phenolics, 2-butanone and toluene results.

The Weyco laboratory results for total phenolics in water samples were low compared to Ecology's results. Total phenolic results for sediment samples were similar with the

Table 6 - Sediment Bioassay Results - Weyco (Snoqualmie) - February 1993.

Hyalella azteca - Chronic Survival Test

Sample	# Tested *	Percent Survival
Control	50	94
Sed-1 (Sample #078095)	50	74+
Sed-2 (Sample #078096)	50	82
Sed-3 (Sample #078097)	50	74+

* 5 replicates of 10 organisms

+ Denotes statistically different from the control sample.

Microtox - Toxicity Test*

* 2 replicates

EC50 (Sed-1) = >45% (Laboratory estimates the EC50 to be >100% using Microtox software)
EC50 (Sed-2) = 24.7%
EC50 (Sed-3) = 3.2%

NOEC - no observable effects concentration
LOEC - lowest observable effects concentration
LC50 - lethal concentration for 50% of the organisms
EC50 - effect concentration for 50% of the organisms

Table 7 – General Chemisrty Split Sample Results Comparison – Weyco (Snoqualmie) – February 1993.

		Location:	002–1	002–2	002–E	002–W	Runoff	001–1	001–2	001–E
		Type:	grab	grab	E–comp	W–comp	dup	grab	grab	E–comp
		Date:	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16
		Lab Log #:	088081	088082	088083	088084	088094	088085	088086	088087
		Sampler:	Ecology	Ecology	Ecology	Weyco	Ecology	Ecology	Ecology	Ecology
PARAMETER	Analyzed by:									
Conductivity (umhos/cm)	Ecology				196	200	197			138
	Weyco				200	210				140
Alkalinity (mg/L CaCO3)	Ecology				58	58.2	57.8			46.6
	Weyco				27	24				46
Hardness (mg/L CaCO3)	Ecology				89.3	86.7	91.8			46.9
	Weyco				99	85				45
TS (mg/L)	Ecology				1,950	1,980				159
	Weyco				1,900	1,900				120
TNVS (mg/L)	Ecology				128	121				74
	Weyco				150	140				77
TSS (mg/L)	Ecology		708	917	774	674	762	6	6	8
	Weyco		680(630)	640	830	800		7	7	<10
TNVSS (mg/L)	Ecology				35	26				3
	Weyco				44	28				
Settleable Slds (ml/L/hr)	Ecology									0.2 U
	Weyco									<0.1
% Solids	Ecology									
	Weyco									
% Volatile Solids	Ecology									
	Weyco									
BOD5 (mg/L)	Ecology				841	847				5
	Weyco				780	990				<3
COD (mg/L)	Ecology				2,580	2,580	2,210			19.4
	Weyco				3,000(2,900)	2,800				27
TOC (mg/L)	Ecology		752	464	569	589	583	8.9	9.4	9.7
	Weyco		814(888)	613	780	1,010		9	8	8
NH3–N (mg/L)	Ecology				0.33	0.34	0.38			0.08
	Weyco				0.43(0.44)	0.45				<0.02
NO2+NO3–N (mg/L)	Ecology				0.62	0.64	0.59			0.49
	Weyco				0.55(0.53)	0.55				0.42
Total–P (mg/L)	Ecology				1.86	1.88	1.91			0.08
	Weyco				1.4	1.4				0.08
Oil and Grease (mg/L)	Ecology		25	11				1 U	1 U	
	Weyco		26	18				<1	<1	
Oil and Grease (mg/Kg–dr)	Ecology									
	Weyco									
Phenolics Total (mg/L)	Ecology				20.4	19.7				2.8
	Weyco				0.67(0.61)	0.62				0.02
Phenolics Total (mg/kg–dr)	Ecology									
	Weyco									

NOTE: Results in parentheses represent Weyco duplicate analyses.
U The analyte was not detected at the reported result.

Table 7 (cont.) – General Chemistry Split Sample Results Comparison – Weyco (Snoqualmie) – February 1993.

		Location:	001-W	Trk wsh	Blr dis	Ditch-1	Ditch-2	Sed-1	Sed-2	Sed-3
		Type:	grab	grab	grab	grab	grab	grab	grab	grab
		Date:	2/16	2/16	2/16	2/16	2/16	2/9	2/9	2/9
		Lab Log #:	088088	088090	088091	088092	088093	078095	078096	078097
		Sampler:	Weyco	Ecology	Ecology	Ecology	Ecology	Ecology	Ecology	Ecology
PARAMETER	Analyzed by:									
Conductivity (umhos/cm)	Ecology		139	119	338	239	85.7			
	Weyco		140(140)	120	310	240	85			
Alkalinity (mg/L CaCO3)	Ecology		47.3	51.5	90.6	106	34.9			
	Weyco		46	50	87	63(62)	33			
Hardness (mg/L CaCO3)	Ecology		46.6	51.7	132	109	35			
	Weyco		45	55	92	103	35			
TS (mg/L)	Ecology		170							
	Weyco		120(120)							
TNVS (mg/L)	Ecology		71							
	Weyco		15(79)							
TSS (mg/L)	Ecology		8	104	15	141	3			
	Weyco		<10(<10)	130	10	160	3			
TNVSS (mg/L)	Ecology		4							
	Weyco		<10(<10)							
Settleable Slds (ml/L/hr)	Ecology									
	Weyco									
% Solids	Ecology							21.6	7.6	26.1
	Weyco							26.2(25.0)	9.37	26.2
% Volatile Solids	Ecology							19.1	60.5	11.3
	Weyco							20.0(19.8)	62.1	13.7
BOD5 (mg/L)	Ecology		4							
	Weyco		<3							
COD (mg/L)	Ecology									
	Weyco									
TOC (water mg/L)	Ecology		9.7	18.5	17.7	171	55.3			
	Weyco		7	17	14	161	1			
NH3-N (mg/L)	Ecology			0.46	1.54	0.56	0.01	U		
	Weyco			0.50	1.44	0.65	<0.02			
NO2+NO3-N (mg/L)	Ecology			0.30	4.5	0.29	0.60			
	Weyco			0.22	3.34	0.23	0.54			
Total-P (mg/L)	Ecology			0.13	0.43	0.40	0.02			
	Weyco			0.25	0.29	0.99	0.02			
Oil and Grease (mg/L)	Ecology			1	1	12	1	U		
	Weyco			<1	<1	10	<1			
Oil and Grease (mg/Kg-dr)	Ecology							2,490	7,500	2,320
	Weyco							1,400(490*)	1,200(508*)	3,100(1440*)
Phenolics Total (mg/L)	Ecology									
	Weyco									
Phenolics Total (mg/kg-dr)	Ecology							11.2	1.2	0.72
	Weyco							6.1(5.7)	<1.1	10.3

NOTE: Results in parentheses represent Weyco duplicate analyses.
* Infrared analysis of freon extracts.
U The analyte was not detected at the reported result.

exception of sample #078097, for which Ecology's results were much less than Weyco's results. The Weyco laboratory detected 2-butanone in only one sediment sample, while the Ecology laboratory detected it in all sediment samples. Weyco reported a much lower toluene concentration (810 ug/Kg dry weight) in sample Sed-2 than the Ecology estimate (9800 ug/Kg dry weight). It is unclear why these differences exist.

The Weyco laboratory's BNA detection limits were higher than concentrations Ecology's contract laboratory detected in the sediments. Also, Weyco reported positive detections of a number of pesticides in the sediment samples. The Ecology contract laboratory was unable to detect any pesticides. The reason for this discrepancy is unclear.

Weyco conducted acute and chronic toxicity tests on a final effluent grab sample of the 001 discharge. The only significant difference in results was for the Microtox test. The Ecology contract laboratory estimated the EC_{50} to be 56.8% effluent using Microtox software. The Weyco laboratory estimated the EC_{50} to be greater than 100% effluent using the same Microtox software (Backman, 1993). A summary of the Weyco bioassay results are provided in Appendix G.

RECOMMENDATIONS AND CONCLUSIONS

Sampling Conditions

The prolonged dry weather and lack of laboratory scheduling flexibility resulted in the inability of the inspection to fulfill the inspection objective to characterize the discharges during wet weather conditions. Runoff conditions were expected to affect 001, Ditch-1 and Ditch-2 water quality and have little effect on the 002, boiler discharge and sediment samples.

Flow Measurements

Flows were measured by Darla Wise of Weyco. The flow into the log pond exceeded the estimated discharge from the pond by approximately 1.5 MGD. Water losses are attributed to evaporation and infiltration.

The weir plate at the 001 permitted outfall was separated from the weir support structure, allowing water flow between the plate and the support structure.

- The 001 discharge weir should be repaired, or preferably replaced with a smaller weir more closely bracketing expected flows.

The 002 flow rate estimated by Ecology (0.12 MGD) and Weyco (0.16 MGD) differed.

- Weyco should accurately measure the 002 flow rate and demonstrate it is consistent, or else install a calibrated flow meter.

General Chemistry

The 002 discharge from the silvacel production facility was the most contaminated wastestream. Concentrations of TS, TSS, BOD_5, COD and TOC were the highest observed during the inspection.

The 001 discharge from the log pond was low in TSS and BOD_5.

NPDES Permit Compliance

Compliance of the 001 discharge with the stayed permit limitations was good. No violations of the permitted parameters were documented. The discharge of outfall 002 exceeded the BOD_5 and TSS daily average but not the daily maximum effluent limitations of the stayed permit.

