

**Hylebos Fish Injury Study - Round II, Part 3
Individual Data and Quality Assurance Results
CASE NARRATIVE**

Juvenile Salmon Biomarker Response Studies

DNA Adducts - measured as nmol DNA adducts/mol of nucleotides (Table 1)

Performance Evaluation

The standard used for ³²P-postlabeling DNA adducts, benzo[a]pyrene diolepoxide-dG (BaPDE-dG), met the ³²P-postlabeling criteria.

Calibration

There was no deviation from the QA/SAP calibration criteria. All of the calibration data used to quantitate DNA adducts met the initial and continuing criteria.

Method Blank

The QA/SAP criteria were met for the method blank in both sample sets.

Sample Duplicates

Four samples (2 samples per sample set) were processed and analyzed in duplicate. The relative standard deviations (RSD) ranged from 12% to 35%, which is within the 50% RSD set in the SAP. Every 17th sample was analyzed in duplicate, in contrast to the SAP which states that every 10th sample should be analyzed in duplicate. This decrease in the number of replicates was due to limited space per sample set.

Values reported that are less than 10 nmol adducts/mol nucleotide

If the storage phosphor images of the distribution of radioactivity on the chromatograms are sufficiently resolved and have a low background, then values less than 10 nmol DNA adducts/mol nucleotides for the large diagonal radioactive zone containing adducts derived from polycyclic aromatic compounds can be obtained. For the chromatography standard (BaPDE-dG), the limit of detection for a single, well-resolved spot is 0.1 nmol DNA adducts/mol nucleotides.

Commentary on Sample Analyses

DNA adducts were initially analyzed in fish exposed to HCBd at 6 days post exposure because adduct levels tend to decrease with time. DNA adducts were not observed on chromatograms from these HCBd-treated fish, so later timepoints were not measured. PCB-exposed fish were not analyzed because PCB-DNA adducts are not formed in detectable amounts. Table 1 contains DNA adduct data from juvenile salmon sampled at all timepoints during the Biomarker Response Study and Growth Study. Figures and statistics in the "Results" section of this report represent data from fish sampled at 6 and 20 days in the Biomarker Response Study and fish sampled at 60 days in the Growth Study. Data measured at these timepoints were used so that results between the various biomarkers could be compared.

Missing samples

One sample (#970825-23) was lost because sufficient DNA could not be extracted (Table 1).

Results from acetone/emulphor-injected fish

The DNA adduct profiles from the acetone/Emulphor (A/E) injected fish did not indicate any evidence of PAH exposure, however, parts of the chromatograms were very uncharacteristic of those normally generated in numerous past studies with fish injected with this solvent vehicle and this abnormality interfered with accurate quantitation. The reason for these chromatographic irregularities was not determined. However, the DNA adduct profiles and levels in the NQSE treated fish were highly representative of those typically observed in fish collected from uncontaminated sites, injected with uncontaminated sediment extracts or the solvent vehicle,

acetone/Emulphor in past studies (French et al. 1996, Stein et al. 1993). For these reasons the (A/E) injected fish were replaced with the reference sediment extract (NQSE) treated group (see Appendix 2) as the control group in the interpretation of the DNA damage data in this report.

DNA Adducts
Table 1 - Page 1

<u>ppl#</u>	<u>set #</u>	<u>sample#</u>	<u>species</u>	<u>treatment</u>	<u>post exposure</u>	<u>nmol adducts/mol nucleotides</u>
172-01	2	970710DA001	juvenile chinook	none	0 d	16
172-02	2	970710DA002	juvenile chinook	none	0 d	6
172-03	2	970710DA003	juvenile chinook	none	0 d	9
172-04	1	970715DA001	juvenile chinook	A/E	6d	47
172-05	1	970715DA002	juvenile chinook	A/E	6d	62
172-06	1	970715DA003	juvenile chinook	A/E	6d	41
172-07a	1	970729DA043	juvenile chinook	A/E	20d	36
172-07b	1	replicate	"	"	"	28
172-08	1	970729DA044	juvenile chinook	A/E	20d	45
172-09	1	970729DA045	juvenile chinook	A/E	20d	30
172-10a	2	970813DA100	juvenile chinook	A/E	35d	5
172-10b	2	replicate	"	"	"	7
172-11	2	970813DA101	juvenile chinook	A/E	35d	5
172-12	2	970813DA102	juvenile chinook	A/E	35d	11
172-13	2	970715DA010	juvenile chinook	HWSE-P	6d	27
172-14	2	970715DA011	juvenile chinook	HWSE-P	6d	27
172-15a	2	970715DA012	juvenile chinook	HWSE-P	6d	21
172-15b	2	replicate	"	"	"	25
172-16	2	970729DA052	juvenile chinook	HWSE-P	20d	32
172-17	2	970729DA053	juvenile chinook	HWSE-P	20d	6
172-18	2	970729DA054	juvenile chinook	HWSE-P	20d	5
172-19	2	970903DA106	juvenile chinook	HWSE-P	56d	7
172-20	2	970903DA107	juvenile chinook	HWSE-P	56d	7
172-21	2	970903DA108	juvenile chinook	HWSE-P	56d	17
172-31	2	970715DA007	juvenile chinook	HWSE-M	6d	19
172-32	2	970715DA008	juvenile chinook	HWSE-M	6d	22
172-33	2	970715DA009	juvenile chinook	HWSE-M	6d	36
172-34	2	970729DA055	juvenile chinook	HWSE-M	20d	12
172-35	2	970729DA056	juvenile chinook	HWSE-M	20d	10
172-36	2	970729DA057	juvenile chinook	HWSE-M	20d	14
172-37	2	970811DA085	juvenile chinook	HWSE-M	33d	13
172-38	2	970811DA086	juvenile chinook	HWSE-M	33d	14
172-39	2	970811DA087	juvenile chinook	HWSE-M	33d	10
172-40	1	970715DA004	juvenile chinook	NQSE	6d	3
172-41	1	970715DA005	juvenile chinook	NQSE	6d	2
172-42	1	970715DA006	juvenile chinook	NQSE	6d	3
172-43	2	970729DA046	juvenile chinook	NQSE	20d	5
172-44	1	970729DA047	juvenile chinook	NQSE	20d	6
172-45	1	970729DA048	juvenile chinook	NQSE	20d	2
172-49	1	970715DA016	juvenile chinook	PAHs	6d	37
172-50	2	970715DA017	juvenile chinook	PAHs	6d	28
172-51a	1	970715DA018	juvenile chinook	PAHs	6d	20
172-51b	1	replicate	"	"	"	31
172-52	1	970729DA049	juvenile chinook	PAHs	20d	41
172-53	2	970729DA050	juvenile chinook	PAHs	20d	23
172-54	1	970729DA051	juvenile chinook	PAHs	20d	26
172-55	1	970909DA121	juvenile chinook	PAHs	62d	4
172-56	1	970909DA122	juvenile chinook	PAHs	62d	10
172-57	1	970909DA123	juvenile chinook	PAHs	62d	3
172-58	2	970626-01	juvenile chinook	none	0d	9
172-59	2	970626-02	juvenile chinook	none	0d	9
172-60	2	970626-03	juvenile chinook	none	0d	6
172-61	2	970825-11	juvenile chinook	HWSE-M	60d	5
172-62	2	970825-12	juvenile chinook	HWSE-M	60d	4
172-63	2	970825-13	juvenile chinook	HWSE-M	60d	4
172-64	2	970825-14	juvenile chinook	HWSE-M	60d	8

DNA Adducts
Table 1 - Page 2

<u>ppl#</u>	<u>set #</u>	<u>sample#</u>	<u>species</u>	<u>treatment</u>	<u>post exposure</u>	<u>nmol adducts/mol nucleotides</u>
172-65	2	970825-15	juvenile chinook	HWSE-P	60d	3
172-66	2	970825-16	juvenile chinook	HWSE-P	60d	10
172-67	2	970825-17	juvenile chinook	HWSE-P	60d	2
172-68	2	970825-18	juvenile chinook	HWSE-P	60d	2
172-69	1	970825-19	juvenile chinook	PAHs	60d	8
172-70	1	970825-20	juvenile chinook	PAHs	60d	6
172-71	1	970825-21	juvenile chinook	PAHs	60d	7
172-72	1	970825-22	juvenile chinook	PAHs	60d	6
172-73	-	970825-23	juvenile chinook	A/E	60d	NDR
172-74	1	970825-24	juvenile chinook	A/E	60d	10
172-75	1	970825-25	juvenile chinook	A/E	60d	8
172-76	1	970825-26	juvenile chinook	A/E	60d	10
172-77	1	970825-27	juvenile chinook	NQSE	60d	3
172-78	1	970825-28	juvenile chinook	NQSE	60d	<10
172-79	1	970825-29	juvenile chinook	NQSE	60d	1
172-80	1	970825-30	juvenile chinook	NQSE	60d	2

ppl set #1

salmon sperm DNA blank	3
Benzo[a]pyrene-DNA adduct standard - 5 ul	3
Benzo[a]pyrene-DNA adduct standard - 5 ul	3
Benzo[a]pyrene-DNA adduct standard - 10 ul	1
Benzo[a]pyrene-DNA adduct standard - 10 ul	2
deoxyadenosine (total nucleotide analysis standard) - 10 ul	8
deoxyadenosine (total nucleotide analysis standard) - 10 ul	11

ppl set #2

salmon sperm DNA blank	2
Benzo[a]pyrene-DNA adduct standard - 5 ul	2.5
Benzo[a]pyrene-DNA adduct standard - 5 ul	3.4
Benzo[a]pyrene-DNA adduct standard - 10 ul	1.7
Benzo[a]pyrene-DNA adduct standard - 10 ul	1.7
deoxyadenosine (total nucleotide analysis standard) - 10 ul	14
deoxyadenosine (total nucleotide analysis standard) - 10 ul	14

NDR = no DNA recovered

Hepatic DNA Adduct results of biomarker study samples (6, 20, 33, 35, 56, and 62 d post exposure) and growth study samples (60 d post exposure).

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
treatment	4	4150.543	1037.636	31.346	.0001
*time post expo...	6	5804.554	967.426	29.225	.0001
treatment * *ti...	8	1699.791	212.474	6.419	.0001
Residual	47	1555.833	33.103		

Dependent: nmol DNA adducts/mol DNA nucleotides

Means Table

Effect: treatment * time post exposure (d)

Dependent: nmol DNA adducts/mol DNA nucleotides

	Count	Mean	Std. Dev.	Std. Error
none, 0	6	9.167	3.656	1.493
A/E, 6	3	50.000	10.817	6.245
A/E, 20	3	35.667	8.145	4.702
A/E, 35	3	7.333	3.215	1.856
A/E, 60	3	9.333	1.155	.667
HWSE-P, 6	3	25.667	2.309	1.333
HWSE-P, 20	3	14.333	15.308	8.838
HWSE-P, 56	3	10.333	5.774	3.333
HWSE-P, 60	4	4.250	3.862	1.931
HWSE-M, 6	3	25.667	9.074	5.239
HWSE-M, 20	3	12.000	2.000	1.155
HWSE-M, 33	3	12.333	2.082	1.202
HWSE-M, 60	4	5.250	1.893	.946
NQSE, 6	3	2.667	.577	.333
NQSE, 20	3	4.333	2.082	1.202
NQSE, 60	4	3.250	2.630	1.315
PAHs, 6	3	30.333	5.859	3.383
PAHs, 20	3	30.000	9.644	5.568
PAHs, 60	4	6.750	.957	.479
PAHs, 62	3	5.667	3.786	2.186

Hepatic DNA Adduct levels at 6 d post exposure

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
treatment	4	3407.067	851.767	17.795	.0002
Residual	10	478.667	47.867		

Dependent: nmol DNA adducts/mol DNA nucleotides

Means Table

Effect: treatment

Dependent: nmol DNA adducts/mol DNA nucleotides

	Count	Mean	Std. Dev.	Std. Error
A/E	3	50.000	10.817	6.245
HWSE-P	3	25.667	2.309	1.333
HWSE-M	3	25.667	9.074	5.239
NOSE	3	2.667	.577	.333
PAHs	3	30.333	5.859	3.383

Dunnett Two-Tailed

Effect: treatment

Dependent: nmol DNA adducts/mol DNA nucleotides

Significance level: .05

	Vs.	Diff.	Crit. diff.	
NOSE	HWSE-P	23.000	16.326	S
	HWSE-M	23.000	16.326	S
	PAHs	27.667	16.326	S
	A/E	47.333	16.326	S

S = Significantly different at this level.

Hepatic DNA Adduct levels at 20 d post exposure

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
treatment	4	2052.933	513.233	6.383	.0081
Residual	10	804.000	80.400		

Dependent: nmol DNA adducts/mol DNA nucleotides

Means Table

Effect: treatment

Dependent: nmol DNA adducts/mol DNA nucleotides

	Count	Mean	Std. Dev.	Std. Error
A/E	3	35.667	8.145	4.702
HWSE-P	3	14.333	15.308	8.838
HWSE-M	3	12.000	2.000	1.155
NOSE	3	4.333	2.082	1.202
PAHs	3	30.000	9.644	5.568

Dunnett Two-Tailed

Effect: treatment

Dependent: nmol DNA adducts/mol DNA nucleotides

Significance level: .05

	Vs.	Diff.	Crit. diff.	
NOSE	HWSE-M	7.667	21.158	
	HWSE-P	10.000	21.158	
	PAHs	25.667	21.158	S
	A/E	31.333	21.158	S

S = Significantly different at this level.

Hepatic DNA Adduct levels at 60 d post exposure (from growth study)

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
treatment	4	76.965	19.241	3.298	.0421
Residual	14	81.667	5.833		

Dependent: nmol DNA adducts/mol DNA nucleotides

Means Table

Effect: treatment

Dependent: nmol DNA adducts/mol DNA nucleotides

	Count	Mean	Std. Dev.	Std. Error
A/E	3	9.333	1.155	.667
HWSE-P	4	4.250	3.862	1.931
HWSE-M	4	5.250	1.893	.946
NOSE	4	3.250	2.630	1.315
PAHs	4	6.750	.957	.479

Dunnett Two-Tailed

Effect: treatment

Dependent: nmol DNA adducts/mol DNA nucleotides

Significance level: .05

	Vs.	Diff.	Crit. diff.	
NOSE	HWSE-P	1.000	4.697	
	HWSE-M	2.000	4.697	
	PAHs	3.500	4.697	
	A/E	6.083	5.073	S

S = Significantly different at this level.

Hylebos Fish Injury Study - Round II, Part 3
Individual Data and Quality Assurance Results
CASE NARRATIVE

Juvenile Salmon Biomarker Response Studies

Cytochrome P4501A - measured as aryl hydrocarbon hydroxylase (AHH) Activity
 (Tables 1-3)

Microsomal Protein Standard Curve Calibration

Both criteria of the QAP were met for data used in this calibration. Standard curves for each sample set had regression coefficient (r^2) of ≥ 0.990 and each protein standard run in triplicate had RSD < 20%.

Method Blank

All three sample sets had a mean blank (calculated from 2 sets of duplicates) of greater than 50 dpm ^{14}C , therefore these sets do not meet the QAP guidelines outlined in table 4, for method blank QA. The CYP1A data must be qualified with respect to method blank. However, this does not affect the final data, as the mean blank values are corrected for in all samples.

Performance Evaluation

Triplicate analyses of each sample met the criteria as stated in the QAP of less than 30% RSD, for all values > 50 pmol/mg microsomal protein/minute.