Priority Pollutant Organics - Water

Acetone was the most frequently detected volatile organic (VOA) compound in the water samples. It was detected at concentrations ranging from 7.1 - 20 ug/L. Acetone is a common laboratory contaminant so its presence should be confirmed if the concentrations observed are of concern. Chloroform was detected at concentrations ranging from 1.3 - 3.7 ug/L. In addition to acetone and chloroform; benzene, toluene, ethylbenzene and total xylenes were detected in low concentrations.

Two base neutral acid (BNA) compounds were also detected. Benzyl alcohol concentrations ranged from 58 - 285 ug/L. Benzoic acid concentrations ranged from 18 - 77 ug/L.

Priority Pollutant Metals - Water

Several priority pollutant metals were detected in the water samples. Arsenic, copper and zinc were detected in all samples. Lead and cadmium were detected in five of six samples. Metals concentrations were generally higher in the 002 discharge and Ditch-1 samples than in the other contributing streams. The concentration of cadmium was highest in one of the 001 discharge samples and exceeded the chronic freshwater quality criterion by a slight margin.

Bioassays - Water

Bioassay testing documented little adverse effects of the 001 effluent to the test organisms. Ecology's Microtox test did demonstrate a sensitivity to the 001 effluent with an EC_{50} estimated at 56.8%, while Weyco's did not.

Sediments

All three sediment samples are characterized by substantial oil and grease concentrations, with Sed-2 the highest at 7,500 mg/Kg dry weight. Sed-1 had the highest concentration of total phenolics at 11.2 mg/Kg dry weight.

Sed-2 had the highest concentrations of VOA compounds. Toluene was detected by Ecology in Sed-2 at a concentration of 9,800 ug/Kg dry weight.

Most of the BNA compounds detected were phenolic or PNA compounds. Sed-1 contained the highest concentrations and number of BNA compounds detected in the three sediment samples. Of these, phenol (3,500 ug/Kg dry weight) and 4-methylphenol (2,400 ug/ Kg dry weight) were found in the highest concentrations. These two compounds are associated with decaying wood. None of the specific BNA compounds detected in the sediments were detected in the composite water sample of the 001 discharge.

Bioassay testing of Hyalella azteca and Microtox demonstrated significant toxicity to Sed-1 and Sed-3 samples. Sed-3 demonstrated the greatest adverse effect to Microtox with an EC_{50} of 3.2%.

Split Sample Analyses

Ecology analyses of the 002 discharge hand-composite and automatic composite samples indicate the Weyco hand composites are representative. Ecology analyses of the Weyco 001 grab sample correlated very well with the analyses of both the Ecology 001 grab and composite samples.

- At higher flow rates, when discharge quality is more susceptable to change, a grab-composite sample (flow proportional volumes every two hours for eight hours) of the 001 discharge is recommended for permit monitoring.

The comparison of the general chemistry results reported by the Ecology and Weyco laboratories was also generally good. A few exceptions were noted in solids, TOC, total phenolics and alkalinity analyses. Ecology and Weyco analytical results for NPDES permit parameters were similar.

The VOA, BNA, pesticide/PCB and metals split sample results generally compared well. However, Weyco laboratory detection limits for sediment BNA analyses were too high to detect some compounds reported to be present by the Ecology contract laboratory. Also, Weyco reported the presence of pesticides in the sediments that were undetected by the Ecology contract laboratory.

The effluent bioassay split sample results were similar. However, the Ecology estimated EC_{50} for Microtox was less than the Weyco test result which estimated no toxicity.

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APPENDICES

Appendix A – Samples Collected and Parameters Analyzed – Weyco (Snoqualmie) – February 1993.

Parameter	Location:	Plnt Wtr	002–1	002–2	002–E	002–W	001–1	001–2	001–E	001–W	001–GC	Trk wsh	Blr dis	Ditch–1	Ditch–2
	Type:	grab	grab	grab	E–comp	W–comp	grab	grab	E–comp	W–comp	gr–comp	grab	grab	grab	grab
	Date:	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16
	Time:	1325	930	1420	0800–160	**	1000	1500	0830–163	1700	***	1535	1100	1130	1050
	Lab Log #:	088080	088081	088082	088083	088084	088085	088086	088087	088088	088089	088090	088091	088092	088093
GENERAL CHEMISTRY															
Conductivity		1			1	1			1	1		1	1	1	1
Alkalinity		1			1	1			1	1	1	1	1	1	1
Hardness		1			1	1			1	1	1	1	1	1	1
Grain Size															
TS					1	1			1	1					
TNVS					1	1			1	1					
TSS		1	1	1	1	1	1	1	1	1	1	1	1	1	1
TNVSS					1	1			1	1					
Settleable Slds									1	1					
% Solids															
% Volatile Solids															
BOD5					1	1			1	1					
COD					1	1			1	1					
TOC (water)		1	1	1	1	1	1	1	1	1		1	1	1	1
TOC (soil/sed)															
NH3–N		1			1	1			1	1		1	1	1	1
NO2+NO3–N		1			1	1			1	1		1	1	1	1
Total–P		1			1	1			1	1		1	1	1	1
Oil and Grease (water)			1	1			1	1				1	1	1	1
Oil and Grease (soil/sed)															
F–Coliform MF							1	1							
ORGANICS															
VOC (water)			1	1			1	1				1	1	1	1
VOC (soil/sed)															
BNAs (water)					1				1					1	1
BNAs (soil/sed)															
Pest/PCB (water)					1				1					1	1
Pest/PCB (soil/sed)															
Phenolics Total(water)					1	1			1	1				1	1
Phenolics Total(soil/sed)															
METALS															
PP Metals (water)		1			1	1			1	1				1	1
PP Metals (soil/sed)															
BIOASSAYS															
Salmonid (acute 100%)											1				
Microtox (acute)											1				
Ceriodaphnia (chronic)											1				
Fathead Minnow (chronic)											1				
Selenastrum											1				
Hyallela (solid acute)															
Microtox (solid acute)															
FIELD OBSERVATIONS															
Temperature		1	1	1			1	1				1	1	1	1
Temp–cooled*+					1	1			1	1					
pH		1	1	1	1	1	1	1	1	1		1	1	1	1
Chlorine		1												1	1

Appendix A (cont.) – Samples Collected and Parameters Analyzed – Weyco (Snoqualmie) – February 1993.

Parameter	Location:	Sed–1	Sed–2	Sed–3
	Type:	grab	grab	grab
	Date:	2/9	2/9	2/9
	Time:	1345–1405	1305–1320	1210–1225
	Lab Log #:	078095	078096	078097
GENERAL CHEMISTRY				
Conductivity				
Alkalinity				
Hardness				
Grain Size		1	1	1
TS				
TNVS				
TSS				
TNVSS				
Settleable Slds				
% Solids		1	1	1
% Volatile Solids		1	1	1
BOD5				
COD				
TOC (water)				
TOC (soil/sed)		1	1	1
NH3–N				
NO2+NO3–N				
Total–P				
Oil and Grease (water)				
Oil and Grease (soil/sed)		1	1	1
F–Coliform MF				
ORGANICS				
VOC (water)				
VOC (soil/sed)		1	1	1
BNAs (water)				
BNAs (soil/sed)		1	1	1
Pest/PCB (water)				
Pest/PCB (soil/sed)		1	1	1
Phenolics Total(water)				
Phenolics Total(soil/sed)		1	1	1
METALS				
PP Metals (water)				
PP Metals (soil/sed)		1	1	1
BIOASSAYS				
Salmonid (acute 100%)				
Microtox (acute)				
Ceriodaphnia (chronic)				
Fathead Minnow (chronic)				
Selenastrum				
Hyallela (solid acute)		1	1	1
Microtox (solid acute)		1	1	1
FIELD OBSERVATIONS				
Temperature				
Temp–cooled*+				
pH				
Chlorine				

Appendix B – Ecology Analytical Methods and Laboratories Used – Weyco (Snoqualmie) – February 1993.

PARAMETER	METHODS	LABORATORY USED
GENERAL CHEMISTRY		
Conductivity	EPA, Revised 1983: 120.1	Ecology (Manchester)
Alkalinity	EPA, Revised 1983: 310.1	Ecology (Manchester)
Hardness	EPA, Revised 1983: 130.2	Ecology (Manchester)
Grain Size	Tetra Tech, 1986:TC-3991-04	Soil Technology, Inc.
TS	EPA, Revised 1983: 160.3	Ecology (Manchester)
TNVS	EPA, Revised 1983: 160.3	Ecology (Manchester)
TSS	EPA, Revised 1983: 160.2	Ecology (Manchester)
TNVSS	EPA, Revised 1983: 160.2	Ecology (Manchester)
Settleable Slds	EPA, Revised 1983: 160.2	Ecology (Manchester)
% Solids	EPA, Revised 1983: 160.3	Analytical Resources, Inc.
% Volatile Solids	EPA, Revised 1983: 160.4	Ecology (Manchester)
BOD5	EPA, Revised 1983: 405.1	Ecology (Manchester)
COD	EPA, Revised 1983: 410.1	Analytical Resources, Inc.
TOC (water)	EPA, Revised 1983: 415.1	Analytical Resources, Inc.
TOC (soil)	EPA, Revised 1983: 415.1	Ecology (Manchester)
NH3-N	EPA, Revised 1983: 350.1	Ecology (Manchester)
NO2+NO3-N	EPA, Revised 1983: 353.2	Ecology (Manchester)
Total-P	EPA, Revised 1983: 365.3	Ecology (Manchester)
Oil and Grease (water)	EPA, Revised 1983: 413.1	Ecology (Manchester)
Oil and Grease (soil)	EPA, Revised 1983: 413.1	Analytical Resources, Inc.
F-Coliform MF	APHA, 1989: 9222D	Ecology (Manchester)
Phenolics Total(water)	EPA, Revised 1983: 420.2	Ecology (Manchester)
Phenolics Total(soil)	EPA, Revised 1983: 420.2	Ecology (Manchester)
VOA (water)	EPA, 1986: 8260	Analytical Resources, Inc.
VOA (soil)	EPA, 1986: 8240	Analytical Resources, Inc.
BNA (water)	EPA, 1986: 8270	Analytical Resources, Inc.
BNA (soil)	EPA, 1986: 8270	Analytical Resources, Inc.
Pest/PCB (water)	EPA, 1986: 8080	Analytical Resources, Inc.
Pest/PCB (soil)	EPA, 1986: 8080	Analytical Resources, Inc.
PP Metals	EPA, Revised 1983: 200-299	Ecology (Manchester)
Salmonid (acute)	Ecology, Revised 1991	Parametrix, Inc.
Fathead Minnow (chronic)	EPA, Revised 1989: 1000.0	Parametrix, Inc.
Ceriodaphnia (chronic)	EPA, Revised 1989: 1002.0	Parametrix, Inc.
Selenastrum (chronic)	EPA, Revised 1989: 600/4-89/001	Parametrix, Inc.
Hyalella (chronic)	ASTM, 1992: E1383-92	Parametrix, Inc.
Microtox (acute)	Beckman, 1982	Parametrix, Inc.