Juvenile Salmon - Biomarker Studies

Analyses of Cytochrome P4501A [measured as aryl hydrocarbon hydroxylase(AHH) Activity]

Table 1 Notes

Microsomal Protein Standard Curve Calibration

The Microsome # (column heading abbr. μsome #), Protein sample #(column heading abbr. prot. sample#) and Sample #, are internal lab use numbers and for identification only. Column Final Liver Comp# is the official number assigned to each composited sample.

The number under Plate # column is the number assigned to each assay plate.

The concentrations of total protein were calculated using Bovine Albumin Serum (BSA) as the standard.

Column for Protein Standard concentrations (column abbr. Prot. Std. Conc #) identify each standard concentration dilution used : 2.0, 4.0, 8.0, 16.0, 20.0, and 30.0 mg/ml, with all standards loaded on plate as triplicates (e.g. 2.0-1, 2.0-2, 2.0-3 etc).

The Prot. Std OD value column is the absorbance of the sample measured as Optical Density (OD) at a wavelength of 620nm.

Percent coefficient of variation (column OD %CV) is standard deviation (SD) of each triplicate analyses (reported in Prot. Std OD value) divided by mean of each triplicate, multiplied by 100.

Correlation Coefficient (column abbr. Corr. Coeff.) is generated from linear standard curve fit of mean OD values of protein standards.

Sample Protein concentrations are given in column mg Prot./ml and are generated by automated interpolation from the standard curve fit of the mean OD values of protein standards.

µsone #	Sample #	Study	Trtmnt	Time	Plate #	Prot. Sample #	mg Prot. /ml	Protein Standard Curve			
								Prot. Std. Conc.#	Prot. Std. OD value	OD	Corr. Coeff. (>0.95)
97103001	970710DA001	Biomarker	none	0	971030, 971031	A01	14.4	2.0-1	0.263		0.997
97103002	970710DA002	Biomarker	none	0		A02	16.4	2.0-2	0.265		
97103003	970710DA003	Biomarker	none	0		A03	17.9	2.0-3	0.263	0.436	
97103004	970715DA01	Biomarker	A/E	6 day		A04	19.8	4.0-1	0.294		
97103005	970715DA02	Biomarker	A/E	6 day		A05	16.4	4.0-2	0.295		
97103006	970715DA03	Biomarker	A/E	6 day		A06	16.6	4.0-3	0.289	1.098	
97103007	970729DA43	Biomarker	A/E	20 day		A07	19.7	8.0-1	0.355		
97103008	970729DA44	Biomarker	A/E	20 day		A08	18.0	8.0-2	0.359		
97103009	970729DA45	Biomarker	A/E	20 day		A09	19.1	8.0-3	0.362	0.979	
97103010	970813DA100	Biomarker	A/E	35 day		A10	15.4	16.0-1	0.455		
97103011	970813DA101	Biomarker	A/E	35 day		A11	16.6	16.0-2	0.455		
97103012	970813DA102	Biomarker	A/E	35 day		A12	16.2	16.0-3	0.465	1.259	
97103101	970715DA10	Biomarker	HWSE-P	6 day		A13	17.4	20.0-1	0.496		
97103102	970715DA11	Biomarker	HWSE-P	6 day		A14	20.0	20.0-2	0.518		
97103103	970715DA12	Biomarker	HWSE-P	6 day		A15	17.3	20.0-3	0.515	2.341	
97103104	970729DA52	Biomarker	HWSE-P	20 day		A16	18.4	30.0-1	0.590		
97103105	970729DA53	Biomarker	HWSE-P	20 day		A17	16.9	30.0-2	0.528		
97103106	970729DA54	Biomarker	HWSE-P	20 day		A18	17.7	30.0-3	0.518	3.218	
97103107	970903DA106	Biomarker	HWSE-P	56 day		A19	21.1				
97103108	970903DA107	Biomarker	HWSE-P	56 day		A20	19.5				
97103109	970903DA108	Biomarker	HWSE-P	56 day		A21	21.2				
97103110	970715DA13	Biomarker	HCBD	6 day		A22	14.8				
97103111	970715DA14	Biomarker	HCBD	6 day		A23	18.0				
97103112	970715DA15	Biomarker	HCBD	6 day		A24	15.4				
97110301	970729DA58	Biomarker	HCBD	20 day	Data 11-24 0002	A01	19.5	2.0-1	0.274		0.996
97110302	970729DA59	Biomarker	HCBD	20 day		A02	20.3	2.0-2	0.276		
97110303	970729DA60	Biomarker	HCBD	20 day		A03	19.6	2.0-3	0.271	0.92	
97110304	970903DA118	Biomarker	HCBD	56 day		A04	19.3	4.0-1	0.303		
97110305	970903DA119	Biomarker	HCBD	56 day		A05	18.8	4.0-2	0.295		
97110306	970903DA120	Biomarker	HCBD	56 day		A06	16.6	4.0-3	0.301	1.389	
97110307	970715DA07	Biomarker	HWSE-M	6 day		A07	17.5	8.0-1	0.364		
97110308	970715DA08	Biomarker	HWSE-M	6 day		A08	17.1	8.0-2	0.363		
97110309	970715DA09	Biomarker	HWSE-M	6 day		A09	15.0	8.0-3	0.365	0.272	

Assay date
11/24/87

µsome #	Sample #	Study	Trtmnt	Time	Plate #	Sample #	Prot. mg /ml	Protein Standard Curve				Assay date
								Prot. Std. Conc.#	Prot.Std OD value	OD	Corr. Coeff. (>0.95)	
97110310	970729DA55	Biomarker	HWSE-M	20 day		A10	17.4	16.0-1	0.462			
97110311	970729DA56	Biomarker	HWSE-M	20 day		A11	11.1	16.0-2	0.463			
97110312	970729DA57	Biomarker	HWSE-M	20 day		A12	17.5	16.0-3	0.483	2.524		
97110601	970811DA85	Biomarker	HWSE-M	33 day		A13	20.6	20.0-1	0.504			
97110602	970811DA86	Biomarker	HWSE-M	33 day		A14	20.4	20.0-2	0.517			
97110603	970811DA87	Biomarker	HWSE-M	33 day		A15	21.7	20.0-3	0.513	1.302		
97110604	970715DA04	Biomarker	NQSE	6 day		A16	19.5	30.0-1	0.591			
97110605	970715DA05	Biomarker	NQSE	6 day		A17	16.4	30.0-2	0.616			
97110606	970715DA06	Biomarker	NQSE	6 day		A18	18.6	30.0-3	0.621	2.638		11/24/97
97110607	970729DA46	Biomarker	NQSE	20 day		A19	19.1					
97110608	970729DA47	Biomarker	NQSE	20 day		A20	16.4					
97110609	970729DA48	Biomarker	NQSE	20 day		A21	18.5					
97110610	970811DA91	Biomarker	NQSE	33 day		A22	21.6					
97110611	970811DA92	Biomarker	NQSE	33 day		A23	19.8					
97110612	970811DA93	Biomarker	NQSE	33 day		A24	19.7					
97111001	970715DA16	Biomarker	PAHs	6 day	971110, 971121	A01	18.6	2.0-1	0.265			0.992
97111002	970715DA17	Biomarker	PAHs	6 day		A02	20.6	2.0-2	0.259			
97111003	970715DA18	Biomarker	PAHs	6 day		A03	20.9	2.0-3	0.259	1.328		
97111004	970729DA49	Biomarker	PAHs	20 day		A04	21.6	4.0-1	0.267			
97111005	970729DA50	Biomarker	PAHs	20 day		A05	18.4	4.0-2	0.279			
97111006	970729DA51	Biomarker	PAHs	20 day		A06	20.0	4.0-3	0.271	2.243		
97111007	970909DA121	Biomarker	PAHs	62 day		A07	18.5	8.0-1	0.345			
97111008	970909DA122	Biomarker	PAHs	62 day		A08	19.2	8.0-2	0.347			
97111009	970909DA123	Biomarker	PAHs	62 day		A09	18.4	8.0-3	0.347	0.334		
97111010	970715DA19	Biomarker	PCBs	6 day		A10	18.1	16.0-1	0.424			
97111011	970715DA20	Biomarker	PCBs	6 day		A11	22.6	16.0-2	0.441			
97111012	970715DA21	Biomarker	PCBs	6 day		A12	18.7	16.0-3	0.437	2.048		
97111013	970729DA61	Biomarker	PCBs	20 day		A13	21.4	20.0-1	0.485			
97111014	970729DA62	Biomarker	PCBs	20 day		A14	21.9	20.0-2	0.498			
97111015	970729DA63	Biomarker	PCBs	20 day		A15	24.4	20.0-3	0.481	1.821		
97111016	970909DA124	Biomarker	PCBs	62 day		A16	22.2	30.0-1	0.545			
97111017	970909DA125	Biomarker	PCBs	62 day		A17	22.8	30.0-2	0.573			
97111018	970909DA126	Biomarker	PCBs	62 day		A18	22.3	30.0-3	0.569	2.693		12/12/98

Hylebos/NRDA Juvenile salmon Biomarker Response Studies

TABLE 1: Protein Standard Curve Calibration

µsome #	Sample #	Study	Trtmt	Time	Plate #	Sample #	Prot. mg /ml	Protein Standard Curve				
								Prot. Std. Conc.#	Prot.Std OD value	OD	Corr. Coeff. (>0.95)	
97112001	97062601	Lab Growth	none	0		A19	21.6					
97112002	97062602	Lab Growth	none	0		A20	20.5					
97112003	97062603	Lab Growth	none	0		A21	24.2					
97112004	97082507	Lab Growth	PCBs	60 day		A22	25.4					
97112005	97082508	Lab Growth	PCBs	60 day		A23	23.9					
97112006	97082509	Lab Growth	PCBs	60 day		A24	24.9					
97112007	97082510	Lab Growth	PCBs	60 day	971120, 971121	A01	22.8	2.0-1	0.273			0.998
97112008	97082511	Lab Growth	HWSE-M	60 day		A02	22.7	2.0-2	0.27			
97112009	97082512	Lab Growth	HWSE-M	60 day		A03	21.6	2.0-3	0.267	1.111		
97112010	97082513	Lab Growth	HWSE-M	60 day		A04	20.8	4.0-1	0.298			
97112011	97082514	Lab Growth	HWSE-M	60 day		A05	23.5	4.0-2	0.293			
97112012	97082515	Lab Growth	HWSE-P	60 day		A06	21.5	4.0-3	0.297	0.895		
97112013	97082516	Lab Growth	HWSE-P	60 day		A07	20.3	8.0-1	0.347			
97112014	97082517	Lab Growth	HWSE-P	60 day		A08	21.9	8.0-2	0.361			
97112015	97082518	Lab Growth	HWSE-P	60 day		A09	23.8	8.0-3	0.358	2.074		
97112016	97082519	Lab Growth	PAHs	60 day		A10	22.7	16.0-1	0.433			
97112017	97082520	Lab Growth	PAHs	60 day		A11	19.7	16.0-2	0.432			
97112018	97082521	Lab Growth	PAHs	60 day		A12	20.8	16.0-3	0.431	0.23		
97112019	97082522	Lab Growth	PAHs	60 day		A13	22.2	20.0-1	0.456			
97112020	97082523	Lab Growth	A/E	60 day		A14	22.0	20.0-2	0.505			
97112021	97082524	Lab Growth	A/E	60 day		A15	17.5	20.0-3	0.516	6.488		
97112022	97082525	Lab Growth	A/E	60 day		A16	20.4	30.0-1	0.567			
97112023	97082526	Lab Growth	A/E	60 day		A17	19.8	30.0-2	0.614			
97112024	97082527	Lab Growth	NQSE	60 day		A18	20.9	30.0-3	0.587	4.002		Assay date 12/12/98
97112025	97082528	Lab Growth	NQSE	60 day		A19	18.8					
97112026	97082529	Lab Growth	NQSE	60 day		A20	21.5					
97112027	97082530	Lab Growth	NQSE	60 day		A21	21.1					
97112028	97082531	Lab Growth	HCED	60 day		A22	22.3					
97112029	97082532	Lab Growth	HCED	60 day		A23	23.4					
97112030	97082533	Lab Growth	HCED	60 day		A24	22.5					
97112119	97082534	Lab Growth	HCED	60 day	971121	A01	21.4	2.0-1	0.274			0.999
								2.0-2	0.272			
								2.0-3	0.268	1.125		

µsome #	Sample #	Study	Tritmnt	Time	Plate #	Prot. mg Sample # /ml	Protein Standard Curve				Assay date
							Prot. Std. Conc.#	Prot.Std OD value	OD	Corr. Coeff. (>0.95)	
	4.0-1						0.298				
	4.0-2						0.301				
	4.0-3						0.3	0.509			
	8.0-1						0.363				
	8.0-2						0.356				
	8.0-3						0.354	1.322			
	16.0-1						0.442				
	16.0-2						0.443				
	16.0-3						0.47	3.517			
	20.0-1						0.494				
	20.0-2						0.493				
	20.0-3						0.514	2.367			
	30.0-1						0.608				
	30.0-2						0.624				
	30.0-3						0.593	2.549			12/12/98

Juvenile Salmon - Biomarker Studies

Analyses of Cytochrome P4501A [measured as aryl hydrocarbon hydroxylase(AHH) Activity]

Table 2 Notes

Method Blank - AHH Assay

The numbers under columns Microsome # (column abbr. μ some #), AHH # and Sample # are internal lab use numbers and for identification only. Column Final Liver Comp# is the official number assigned to each composited sample.

The AHH Assay Date column is the day sample set was run. The column AHH Set Blk (μ some #) is the sample run as the blank for each set.

Substrate blank is reaction mixture without substrate (^{14}C -Benzo[a]Pyrene) added. Boiled blank is reaction mixture with an aliquot of boiled microsome sample. Both blank sets run as duplicates (i.e. DPM1 and DPM2). All 4 blanks are then averaged to give AHH Assay Set Blk Avg DPM.

AHH

Assay Date	usome #	AHH #	Sample #	Study	Trtmnt	Time	AHH Set Bk (μsome#)	Substrate Bk (DPM1)	Substrate Bk (DPM2)	Boiled Bk (DPM1)	Boiled Bk (DPM2)
1/20/98	97103001	1/20/98-1	970710DA001	Blomarker	none	0	97103004	55	58	47	54
	97103002	1/20/98-2	970710DA002	Blomarker	none	0					
	97103003	1/20/98-3	970710DA003	Blomarker	none	0					
	97103004	1/20/98-4	970715DA01	Blomarker	A/E	6 day					
	97103005	1/20/98-5	970715DA02	Blomarker	A/E	6 day					
	97103006	1/20/98-6	970715DA03	Blomarker	A/E	6 day					
	97103007	1/20/98-7	970729DA43	Blomarker	A/E	20 day					
	97103008	1/20/98-8	970729DA44	Blomarker	A/E	20 day					
	97103009	1/20/98-9	970729DA45	Blomarker	A/E	20 day					
	97103010	1/20/98-10	970813DA100	Blomarker	A/E	35 day					
	97103011	1/20/98-11	970813DA101	Blomarker	A/E	35 day					
	97103012	1/20/98-12	970813DA102	Blomarker	A/E	35 day					
	97103101	1/20/98-13	970715DA10	Blomarker	HWSE-P	6 day					
	97103102	1/20/98-14	970715DA11	Blomarker	HWSE-P	6 day					
	97103103	1/20/98-15	970715DA12	Blomarker	HWSE-P	6 day					
	97103104	1/20/98-16	970729DA52	Blomarker	HWSE-P	20 day					
	97103105	1/20/98-17	970729DA53	Blomarker	HWSE-P	20 day					
	97103106	1/20/98-18	970729DA54	Blomarker	HWSE-P	20 day					
	97103107	1/20/98-19	970903DA106	Blomarker	HWSE-P	56 day					
	97103108	1/20/98-20	970903DA107	Blomarker	HWSE-P	56 day					
	97103109	1/20/98-21	970903DA108	Blomarker	HWSE-P	56 day					
	97103110	1/20/98-22	970715DA13	Blomarker	HCBD	6 day					
	97103111	1/20/98-23	970715DA14	Blomarker	HCBD	6 day					
	97103112	1/20/98-24	970715DA15	Blomarker	HCBD	6 day					
	97110301	1/20/98-25	970729DA58	Blomarker	HCBD	20 day					
	97110302	1/20/98-26	970729DA59	Blomarker	HCBD	20 day					
	97110303	1/20/98-27	970729DA60	Blomarker	HCBD	20 day					
	97110304	1/20/98-28	970903DA118	Blomarker	HCBD	56 day					
	97110305	1/20/98-29	970903DA119	Blomarker	HCBD	56 day					
	97110306	1/20/98-30	970903DA120	Blomarker	HCBD	56 day					
	97110307	1/20/98-31	970715DA07	Blomarker	HWSE-M	6 day					
2/2/98	97110308	2/2/98-1	970715DA08	Blomarker	HWSE-M	6 day	97110308	59	62	74	75
	97110309	2/2/98-2	970715DA09	Blomarker	HWSE-M	6 day					

AHH Assay Set Bk
Avg DPM 54

AHH Assay Date	Assay useme #	AHH #	Sample #	Study	Trtmt	Time	AHH Set Blk (µsome#)	Substrate Blk (DPM1)	Substrate Blk (DPM2)	Boiled Blk (DPM1)	Boiled Blk (DPM2)
	97110310	2/2/98-3	970729DA55	Biomarker	HWSE-M	20 day					
	97110311	2/2/98-4	970729DA56	Biomarker	HWSE-M	20 day					
	97110312	2/2/98-5	970729DA57	Biomarker	HWSE-M	20 day					
	97110601	2/2/98-6	970811DA85	Biomarker	HWSE-M	33 day					
	97110602	2/2/98-7	970811DA86	Biomarker	HWSE-M	33 day					
	97110603	2/2/98-8	970811DA87	Biomarker	HWSE-M	33 day					
	97110604	2/2/98-9	970715DA04	Biomarker	NQSE	6 day					
	97110605	2/2/98-10	970715DA05	Biomarker	NQSE	6 day					
	97110606	2/2/98-11	970715DA06	Biomarker	NQSE	6 day					
	97110607	2/2/98-12	970729DA46	Biomarker	NQSE	20 day					
	97110608	2/2/98-13	970729DA47	Biomarker	NQSE	20 day					
	97110609	2/2/98-14	970729DA48	Biomarker	NQSE	20 day					
	97110610	2/2/98-15	970811DA91	Biomarker	NQSE	33 day					
	97110611	2/2/98-16	970811DA92	Biomarker	NQSE	33 day					
	97110612	2/2/98-17	970811DA93	Biomarker	NQSE	33 day					
	97111001	2/2/98-18	970715DA16	Biomarker	PAHs	6 day					
	97111002	2/2/98-19	970715DA17	Biomarker	PAHs	6 day					
	97111003	2/2/98-2	970715DA18	Biomarker	PAHs	6 day					
	97111004	2/2/98-21	970729DA49	Biomarker	PAHs	20 day					
	97111005	2/2/98-22	970729DA50	Biomarker	PAHs	20 day					
	97111006	2/2/98-23	970729DA51	Biomarker	PAHs	20 day					
	97111007	2/2/98-24	970909DA121	Biomarker	PAHs	62 day					
	97111008	2/2/98-25	970909DA122	Biomarker	PAHs	62 day					
	97111009	2/2/98-26	970909DA123	Biomarker	PAHs	62 day					
	97111010	2/2/98-27	970715DA19	Biomarker	PCBs	6 day					
	97111011	2/2/98-28	970715DA20	Biomarker	PCBs	6 day					
	97111012	2/2/98-29	970715DA21	Biomarker	PCBs	6 day					
	97111013	2/2/98-30	970729DA61	Biomarker	PCBs	20 day					
	97111014	2/2/98-31	970729DA62	Biomarker	PCBs	20 day					
2/3/98	97111015	2/3/98-1	970729DA63	Biomarker	PCBs	20 day	97110308	61	69	60	53
	97111016	2/3/98-2	970909DA124	Biomarker	PCBs	62 day					
	97111017	2/3/98-3	970909DA125	Biomarker	PCBs	62 day					
	97111018	2/3/98-4	970909DA126	Biomarker	PCBs	62 day					

AHH Assay Set Blk
Avg DPM 68

AHH

Assay Date	usome #	AHH #	Sample #	Study	Trtmt	Time	AHH Set Blk (µsome#)	Substrate		Boiled Blk (DPM1)	Boiled Blk (DPM2)
								Blk (DPM1)	Blk (DPM2)		
								AHH Assay Set Blk			
								Avg DPM			61
	97112001	2/3/98-5	97062601	Lab Growth	none	0					
	97112002	2/3/98-6	97062602	Lab Growth	none	0					
	97112003	2/3/98-7	97082603	Lab Growth	none	0					
	97112004	2/3/98-8	97082507	Lab Growth	PCBs	60 day					
	97112005	2/3/98-9	97082508	Lab Growth	PCBs	60 day					
	97112006	2/3/98-10	97082509	Lab Growth	PCBs	60 day					
	97112007	2/3/98-11	97082510	Lab Growth	PCBs	60 day					
	97112008	2/3/98-12	97082511	Lab Growth	HWSE-M	60 day					
	97112009	2/3/98-13	97082512	Lab Growth	HWSE-M	60 day					
	97112010	2/3/98-14	97082513	Lab Growth	HWSE-M	60 day					
	97112011	2/3/98-15	97082514	Lab Growth	HWSE-M	60 day					
	97112012	2/3/98-16	97082515	Lab Growth	HWSE-P	60 day					
	97112101	2/3/98-17	97082516	Lab Growth	HWSE-P	60 day					
	97112102	2/3/98-18	97082517	Lab Growth	HWSE-P	60 day					
	97112103	2/3/98-19	97082518	Lab Growth	HWSE-P	60 day					
	97112104	2/3/98-2	97082519	Lab Growth	PAHs	60 day					
	97112105	2/3/98-21	97082520	Lab Growth	PAHs	60 day					
	97112106	2/3/98-22	97082521	Lab Growth	PAHs	60 day					
	97112107	2/3/98-23	97082522	Lab Growth	PAHs	60 day					
	97112108	2/3/98-24	97082523	Lab Growth	A/E	60 day					
	97112109	2/3/98-25	97082524	Lab Growth	A/E	60 day					
	97112110	2/3/98-26	97082525	Lab Growth	A/E	60 day					
	97112111	2/3/98-27	97082526	Lab Growth	A/E	60 day					
	97112112	2/3/98-28	97082527	Lab Growth	NQSE	60 day					
	97112113	2/3/98-29	97082528	Lab Growth	NQSE	60 day					
	97112114	2/3/98-30	97082529	Lab Growth	NQSE	60 day					
	97112115	2/3/98-31	97082530	Lab Growth	NQSE	60 day					
	97112116	2/3/98-32	97082531	Lab Growth	HCBD	60 day					
	97112117	2/3/98-33	97082532	Lab Growth	HCBD	60 day					
	97112118	2/3/98-34	97082533	Lab Growth	HCBD	60 day					
	97112119	2/3/98-35	97082534	Lab Growth	HCBD	60 day					

Juvenile Salmon Injury

Analyses of Cytochrome P4501A [measured as aryl hydrocarbon hydroxylase(AHH) Activity]

Table 3 Notes

Performance Evaluation Final - AHH Activity

Microsome # (column abbr. µsome #), AHH # and Sample # are internal lab use numbers and for identification only. Column Final Liver Comp# is the official number assigned to each composited sample.

The AHH Assay Date column is the day sample set was run. The AHH Set Blk (µsome #) is the sample run as the blank for each set.

Samples are run in triplicate. The percent coefficient of variation (%CV of DPM column) is the standard deviation (value reported in column DPM SD) of each triplicate (reported in columns :AHH DPM1, AHH DPM2, AHH DPM3) divided by mean of each triplicate (column AHH DPM Avg) multiplied by 100.

Triplicate sample outlier indicated by •, was not used in final calculation to meet criteria of %CV < 30%.

The column Avg AHH minus set Blk, is AHH DPM Avg , minus the value calculated in **Table 2** (AHH set Blk) for each set.

Final AHH Activity is normalized for total microsomal protein i.e. "Avg AHH minus set Blk" divided by "mg prot/ ml" (from **Table 1**).

Final units for AHH activity are picomoles BaP metabolized per minute per mg microsomal protein.

Table 3 : Performance Evaluation Final - Aryl hydrocarbon hydroxylase (AHH) Activity Calculations Hylebos/NRDA Juvenile Salmon Biomarker Response Studies Page 1 of 3

Assay Date	usome #	AHH #	Sample #	Study	Trtmt	Time	AHH Set Bk	mg prot. /ml	AHH DPM1	AHH DPM2	AHH DPM3	AHH DPM Avg	AHH DPM SD	DPM (-30%)	%CV of DPM	AHH minus Set Bk	AHH Activity	Final AHH Activity
1/20/98	97103001	1/20/98-1	970710DA001	Biomarker	none	0	54	14.4	239	227	228	231	7	3	177	71	71	
	97103002	1/20/98-2	970710DA002	Biomarker	none	0		16.4	235	239	175	216	36	17	162	67	67	
	97103003	1/20/98-3	970710DA003	Biomarker	none	0		17.9	212	277	271	253	36	14	199	76	76	
	97103004	1/20/98-4	970715DA01	Biomarker	AE	6 day		19.8	494	558	511	521	33	6	467	160	160	
	97103005	1/20/98-5	970715DA02	Biomarker	AE	6 day		16.4	402	385	433	407	24	6	353	146	146	
	97103006	1/20/98-6	970715DA03	Biomarker	AE	6 day		16.6	430	414	437	427	12	3	373	153	153	
	97103007	1/20/98-7	970729DA43	Biomarker	AE	20 day		19.7	455	462	470	462	8	2	408	141	141	
	97103008	1/20/98-8	970729DA44	Biomarker	AE	20 day		18.0	458	453	429	447	16	3	393	148	148	
	97103009	1/20/98-9	970729DA45	Biomarker	AE	20 day		19.1	390	391	389	390	1	0.3	336	120	120	
	97103010	1/20/98-10	970813DA100	Biomarker	AE	35 day		15.4	173	177	193	181	11	6	127	56	56	
	97103011	1/20/98-11	970813DA101	Biomarker	AE	35 day		16.6	204	200	147	184	32	17	130	53	53	
	97103012	1/20/98-12	970813DA102	Biomarker	AE	35 day		16.2	221	73	212	217	6	3	163	68	68	
	971030101	1/20/98-13	970715DA10	Biomarker	HWSEP	6 day		17.4	1890	1661	1537	1696	179	11	1642	642	642	
	97103102	1/20/98-14	970715DA11	Biomarker	HWSEP	6 day		20.0	1598	1359	702	1479	169	11	1425	485	485	
	97103103	1/20/98-15	970715DA12	Biomarker	HWSEP	6 day		17.3	121	2031	2061	2046	21	1	1992	783	783	
	97103104	1/20/98-16	970729DA52	Biomarker	HWSEP	20 day		18.4	920	907	845	891	40	4	837	309	309	
	97103105	1/20/98-17	970729DA53	Biomarker	HWSEP	20 day		16.9	720	677	698	698	22	3	644	259	259	
	97103106	1/20/98-18	970729DA54	Biomarker	HWSEP	20 day		17.7	667	716	688	690	25	4	636	245	245	
	97103107	1/20/98-19	970903DA106	Biomarker	HWSEP	56 day		21.1	317	326	338	327	11	3	273	88	88	
	97103108	1/20/98-20	970903DA107	Biomarker	HWSEP	56 day		19.5	178	199	179	185	12	6	131	46	46	
	97103109	1/20/98-21	970903DA108	Biomarker	HWSEP	56 day		21.2	262	274	237	258	19	7	204	65	65	
	97103110	1/20/98-22	970715DA13	Biomarker	HCBD	6 day		14.8	301	284	312	299	14	5	245	113	113	
	97103111	1/20/98-23	970715DA14	Biomarker	HCBD	6 day		18.0	382	400	388	390	9	2	336	127	127	
	97103112	1/20/98-24	970715DA15	Biomarker	HCBD	6 day		15.4	302	269	298	290	18	6	236	104	104	
	97110301	1/20/98-25	970729DA58	Biomarker	HCBD	20 day		19.5	568	545	540	551	15	3	497	173	173	
	97110302	1/20/98-26	970729DA59	Biomarker	HCBD	20 day		20.3	644	547	654	615	59	10	561	188	188	
	97110303	1/20/98-27	970729DA60	Biomarker	HCBD	20 day		19.6	613	674	639	642	31	5	588	204	204	
	97110304	1/20/98-28	970903DA118	Biomarker	HCBD	56 day		19.3	261	254	269	261	8	3	207	73	73	
	97110305	1/20/98-29	970903DA119	Biomarker	HCBD	56 day		18.8	213	267	267	249	31	13	195	71	71	
	97110306	1/20/98-30	970903DA120	Biomarker	HCBD	56 day		16.6	193	183	148	175	24	14	121	49	49	
	97110307	1/20/98-31	970715DA07	Biomarker	HWSE-M	6 day		17.5	2836	3242	3220	3099	228	7	3045	1184	1184	
2/2/98	97110308	2/2/98-1	970715DA08	Biomarker	HWSE-M	6 day	68	17.1	3022	2907	3083	3004	89	3	2936	1168	1168	
	97110309	2/2/98-2	970715DA09	Biomarker	HWSE-M	6 day		15.0	2373	2162	2415	2317	136	6	2249	1020	1020	
	97110310	2/2/98-3	970729DA55	Biomarker	HWSE-M	20 day		17.4	989	981	1004	991	12	1	923	361	361	

Table 3 : Performance Evaluation Final - Aryl hydrocarbon hydroxylase (AHH) Activity Calculations Hylebos/NRDA Juvenile Salmon Biomarker Response Studies Page 2 of 3