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Appendix B-1 - Priority Pollutant Cleaning Methodology - Weyco (Snoqualmie), February 1993.

Priority Pollutant Cleaning Methodology

1. Wash with laboratory grade detergent (Liqui-Nox).
2. Rinse several times with tap water.
3. Rinse with 10% nitric acid solution.
4. Rinse three (3) times with distilled/deionized water.
5. Rinse with reagent-grade methylene chloride.
6. Rinse with reagent-grade acetone.
7. Allow to air dry and seal with aluminum foil.

Appendix C
Weyerhaeuser Flow Measurements
Weyco (Snoqualmie), February 1993.

Snoqualmie Wastestreams Flow Measurement
February 10, 1993

The following flow values are an estimate of flow rates based on a limited set of data collected over an 8 hour time period. Hydraulic flow characteristics should be evaluated over an extended period of time to insure flow rate accuracy.

Site #	Site Description	Outfall	Flow Method	Q (gpm)
	Water Treatment Overflow and Stromwater Drainage (Outfall A)			
1	Water Treatment Overflow	A	By Difference, Outfall A - Upper Parking Lot and Ground Water Drainage	436
2	Upper Parking Lot and Ground Water Drainage	A	Bucket and Stopwatch (3 value average)	12
3	Outfall A (at Open Ditch Upstream of Discharge)	A	Ditch Cross Sectional Area x Veliocity	448
	Power House Wastewater Streams (Outfall B)			
4	Air Compressor Cooling Water	B	Bucket and Stopwatch (3 value average)	57
5	Scrubber H2O+Siphon H2O+#5 Grate+Constant Boiler Blowdown+Scrubber Cooling Water	B	Pipe Cross Sectional Area x Velocity	129
6	Siphon Water Flow	B	Bucket and Stopwatch (3 value average)	31
7	Scrubber Cooling Water	B	Bucket and Stopwatch (3 value average)	7
8	Scrubber Water Blowdown	B	Bucket and Stopwatch (3 value average)	27
9	Boiler Washdown	B	Mill Estimate (1/Day @ 2000gals)	1
10	#5 Grate H2O + Constant Boiler Blowdown	B	Stream 5 - Σ of Streams 6 + 7 + 8	64
11	Outfall B (Power House Area Total Flow)	B	Σ of Streams 4, 5, 6, 7, 8, 9, & 10	315
	Silvacel and Main Site Stormwater Drainage (Outfall C)			
12	Silvacel Fresh Water	C	Bucket and Stopwatch (3 value average)	6
13	Chip Pressate	C	Bucket and Stopwatch (3 value average)	8
14	Chip Pressate Bearing Cooling Water (Σ 2 Streams)	C	Bucket and Stopwatch (3 value average)	28
15	Cyclone Water	C	Bucket and Stopwatch (3 value average)	48
16	Ground Water Basement Sump Pump	C	Bucket and Stopwatch (3 value average)	1
17	Hydraulic Pump Cooling Water	C	Bucket and Stopwatch (3 value average)	23
18	Silvacel Operation Total Flow	C	Σ of Streams 12, 13, 14, 15, & 17	114
19	Truck Wash Runoff (Intermitent Operation)	C	Bucket and Stopwatch at Spray Nozzles	611
20	Outfall C (Silvacel, Truck Wash, and Stormwater Runoff)	C	Pipe Cross Sectional Area x Velocity	402

Appendix C (cont.)
Weyerhauser Flow Measurements
Weyco (Snoqualmie), February 1993.

1.	Water Treatment Overflow and Stormwater Drainage (Ditch-2)	0.65 MGD
2.	Power House Wastewater Streams (Boiler Discharge)	0.45 MGD
3.	Silvacel and Main Site Stormwater Drainage (Ditch-1)	+ 0.58 MGD
	Total Discharge into Pond	**1.68 MGD**
	Total Discharge from the Pond	**- 0.07 MGD**
	Net Loss from the Pond	**1.61 MGD**

Appendix D – Ecology VOA, BNA, Pesticide/PCB and Metals Results – Weyco (Snoqualmie), February 1993.

Parameter	Location:	Plnt Wtr	002–1	002–2	002–E	002–W	001–1	001–2	001–E	001–W	Trk wsh	Blr dis
	Type:	grab	grab	grab	E–comp	W–comp	grab	grab	E–comp	grab	grab	grab
	Date:	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16
	Time:	1325	0930	1420	0800–1600	**	1000	1500	0830–1630	1700	1535	1100
	Lab Log #:	088080	088081	088082	088083	088084	088085	088086	088087	088088	088090	088091
VOA Compounds		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Chloromethane			2 U	2 U			2 U	2 U			2 U	2 U
Bromomethane			2 U	2 U			2 U	2 U			2 U	2 U
Vinyl Chloride			2 U	2 U			2 U	2 U			2 U	2 U
Chloroethane			2 U	2 U			2 U	2 U			2 U	2 U
Methylene Chloride			2 U	2 U			2 U	2 U			2 U	2 U
Acetone			**20**	**13**			5 U	5 U			**8.6**	**7.1**
Carbon Disulfide			1 U	1 U			1 U	1 U			1 U	1 U
1,1–Dichloroethene			1 U	1 U			1 U	1 U			1 U	1 U
1,1–Dichloroethane			1 U	1 U			1 U	1 U			1 U	1 U
1,2–Dichloroethene (total)			1 U	1 U			1 U	1 U			1 U	1 U
Chloroform			**3.1**	**3.7**			1 U	1 U			1 U	**2.1**
1,2–Dichloroethane			1 U	1 U			1 U	1 U			1 U	1 U
2–Butanone (MEK)			5 U	5 U			5 U	5 U			5 U	5 U
1,1,1–Trichloroethane			1 U	1 U			1 U	1 U			1 U	1 U
Carbon Tetrachloride			1 U	1 U			1 U	1 U			1 U	1 U
Vinyl Acetate			1 U	1 U			1 U	1 U			1 U	1 U
Bromodichloromethane			1 U	1 U			1 U	1 U			1 U	1 U
1,2–Dichloropropane			1 U	1 U			1 U	1 U			1 U	1 U
cis–1,3–Dichloropropene			1 U	1 U			1 U	1 U			1 U	1 U
Trichloroethene			1 U	1 U			1 U	1 U			1 U	1 U
Dibromochloromethane			1 U	1 U			1 U	1 U			1 U	1 U
1,1,2–Trichloroethane			1 U	1 U			1 U	1 U			1 U	1 U
Benzene			1 U	1 U			1 U	1 U			1 U	1 U
trans–1,3–Dichloropropene			1 U	1 U			1 U	1 U			1 U	1 U
Bromoform			1 U	1 U			1 U	1 U			1 U	1 U
4–Methyl–2–Pentanone (MIBK)			5 U	5 U			5 U	5 U			5 U	5 U
2–Hexanone			5 U	5 U			5 U	5 U			5 U	5 U
Tetrachloroethene			1 U	1 U			1 U	1 U			1 U	1 U
1,1,2,2–Tetrachloroethane			1 U	1 U			1 U	1 U			1 U	1 U
Toluene			1 U	1 U			1 U	1 U			1 U	1 U
Chlorobenzene			1 U	1 U			1 U	1 U			1 U	1 U
Ethylbenzene			1 U	1 U			1 U	1 U			1 U	1 U
Styrene			1 U	1 U			1 U	1 U			1 U	1 U
Total Xylenes			2 U	2 U			2 U	2 U			2 U	2 U
Trichlorofluoromethane			2 U	2 U			2 U	2 U			2 U	2 U
1,1,2–Trichloro–1,2,2–Trifluoroethane (Freon 1			2 U	2 U			2 U	2 U			2 U	2 U
BNA Compounds												
Carbazole					5 U				1 U			
Phenol					10 U				2 U			
Bis(2–Chloroethyl)Ether					5 U				1 U			
2–Chlorophenol					5 U				1 U			
1,3–Dichlorobenzene					5 U				1 U			
1,4–Dichlorobenzene					5 U				1 U			
Benzyl Alcohol					**285**				5 U			
1,2–Dichlorobenzene					5 U				1 U			
2–Methylphenol					5 U				1 U			
2,2'–Oxybis(1–Chloropropane)					5 U				1 U			
4–Methylphenol					5 U				1 U			
N–Nitroso–di–n–Propylamine					5 U				1 U			
Hexachloroethane					10 U				2 U			
Nitrobenzene					5 U				1 U			

Appendix D – Ecology VOA, BNA, Pesticide/PCB and Metals Results – Weyco (Snoqualmie), February 1993.

Parameter	Location:	Plnt Wtr	002–1	002–2	002–E	002–W	001–1	001–2	001–E	001–W	Trk wsh	Blr dis
	Type:	grab	grab	grab	E–comp	W–comp	grab	grab	E–comp	grab	grab	grab
	Date:	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16
	Time:	1325	0930	1420	0800–1600	**	1000	1500	0830–1630	1700	1535	1100
	Lab Log #:	088080	088081	088082	088083	088084	088085	088086	088087	088088	088090	088091
BNA Compounds		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Isophorone					5 U				1 U			
2–Nitrophenol					25 U				5 U			
2,4–Dimethylphenol					10 U				2 U			
Benzoic Acid					77				10 U			
Bis(2–Chloroethoxy)Methane					5 U				1 U			
2,4–Dichlorophenol					15 U				3 U			
1,2,4–Trichlorobenzene					5 U				1 U			
Naphthalene					5 U				1 U			
4–Chloroaniline					15 U				3 U			
Hexachlorobutadiene					10 U				2 U			
4–Chloro–3–Methylphenol					10 U				2 U			
2–Methylnaphthalene					5 U				1 U			
Hexachlorocyclopentadiene					25 U				5 U			
2,4,6–Trichlorophenol					25 U				5 U			
2,4,5–Trichlorophenol					25 U				5 U			
2–Chloronaphthalene					5 U				1 U			
2–Nitroaniline					25 U				5 U			
Dimethyl Phthalate					5 U				1 U			
Acenaphthylene					5 U				1 U			
2,6–Dinitrotoluene					25 U				5 U			
3–Nitroaniline					25 U				1 U			
Acenaphthene					5 U				1 U			
2,4–Dinitrophenol					50 U				10 U			
4–Nitrophenol					25 U				5 U			
Dibenzofuran					5 U				1 U			
2,4–Dinitrotoluene					25 U				5 U			
Diethyl Phthalate					5 U				1 U			
4–Chlorophenyl Phenylether					5 U				1 U			
Fluorene					5 U				1 U			
4–Nitroaniline					25 U				5 U			
4,6–Dinitro–2–Methylphenol					50 U				10 U			
N–Nitrosodiphenylamine					5 U				1 U			
4–Bromophenyl Phenylether					5 U				1 U			
Hexachlorobenzene					5 U				1 U			
Pentachlorophenol					25 U				5 U			
Phenanthrene					5 U				1 U			
Anthracene					5 U				11 U			
Di–n–Butyl Phthalate					5 U				1 U			
Fluoranthene					5 U				1 U			
Pyrene					5 U				1 U			
Butylbenzyl Phthalate					5 U				1 U			
3,3'–Dichlorobenzidine					25 U				5 U			
Benzo(a)Anthracene					5 U				1 U			
Chrysene					5 U				1 U			
Bis(2–Ethylhexyl)Phthalate					5 U				1 U			
Di–n–Octyl Phthalate					5 U				1 U			
BenzoFluoranthene					5 U				1 U			
Benzo(a)Pyrene					5 U				1 U			
Indeno(1,2,3–cd)Pyrene					5 U				1 U			
Dibenzo(a,h)Anthracene					5 U				1 U			
Benzo(g,h,i)Perylene					5 U				1 U			

Appendix D – Ecology VOA, BNA, Pesticide/PCB and Metals Results – Weyco (Snoqualmie), February 1993.

Parameter	Location:	Plnt Wtr	002–1	002–2	002–E	002–W	001–1	001–2	001–E	001–W	Trk wsh	Blr dis
	Type:	grab	grab	grab	E-comp	W-comp	grab	grab	E-comp	grab	grab	grab
	Date:	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16
	Time:	1325	0930	1420	0800–1600	**	1000	1500	0830–1630	1700	1535	1100
	Lab Log #:	088080	088081	088082	088083	088084	088085	088086	088087	088088	088090	088091
Pesticide/PCB Compounds		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
alpha–BHC					0.05 U				0.05 U			
beta–BHC					0.05 U				0.05 U			
delta–BHC					0.05 U				0.05 U			
gamma–BHC (Lindane)					0.05 U				0.05 U			
Heptachlor					0.05 U				0.05 U			
Aldrin					0.05 U				0.05 U			
Heptachlor Epoxide					0.05 U				0.05 U			
Endosulfan I					0.05 U				0.05 U			
Dieldrin					0.10 U				0.10 U			
4,4'–DDE					0.10 U				0.10 U			
Endrin					0.10 U				0.10 U			
Endosulfan II					0.10 U				0.10 U			
4,4'–DDD					0.10 U				0.10 U			
Endosulfan Sulfate					0.10 U				0.10 U			
4,4'–DDT					0.10 U				0.10 U			
Methoxychlor					0.50 U				0.50 U			
Endrin Ketone					0.10 U				0.10 U			
alpha–Chlordane					0.05 U				0.05 U			
gamma–Chlordane					0.05 U				0.05 U			
Toxaphene					5.0 U				5.0 U			
Aroclor–1016					1.0 U				1.0 U			
Aroclor–1221					2.0 U				2.0 U			
Aroclor–1232					1.0 U				1.0 U			
Aroclor–1242					1.0 U				1.0 U			
Aroclor–1248					1.0 U				1.0 U			
Aroclor–1254					1.0 U				1.0 U			
Aroclor–1260					1.0 U				1.0 U			
Endrin Aldehyde					0.10 UJ				0.10 UJ			
Chlordane												
Metals		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Antimony		30 U			30 U	30 U			30 U	30 U		
Arsenic		1.3 P			3.4 P	2.9 P			3.6 P	3.5 P		
Beryllium		1.0 U			1.0 U	1.0 U			1.0 U	1.0 U		
Cadmium		2.0 U			0.24 P	0.63			0.20 P	2.15		
Chromium		5.0 UJ			5.0 UJ	5.0 UJ			5.0 UJ	5.0 UJ		
Copper		12 P			31	42			5.7 P	7.7 P		
Lead		1.0 U			5.9	23.3			1.4 P	2.1 P		
Mercury		0.10 U			0.10 U	0.10 U			0.10 U	0.10 U		
Nickel		12 P			10 U	10 U			10 U	10 U		
Selenium		2.0 U			2.0 U	2.0 U			2.0 U	2.0 U		
Silver		0.50 U			0.50 U	0.50 U			0.50 U	0.50 U		
Thallium		2.5 U			2.5 U	2.5 U			2.5 U	2.5 U		
Zinc		32 P			114	125			20 P	34 P		

[1]NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS.
REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

U The analyte was not detected at or above the reported result.
UJ The analyte was not detected at or above the reported estimated result.
J The analyte was positively identified. The associated numerical result is an estimate.
B Analyte was found in the analytical method blank, indicating the sample may have been contaminated.
P The analyte was detected above the instrument detection limit but below the established minimum quantification limit.

Appendix D – Ecology VOA, BNA, Pesticide/PCB and Metals Results – Weyco (Snoqualmie), February 1993.

Parameter	Location:	Ditch-1		Sed-1		Sed-2		Sed-3	
	Type:	grab		grab		grab		grab	
	Date:	2/16		2/9		2/9		2/9	
	Time:	1130		1345-1405		1305-1320		1210-1225	
	Lab Log #:	088092		078095		078096		078097	
VOA Compounds		ug/L		ug/Kg		ug/Kg		ug/Kg	
Chloromethane		2	U	23	UJ	40	UJ	16	UJ
Bromomethane		2	U	23	U	40	UJ	16	U
Vinyl Chloride		2	U	23	U	40	UJ	16	U
Chloroethane		2	U	23	U	40	UJ	16	U
Methylene Chloride		2	U	35	U	100	U	27	U
Acetone		13		130	U	300	U	98	U
Carbon Disulfide		1	U	11	U	40	U	7.5	
1,1-Dichloroethene		1	U	11	U	40	U	8.2	U
1,1-Dichloroethane		1	U	11	U	40	U	8.2	U
1,2-Dichloroethene (total)		1	U	11	U	40	U	8.2	U
Chloroform		1.3		11	U	40	U	8.2	U
1,2-Dichloroethane		1	U	11	U	40	U	8.2	U
2-Butanone (MEK)		5	U	46	J	81	J	38	J
1,1,1-Trichloroethane		1	U	11	U	40	U	8.2	U
Carbon Tetrachloride		1	U	11	U	40	U	8.2	U
Vinyl Acetate		1	U	11	U	40	U	8.2	U
Bromodichloromethane		1	U	11	U	40	U	8.2	U
1,2-Dichloropropane		1	U	11	U	40	U	8.2	U
cis-1,3-Dichloropropene		1	U	11	U	40	U	8.2	U
Trichloroethene		1	U	11	U	40	U	8.2	U
Dibromochloromethane		1	U	11	U	40	U	8.2	U
1,1,2-Trichloroethane		1	U	11	U	40	U	8.2	U
Benzene		0.6	J	11	U	40	U	8.2	U
trans-1,3-Dichloropropene		1	U	11	U	40	U	8.2	U
Bromoform		1	U	11	U	40	U	8.2	U
4-Methyl-2-Pentanone (MIBK)		5	U	57	UJ	100	UJ	41	UJ
2-Hexanone		5	U	57	UJ	100	UJ	41	UJ
Tetrachloroethene		1	U	11	U	20	U	8.2	U
1,1,2,2-Tetrachloroethane		1	U	11	U	20	U	8.2	U
Toluene		7.5		11	U	9800	J	8.2	U
Chlorobenzene		1	U	11	U	20	U	8.2	U
Ethylbenzene		0.7	J	11	U	20	U	8.2	U
Styrene		1	U	11	U	20	U	8.2	U
Total Xylenes		3		23	U	50	J	16	U
Trichlorofluoromethane		2	U	23	U	40	U	16	U
1,1,2-Trichloro-1,2,2-Trifluoro		2	U	23	U	40	U	16	U
BNA Compounds									
Carbazole		1	U	210	U	490	U	210	U
Phenol		2	U	3500		970	U	420	U
Bis(2-Chloroethyl)Ether		1	U	210	U	490	U	210	U
2-Chlorophenol		1	U	210	U	490	U	210	U
1,3-Dichlorobenzene		1	U	210	U	490	U	210	U
1,4-Dichlorobenzene		1	U	210	U	490	U	210	U
Benzyl Alcohol		58		1000	U	2400	U	1000	U
1,2-Dichlorobenzene		1	U	210	U	490	U	210	U
2-Methylphenol		1	U	270		490	U	210	U
2,2'-Oxybis(1-Chloropropane)		1	U	210	U	490	U	210	U
4-Methylphenol		1	U	2400		2300		590	
N-Nitroso-di-n-Propylamine		1	U	210	U	490	U	210	U
Hexachloroethane		2	U	410	U	970	U	410	U
Nitrobenzene		1	U	210	U	490	U	210	U