Assay Date	usome #	AHH #	Sample #	Study	Trtmt	Time	AHH Set Bk	mg prot. /ml	AHH DPM1	AHH DPM2	AHH DPM3	AHH Avg SD	DPM	%CV of DPM (<30%)	Avg AHH minus Set Bk	Final AHH Activity
	97110311	2/2/98-4	970729DA56	Biomarker	HWSE-M	20 day		11.1	349	352	352	351	2	0.5	283	173
	97110312	2/2/98-5	970729DA57	Biomarker	HWSE-M	20 day		17.5	1018	937	857	937	81	9	869	338
	97110601	2/2/98-6	970811DA85	Biomarker	HWSE-M	33 day		20.5	418	428	462	436	23	5	368	122
	97110602	2/2/98-7	970811DA86	Biomarker	HWSE-M	33 day		20.4	397	451	440	429	29	7	361	120
	97110603	2/2/98-8	970811DA87	Biomarker	HWSE-M	33 day		21.7	408	407	401	405	4	1	337	106
	97110604	2/2/98-9	970715DA04	Biomarker	NCSE	6 day		19.5	865	940	1005	937	70	7	869	303
	97110605	2/2/98-10	970715DA05	Biomarker	NCSE	6 day		16.4	900	909	914	908	7	1	840	348
	97110606	2/2/98-11	970715DA06	Biomarker	NCSE	6 day		18.6	1071	1008	995	1025	41	4	957	350
	97110607	2/2/98-12	970729DA46	Biomarker	NCSE	20 day		19.1	454	474	467	465	10	2	397	141
	97110608	2/2/98-13	970729DA47	Biomarker	NCSE	20 day		16.4	443	449	458	450	8	2	382	158
	97110609	2/2/98-14	970729DA48	Biomarker	NCSE	20 day		18.5	431	425	444	433	10	2	365	134
	97110610	2/2/98-15	970811DA91	Biomarker	NCSE	33 day		21.6	452	442	453	449	6	1	381	120
	97110611	2/2/98-16	970811DA92	Biomarker	NCSE	33 day		19.8	395	428	401	408	18	4	340	117
	97110612	2/2/98-17	970811DA93	Biomarker	NCSE	33 day		19.7	345	297	346	329	28	9	261	90
	97111001	2/2/98-18	970715DA16	Biomarker	PAHs	6 day		18.6	2588	2520	2602	2570	44	2	2502	915
	97111002	2/2/98-19	970715DA17	Biomarker	PAHs	6 day		20.6	2432	2387	2454	2424	34	1	2356	778
	97111003	2/2/98-2	970715DA18	Biomarker	PAHs	6 day		20.9	2559	2559	2486	2535	42	2	2467	803
	97111004	2/2/98-21	970729DA49	Biomarker	PAHs	20 day		21.6	707	672	678	686	19	3	618	195
	97111005	2/2/98-22	970729DA50	Biomarker	PAHs	20 day		18.4	626	610	596	611	15	2	543	201
	97111006	2/2/98-23	970729DA51	Biomarker	PAHs	20 day		20.0	643	655	668	655	13	2	587	200
	97111007	2/2/98-24	970909DA121	Biomarker	PAHs	62 day		18.5	256	282	269	269	13	5	201	74
	97111008	2/2/98-25	970909DA122	Biomarker	PAHs	62 day		19.2	301	293	310	301	9	3	233	83
	97111009	2/2/98-26	970909DA123	Biomarker	PAHs	62 day		18.4	321	317	302	313	10	3	245	91
	97111010	2/2/98-27	970715DA19	Biomarker	PCBs	6 day		18.1	2354	2416	2329	2366	45	2	2298	864
	97111011	2/2/98-28	970715DA20	Biomarker	PCBs	6 day		22.6	3091	3139	3091	3107	28	1	3039	915
	97111012	2/2/98-29	970715DA21	Biomarker	PCBs	6 day		19.7	2421	2310	2375	2369	56	2	2301	837
	97111013	2/2/98-30	970729DA61	Biomarker	PCBs	20 day		21.4	3483	3279	3218	3327	139	4	3259	1036
	97111014	2/2/98-31	970729DA62	Biomarker	PCBs	20 day		21.9	3444	2624	3436	3168	471	15	3100	961
2/3/98	97111015	2/3/98-1	970729DA63	Biomarker	PCBs	20 day	61	24.4	3693	3352	3355	3467	196	6	3406	950
2/3/98	97111016	2/3/98-2	970909DA124	Biomarker	PCBs	62 day		22.2	857	921	898	891	32	4	830	254
2/3/98	97111017	2/3/98-3	970909DA125	Biomarker	PCBs	62 day		22.8	917	958	951	942	22	2	881	263
2/3/98	97111018	2/3/98-4	970909DA126	Biomarker	PCBs	62 day		22.3	809	943	981	911	90	10	850	259
2/3/98	97112001	2/3/98-5	97062601	Lab Growth	none	0		21.6	407	382	389	393	13	3	332	104
2/3/98	97112002	2/3/98-6	97062602	Lab Growth	none	0		20.5	291	307	301	300	8	3	239	79

Table 3 : Performance Evaluation Final - Aryl hydrocarbon hydroxylase (AHH) Activity Calculations Hylebos/NRDA Juvenile Salmon Biomarker Response Studies Page 3 of 3

Assay Date	usome #	AHH #	Sample #	Study	Trtmt	Time	AHH Set Bk	mg prot. /ml	AHH			AHH			Set Bk	Final Activity
									DPM1	DPM2	DPM3	Avg	SD	DPM		
	97112003	2/3/98-7	97062603	Lab Growth	none	0		24.2	441	462	355	419	57	14	358	101
	97112004	2/3/98-8	97082507	Lab Growth	PCBs	60 day		25.4	1366	1280	1330	1325	43	3	1264	339
	97112005	2/3/98-9	97082508	Lab Growth	PCBs	60 day		23.9	1574	1408	1526	1503	85	6	1442	410
	97112006	2/3/98-10	97082509	Lab Growth	PCBs	60 day		24.9	1300	1279	1225	1268	39	3	1207	330
	97112007	2/3/98-11	97082510	Lab Growth	PCBs	60 day		22.8	923	959	959	947	21	2	886	264
	97112008	2/3/98-12	97082511	Lab Growth	HWSE-M	60 day		22.7	364	354	376	365	11	3	304	91
	97112009	2/3/98-13	97082512	Lab Growth	HWSE-M	60 day		21.6	395	390	361	382	18	5	321	101
	97112010	2/3/98-14	97082513	Lab Growth	HWSE-M	60 day		20.8	372	339	405	372	33	9	311	102
	97112011	2/3/98-15	97082514	Lab Growth	HWSE-M	60 day		23.5	372	356	382	370	13	4	309	89
	97112012	2/3/98-16	97082515	Lab Growth	HWSE-P	60 day		21.5	294	248	289	277	25	9	216	68
	97112101	2/3/98-17	97082516	Lab Growth	HWSE-P	60 day		20.3	309	262	284	285	24	8	224	75
	97112102	2/3/98-18	97082517	Lab Growth	HWSE-P	60 day		21.9	352	405	354	370	30	8	309	96
	97112103	2/3/98-19	97082518	Lab Growth	HWSE-P	60 day		23.8	350	378	383	370	18	5	309	88
	97112104	2/3/98-2	97082519	Lab Growth	PAHs	60 day		22.7	372	391	353	372	19	5	311	93
	97112105	2/3/98-21	97082520	Lab Growth	PAHs	60 day		19.7	253	303	465	278	35	13	217	75
	97112106	2/3/98-22	97082521	Lab Growth	PAHs	60 day		20.8	295	462	464	407	97	24	346	113
	97112107	2/3/98-23	97082522	Lab Growth	PAHs	60 day		22.2	386	383	350	373	20	5	312	96
	97112108	2/3/98-24	97082523	Lab Growth	AVE	60 day		22.0	270	375	342	329	54	16	268	83
	97112109	2/3/98-25	97082524	Lab Growth	AVE	60 day		17.5	217	262	291	257	37	15	196	76
	97112110	2/3/98-26	97082525	Lab Growth	AVE	60 day		20.4	256	335	309	300	40	13	239	80
	97112111	2/3/98-27	97082526	Lab Growth	AVE	60 day		19.8	298	260	273	277	19	7	216	74
	97112112	2/3/98-28	97082527	Lab Growth	NOSE	60 day		20.9	269	313	294	292	22	8	231	75
	97112113	2/3/98-29	97082528	Lab Growth	NOSE	60 day		18.8	280	242	200	241	40	17	180	65
	97112114	2/3/98-30	97082529	Lab Growth	NOSE	60 day		21.5	259	278	295	277	18	6	216	68
	97112115	2/3/98-31	97082530	Lab Growth	NOSE	60 day		21.1	320	313	291	308	15	5	247	80
	97112116	2/3/98-32	97082531	Lab Growth	HCBD	60 day		22.3	243	252	286	260	23	9	199	61
	97112117	2/3/98-33	97082532	Lab Growth	HCBD	60 day		23.4	233	221	242	232	11	5	171	50
	97112118	2/3/98-34	97082533	Lab Growth	HCBD	60 day		22.5	372	383	370	375	7	2	314	95
	97112119	2/3/98-35	97082534	Lab Growth	HCBD	60 day		21.4	347	370	422	380	38	10	319	101

ANOVA Output: CYP1A results of biomarker study samples (6,20,33,35,56, and 62 d post exposure) and growth study samples (60 d post exposure).

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	6	2738423.619	456403.937	2.53E2	.0001
Time	6	3451856.953	575309.492	3.19E2	.0001
Treatment * Time	15	2117392.056	141159.470	78.180	.0001
Residual	68	122778.500	1805.566		

Dependent: Final AHH

Means Table

Effect: Treatment * Time

Dependent: Final AHH

	Count	Mean	Std. Dev.	Std. Error	
none, 0 day	6	83.000	15.684	6.403	from both biomarker and growth studies
A/E, 06 days	3	153.000	7.000	4.041	
A/E, 20 days	3	136.333	14.572	8.413	
A/E, 35 days	3	59.000	7.937	4.583	
A/E, 60 days	4	78.250	4.031	2.016	
HWSE-P, 06 days	3	636.667	149.072	86.067	
HWSE-P, 20 days	3	271.000	33.645	19.425	
HWSE-P, 56 days	3	66.333	21.032	12.143	
HWSE-P, 60 days	4	81.750	12.606	6.303	
HCBd, 06 days	3	114.667	11.590	6.692	
HCBd, 20 days	3	188.333	15.503	8.950	
HCBd, 56 days	3	64.333	13.317	7.688	
HCBd, 60 days	4	76.750	25.065	12.532	
HWSE-M, 06 days	3	1124.000	90.421	52.205	
HWSE-M, 20 days	3	290.667	102.549	59.207	
HWSE-M, 33 days	3	116.000	8.718	5.033	
HWSE-M, 60 days	4	95.750	6.702	3.351	
NQSE, 06 days	3	333.667	26.577	15.344	
NQSE, 20 days	3	144.333	12.342	7.126	
NQSE, 33 days	3	109.000	16.523	9.539	
NQSE, 60 days	4	72.000	6.782	3.391	
PAHs, 06 days	3	832.000	72.959	42.123	
PAHs, 20 days	3	198.667	3.215	1.856	
PAHs, 62 days	3	82.667	8.505	4.910	
PAHs, 60 days	4	94.250	15.564	7.782	
PCBs, 06 days	3	872.000	39.611	22.869	
PCBs, 20 days	3	983.000	46.357	26.764	
PCBs, 62 days	3	258.667	4.509	2.603	
PCBs, 60 days	4	335.750	59.735	29.867	

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 CYP1A activity (AHH) at 6 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	6	2722362.571	453727.095	83.187	.0001
Residual	14	76360.000	5454.286		

Dependent: Final AHH

Means Table

Effect: Treatment

Dependent: Final AHH

	Count	Mean	Std. Dev.	Std. Error
A/E	3	153.000	7.000	4.041
HWSE-P	3	636.667	149.072	86.067
HCBD	3	114.667	11.590	6.692
HWSE-M	3	1124.000	90.421	52.205
NOSE	3	333.667	26.577	15.344
PAHs	3	832.000	72.959	42.123
PCBs	3	872.000	39.611	22.869

Dunnnett Two-Tailed

Effect: Treatment

Dependent: Final AHH

Significance level: .05

	Vs.	Diff.	Crit. diff.	
A/E	HCBD	-38.333	175.475	
	NOSE	180.667	175.475	S
	HWSE-P	483.667	175.475	S
	PAHs	679.000	175.475	S
	PCBs	719.000	175.475	S
	HWSE-M	971.000	175.475	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 CYP1A activity (AHH) at 20 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	6	1618113.619	269685.603	130.982	.0001
Residual	14	28825.333	2058.952		

Dependent: Final AHH

Means Table

Effect: Treatment

Dependent: Final AHH

	Count	Mean	Std. Dev.	Std. Error
A/E	3	136.333	14.572	8.413
HWSE-P	3	271.000	33.645	19.425
HCBD	3	188.333	15.503	8.950
HWSE-M	3	290.667	102.549	59.207
NOSE	3	144.333	12.342	7.126
PAHs	3	198.667	3.215	1.856
PCBs	3	983.000	46.357	26.764

Dunnnett Two-Tailed

Effect: Treatment

Dependent: Final AHH

Significance level: .05

	Vs.	Diff.	Crit. diff.	
A/E	NOSE	8.000	107.813	
	HCBD	52.000	107.813	
	PAHs	62.333	107.813	
	HWSE-P	134.667	107.813	S
	HWSE-M	154.333	107.813	S
	PCBs	846.667	107.813	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 CYP1A activity (AHH) at 60 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	6	220702.214	36783.702	54.728	.0001
Residual	21	14114.500	672.119		

Dependent: Final AHH

Means Table

Effect: Treatment

Dependent: Final AHH

	Count	Mean	Std. Dev.	Std. Error
A/E	4	78.250	4.031	2.016
HWSE-P	4	81.750	12.606	6.303
HCBD	4	76.750	25.065	12.532
HWSE-M	4	95.750	6.702	3.351
NOSE	4	72.000	6.782	3.391
PAHs	4	94.250	15.564	7.782
PCBs	4	335.750	59.735	29.867

Dunnett Two-Tailed

Effect: Treatment

Dependent: Final AHH

Significance level: .05

	Vs.	Diff.	Crit. diff.	
A/E	NOSE	-6.250	51.144	
	HCBD	-1.500	51.144	
	HWSE-P	3.500	51.144	
	PAHs	16.000	51.144	
	HWSE-M	17.500	51.144	
	PCBs	257.500	51.144	S

S = Significantly different at this level.

Hylebos Fish Injury Study - Round II, Part 3
Individual Data and Quality Assurance Results
CASE NARRATIVE

Juvenile Salmon Biomarker Response Studies

PCBs and Pesticides

Semi-volatile Organics

Calibrations

The calibration data used to quantitate the analytes (Tables 1J, 1K, and 1L) met the initial and continuing calibration criteria detailed in the "Commencement Bay Quality Assurance Plan, 12/95" (QAP). The only exception was for the standard curve correlation (r) for p,p'-DDT in set H506 (0.9857). However, p,p'-DDT was not detected in the sample set.

Method Blank Analysis

The criteria in the QAP for method blanks (Tables 1E, 1F) were met (no more than 4 analytes to exceed 3 X MDL listed in Table 1M of this report).

Surrogate Recoveries

Surrogate recoveries for sample analyzed for PCBs, DDTs, pesticides, and hexachlorobutadiene (Tables 1A, 1D) were within the guidelines detailed in the QA Plan (50 - 125% recovery).

Reference Material Analyses

An aliquot of NIST tissue SRM 1974a was analyzed with each of the sample sets, and the results (Tables 1E, 1F) met the criteria in the QA plan (>70% of the concentrations for the certified analytes that were present in the NIST SRM 1974a in concentrations greater than 10 times the MDL were within 35% of either of the NIST certified value \pm 95% confidence interval. Some concentrations for p,p'-DDE, p,p'-DDT and PCB congener 180 were below the criteria but were considerably lower than 10x MDL. Noncertified values for the other analytes in the SRM are also shown in the Tables.

Sample Duplicates/Replicates

The RSDs for the concentrations of analytes in the replicate analyses of the samples were less than 50% (Tables 1H, 1I), meeting the criteria in the QAP, 12/95, Table 6.2.

Reanalyses

There is no plan to reanalyze any samples.

1997 Hylebos Salmon Growth Study

Analyses for chemicals in tissues

Data for these analyses are provided as follows:

Table 1 reports concentrations (in ng/g, wet weight) of chlorinated hydrocarbons.

Table 1A provides sample information such as sample weight, dry weight, field sample numbers (as provided by the field sampling group), and surrogate recoveries for field samples analyzed as part of this project.

Table 1B provides concentrations of pesticides in field samples analyzed as part of this project.

Table 1C provides concentrations of PCBs in field samples analyzed as part of this project.