Appendix D – Ecology VOA, BNA, Pesticide/PCB and Metals Results – Weyco (Snoqualmie), February 1993.

Parameter	Location:	Ditch-1		Sed-1		Sed-2		Sed-3	
	Type:	grab		grab		grab		grab	
	Date:	2/16		2/9		2/9		2/9	
	Time:	1130		1345-1405		1305-1320		1210-1225	
	Lab Log #:	088092		078095		078096		078097	
BNA Compounds		ug/L		ug/Kg		ug/Kg		ug/Kg	
Isophorone		1	U	210	U	490	U	210	U
2-Nitrophenol		5	U	1000	U	2400	U	1000	U
2,4-Dimethylphenol		2	U	410	U	970	U	410	U
Benzoic Acid		**18**		2100	U	4900	U	2100	U
Bis(2-Chloroethoxy)Methane		1	U	210	U	490	U	210	U
2,4-Dichlorophenol		3	U	620	U	1500	U	620	U
1,2,4-Trichlorobenzene		1	U	210	U	490	U	210	U
Naphthalene		1	U	**2000**		490	U	**170**	J
4-Chloroaniline		3	U	620	U	1500	U	620	U
Hexachlorobutadiene		2	U	410	U	970	U	410	U
4-Chloro-3-Methylphenol		2	U	410	U	970	U	410	U
2-Methylnaphthalene		1	U	**180**	J	490	U	**170**	J
Hexachlorocyclopentadiene		5	U	1000	U	2400	U	1000	U
2,4,6-Trichlorophenol		5	U	1000	U	2400	U	1000	U
2,4,5-Trichlorophenol		5	U	1000	U	2400	U	1000	U
2-Chloronaphthalene		1	U	210	U	490	U	210	U
2-Nitroaniline		5	U	1000	U	2400	U	1000	U
Dimethyl Phthalate		1	U	210	U	490	U	210	U
Acenaphthylene		1	U	**850**		490	U	210	U
2,6-Dinitrotoluene		5	U	1000	U	2400	U	1000	U
3-Nitroaniline		1	U	1000	U	2400	U	1000	U
Acenaphthene		1	U	210	U	490	U	210	U
2,4-Dinitrophenol		10	U	2100	U	4900	U	2100	U
4-Nitrophenol		5	U	1000	U	2400	U	1000	U
Dibenzofuran		1	U	**400**		490	U	210	U
2,4-Dinitrotoluene		5	U	1000	U	2400	U	1000	U
Diethyl Phthalate		1	U	210	U	490	U	210	U
4-Chlorophenyl Phenylether		1	U	210	U	490	U	210	U
Fluorene		1	U	**220**		490	U	210	U
4-Nitroaniline		5	U	1000	U	2400	U	1000	U
4,6-Dinitro-2-Methylphenol		10	U	2100	U	4900	U	2100	U
N-Nitrosodiphenylamine		1	U	210	U	490	U	210	U
4-Bromophenyl Phenylether		1	U	210	U	490	U	210	U
Hexachlorobenzene		1	U	210	U	490	U	210	U
Pentachlorophenol		5	U	1000	U	2400	U	1000	U
Phenanthrene		1	U	**1700**		**550**		**340**	
Anthracene		11	U	**240**		490	U	210	U
Di-n-Butyl Phthalate		1	U	210	U	570	U	210	U
Fluoranthene		1	U	**2300**		**620**		**270**	
Pyrene		1	U	**1200**	J	**360**	J	**250**	
Butylbenzyl Phthalate		1	U	210	U	490	U	210	U
3,3'-Dichlorobenzidine		5	U	1000	U	2400	U	1000	U
Benzo(a)Anthracene		1	U	**230**	J	490	U	210	U
Chrysene		1	U	**350**	J	490	U	**120**	J
Bis(2-Ethylhexyl)Phthalate		1	U	**300**	J	**590**		**400**	
Di-n-Octyl Phthalate		1	U	210	U	490	U	210	U
BenzoFluoranthene		1	U	**520**	J	490	U	210	U
Benzo(a)Pyrene		1	U	**210**	J	490	U	210	U
Indeno(1,2,3-cd)Pyrene		1	U	210	U	490	U	210	U
Dibenzo(a,h)Anthracene		1	U	210	U	490	U	210	U
Benzo(g,h,i)Perylene		1	U	210	U	490	U	210	U

Appendix D – Ecology VOA, BNA, Pesticide/PCB and Metals Results – Weyco (Snoqualmie), February 1993.

Parameter	Location:	Ditch-1		Sed-1		Sed-2		Sed-3	
	Type:	grab		grab		grab		grab	
	Date:	2/16		2/9		2/9		2/9	
	Time:	1130		1345-1405		1305-1320		1210-1225	
	Lab Log #:	088092		078095		078096		078097	
Pesticide/PCB Compounds		ug/L		ug/Kg		ug/Kg		ug/Kg	
alpha-BHC		0.05	U	11	U	26	U	11	U
beta-BHC		0.05	U	15	U	26	U	15	U
delta-BHC		0.05	U	11	U	26	U	11	U
gamma-BHC (Lindane)		0.05	U	11	U	26	U	11	U
Heptachlor		0.05	U	11	U	26	U	11	U
Aldrin		0.05	U	11	U	26	U	11	U
Heptachlor Epoxide		0.05	U	11	U	26	U	11	U
Endosulfan I		0.05	U	11	U	26	U	11	U
Dieldrin		0.10	U	22	U	53	U	22	U
4,4'-DDE		0.10	U	22	U	53	U	22	U
Endrin		0.10	U	22	U	53	U	22	U
Endosulfan II		0.10	U	22	U	53	U	22	U
4,4'-DDD		0.10	U	22	U	53	U	22	U
Endosulfan Sulfate		0.10	U	22	U	53	U	22	U
4,4'-DDT		0.10	U	22	U	53	U	22	U
Methoxychlor		0.50	U	110	U	260	U	110	U
Endrin Ketone		0.10	U	22	U	53	U	22	U
alpha-Chlordane		0.05	U	11	U	26	U	11	U
gamma-Chlordane		0.05	U	11	U	26	U	11	U
Toxaphene		5.0	U	1100	U	2600	U	1100	U
Aroclor-1016		1.0	U	220	U	530	U	220	U
Aroclor-1221		2.0	U	440	U	1100	U	440	U
Aroclor-1232		1.0	U	220	U	530	U	220	U
Aroclor-1242		1.0	U	220	U	530	U	220	U
Aroclor-1248		1.0	U	220	U	530	U	220	U
Aroclor-1254		1.0	U	220	U	530	U	220	U
Aroclor-1260		1.0	U	220	U	530	U	220	U
Endrin Aldehyde		0.10	UJ	22	UJ	53	UJ	22	UJ
Chlordane									
Metals		mg/L		mg/Kg-dry		mg/Kg-dry		mg/Kg-dry	
Antimony		30	U	3.0	UJ	3.0	UJ	3.0	UJ
Arsenic		**8.9**	**P**	**26.4**		**5.38**		**15.3**	
Beryllium		1.0	U	**0.61**		**0.25**		**0.65**	
Cadmium		**0.17**	**P**	**1.9**		**0.76**	**P**	**1.0**	**P**
Chromium		5	UJ	**48.1**	**J**	**19.0**	**J**	**51.9**	**J**
Copper		**12**	**P**	**106**	**J**	**40.2**	**J**	**77.0**	**J**
Lead		**3.7**	**P**	**76.8**		**11**		**20.3**	
Mercury		.10	U	**0.356**		**0.074**	**P**	**0.10**	**P**
Nickel		10	U	**48.3**		**22.1**		**59.6**	
Selenium		2.0	U	0.40	U	0.40	U	0.40	U
Silver		0.50	U	**1.2**		0.30	U	0.30	U
Thallium		2.5	U	0.50	U	0.50	U	0.50	U
Zinc		**109**		**320**		**150**		**153**	

[1]NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS. REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

U The analyte was not detected at or above the reported result.
UJ The analyte was not detected at or above the reported estimated result.
J The analyte was positively identified. The associated numerical result is an estimate.
B Analyte was found in the analytical method blank, indicating the sample may have been contaminated.
P The analyte was detected above the instrument detection limit but below the established minimum quantification limit.