Table 1D provides sample information for QA samples (method blanks and SRMs) analyzed as part of this project.

Table 1E provides concentrations of pesticides in QA samples (method blanks and SRMs) analyzed as part of this project.

Table 1F provides concentrations of PCBs in QA samples (method blanks and SRMs) analyzed as part of this project.

Table 1G provides sample information for QA samples (replicates of field samples) analyzed as part of this project.

Table 1H provides concentrations of pesticide in QA samples (replicates of field samples) analyzed as part of this project.

Table 1I provides concentrations of PCBs in QA samples (replicates of field samples) analyzed as part of this project.

Table 1J provides continuing calibration data for pesticides in standards analyzed with each set as part of this project.

Table 1K provides continuing calibration data for PCBs in standards analyzed with each set as part of this project.

Table 1L provides correlation data for the standard calibration curves analyzed with each set as part of this project.

Table 1M provides method detection limits for chlorinated hydrocarbons analyzed as part of this project.

1997 Hylebos Salmon Growth Study

Table 1 Analyses for Chlorinated Hydrocarbons in tissues Notes

- The concentrations of analytes were calculated using 4,4'-dibromooctafluorobiphenyl as the surrogate standard.
- The "less than" symbol (<) indicates that the analyte was not detected in concentrations above the stated value.
- "NR" denotes that the indicated analyte was not reported; the circumstances are explained in the footnotes.
- Results were determined using gas chromatography (GC) with electron capture detection (ECD), except where noted for analytes exceeding the ECD calibration range.
- The percent recovery of the surrogate standard was calculated using tetrachloro-*o*-xylene to correct for the fraction of the total extract used for the HPLC cleanup step, with tetrachloro-*m*-xylene as the internal standard.
- Concentrations are reported as if two figures are significant.
- The concentration reported for "PCBs (Est. Total)" is an estimate of the total PCBs obtained by taking the sum of the concentrations of the 17 congeners reported in Table 1C, and multiplying by 2.
- The sample weight used to calculate analyte concentrations for method blanks is the mean sample weight of all field samples in the same sample set.
- Set # and Sample # designations are intended for internal lab use and identification only. Field sample numbers, as provided by the field sampling group, are included to aid in identifying individual specimens used to make up sample composites.

Table 1A-1p: Sample Information for tissues analyzed for chlorinated hydrocarbons as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Set #	Samples	Field Sample #s	Lipid (%)	Sample Wt. (g)	DOB Recovery (%)
Exposure Group CARRIER					
Tissue - liver					
H506	110-495	970715DA22L		0.42 \$	96
H506	110-496	970715DA23L		0.49 \$	96
H506	110-497	970729DA67L		0.60 \$	93
H507	110-509	970729DA68L		0.47 \$	96
H507	110-510	97082553L		1.71	94
H508	110-523	97082554L		2.14	102
Tissue - whole body					
H511	110-568	970715DA22B	1.9%	482	97
H510	110-554	970715DA23B	1.7%	525	91
H510	110-555	970729DA67B	3.2%	490	92
H512	110-578	970729DA68B	2.9%	470	100
H512	110-579	97082553B	6.1%	485	99
H513	110-592	97082554B	6.4%	522	58
Exposure Group HCB					
Tissue - liver					
H509	110-537	970715DA34L		0.38 \$	92
H509	110-538	970715DA35L		0.49 \$	90
H509	110-539	970729DA76L		0.47 \$	89
H509	110-540	970729DA77L		0.52 \$	95
H509	110-541	97082559L		2.93	93
H509	110-542	97082560L		1.81	92
H515	110-623	97082561L		2.30	94
H515	110-624	97082562L		2.19	96
Tissue - whole body					
H509	110-543	970715DA34B	2.8%	5.03	97
H509	110-544	970715DA35B	2.1%	5.18	95
H509	110-545	970729DA76B	3.1%	4.79	95
H509	110-546	970729DA77B	2.7%	5.25	93
H510	110-551	97082559B	5.3%	5.12	99
H510	110-553	97082559B	5.4%	4.96	98
H510	110-552	97082560B	5.5%	5.35	95
Exposure Group HWSE-M					
Tissue - liver					
H506	110-501	970715DA31L		0.52 \$	92
H506	110-502	970715DA32L		0.47 \$	39
H507	110-514	970729DA78L		0.71 \$	93
H507	110-515	970729DA80L		0.69	91
H507	110-513	97082539L		1.64	95
H508	110-525	97082540L		2.55	95

DOB = dibromodichlorobiphenyl
 No dry weight analysis was performed for samples in this project, as sample sizes were small, and calculations were performed on a wet weight basis.

\$ Flagged samples were less than 1.5g in size, and represented between 10% and 50% of the usual 3g sample size.

Table 1A-p2: Sample Information for tissues analyzed for chlorinated hydrocarbons as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Set #	Samples	Field Sample #s	Lipid (%)	Sample Wt. (g)	DOB Recovery (%)
Tissue - whole body					
H510	110-558	970715DA31B	2.1%	5.27	96
H515	110-622	970715DA31B	0.4%	4.77	95
H510	110-559	970715DA32B	1.7%	5.09	93
H513	110-594	97082539B	6.4%	4.96	98
H513	110-595	97082540B	7.5%	5.11	97
H512	110-582	970929DA79B	2.5%	4.58	94
H512	110-583	970929DA80B	2.8%	5.12	97
Exposure Group HWSE-P					
Tissue - liver					
H508	110-498	970715DA29L		0.58 \$	94
H508	110-499	970715DA30L		0.56 \$	92
H506	110-500	970729DA70L		0.70 \$	93
H507	110-511	970729DA71L		0.54 \$	94
H507	110-512	97082543L		1.64	91
H508	110-524	97082544L		2.02	97
Tissue - whole body					
H510	110-560	970715DA29B	2.3%	4.93	98
H511	110-569	970715DA29B	1.9%	4.57	98
H510	110-557	970715DA30B	2.1%	5.28	95
H510	110-556	970729DA70B	3.1%	5.13	101
H512	110-580	970729DA71B	2.9%	5.33	99
H512	110-581	97082543B	5.3%	5.23	97
H513	110-593	97082544B	5.7%	5.23	99
Exposure Group NONE					
Tissue - liver					
H508	110-526	97062604L		0.38 \$	93
H508	110-527	97062605L		0.42 \$	90
H507	110-516	970717DA005L		0.34 \$	85
H507	110-517	970717DA006L		0.31 \$	88
Tissue - whole body					
H513	110-586	97062604B	1.9%	5.09	93
H513	110-597	97062605B	2.6%	5.22	98
H512	110-596	970717DA005B	1.9%	4.44	91
H512	110-587	970717DA006B	1.7%	5.01	92
Exposure Group NQSE					
Tissue - liver					
H506	110-503	970715DA26L		0.53 \$	90
H506	110-504	970715DA27L		0.57 \$	89
H508	110-528	970729DA66L		0.54 \$	91
H508	110-529	97082557L		2.17	91

DOB = dibromocyclohexadiene
 No dry weight analysis was performed for samples in this project, as sample sizes were small, and calculations were performed on a wet weight basis.

\$ Flagged samples were less than 1.5g in size and represented between 10% and 50% of the usual 3g sample size.

Table 1A-p3: Sample information for tissues analyzed for chlorinated hydrocarbons as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Set #	Sample	Field Sample #s	Lipid (%)	Sample Wt. (g)	DOB Recovery (%)
H508	110-530	97082558L		251	93
H507	110-518	970829DA6SL		0.57 §	88
Tissue - whole body					
H512	110-584	970715DA26B	2.2%	473	89
H513	110-601	970715DA26B	2.6%	528	91
H512	110-585	970715DA27B	2.3%	516	92
H513	110-598	970729DA65B	3.5%	512	92
H513	110-599	970729DA66B	2.9%	540	95
H513	110-600	97082557B	5.9%	551	92
H515	110-621	97082558B	5.8%	520	97
Exposure Group PCBs					
Tissue - liver					
H511	110-565	370715DA40L		0.49 §	97
H511	110-566	370729DA87L		0.61 §	95
H511	110-567	370729DA83L		0.60 §	97
H508	110-531	37082535L		325	94
H508	110-532	37082536L		127 §	89
H515	110-628	37082537L		228	94
H515	110-625	37082538L		216	94
Tissue - whole body					
H511	110-570	370715DA40B	1.9%	519	97
H511	110-571	370715DA41B	2.5%	509	94
H511	110-572	370729DA82B	2.7%	492	94
H515	110-620	370729DA82B	3.0%	518	94
H511	110-573	370729DA83B	2.6%	466	92
H515F	110-818	37082535B	6.1%	493	96
H515	110-619	37082536B	5.8%	490	93

DOB = dibromocyclohexadienyl
 No dry weight analysis was performed for samples in this project, as sample sizes were small, and calculations were performed on a wet weight basis.

§ Fleeced samples were less than 1.5g in size, and represented between 10% and 50% of the usual 3g sample size.

Table 1B-1: Concentrations (ng/g, wet weight) of pesticides and hexachlorobutadiene in tissues analyzed as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Sampled Field Sample#	HCBD	HCB	Lind	Hept	Aldrin	HPE	Oxy-Chlor	γ-Chlor	α-Chlor	ε-Nona	Mirex	o,p'-DDE	p,p'-DDE	o,p'-DDD	p,p'-DDD	o,p'-DDT	p,p'-DDT	
Exposure Group	HCBD	CARRIER																
Tissue - liver																		
110-495	970715DA22L	<0.47	0.61	<0.78	<0.51	<1.9	<0.87	<0.87	<0.62	1.5	<1.1	<0.86	<1.3	38	<1.2	3.6	<0.95	<1.1
110-496	970715DA23L	<0.39	0.41	<0.66	<0.43	<1.6	<0.63	<0.73	<0.69	1.6	<0.91	<0.72	<1.1	46	<1	3.8	<0.8	<0.91
110-497	970729DA67L	<0.35	0.41	<0.59	<0.38	<1.4	<0.56	<0.66	<0.61	1.1	2	<0.65	<0.98	28	<0.9	2.8	<0.71	<0.82
110-509	970729DA68L	<0.29	0.4	<0.37	<0.52	<0.42	<1.1	<0.33	<0.32	5.9	<0.38	<0.3	<3.1	9.1	<2.3	1.1	<1.5	<0.61
110-510	97082553L	<0.082	0.32	<0.11	<0.15	<0.12	1.9	<0.32	<0.093	1.7	0.22	<0.085	<0.88	3.3	<0.65	0.53	<0.44	<0.17
110-523	97082554L	0.22	0.28	<0.1	<0.14	8.8	1.5	<0.28	0.2	1.4	0.22	<0.08	<0.85	3.9	<0.6	0.53	0.87	<0.17
Tissue - whole body																		
110-588	970715DA22B	<0.038	0.32	<0.042	<0.047	<0.049	0.61	0.53	0.44	1.4	0.3	0.17	0.65	27	0.53	1.4	0.59	0.45
110-584	970715DA23B	0.089	0.23	<0.038	<0.046	<0.044	0.58	0.5	0.87	3	1.2	0.14	0.62	27	0.55	1.1	3.5	0.43
110-585	970729DA67B	0.082	0.37	<0.056	<0.067	<0.064	0.66	0.55	0.11	0.43	1.4	0.24	0.7	27	0.61	1.3	0.54	0.47
110-578	970729DA68B	<0.036	0.37	<0.045	0.11	0.1	0.71	0.6	0.12	0.4	1.3	0.28	0.73	27	0.59	1.4	0.53	0.48
110-579	97082553B	<0.042	0.71	0.08	<0.067	<0.059	0.78	0.62	0.19	0.65	1.4	0.56	0.75	23	0.65	1.9	0.66	0.66
110-592	97082554B	<0.58	1.3	<0.72	<0.92	<0.81	<3.7	<2.1	<0.63	1.4	2.6	1.2	<5.5	27	<4.2	2.9	<2.6	<1.1
Exposure Group HCBD																		
Tissue - liver																		
110-537	970715DA34L	3100	4.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-538	970715DA35L	2700	5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-539	970729DA76L	89	2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-540	970729DA77L	20	1.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-541	97082559L	0.59	0.43	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-542	97082560L	0.38	0.39	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-623	97082561L	0.36	0.39	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-624	97082562L	<0.12	0.36	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tissue - whole body																		
110-543	970715DA34B	2600	4.5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-544	970715DA35B	2300	4.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-545	970729DA76B	100	2.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-546	970729DA77B	18	1.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-551	97082559B	1.5	0.99	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-553	97082559B	1.5	0.96	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-552	97082560B	1.7	0.91	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Exposure Group HWSE-M																		
Tissue - liver																		
110-501	970715DA31L	4.2	37	<0.58	<0.38	<1.4	7.8	<0.56	<0.65	0.71	1.6	1.5	<0.98	44	<0.89	4.6	<0.71	<0.81
110-502	970715DA32L	0.99	29	<0.63	<0.41	<1.5	8.2	<0.6	<0.71	0.79	2.1	<0.87	<1.1	69	<0.97	5.5	<0.77	1
110-514	970729DA79L	<0.27	5.6	<0.35	<0.49	<0.39	5.9	<1	<0.3	<0.3	4.1	<0.35	<2.9	7.3	<2.1	0.88	<1.4	<0.57
110-515	970729DA80L	<0.25	7.2	<0.32	<0.45	<0.36	6	<0.97	<0.28	<0.28	4.1	<0.33	<2.7	6.7	<2	0.85	<1.3	<0.53
110-513	97082539L	<0.1	0.84	<0.13	<0.19	<0.15	2.2	<0.4	<0.12	0.18	1.8	0.24	<1.1	2.9	<0.82	0.51	<0.55	<0.22
110-525	97082540L	0.24	0.97	<0.088	<0.12	2.9	1.4	<0.25	0.079	0.2	1.2	0.22	<0.07	4	<0.53	0.5	0.72	<0.14
Tissue - whole body																		
110-588	970715DA31B	7.1	21	0.14	<0.047	<0.045	3.8	0.48	0.13	0.4	1.4	0.18	0.69	25	0.59	1.5	0.57	0.42

HCBD = hexachlorobutadiene; HCB = hexachlorobenzene; Lind = lindane; Hept = heptachlor; HPE = heptachlor epoxide; Oxy-Chlor = oxychlorane; γ-Chlor = gamma-chlorane; α-Chlor = alpha-chlorane; ε-Nona = trans-nonachlor; c-Nona = cis-nonachlor.

NR Samples in the PCB and HCBD exposure groups were not analyzed for pesticides other than HCB and HCBD. NR is reported in place of concentrations for pesticides that were not analyzed in these samples.

Table 1B-p2: Concentrations (ng/g, wet weight) of pesticides and hexachlorobutadiene in tissues analyzed as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Sample#	Field Sample#	HCBD	HCB	Lind	Hept	Aldrin	HPE	Oxy-Chlor	γ-Chlor	t-Nona	Dieldrin	c-Nona	Mirex	o,p'-DDE	p,p'-DDE	o,p'-DDD	p,p'-DDD	o,p'-DDT	p,p'-DDT
110-62	970715DA31B	6.9	20	0.08	<0.098	<0.061	3.8	0.8	0.12	0.35	1.4	0.22	0.16	0.61	32	0.84	1.6	0.49	0.5
110-569	970715DA32B	0.77	12	0.077	<0.059	<0.057	2.8	0.48	0.097	0.28	1.2	0.1	0.14	<0.045	25	0.57	0.99	0.51	0.49
110-594	97082539B	<0.038	2.5	0.073	<0.057	<0.05	1.3	0.59	0.18	0.66	1.5	0.5	0.18	<0.041	30	0.67	1.8	0.72	0.62
110-595	97082540B	<0.025	3.4	0.09	<0.04	<0.036	1.5	0.58	0.2	0.75	1.7	0.59	0.2	0.03	32	0.68	2.2	0.76	0.68
110-562	970829DA79B	0.12	7.8	<0.051	<0.065	0.11	2.3	0.56	0.12	0.39	1.3	0.29	0.15	0.05	24	0.61	1.4	0.48	0.55
110-583	9709729DA80B	0.053	8.9	<0.057	<0.073	0.11	2.7	0.55	0.13	0.44	1.4	0.31	0.17	0.054	26	0.58	1.5	0.45	0.61
Exposure Group HWSE-P																			
Tissue - liver																			
110-498	970715DA29L	1.7	20	<0.51	<0.33	<1.2	5.8	<0.49	<0.57	1.4	<0.71	<0.57	<0.41	<0.86	37	<0.79	3.3	<0.63	<0.72
110-459	970715DA30L	0.85	21	<0.49	<0.32	<1.2	6.6	<0.47	<0.55	1.5	<0.68	<0.54	0.43	<0.82	42	<0.75	3.3	<0.6	<0.68
110-500	970729DA70L	<0.18	6	<0.29	<0.19	<0.7	2.5	<0.28	0.44	0.52	0.98	0.43	<0.24	<0.49	27	<0.45	2.6	0.49	<0.41
110-511	970729DA71L	<0.29	6.2	<0.38	<0.53	<0.42	7.5	<1.1	<0.33	<0.32	5.2	<0.38	<0.34	<3.1	7.4	<2.3	0.88	<1.6	<0.62
110-512	97082543L	<0.11	8.7	<0.14	<0.2	<0.16	2.2	<0.43	0.13	0.18	1.8	0.24	<0.13	<1.2	3.3	<0.87	0.58	<0.58	<0.23
110-564	97082544L	0.26	0.69	<0.11	<0.16	2	1.7	<0.32	<0.1	0.21	1.5	0.22	<0.091	<0.97	4.5	<0.69	0.57	0.89	<0.19
Tissue - whole body																			
110-560	970715DA29B	3	19	0.38	<0.058	<0.056	3.7	0.49	0.11	0.36	1.5	0.095	0.16	0.45	23	0.55	1.2	0.6	0.54
110-569	970715DA29B	2.6	18	0.24	<0.056	<0.058	3.2	<0.13	0.1	0.3	1.3	0.12	0.14	<0.049	21	0.57	0.98	0.52	0.44
110-537	970715DA30B	0.94	18	0.38	<0.06	<0.058	3.8	<0.14	0.73	0.28	1.4	0.078	0.15	0.17	24	0.53	1	0.54	0.51
110-556	970729DA70B	0.22	8.1	0.19	<0.068	<0.063	2.1	<0.15	0.14	0.44	1.4	0.19	0.16	0.14	24	0.58	1.4	0.56	0.52
110-560	970729DA71B	<0.038	8.1	0.1	<0.057	<0.051	2.9	0.52	0.12	0.41	1.4	0.31	0.16	0.05	26	0.56	1.5	0.43	0.57
110-561	97082543B	<0.039	7.8	0.087	<0.061	<0.054	1.2	0.57	0.18	0.57	1.4	0.5	0.16	0.048	22	0.59	1.7	0.58	0.65
110-563	97082544B	<0.033	7.9	0.11	<0.052	<0.046	1.2	0.58	0.18	0.66	1.6	0.51	0.18	<0.038	32	0.64	1.8	0.72	0.6
Exposure Group NONE																			
Tissue - liver																			
110-568	97062604L	1.3	0.59	<0.52	<0.74	1.7	<2.9	<1.5	<0.46	0.66	7.6	<0.53	<0.42	<0.47	25	13	2.2	<2.1	<0.86
110-527	97062605L	1.2	0.51	<0.51	<0.71	7	<2.8	<1.4	<0.44	0.51	6.6	<0.51	<0.41	<0.46	15	<3	1.6	<2.1	<0.83
110-516	970717DA005L	<0.55	<0.55	<0.71	<0.1	<0.79	<4	<2.1	<0.62	<0.61	8.5	<0.72	<0.57	<0.63	22	<4.3	1.7	<2.9	<1.2
110-517	970717DA006L	<0.52	<0.52	<0.67	<0.94	<0.74	<3.8	<2	<0.58	<0.57	9	<0.68	<0.53	<0.6	19	<4.1	1.4	<2.7	<1.1
Tissue - whole body																			
110-568	97062604B	<0.03	0.43	<0.037	<0.048	<0.042	0.69	0.64	0.16	0.52	1.7	0.29	0.21	0.09	44	0.59	1.8	0.64	0.48
110-597	97062605B	<0.029	0.51	0.043	<0.046	<0.041	0.7	0.64	0.18	0.6	1.7	0.37	0.21	0.084	43	0.58	2	0.64	0.49
110-568	970717DA005B	<0.043	0.18	<0.054	<0.069	<0.061	0.69	0.59	0.69	0.23	1.2	0.12	0.13	0.087	26	0.58	0.89	0.51	0.41
110-567	970717DA006B	<0.046	0.17	<0.057	<0.074	<0.065	0.63	0.53	0.69	0.22	1	0.12	0.12	0.084	23	0.52	0.86	0.46	0.39
Exposure Group NOSE																			
Tissue - liver																			
110-503	970715DA26L	<0.32	0.44	<0.54	<0.35	<1.3	<0.71	<0.52	<0.6	0.69	1.3	<0.75	<0.59	<0.44	35	<0.83	3.5	<0.66	<0.75
110-504	970715DA27L	<0.3	0.38	<0.5	<0.32	<1.2	<0.66	<0.48	<0.56	0.61	1.2	<0.69	<0.55	<0.4	31	<0.76	3.2	<0.61	<0.69
110-528	970729DA86L	0.85	7.4	<0.44	<0.62	1.8	<2.4	<1.2	<0.38	<0.38	5.1	<0.45	<0.35	<0.39	11	<2.6	1.2	<1.8	<0.72
110-529	97082557L	0.37	0.28	<0.099	<0.14	1.7	<0.54	<0.28	0.1	0.21	1.4	0.24	<0.079	<0.088	4.3	<0.59	0.55	0.87	<0.16
110-530	97082558L	0.3	0.29	<0.093	<0.13	0.97	<0.51	<0.26	0.082	0.22	1.3	0.23	<0.074	<0.083	4	<0.55	0.54	0.79	<0.15
110-518	970929DA85L	<0.23	7.4	<0.3	<0.41	<0.33	<1.7	<0.88	<0.26	0.27	4.8	<0.3	<0.24	<0.28	7.1	<1.8	0.89	<1.2	<0.48
Tissue - whole body																			
110-568	970715DA26B	<0.079	0.33	<0.098	<0.13	<0.11	0.69	0.61	0.13	0.43	1.3	0.27	0.16	<0.091	23	<0.57	1.3	0.61	0.54

HCBD = hexachlorobutadiene; HCB = hexachlorobenzene; Lind = lindane; Hept = heptachlor; HPE = heptachlor epoxide; Oxy-Chlor = oxychlorodane; γ-Chlor = gamma-chlorodane; α-Chlor = alpha-chlorodane; t-Nona = trans-nonachlor; c-Nona = cis-nonachlor.

NR Samples in the PCB and HCBD exposure groups were not analyzed for pesticides other than HCB and HCBD. NR is reported in place of concentrations for pesticides that were not analyzed in these samples.

Table 1B-p3: Concentrations (ng/g, wet weight) of pesticides and hexachlorobutadiene in tissues analyzed as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Sample#	Field Sample#	HCBD	HCB	Lind	Hept	Aldrin	HPE	Oxy-Chlor	γ-Chlor	α-Chlor	i-Nona	Dieldrin	c-Nona	Mirex	o,p'-DDE	p,p'-DDE	o,p'-DDD	p,p'-DDD	o,p'-DDT	p,p'-DDT
110-501	970715DA26B	< 0.023	0.41	0.031	< 0.037	< 0.032	0.65	0.57	0.12	0.44	1.4	0.21	0.15	0.073	0.61	35	0.56	1.5	0.64	0.47
110-585	970715DA27B	< 0.036	0.37	< 0.044	< 0.057	< 0.05	0.63	0.57	0.13	0.43	1.4	0.26	0.17	0.078	0.65	27	0.55	1.6	0.57	0.57
110-598	970729DA65B	< 0.032	0.48	0.047	< 0.051	< 0.045	0.69	0.59	0.13	0.47	1.4	0.29	0.16	0.08	0.65	33	0.61	1.5	0.63	0.44
110-599	970729DA66B	< 0.03	0.39	0.041	< 0.048	< 0.042	0.65	0.56	0.12	0.44	1.4	0.24	0.16	0.079	0.6	34	0.56	1.4	0.6	0.45
110-500	97082557B	< 0.029	0.74	0.075	< 0.046	< 0.041	0.72	0.59	0.16	0.67	1.5	0.53	0.18	< 0.033	0.62	30	0.61	1.8	0.7	0.61
110-821	97082558B	< 0.044	0.73	0.087	< 0.11	< 0.067	0.86	0.82	0.22	0.52	1.5	0.57	0.2	< 0.066	0.67	30	0.72	2.1	0.72	0.88

Exposure Group PCBs

Tissue - liver

110-565	970715DA40L	< 0.35	0.44	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-566	970729DA82L	< 0.29	0.42	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-567	970729DA83L	< 0.32	0.4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-531	97082535L	0.3	0.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-532	97082536L	0.62	0.29	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-628	97082537L	< 0.11	0.29	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-625	97082538L	< 0.13	0.27	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tissue - whole body																					
110-570	970715DA40B	< 0.036	0.32	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-571	970715DA41B	< 0.044	0.34	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-572	970729DA82B	< 0.043	0.36	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-620	970729DA82B	< 0.061	0.35	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-573	970729DA83B	< 0.056	0.34	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-518	97082535B	< 0.053	0.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110-619	97082536B	< 0.049	0.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

HCBD = hexachlorobutadiene; HCB = hexachlorobenzene; Lind = lindane; Hept = heptachlor; HPE = heptachlor epoxide; Oxy-Chlor = oxychloridane; γ-Chlor = gamma-chloridane; α-Chlor = alpha-chloridane; i-Nona = trans-nonachlor; c-Nona = cis-nonachlor.

NR Samples in the PCB and HCBD exposure groups were not analyzed for pesticides other than HCB and HCBD. NR is reported in place of concentrations for pesticides that were not analyzed in these samples.

Table 1C-p1: Concentrations (ng/g, wet weight) of chlorobiphenyl congeners (by IUPAC number) in tissues analyzed as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Sample	Field Sample#	18	28	44	52	66	101V	105	118	128	138V	153V	170	180A	187	195	205	209	PCBs (Est. Total)
Exposure Group CARRIER																			
Tissue - liver																			
110-485	970715DA22L	2	2.8	4.5	1.6	<0.99	3.1	1.2	3.4	0.79	5.9	5.5	0.73	0.67	1.4	<0.43	<0.42	0.65	68
110-486	970715DA23L	2.4	2.3	4.1	1.5	<0.83	3.7	1.4	3.9	0.91	6.8	6.7	0.84	0.8	1.7	<0.36	<0.35	0.84	76
110-487	970729DA67L	2.5	3.2	3.1	1.2	<0.74	2.7	1.1	2.9	0.63	5.9	4.7	0.65	0.61	1.2	<0.32	<0.31	1.2	64
110-509	970729DA68L	3.1	3.2	2.9	1.9	0.68	2.3	0.56	1.6	0.37	3.5	3.5	0.54	0.45	0.99	<0.23	<0.24	0.35	52
110-510	97082553L	1.2	0.69	0.88	0.77	0.27	0.84	0.18	0.52	0.13	1.2	1.2	0.17	0.18	0.38	<0.066	<0.068	0.2	18
110-523	97082554L	0.52	0.44	0.69	0.51	<0.13	0.73	0.19	0.52	0.13	1.1	1.1	0.14	0.15	0.33	<0.062	<0.064	0.3	14
Tissue - whole body																			
110-568	970715DA22B	0.25	0.22	0.45	0.8	0.26	0.3	0.38	1.5	0.34	3.2	3.7	0.29	0.54	0.87	0.059	0.03	<0.036	30
110-564	970715DA23B	0.24	0.22	0.38	0.57	0.3	1.8	0.37	1.2	0.27	2.7	3.4	0.3	0.55	0.88	0.066	0.064	<0.032	26
110-565	970729DA67B	0.24	0.21	0.41	0.63	0.29	1.8	0.46	1.2	0.28	2.6	3.3	0.29	0.52	0.88	0.066	0.061	<0.046	26
110-578	970729DA68B	0.23	0.23	0.4	0.66	0.24	1.8	0.28	1.2	0.28	2.5	3.4	0.28	0.49	0.86	0.059	0.057	<0.034	26
110-579	97082553B	0.34	0.37	0.55	1.1	0.27	1.9	0.29	1.3	0.34	2.5	3.3	0.25	0.5	0.82	0.054	0.052	<0.039	28
110-582	97082554B	<2.1	<1.2	0.95	2.3	<0.92	3.6	<0.59	1.8	0.55	3.6	5.3	<0.45	0.67	1.4	<0.45	<0.47	<0.54	40

Exposure Group HCBD																				
Tissue - liver																				
110-557	970715DA34L	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-538	970715DA35L	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-539	970729DA78L	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-540	970729DA77L	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-541	97082559L	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-542	97082560L	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-623	97082561L	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-624	97082562L	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
Tissue - whole body																				
110-543	970715DA34B	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-544	970715DA35B	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-545	970729DA78B	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-546	970729DA77B	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-561	97082559B	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-563	97082559B	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-562	97082560B	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0

Exposure Group HWSE-M																			
Tissue - liver																			
110-501	970715DA31L	1.2	2.1	4.1	1.6	1.7	3.5	0.98	4	0.84	7.8	6.9	1.4	1	2.1	1.4	7.2	34	160
110-502	970715DA32L	2.5	3.3	4.7	1.9	2.3	5	1.7	5.8	1.2	10	10	1.7	1.5	2.9	1.4	6.3	27	180
110-514	970729DA78L	1.4	1.1	2.1	1.3	0.62	1.8	0.41	1.2	0.32	4	3.5	0.7	0.59	1.1	0.46	1.5	5.5	55
110-515	970729DA80L	1.7	1	2.2	1.3	0.51	1.7	0.41	1.1	0.3	3.2	2.8	0.51	0.43	0.95	0.43	1.6	7.9	56

‡ Concentrations of these analytes were calculated using an 8-pt calibration curve.
 † Concentrations of these analytes were estimated because they exceeded the GC-ECD calibration range.
 ‡ Concentrations of these analytes were estimated because they saturated the detector; the actual concentrations are probably somewhat greater than this estimated value.
 NR Samples in the HCBD exposure group were not analyzed for PCBs. NR is reported in place of concentrations of congeners that were not analyzed in these samples.
 vPCBs 101 and 90 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "101".
 PCBs 138, 163, and 164 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "138".
 PCBs 153 and 132 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "153".

‡ PCB180 coelutes with an unidentified compound and its concentration is estimated based on a percentage determined by GC/MS.
 PCBs (Est. Total) is an estimate of the total PCBs obtained by multiplying the sum of the concentrations of the 17 individual congeners reported here by 2.