Appendix E - Tentatively Identified Compounds - Weyco (Snoqualmie)
February 1993.

ANALYTICAL
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333 Ninth Ave. North
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(206) 621-6490
(206) 621-7523 (FAX)

ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 088083

QC Report No: D035 - WDOE
Project No: Weyco - Snoqualmie

Lab ID: D035H2
Matrix: Waters

VTSR: 02/17/93

Data Release Authorized: Mark Hartsell
Report Prepared: 03/05/93 MAC:D sk

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)	
1	-	Unknown (bp m/e 69)	ABN	1097	55 J	
2	-	Unknown (bp m/e 69)	ABN	1103	120 J	
3	134-96-3	4-Hydroxy-3,5-Dimethoxybenzaldehyde	ABN	1177	38 J NJ	KF
4	-	Unknown (bp m/e 137)	ABN	1239	110 J	
5	57-10-3	Hexadecanoic Acid	ABN	1398	53 J	
6	-	Unknown (bp m/e 67)	ABN	1518	66 J	
7	18956-15-5	1-(2,6-Dihydroxy-4-Methoxyphenyl)-3-phenyl-2-propen-1-one	ABN	1694	16 J NJ	KF
8	-	Unknown (bp m/e 57)	ABN	1771	15 J	
9	-	Unknown (bp m/e 57)	ABN	1804	14 J	
10	-	Unknown (bp m/e 57)	ABN	1852	39 J	
11	-	Unknown (bp m/e 97)	ABN	1868	41 J	
12	-	Unknown (bp m/e 57)	ABN	1876	38 J	
13	-	Unknown (bp m/e 167)	ABN	1899	80 J	
14	-	Unknown (bp m/e 57)	ABN	1923	77 J	
15	-	Unknown (bp m/e 107)	ABN	1961	60 J	
16	-	Unknown (bp m/e 107)	ABN	1990	140 J	
17	-	Unknown (bp m/e 165)	ABN	2078	110 J	
18	-	Unknown Sterol Isomer (bp m/e 43)	ABN	2214	210 J NJ	KF
19	-	Unknown (bp m/e 95)	ABN	2264	99 J	
20	-	Unknown (bp m/e 95)	ABN	2286	300 J	
21	-	Unknown (bp m/e 43)	ABN	2372	42 J	
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Appendix E (cont.) - Tentatively Identified Compounds - Weyco (Snoqualmie) - February 1993.

ANALYTICAL RESOURCES INCORPORATED

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Seattle, WA 98109-5187
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 088087

QC Report No: D035 - WDOE
Project No: Weyco - Snoqualmie

Lab ID: D0351 2
Matrix: Waters

VTSR: 02/17/93

Data Release Authorized: Mark Hamilton
Report Prepared: 03/10/93 MAC:D sk

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)	
1	541-02-6	Decamethylcyclopentasiloxane	ABN	697	7 J NJ	KF
2	540-97-6	Dodecamethylcyclohexasiloxane	ABN	874	14 J	
3	124-17-4	Ethanol, 2-(2-Butoxyethoxy)-, Acetate	ABN	913	4 J	
4	-	Unknown Silane Isomer (bp m/e 73)	ABN	1034	10 J	
5	-	Unknown (bp m/e 73)	ABN	1095	4 J	
6	-	Unknown Silane Isomer (bp m/e 73)	ABN	1177	6 J NJ	KF
7	-	Unknown Silane Isomer (bp m/e 73)	ABN	1301	5 J	
8	-	Unknown Silane Isomer (bp m/e 73)	ABN	1413	3 J	
9	-	Unknown (bp m/e 56)	ABN	1551	8 J	
10	-	Unknown (bp m/e 56)	ABN	1676	8 J	
11	-	Unknown Silane Isomer (bp m/e 73)	ABN	1776	3 J NJ	KF
12	-	Unknown (bp m/e 95)	ABN	1832	4 J	
13	-	Unknown (bp m/e 73)	ABN	1853	4 J	
14	541-01-5	Hexadecamethylheptasiloxane	ABN	1925	8 J NJ	KF
15	-	Unknown (bp m/e 73)	ABN	1991	6 J	
16	-	Unknown (bp m/e 203)	ABN	1996	4 J	
17	-	Unknown (bp m/e 43)	ABN	2018	6 J	
18	-	Unknown Silane Isomer (bp m/e 73)	ABN	2054	7 J NJ	KF
19	-	Unknown (bp m/e 43)	ABN	2071	10 J	
20	-	Unknown Silane Isomer (bp m/e 73)	ABN	2132	4 J NJ	KF
21	-	Unknown (bp m/e 97)	ABN	2268	4 J	
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Form 1, Part B

Appendix E (cont.) - Tentatively Identified Compounds - Weyco (Snoqualmie) - February 1993.

ANALYTICAL RESOURCES INCORPORATED

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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 088092

QC Report No: D035 - WDOE
Project No: Weyco - Snoqualmie

Lab ID: D035G
Matrix: Waters

VTSR: 02/17/93

Data Release Authorized: _____
Report Prepared: 03/05/93 MAC:D sk

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)	
1	121-33-5	4-Hydroxy-3-Methoxybenzaldehyde	ABN	951	12 J NJ	KF
2	-	Unknown (bp m/e 69)	ABN	1102	12 J	
3	-	Unknown (bp m/e 69)	ABN	1108	29 J	
4	-	Unknown (bp m/e 151)	ABN	1121	14 J	
5	-	Unknown (bp m/e 170)	ABN	1174	9 J	
6	134-96-3	4-Hydroxy-3,5-Dimethoxybenzaldehyde	ABN	1181	15 J NJ	KF
7	-	Unknown (bp m/e 178)	ABN	1243	31 J	
8	57-10-3	Hexadecanoic Acid	ABN	1403	17 J NJ	KF
9	-	Unknown (bp m/e 107)	ABN	1460	17 J	
10	-	Unknown (bp m/e 67)	ABN	1525	21 J	
11	-	Unknown (bp m/e 149)	ABN	1778	3 J	
12	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1803	3 J NJ	KF
13	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1857	3 J	
14	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1910	5 J	
15	6006-01-5	4,8,12-Trimethyl-3,7,11-Tridecatrienenitrile	ABN	1928	8 J	
16	-	Unknown (bp m/e 107)	ABN	1968	12 J J	KF
17	-	Unknown (bp m/e 107)	ABN	2000	32 J	
18	-	Unknown (bp m/e 165)	ABN	2090	11 J	
19	-	Unknown Sterol Isomer (bp m/e 43)	ABN	2230	47 J NJ	KF
20	-	Unknown (bp m/e 109)	ABN	2285	22 J	
21	-	Unknown (bp m/e 95)	ABN	2308	73 J	
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Form 1, Part B

Appendix E (cont.) - Tentatively Identified Compounds - Weyco (Snoqualmie) - February 1993.

ANALYTICAL RESOURCES INCORPORATED

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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 078095

QC Report No: C988 - WDOE
Project No: Weyco Snoqualmie

Lab ID: C988A
Matrix: Soils/Sediments

VTSR: 02/11/93

Data Release Authorized: Mark Hamilton
Date Prepared: 03/03/93 MAC:D sk

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/Kg)
1	-	Unknown (bp m/e 109)	ABN	1435	7700 J
2	-	C18.H18 Isomer (bp m/e 219)	ABN	1597	13000 J NJ
3	-	Unknown (bp m/e 57)	ABN	1703	2400 J
4	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1749	11000 J NJ
5	-	Unknown (bp m/e 69)	ABN	1759	2700 J
6	-	Unknown (bp m/e 57)	ABN	1780	3200 J
7	-	Unknown (bp m/e 57)	ABN	1787	3000 J
8	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1806	2600 J NJ
9	-	Unknown (bp m/e 57)	ABN	1837	2300 J
10	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1860	6000 J NJ
11	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1881	4500 J NJ
12	-	Unknown (bp m/e 57)	ABN	1933	6500 J
13	-	unknown Hydrocarbon (bp m/e 57)	ABN	1948	4100 J NJ
14	-	unknown Hydrocarbon (bp m/e 57)	ABN	1962	9500 J NJ
15	-	Unknown (bp m/e 55)	ABN	1996	9400 J
16	-	Unknown (bp m/e 57)	ABN	2033	6700 J
17	-	Unknown (bp m/e 57)	ABN	2065	4000 J
18	-	Unknown (bp m/e 57)	ABN	2097	9200 J
19	83-47-6	(3.Beta.,24S) Stigmast-5-en-3-ol/Coelute	ABN	2235	8100 J NJ
20	-	Unknown (bp m/e 95)	ABN	2245	4400 J
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Appendix E (cont.) - Tentatively Identified Compounds - Weyco (Snoqualmie) - February 1993.