Table 1 C-p2: Concentrations (ng/g, wet weight) of chlorobiphenyl congeners (by IUPAC number) in tissues analyzed as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Sample	Field Sample#	16	28	41	52	68	101V	105	118	128	138V	153V	170	180A	187	195	208	209	PCBs (Est. Total)
110-513	97082539L	0.88	0.53	0.9	0.73	0.25	0.8	0.21	0.51	0.12	1.4	1.2	0.17	0.17	0.37	<0.093	0.15	0.61	18
110-525	97082540L	0.59	0.4	0.65	0.52	0.12	0.73	0.15	0.49	0.11	1	1.1	0.15	0.16	0.35	0.087	0.16	1.1	16
Tissue - whole body																			
110-558	970715DA31B	0.32	0.32	0.49	0.86	0.53	1.8	0.4	1.4	0.34	2.9	3.7	0.42	0.66	1.1	0.37	2.2	5.3	46
110-622	970715DA31B	0.58	0.29	0.69	0.9	0.48	2	0.39	1.4	0.33	2.8	3.5	0.45	0.55	1	0.36	2	5.1	46
110-559	970715DA32B	0.16	0.2	0.41	0.63	0.41	1.7	0.38	1.3	0.3	2.8	3.7	0.4	0.52	1.1	0.34	1.8	4.3	41
110-594	97082539B	0.36	0.38	0.69	1.2	0.31	2	0.1	1.3	0.32	2.6	3.6	0.25	0.54	0.86	0.13	0.59	1.6	34
110-595	97082540B	0.38	0.42	0.75	1.3	0.31	2.1	0.11	1.4	0.36	2.9	3.9	0.28	0.66	0.93	0.15	0.72	1.9	37
110-582	970929DA79B	0.26	0.28	0.45	0.7	0.3	1.8	0.3	1.3	0.31	2.7	3.5	0.28	0.57	0.94	0.26	1.3	3.3	38
110-583	970929DA80	0.27	0.29	0.49	0.76	0.31	2	0.32	1.4	0.32	2.8	3.7	0.3	0.6	1	0.31	1.6	4.2	42
Exposure Group HWSE-P																			
Tissue - liver																			
110-488	970715DA29L	2.2	2.1	3.8	1.4	1.2	3.4	1.2	3.8	0.83	7.3	6.1	1.1	0.86	1.9	1.3	7.1	34	160
110-469	970715DA30L	1.5	1.8	4	1.6	1.3	3.9	1.4	4.5	0.92	7.9	7	1.2	0.96	2.2	1.4	8.1	37	170
110-500	970729DA70L	1.8	2	3	1.2	1.1	2.6	0.93	3.2	0.62	5.4	4.7	0.62	0.53	1.2	0.48	2	11	86
110-511	970729DA71L	2.8	1.8	2.8	2	0.68	2.4	0.55	1.6	0.37	3.5	3.6	0.64	0.51	1.1	0.53	2.2	11	76
110-512	97082543L	1.5	0.64	0.58	0.77	0.27	0.9	0.21	0.6	0.14	1.4	1.4	0.19	0.19	0.42	0.091	0.16	0.77	21
110-524	97082544L	0.65	0.48	0.79	0.63	<0.15	0.86	0.19	0.57	0.13	1.2	1.2	0.15	0.16	0.37	0.085	0.14	0.93	17
Tissue - whole body																			
110-550	970715DA29B	0.3	0.28	0.44	0.93	0.55	2.1	0.44	1.5	0.38	3.3	3.9	0.43	0.62	1.1	0.41	2.5	6.2	51
110-559	970715DA29B	0.21	0.21	0.48	0.86	0.31	1.9	0.38	1.4	0.35	3.2	3.7	0.4	0.61	1.1	0.4	2.5	6	48
110-557	970715DA30B	0.2	0.21	0.36	0.87	0.62	2.1	0.39	1.6	0.37	3.4	4.2	0.48	0.69	1.2	0.27	2.8	6.8	53
110-556	970729DA70B	0.29	0.21	0.51	0.83	0.38	2	0.46	1.3	0.33	2.9	3.5	0.42	0.3	0.96	0.27	1.6	4.2	41
110-580	970729DA71B	0.23	0.26	0.59	0.86	0.32	2.2	0.35	1.6	0.36	3.2	4.1	0.35	0.68	1.1	0.36	2.1	4.8	47
110-581	97082543B	0.29	0.33	0.58	1.1	0.34	2	0.29	1.3	0.3	2.5	3.2	0.22	0.5	0.8	0.15	0.64	1.7	32
110-593	97082544B	0.4	0.38	0.65	1.3	0.29	2.2	0.11	1.4	0.33	2.8	3.8	0.26	0.58	0.89	0.14	0.56	1.5	35
Exposure Group NONE																			
Tissue - liver																			
110-526	97062604L	2.8	2.6	4.5	4.7	1.1	5.3	1.4	4.4	1	6.9	7.5	0.86	0.76	1.6	<0.32	<0.33	0.86	93
110-527	97062605L	2.3	2.2	3.7	3.4	0.72	3.4	0.84	2.5	0.56	6.5	4.7	0.64	0.54	1.1	<0.32	<0.32	0.5	67
110-518	970717DA005	3.5	2.1	3.9	2.3	<0.92	4.1	1.1	2.8	0.8	7.6	7.7	1.4	1.2	2.4	<0.44	<0.45	<0.52	82
110-517	970717DA006	2.9	3	4.4	2.6	<0.87	4.1	1.2	2.8	0.76	7.7	7.8	1.5	1.3	2.4	<0.41	<0.43	<0.49	85
Tissue - whole body																			
110-586	97062604B	0.84	0.94	1.2	2.7	1	3.2	0.53	2.1	0.37	3.4	4.3	0.31	0.68	0.97	0.064	0.064	<0.028	45
110-597	97062605B	1.1	1.2	1.3	2.8	0.92	3	0.55	2	0.36	3.3	4.1	0.29	0.68	0.93	0.063	0.062	<0.027	45
110-586	970717DA005	0.21	0.18	0.39	0.51	0.3	1.7	0.24	1.3	0.29	2.8	3.9	0.37	0.61	1	0.076	0.071	<0.041	28
110-597	970717DA006	0.21	0.16	0.55	0.48	0.27	1.5	0.21	1.1	0.26	2.4	3.3	0.27	0.46	0.84	0.061	0.062	<0.044	24

† Concentrations of these analytes were calculated using an 8-pt calibration curve.
 ‡ Concentrations of these analytes were estimated because they exceeded the GC-ECD calibration range.
 § Concentrations of these analytes were estimated because they saturated the detector; the actual concentrations are probably somewhat greater than this estimated value.
 ¶ Samples in the HCB exposure group were not analyzed for PCBs. NR is reported in place of concentrations of congeners that were not analyzed in these samples.
 †† PCBs 101 and 90 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "101".
 ††† PCBs 138, 163, and 164 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "138".
 †††† PCBs 153 and 132 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "153".

A PCB180 coelutes with an unidentified compound and its concentration is estimated based on a percentage determined by GC/MS.
 PCBs (Est. Total) is an estimate of the total PCBs obtained by multiplying the sum of the concentrations of the 17 individual congeners reported here by 2.

Table 1 C-p3: Concentrations (ng/g, wet weight) of chlorobiphenyl congeners (by IUPAC number) in tissues analyzed as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Sample#	Field Sample#	18	41	52	68	101V	105	118	128	138V	153V	170	180A	187	115	206	209	PCBs* (Est. Total)
Tissue - liver																		
110-503	970715DA26L	2.7	3.7	1.5	1.5	3.3	1.4	3.9	0.81	6.2	5.9	0.78	0.73	1.4	<0.3	<0.29	0.84	77
110-504	970715DA27L	2.7	3.4	1.2	1.1	2.7	1.1	3	0.69	6.1	4.7	0.53	0.57	1.1	<0.27	<0.27	0.84	65
110-508	970729DA66L	1.7	2.5	1.5	<0.57	2.2	0.59	1.7	0.38	4.3	3.6	0.5	0.44	0.96	<0.27	<0.28	0.65	44
110-509	97082557L	0.6	0.39	0.55	0.14	0.77	0.17	0.53	0.12	1.2	1.2	0.17	0.18	0.37	<0.061	<0.063	0.34	15
110-500	97082558L	0.69	0.33	0.52	0.14	0.69	0.13	0.47	0.12	1.1	1.1	0.12	0.14	0.32	<0.057	<0.059	0.45	14
110-518	970929DA65L	2.4	2.4	1.3	<0.38	1.7	0.48	1.2	0.29	4.3	2.6	0.44	0.38	0.78	<0.18	<0.19	0.79	41
Tissue - whole body																		
110-544	970715DA26B	<0.29	0.46	0.62	0.25	1.9	0.38	1.3	0.32	2.4	3.2	0.25	0.41	0.78	<0.062	<0.064	<0.074	26
110-601	970715DA26B	0.3	0.48	0.85	0.42	2	0.37	1.4	0.33	2.8	3.5	0.25	0.52	0.79	0.051	0.05	<0.022	29
110-585	970715DA27B	0.25	0.43	0.85	0.36	2.1	0.32	1.5	0.34	2.9	3.9	0.29	0.56	0.89	0.058	0.057	<0.033	30
110-588	970729DA65B	0.27	0.43	0.77	0.33	1.8	0.36	1.2	0.32	2.5	3.2	0.24	0.5	0.81	0.055	0.06	<0.03	26
110-599	970729DA66B	0.24	0.19	0.4	0.72	1.8	0.33	1.3	0.3	2.6	3.4	0.25	0.52	0.83	0.055	0.055	<0.028	27
110-600	97082557B	0.36	0.3	0.54	0.45	2	0.33	1.2	0.36	2.6	3.2	0.21	0.51	0.79	0.038	0.047	<0.027	28
110-621	97082558B	0.46	0.37	0.66	1.7	0.63	0.5	1.9	0.38	2.9	3.7	0.27	0.46	0.77	0.04	0.049	<0.042	35
Exposure Group PCBs																		
Tissue - liver																		
110-585	970715DA40L	14	490	1500A	240	2200A	970	1700A	520	1300A	1900A	220	210	79	7.7	4	1.8	23000
110-586	970729DA82L	5.1	5.6	200	110	1100A	470	1100	230	1100	910	94	92	34	2.9	1.5	0.42	12000
110-587	970729DA83L	4.5	220	630	130	1300A	480	1400	270	1200A	1100A	110	100	38	3	1.5	0.43	14000
110-531	97082535L	0.96	0.64	25	17	120	50	110	29	110	100	10	10	3.7	0.26	0.11	0.4	1300
110-532	97082536L	1.7	0.82	23	60	15	100	93	24	96	92	7.9	7.8	3	0.23	0.11	0.93	1100
110-608	97082537L	1.3	0.92	21	57	98	33	84	22	88	88	7.3	7.5	2.9	0.21	0.11	0.19	1100
110-625	97082538L	1.1	0.92	20	54	93	30	80	20	84	85	6.8	6.9	2.8	0.2	0.12	<0.12	1100
Tissue - whole body																		
110-570	970715DA40B	10	410A	870A	230A	1200†	500A	880A	440A	1100†	1000†	180A	160A	57	3.6	1.6	0.3	14000
110-571	970715DA41B	12	440A	930A	230A	1300A	520A	920A	230A	1700A	1100A	190A	170A	59	3.6	1.5	0.3	15000
110-572	970729DA82B	3.9	8.8	270A	200A	980A	400A	710A	360A	910A	840A	150A	140A	43	2.7	1.1	0.23	11000
110-600	970729DA82B	4	8.9	300A	190A	1100A	440A	800A	390A	1000A	940A	150A	160A	44	2.5	1	0.22	12000
110-573	970729DA83B	3.4	7.9	280A	630A	1100A	450A	790A	390A	990A	900A	160A	150A	47	2.9	1.2	0.26	12000
110-618	97082535B	1.4	1.5	78	240†	55	430†	330†	82	400†	380†	33	39	14	0.64	0.35	0.11	4500
110-619	97082536B	1.4	2.4	76	250A	64	420A	320A	87	400A	380A	37	43	15	0.79	0.37	0.1	4500

† Concentrations of these analytes were calculated using an 8- μ l calibration curve.
 Δ Concentrations of these analytes were estimated because they exceeded the GC-ECD calibration range.
 † Concentrations of these analytes were estimated because they saturated the detector; the actual concentrations are probably somewhat greater than this estimated value.
 NR Samples in the HCB/D exposure group were not analyzed for PCBs. NR is reported in place of concentrations of congeners that were not analyzed in these samples.
 PCBs 101 and 90 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "101".
 PCBs 138, 163, and 164 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "138".
 PCBs 153 and 132 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "153".

A PCE180 coelutes with an unidentified compound and its concentration is estimated based on a percentage determined by GC/MS.
 PCBs (Est. Total) is an estimate of the total PCBs obtained by multiplying the sum of the concentrations of the 17 individual congeners reported here by 2.

Table 1D-pl: QA: Sample Information for method blanks and standard reference material (SRM 1974a) analyzed for chlorinated hydrocarbons as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Set #	Sample #	Sample Wt (g)	DOB Recovery (%)
Method Blank			
H506	110-506	0.54	87
H507	110-520	0.86	89
H508	110-534	1.73	84
H509	110-548	2.69	92
H510	110-562	5.13	87
H511	110-575	3.44	89
H512	110-589	4.92	93
H513	110-603	5.21	90
H515	110-628	3.77	90
		Average	89
		Std. Dev.	2.5
		R. S. D.	2.8%
SRM 1974a			
H506	110-505	3.20	88
H507	110-519	3.07	85
H508	110-533	3.24	86
H509	110-547	2.93	90
H510	110-561	2.98	90
H511	110-574	3.01	88
H512	110-588	3.02	88
H513	110-602	3.08	90
H515	110-627	3.54	91
		Average	88
		Std. Dev.	1.8
		R. S. D.	2.0%

DOB = dibromooctadecylbiphenyl
 No dry weight analysis was performed for samples in this project, as sample sizes were small, and calculations were performed on a wet weight basis.

Table 1D-p1: QA: Sample Information for method blanks and standard reference material (SRM 1974a) analyzed for chlorinated hydrocarbons as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Set #	Sample #	Sample Wt (g)	DOB Recovery (%)
Method Blank			
	H506	110-506	87
	H507	110-520	89
	H508	110-534	84
	H509	110-548	92
	H510	110-562	87
	H511	110-575	89
	H512	110-589	93
	H513	110-603	90
	H515	110-628	90
		Average	89
		Std. Dev.	2.5
		R. S. D.	2.8%
SRM 1974a			
	H506	110-505	88
	H507	110-519	85
	H508	110-533	86
	H509	110-547	90
	H510	110-561	90
	H511	110-574	88
	H512	110-588	88
	H513	110-602	90
	H515	110-627	91
		Average	88
		Std. Dev.	1.8
		R. S. D.	2.0%

DOB = dibromodifluorobiphenyl

No dry weight analysis was performed for samples in this project, as sample sizes were small, and calculations were performed on a wet weight basis.