ANALYTICAL RESOURCES INCORPORATED

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333 Ninth Ave. North
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(206) 621-7523 (FAX)

ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 078096

QC Report No: C988 - WDOE
Project No: Weyco Snoqualmie

Lab ID: C988B
Matrix: Soils/Sediments

VTSR: 02/11/93

Data Release Authorized: _____
Date Prepared: *03/03/93 MAC:D sk*

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/Kg)
1	-	Unknown (bp m/e 57)	ABN	1780	9800 J
2	-	Unknown (bp m/e 57)	ABN	1860	10000 J
3	-	Unknown (bp m/e 133)	ABN	1903	77000 J
4	-	Unknown (bp m/e 69)	ABN	1930	13000 J
5	-	Unknown (bp m/e 57)	ABN	1944	14000 J
6	-	Unknown (bp m/e 40)	ABN	1960	16000 J
7	-	Unknown (bp m/e 253)	ABN	1997	69000 J
8	-	Unknown (bp m/e 57)	ABN	2011	20000 J
9	-	Unknown (bp m/e 57)	ABN	2024	18000 J
10	-	Unknown (bp m/e 358)	ABN	2031	21000 J
11	-	Unknown (bp m/e 57)	ABN	2038	21000 J
12	-	Unknown (bp m/e 57)	ABN	2044	13000 J
13	-	Unknown (bp m/e 69)	ABN	2066	18000 J
14	-	Unknown (bp m/e 57)	ABN	2079	16000 J
15	-	Unknown (bp m/e 43)	ABN	2093	16000 J
16	-	Unknown (bp m/e 57)	ABN	2105	13000 J
17	-	Unknown (bp m/e 57)	ABN	2187	12000 J
18	-	Unknown (bp m/e 43)	ABN	2234	39000 J
19	-	Unknown (bp m/e 69)	ABN	2244	13000 J
20	-	Unknown (bp m/e 95)	ABN	2292	27000 J
21	-	Unknown (bp m/e 95)	ABN	2314	39000 J
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Appendix E (cont.) - Tentatively Identified Compounds - Weyco (Snoqualmie) - February 1993.

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 078097

QC Report No: C988 - WDOE
Project No: Weyco Snoqualmie

Lab ID: C988C
Matrix: Soils/Sediments

VTSR: 02/11/93

Data Release Authorized: Mark Hartt
Date Prepared: 03/03/93 MAC:D sk

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/Kg)
1	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1211	7700 J
2	-	Unknown (bp m/e 109)	ABN	1437	22000 J
3	-	Unknown Hydrocarbon/Coelute (bp m/e 57)	ABN	1590	4700 J
4	-	Unknown (bp m/e 219)	ABN	1597	6900 J
5	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1642	6100 J
6	-	Unknown (bp m/e 57)	ABN	1658	4700 J
7	-	Unknown (bp m/e 57)	ABN	1695	6400 J
8	-	Unknown (bp m/e 57)	ABN	1705	5400 J
9	-	Unknown (bp m/e 69)	ABN	1725	4800 J
10	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1751	17000 J
11	-	Unknown (bp m/e 57)	ABN	1783	5800 J
12	-	Unknown (bp m/e 57)	ABN	1790	5800 J
13	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1810	5900 J
14	-	Unknown (bp m/e 57)	ABN	1828	6500 J
15	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1839	8000 J
16	-	Unknown (bp m/e 218)	ABN	1851	7600 J
17	-	Unknown (bp m/e 57)	ABN	1861	7100 J
18	-	Unknwon (bp m/e 57)	ABN	1898	14000 J
19	-	Unknown Hydrocarbon (bp m/e 57)	ABN	1925	7900 J
20	-	Unknown (bp m/e 253)	ABN	1996	12000 J
21	83-47-6	(3.Beta.,24S) Stigmast-5-en-3-ol/Coelute	ABN	2235	9600 J
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Appendix F – VOA, BNA, Pesticide/PCB and Metals Split Sample Results Comparison – Weyco (Snoqualmie), February 1993.

Parameter	Analyzed by:	Location:	Plnt Wtr	002–1	002–2	002–E	002–W	001–1	001–2	001–E	001–W	Trk wsh
		Type:	grab	grab	grab	E–comp	W–comp	grab	grab	E–comp	grab	grab
		Date:	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16	2/16
		Lab Log #:	088080	088081	088082	088083	088084	088085	088086	088087	088088	088090
		Sampler:	Ecology	Ecology	Ecology	Ecology	Weyco	Ecology	Ecology	Ecology	Weyco	Ecology
VOA Compounds			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Acetone	Ecology			20	13			U	U			8.6
	Weyco			19	23			U	U			4 J
Methylene Chloride	Ecology			U	U			U	U			2 U
	Weyco			U	U			U	U			7 J
Carbon Disulfide	Ecology			U	U			U	U			U
	Weyco			U	U			U	U			U
Chloroform	Ecology			3.1	3.7			U	U			U
	Weyco			4 J	5 J			U	U			U
2–Butanone (MEK)	Ecology			5 U	U			U	U			U
	Weyco			3 J	U			U	U			U
Benzene	Ecology			U	U			U	U			U
	Weyco			U	U			U	U			U
Toluene	Ecology			U	U			U	U			U
	Weyco			U	U			U	U			U
Ethylbenzene	Ecology			U	U			U	U			U
	Weyco			U	U			U	U			U
Total Xylenes	Ecology			U	U			U	U			U
	Weyco			U	U			U	U			U
BNA Compounds												
Phenol	Ecology					10 U				U		
	Weyco					3 J				U		
2–Methylphenol	Ecology					U				U		
	Weyco					U				U		
4–Methylphenol	Ecology					U				U		
	Weyco					U				U		
Naphthalene	Ecology					U				U		
	Weyco					U				U		
2–Methylnaphthalene	Ecology					U				U		
	Weyco					U				U		
Acenaphthylene	Ecology					U				U		
	Weyco					U				U		
Dibenzofuran	Ecology					U				U		
	Weyco					U				U		
Fluorene	Ecology					U				U		
	Weyco					U				U		
Phenanthrene	Ecology					U				U		
	Weyco					U				U		
Anthracene	Ecology					U				U		
	Weyco					U				U		
Fluoranthene	Ecology					U				U		
	Weyco					U				U		
Pyrene	Ecology					U				U		
	Weyco					U				U		
Benzo(a)Anthracene	Ecology					U				U		
	Weyco					U				U		
Chrysene	Ecology					U				U		
	Weyco					U				U		

Appendix F (cont.) – VOA, BNA, Pesticide/PCB and Metals Split Sample Results Comparison – Weyco (Snoqualmie), Februa

Parameter	Analyzed by:	Location:	Blr dis		Ditch-1		Sed-1		Sed-2		Sed-3	
		Type:	grab		grab		grab		grab		grab	
		Date:	2/16		2/16		2/9		2/9		2/9	
		Lab Log #:	088091		088092		078095		078096		078097	
		Sampler:	Ecology		Ecology		Ecology		Ecology		Ecology	
VOA Compounds			ug/L		ug/L		mg/Kg-dry		mg/Kg-dry		mg/Kg-dry	
Acetone	Ecology		7.1		13		130	U	300	U	98	U
	Weyco		10	U	9	J	100		19(55)*		69	
Methylene Chloride	Ecology			U		U		U		U		U
	Weyco			U		U		U		U		U
Carbon Disulfide	Ecology			U		U		U		U	7.5	
	Weyco			U		U		U		U	2	J
Chloroform	Ecology		2.1		1.3			U		U		U
	Weyco		3	J	2	J		U		U		U
2-Butanone (MEK)	Ecology			U		U	46	J	81	J	38	J
	Weyco			U		U	50	U	10	U	14	
Benzene	Ecology			U	0.6	J		U		U		U
	Weyco			U	10	U		U		U		U
Toluene	Ecology			U	7.5			U	9800	J		U
	Weyco			U	5	J		U	00(810)*	E		U
Ethylbenzene	Ecology			U	0.7	J		U		U		U
	Weyco			U	10	U		U		U		U
Total Xylenes	Ecology			U	3			U	50	J		U
	Weyco			U	3	JX		U	3	J		U
BNA Compounds												
Phenol	Ecology					U	3500			U		U
	Weyco					U	2700			U		U
2-Methylphenol	Ecology					U	270			U		U
	Weyco					U	2100	U		U		U
4-Methylphenol	Ecology					U	2400		2300		590	
	Weyco					U	1800		1700		5000	U
Naphthalene	Ecology					U	2000			U	170	J
	Weyco					U	1600			U	5000	U
2-Methylnaphthalen	Ecology					U	180	J		U	170	J
	Weyco					U	2100	U		U		U
Acenaphthylene	Ecology					U	850			U		U
	Weyco					U	760			U		U
Dibenzofuran	Ecology					U	400			U		U
	Weyco					U	430			U		U
Fluorene	Ecology					U	220			U		U
	Weyco					U	2100	U		U		U
Phenanthrene	Ecology					U	1700		550		340	
	Weyco					U	1900	U	7000	U	5000	U
Anthracene	Ecology					U	240			U		U
	Weyco					U	2100	U		U		U
Fluoranthene	Ecology					U	2300		620		270	
	Weyco					U	2000	U	7000	U	5000	U
Pyrene	Ecology					U	1200	J	360	J	250	
	Weyco					U	1700	U	7000	U	5000	U
Benzo(a)Anthracene	Ecology					U	230	J		U		U
	Weyco					U	340			U		U
Chrysene	Ecology					U	350	J		U	120	J
	Weyco					U	370			U	5000	U

Appendix F (cont.) – VOA, BNA, Pesticide/PCB and Metals Split Sample Results Comparison – Weyco (Snoqualmie), February 1993.

Parameter	Analyzed by:	Location:	Plnt Wtr	002-1	002-2	002-E		002-W	001-1	001-2	001-E		001-W	Trk wsh
		Type:	grab	grab	grab	E-comp		W-comp	grab	grab	E-comp		grab	grab
		Date:	2/16	2/16	2/16	2/16		2/16	2/16	2/16	2/16		2/16	2/16
		Lab Log #:	088080	088081	088082	088083		088084	088085	088086	088087		088088	088090
		Sampler:	Ecology	Ecology	Ecology	Ecology		Weyco	Ecology	Ecology	Ecology		Weyco	Ecology
BNA Compounds			ug/L	ug/L	ug/L	ug/L		ug/L	ug/L	ug/L	ug/L		ug/L	ug/L
Bis(2-Ethylhexyl)Phth	Ecology					5	U					U		
	Weyco					82						U		
BenzoFluoranthene	Ecology						U					U		
	Weyco						U					U		
Benzo(a)Pyrene	Ecology						U					U		
	Weyco						U					U		
Pesticides														
Heptachlor epoxide	Ecology													
	Weyco													
4,4'-DDE	Ecology													
	Weyco													
Endrin	Ecology													
	Weyco													
4,4'-DDD	Ecology													
	Weyco													
Metals			ug/L	ug/L	ug/L	ug/L		ug/L	ug/L	ug/L	ug/L		ug/L	ug/L
Arsenic	Ecology													
	Weyco													
Beryllium	Ecology													
	Weyco													
Cadmium	Ecology													
	Weyco													
Chromium	Ecology													
	Weyco													
Copper	Ecology													
	Weyco													
Lead	Ecology													
	Weyco													
Mercury	Ecology						U		U			U	U	
	Weyco						U(U)		U			U	U	
Nickel	Ecology													
	Weyco													
Selenium	Ecology													
	Weyco													
Silver	Ecology													
	Weyco													
Thallium	Ecology													
	Weyco													
Zinc	Ecology													
	Weyco													

NOTE: Results in parentheses represent Weyco duplicate analyses.

U	The analyte was not detected at or above the reported result.
UJ	The analyte was not detected at or above the reported estimated result.
J	The analyte was positively identified. The associated numerical result is an estimate.
B	Analyte was found in the analytical method blank, indicating the sample may have been contaminated.
P	The analyte was detected above the instrument detection limit but below the established minimum quantification limit.
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument.
*	Duplicate % solids analysis yielded a different result. 26.2% solids was used to calculate result on a dry-weight basis.

Appendix F (cont.) – VOA, BNA, Pesticide/PCB and Metals Split Sample Results Comparison – Weyco (Snoqualmie), Februa

Parameter	Analyzed by:	Location:	Blr dis	Ditch-1	Sed-1	Sed-2	Sed-3
		Type:	grab	grab	grab	grab	grab
		Date:	2/16	2/16	2/9	2/9	2/9
		Lab Log #:	088091	088092	078095	078096	078097
		Sampler:	Ecology	Ecology	Ecology	Ecology	Ecology
VOA Compounds			ug/L	ug/L	mg/Kg-dry	mg/Kg-dry	mg/Kg-dry
Bis(2-Ethylhexyl)Pht	Ecology			U	300 J	590	400
	Weyco			U	2100 U	7000 U	5000 U
BenzoFluoranthene	Ecology			U	520 J	U	U
	Weyco			U	480	U	U
Benzo(a)Pyrene	Ecology			U	210 J	U	U
	Weyco			U	2100 U	U	U
Pesticides							
Heptachlor epoxide	Ecology				11 U	U	U
	Weyco				4.1 JP	U	U
4,4'-DDE	Ecology				22 U	U	22 U
	Weyco				1.3 JP	U	1.4 JP
Endrin	Ecology				22 U	U	U
	Weyco				24 P	U	U
4,4'-DDD	Ecology				U	U	22 U
	Weyco				U	U	5.5 J
Metals			ug/L	ug/L	mg/Kg-dry	mg/Kg-dry	mg/Kg-dry
Arsenic	Ecology				26.4	5.4	15.3
	Weyco				27.5*	8.5	21.4
Beryllium	Ecology				0.6	0.3	0.7
	Weyco				<3.8(<3.8)*	<10.6	<3.8
Cadmium	Ecology				1.9	0.8 P	1.0 P
	Weyco				<3.8(<3.8)*	<10.6	<3.8
Chromium	Ecology				48.1 J	19.0 J	51.9 J
	Weyco				57.2(57.2)*	21.3	57.3
Copper	Ecology				106 J	40.2 J	77.0 J
	Weyco				91.6(95.4)*	42.7	76.3
Lead	Ecology				76.8	11	20.3
	Weyco				80.1(70.2)*	11.7	18.3
Mercury	Ecology			U	0.4	0.1 P	0.1 P
	Weyco			U	.8(<3.8)*	<10.6	<.4
Nickel	Ecology				48.3	22.1	59.6
	Weyco				49.6(45.8)*	<3.2	53.4
Selenium	Ecology				0.4 U	0.4 U	0.4 U
	Weyco				<1.1(<1.1)*	<3.2	<1.1
Silver	Ecology				1.2	0.3 U	0.3 U
	Weyco				<3.8(<3.8)*	<10.6	<3.8
Thallium	Ecology				0.5 U	0.5 U	0.5 U
	Weyco				<1.1(<1.1)*	<3.2	<1.1
Zinc	Ecology				320	150	153
	Weyco				297.7(293.9)*	160	152.7

NOTE: Results in parentheses represent Weyco duplicate analyses.

UJ	The analyte was not detected at or above the reported estimated result.	U	The analyte was not detected at or above the reported result.
J	The analyte was positively identified. The associated numerical result is an estimate.		
B	Analyte was found in the analytical method blank, indicating the sample may have been contaminated.		
P	The analyte was detected above the instrument detection limit but below the established minimum quantification limit.		
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument.		
X	This flag is assigned by the computer when the program has been manually adjusted by the operator. It has no significance to the number.		
*	Duplicate % solids analysis yielded a different result. 26.2% solids was used to calculate result on a dry-weight basis.		

Appendix G - GLOSSARY

ABN	Acid base-neutral, semivolatile organics, see BNA
AED	Atomic Emission Detector
BNA	Base-neutral acids, semivolatiles, see ABN
BOD	Biological Oxygen Demand
CLP	Contract Laboratory Program
COD	Chemical Oxygen Demand
co-elutants	When two or more compounds have the same chromatographic retention time
CVAA	Cold Vapor Atomic Absorption
d-deuterium	An isotope of hydrogen
DL	Detection Limit
DOC	Dissolved Organic Carbon
DW	Dangerous Waste
ECD	Electron Capture Detector-Sensitive to halogen compounds - use: halogenated hydrocarbons
EHW	Extremely Hazardous Waste
ELD	Electrolytic Detector - Hall
EP TOX	Extraction Procedure Toxicity
Fatty Acid	Monobasic organic acids derived from hydrocarbons; include both saturated and unsaturated acids
FID	Flame Ionization Detector-Sensitive to carbon compounds, used in the determination of hydrocarbons
Flash Point	Minimum temperature that will enable combustion or explosions to take place
FTIR	Fourier Transform Infra-Red
GC	Gas Chromatography
GCMS	Gas Chromatography Mass Spectrometry, also GC/MS
HC	Hydrocarbon
HDPE	High Density Polyethylene
HH	Halogenated Hydrocarbon
HPLC	High Performance Liquid Chromatography
HSD	Halogen-Specific Detector - use: halogenated hydrocarbons
HW	Hazardous Waste
HWPAH	Hazardous Waste Polynuclear Aromatic Hydrocarbon
ICP	Inductively Coupled Plasma
ICP/MS	Inductively Coupled Plasma/Mass Spectrometry
IDL	Instrument Detection Limit
isomer	One of two or more substances which have the same elementary composition but differ in structure and hence in properties
isotope	One of two or more nuclides having the same atomic number, but differing in mass number

Isotopically labelled	The substitution of one or more isotopes for elements in a compound
kg	kilogram (1 X 10^3 grams)
L	Liter (1 X 10^3 milliliters)
LC50	Concentration which is lethal to 50% of the test organisms
LOD	Limit of Detection
LOEC	Lowest Observable Effect Concentration
m^3	Cubic meter (1 X 10^3 liters)
MBAS	Methylene Blue Active substances
metalloids	Elements that exhibit transitional characteristics between metals and non-metals, examples include silver, selenium, antimony
MF	Membrane Filter
mg	milligram (1 X 10^{-3} grams)
mL	Milliliter (1 X 10^{-3} liters)
MPN	Most Probable Number
ng	Nanogram (1 X 10^{-9} grams)
nm	Nanometer (1 X 10^{-9} meters)
NOEC	No Observable Effect Concentration
NPDES	National Pollution Discharge Elimination System
NPOC	Non-Purgeable Organic Carbon
NTU	Nephelometric Turbidity Unit
OSHA	Occupation Safety and Health Administration
OSW	Office of Solid Waste
PCB	Polychlorinated Biphenyl
PE	Polyethylene
pg	Picogram (1 X 10^{-12} grams)
pH	Hydrogen Ion Concentration
PID	Photoionization Detector - use: aromatic hydrocarbons
PLM	Polarized Light Microscopy
POC	Purgeable Organic Carbon
Polyvalent	Capable of having more than one valance state
PP	Priority Pollutant
ppb	Parts per billion (1 X 10^{-9} ug/L or ug/kg)
ppm	Parts per million (1 X 10^{-6} ug/L or ug/kg)
ppt	Parts per thousand (1 X 10^{-3} ug/L or ug/kg)
PQL	Practical Quantitation Limit
PUF	Polyurethane Foam
SDWA	State Drinking Water Act
SOW	Statement of Work
SW	Solid Waste

TC	Target Compounds or Total Carbon
TCD	Thermal Conductivity Detector
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TIC	Total Inorganic Carbon or for GCMS Tentatively Identified Compound
TNVS	Total Non-Volatile Solids
TNVSS	Total Non-Volatile Suspended Solids
TOC	Total Organic Carbon
TP	Total Phosphorous
TPH	Total Petroleum Hydrocarbons
TS	Total Solids
TSS	Total Suspended Solids
TVS	Total Volatile Solids
ug	Microgram (1×10^{-6} grams)
ug/m^3	Microgram per cubic meter
VOA	Volatile Organic Analysis
VOC	Volatile Organic Carbon
ZHE	Zero Headspace Extractor