9/3/98

Final

Table 1 F-p1: QA: Concentrations (ng/g, wet weight) of chlorobiphenyl congeners (by IUPAC number) in method blanks and standard reference materials (SRM 1974a) analyzed as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Sample #	18	28	44	52	66	101V	105	118	128	138V	153V	170	180†	187	195	206	209	PCBs (Est. Total)
Method Blank																		
110-506	<1.1	1.8	3.2	<0.76	0.7	1.2	0.84	2.1	<0.38	3.3	2	<0.31	<0.34	<0.4	<0.3	<0.29	<0.32	30
110-520	0.77	0.7	1.5	0.67	<0.27	0.64	0.2	0.65	<0.14	1.2	0.87	0.21	<0.14	0.19	<0.13	<0.13	<0.15	15
110-534	0.45	0.38	0.76	0.37	<0.19	0.5	0.19	0.56	<0.094	0.82	0.67	<0.088	<0.098	<0.12	<0.088	<0.091	<0.1	9.4
110-548	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-562	<0.15	0.11	0.25	<0.1	<0.065	0.085	<0.042	0.094	<0.034	0.33	0.11	<0.032	<0.035	<0.043	<0.033	<0.035	<0.04	1.9
110-575	<0.27	0.17	0.39	<0.19	<0.12	0.19	0.386	0.25	<0.061	0.63	0.32	<0.057	<0.064	<0.079	<0.058	<0.061	<0.071	4.1
110-589	<0.15	0.1	0.26	0.11	<0.065	0.14	0.358	0.16	<0.034	0.27	0.25	0.049	0.036	0.056	<0.032	<0.033	<0.038	3
110-603	<0.15	0.15	0.28	0.12	<0.068	0.14	0.367	0.19	<0.035	0.28	0.2	<0.032	<0.036	<0.045	<0.033	<0.034	<0.039	2.9
110-628	0.35	0.25	0.37	0.17	<0.094	0.16	0.371	0.21	<0.005	0.24	0.21	<0.047	<0.052	<0.063	<0.047	<0.048	<0.055	4
Average*	0.2	0.5	0.9	0.2	0.1	0.4	0.2	0.5	0.0	0.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	7.8
Std. Dev.	0.3	0.5	1.0	0.2	0.2	0.3	0.3	0.6	1.0	0.5	0.1	0.0	0.1	0.1	0.0	0.0	0.0	9.0
R.S.D.	141.1%	117.3%	110.6%	120.7%	264.6%	92.7%	134.3%	116.8%	?	108.8%	102.2%	213.5%	264.6%	203.8%	?	?	?	114.4%

SRM 1974a																		
110-505	3.8	13	11	16	17	19	7.7	19	2.9	20	24	0.57	1.2	4.9	0.078	<0.048	0.1	320
110-519	3.7	8.5	8.8	16	14	18	4.6	16	2	17	22	0.51	0.88	3.8	0.062	<0.04	<0.046	270
110-533	3.9	9.9	9.1	16	12	19	5.2	18	2	19	24	0.58	1	4.3	0.092	<0.045	0.08	290
110-547	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-581	3.6	8.7	8.3	15	12	17	5.2	16	1.7	16	20	0.55	0.87	3.8	0.075	<0.062	<0.071	260
110-574	3.8	15	9.2	18	14	20	6	19	2.2	20	24	0.58	1	4.2	<0.063	<0.066	<0.077	310
110-598	3.6	8.3	8.4	15	14	17	4.6	16	1.8	17	21	0.5	0.89	3.9	0.064	<0.05	<0.058	260
110-602	3.6	8.8	8.3	15	11	17	4.3	15	1.7	17	22	0.51	0.83	3.8	<0.056	0.074	<0.067	260
110-627	3.9	8.2	8.2	15	11	17	4.8	15	1.7	16	21	0.39	0.78	3.8	0.083	0.084	<0.07	250
Average*	3.7	10.0	8.9	15.7	13.1	17.9	5.3	16.7	2.0	17.7	22.2	0.5	0.9	4.0	0.1	0.0	0.0	247.1
Std. Dev.	0.1	2.3	0.9	0.8	1.8	1.3	1.0	1.5	0.4	1.4	1.4	0.1	0.1	0.4	0.0	0.0	0.0	90.3
R.S.D.	3.0%	23.0%	9.7%	5.2%	13.8%	7.4%	19.3%	9.2%	18.9%	7.8%	6.3%	11.6%	14.1%	9.4%	59.9%	173.7%	175.1%	36.5%

SRM 1974a																		
Certified concentrations (ng/g, wet wt)	CC	3.7	9	8.28	13.1	11.54	14.6	6.04	14.9	2.5	15.2	16.51	0.93	1.95	3.67			
95% CI	95% CI	0.84	1.30	0.50	1.1	0.39	0.40	0.39	1.1	0.81	0.12	0.43	0.17					
UCL	UCL	12.31	19.44	16.25	21.20	8.68	20.66	3.90	22.01	23.43	1.01	3.21	5.59					
LCL	LCL	4.84	7.67	7.18	8.78	3.67	9.43	1.37	9.17	10.11	0.33	0.99	2.34					

CC is the certified concentration (bolded values); concentrations in plain type are advisory values only.
 95% CI is the 95% confidence interval
 UCL is the upper control limit (1.35 [CC + 95% CI])
 LCL is the lower control limit (0.65 [CC - 95% CI])
 *PCBs 101 and 90 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "101".
 PCBs 138, 163, and 164 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "138".
 PCBs 153 and 132 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "153".
 ‡ PCB180 coelutes with an unidentified compound and its concentration is estimated based on a percentage determined by GC/MS; this estimate may fall below the LCL for SRM 1974a.
 PCBs (Est. Total) is an estimate of the total PCBs obtained by multiplying the sum of the concentrations of the 17 individual congeners reported here by 2.
 NR Samples in the HCBDD exposure group were not analyzed for PCBs. NR is reported in place of concentrations of congeners that were not analyzed in these samples.
 * When an analyte was detected in some, but not all of the method blanks or SRMs, the average concentration is based on the concentration when detected and zero when not detected. When an analyte was not detected in any of the method blanks or SRMs, zero is reported for the average and the Std. Dev. and a "?" is reported for the R.S.D.

Table 1G-p1: Sample Information for tissues analyzed in replicate for chlorinated hydrocarbons as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Set #	Sample #	Field Sample #	Sample Type	Sample Wt (g)	Lipid (%)	DOB Recovery (%)
Exposure Group HCBD						
H510	110-551	97082559B	Tissue - whole body	5.12	5.3%	99
H510	110-553	97082559B	Tissue - whole body	4.96	5.4%	98
			original			
			duplicate			
			Average	5.04	5.3	99
			Std. Dev.	0.08	0.1	0.9
			R. S. D.	1.6%	1.2%	0.9%
Exposure Group HWSE-M						
H510	110-558	970715DA31B	Tissue - whole body	5.27	2.1%	96
H515	110-582	970715DA31B	Tissue - whole body	4.77	0.4%	95
			original			
			duplicate			
			Average	5.02	1.2	96
			Std. Dev.	0.25	0.8	0.3
			R. S. D.	5.0%	66.8%	0.3%
Exposure Group HWSE-P						
H510	110-560	970715DA29B	Tissue - whole body	4.93	2.3%	98
H511	110-569	970715DA29B	Tissue - whole body	4.57	1.9%	98
			original			
			duplicate			
			Average	4.75	2.1	98
			Std. Dev.	0.18	0.2	0.1
			R. S. D.	3.8%	8.0%	0.1%
Exposure Group NQSE						
H512	110-564	970715DA26B	Tissue - whole body	4.73	2.2%	89
H513	110-6C1	970715DA26B	Tissue - whole body	5.28	2.6%	91
			original			
			duplicate			
			Average	5.01	2.4	90
			Std. Dev.	0.28	0.2	1.3
			R. S. D.	5.5%	7.6%	1.4%
Exposure Group PCBS						
H511	110-572	970729DA82B	Tissue - whole body	4.92	2.7%	94
H515	110-620	970729DA82B	Tissue - whole body	5.18	3.0%	94
			original			
			duplicate			
			Average	5.05	2.8	94
			Std. Dev.	0.13	0.1	0.3
			R. S. D.	2.6%	4.8%	0.4%

DOB = dibromooctachlorobiphenyl
 No dry weight analysis was performed for samples in this project, as sample sizes were small, and calculations were performed on a wet weight basis.

Table 1H-p1: Concentrations (ng/g, wet weight) of pesticides and hexachlorobutadiene in tissues analyzed in replicate as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Sample#	HCBD	HCB	Lind	Hept	Aldrin	HPE	Oxy-Chlor	γ-Chlor	δ-Chlor	ε-Chlor	Nona	Mirex	opDDE	opDDD	opDDT	ppDDD	ppDDT		
Exposure Group HCBD																			
110551	1.5	0.99	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
110553	1.5	0.96	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Average*	1.5	1.0																	
Std. Dev.	0.0	0.0																	
R.S.D.	1.1%	1.3%																	
Exposure Group HWSE-M																			
110558	7.1	21	0.14	<0.047	<0.045	3.8	0.48	0.13	0.4	1.4	0.18	0.16	0.042	0.69	25	0.59	1.5	0.57	0.42
110622	6.9	20	0.08	<0.098	<0.061	3.8	0.8	0.12	0.35	1.4	0.22	0.16	0.061	0.73	32	0.64	1.6	0.49	0.5
Average*	7.0	20.4	0.1	0.0	0.0	3.8	0.6	0.1	0.4	1.4	0.2	0.2	0.1	0.7	28.4	0.6	1.5	0.5	0.5
Std. Dev.	0.1	0.4	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.1	0.0	0.0
R.S.D.	1.5%	2.1%	27.5%	?	?	0.1%	24.9%	7.1%	6.1%	0.2%	8.1%	2.4%	17.9%	2.7%	11.8%	3.8%	3.6%	7.9%	9.2%
Exposure Group HWSE-P																			
110560	3	19	0.38	<0.058	<0.056	3.7	0.49	0.11	0.36	1.5	0.095	0.16	0.045	0.73	23	0.55	1.2	0.6	0.54
110569	2.6	18	0.24	<0.056	<0.058	3.2	<0.13	0.1	0.3	1.3	0.12	0.14	<0.049	0.7	21	0.57	0.98	0.52	0.44
Average*	2.8	18.2	0.3	0.0	0.0	3.5	0.2	0.1	0.3	1.4	0.1	0.1	0.0	0.7	22.2	0.6	1.1	0.6	0.5
Std. Dev.	0.2	0.6	0.1	0.0	0.0	0.3	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.1	0.0	0.1	0.0	0.0
R.S.D.	7.2%	3.1%	21.7%	?	?	7.4%	100.0%	4.9%	5.6%	5.4%	13.1%	5.3%	100.0%	2.5%	5.1%	1.4%	9.9%	7.3%	10.0%
Exposure Group NQSE																			
110584	<0.079	0.33	<0.098	<0.13	<0.11	0.69	0.61	0.13	0.43	1.3	0.27	0.16	<0.091	<0.75	23	<0.57	1.3	0.61	0.54
110601	<0.023	0.41	0.031	<0.037	<0.032	0.65	0.57	0.12	0.44	1.4	0.21	0.15	0.073	0.61	35	0.56	1.5	0.64	0.47
Average*	0.0	0.4	0.0	0.0	0.0	0.7	0.6	0.1	0.4	1.3	0.2	0.2	0.0	0.3	29.1	0.3	1.4	0.6	0.5
Std. Dev.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.3	0.1	0.0	0.0
R.S.D.	?	10.4%	100.0%	?	?	3.1%	2.8%	5.0%	6.6%	3.4%	13.0%	2.7%	100.0%	100.0%	20.4%	100.0%	7.3%	2.4%	6.3%
Exposure Group PCBS																			
110572	<0.043	0.36	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
110620	<0.061	0.35	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Average*	0.0	0.4																	
Std. Dev.	0.0	0.0																	
R.S.D.	?	2.6%																	

HCBE = hexachlorobenzene; Lind = lindane; Hept = heptachlor; HPE = heptachlor epoxide; Oxy-Chlor = oxychlorane; γ-Chlor = gamma-chlorane; α-Chlor = alpha-chlorane; 1-Nona = trans-nonachlor; c-Nona = cis-nonachlor.

NR Samples in the PCB and HCBD exposure groups were not analyzed for pesticides other than HCB and HCBD. NR is reported in place of concentrations for pesticides that were not analyzed in these samples.

* When an analyte was detected in some, but not all of the samples, the average concentration is based on the concentration when detected and zero when not detected. When an analyte was not detected in any of the samples, zero is reported for the average and the Std. Dev. and a "?" is reported for the R.S.D.

Table 11-p1: Concentrations (ng/g, wet weight) of chlorobiphenyl congeners (by IUPAC number) in tissues analyzed in replicate as part of the 1997 Hylebos Salmon Exposure/Growth Study.

Sample #	18	28	44	52	66	101V	105	116	128	138V	153V	170	180*	187	195	206	209	PCBs (Est. Total)
Exposure Group HCBd																		
110-551	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
110-553	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
Average*																		0
Std. Dev.																		0.00
R.S.D.																		7
Exposure Group HWSE-M																		
110-558	0.32	0.32	0.49	0.86	0.53	1.8	0.4	1.4	0.34	2.9	3.7	0.42	0.66	1.1	0.37	2.2	5.3	46
110-622	0.58	0.29	0.69	0.91	0.48	2	0.39	1.4	0.33	2.8	3.5	0.45	0.55	1	0.36	2	5.1	46
Average*	0.45	0.31	0.59	0.88	0.50	1.89	0.40	1.39	0.34	2.88	3.59	0.43	0.60	1.06	0.37	2.13	5.22	46
Std. Dev.	0.13	0.01	0.10	0.03	0.02	0.07	0.00	0.02	0.01	0.06	0.11	0.02	0.05	0.02	0.00	0.09	0.11	0.25
R.S.D.	29.7%	4.8%	17.4%	2.9%	4.8%	3.5%	1.1%	1.6%	2.3%	2.2%	3.0%	3.5%	9.1%	1.8%	0.9%	4.0%	2.0%	0.5%
Exposure Group HWSE-P																		
110-560	0.3	0.28	0.44	0.95	0.55	2.1	0.44	1.5	0.38	3.3	3.9	0.43	0.62	1.1	0.41	2.5	6.2	51
110-569	0.21	0.21	0.48	0.86	0.31	1.9	0.38	1.4	0.35	3.2	3.7	0.4	0.61	1.1	0.4	2.5	6	48
Average*	0.25	0.24	0.46	0.90	0.43	1.99	0.41	1.49	0.36	3.27	3.78	0.42	0.61	1.09	0.41	2.50	6.09	49
Std. Dev.	0.04	0.03	0.02	0.04	0.12	0.10	0.03	0.06	0.01	0.07	0.09	0.01	0.00	0.02	0.01	0.04	0.09	1.50
R.S.D.	16.9%	12.4%	4.4%	4.5%	27.1%	5.1%	8.1%	3.9%	3.7%	2.2%	2.5%	3.5%	0.7%	1.8%	1.5%	1.7%	1.4%	3.0%
Exposure Group NQSE																		
110-584	<0.29	0.25	0.46	0.82	0.25	1.9	0.38	1.3	0.32	2.4	3.2	0.25	0.41	0.78	<0.062	<0.064	<0.074	26
110-601	0.3	0.22	0.48	0.85	0.42	2	0.37	1.4	0.33	2.8	3.5	0.25	0.52	0.79	0.051	0.05	<0.022	29
Average*	0.15	0.24	0.47	0.84	0.34	1.96	0.38	1.40	0.33	2.59	3.36	0.25	0.47	0.79	0.03	0.03	0.00	27
Std. Dev.	0.01	0.02	0.01	0.02	0.09	0.01	0.00	0.05	0.00	0.19	0.11	0.00	0.06	0.01	0.03	0.03	0.00	1.43
R.S.D.	100.0%	8.8%	2.0%	1.8%	25.4%	0.5%	1.0%	3.8%	0.9%	7.3%	3.3%	0.6%	12.0%	0.7%	100.0%	100.0%	7	5.3%
Exposure Group PCBs																		
110-572	3.9	8.8	270Δ	610Δ	200Δ	980Δ	400Δ	710Δ	360Δ	910Δ	840Δ	150Δ	149Δ	43	2.7	1.1	0.23	11000
110-620	4	8.9	300Δ	670Δ	190Δ	1100Δ	440Δ	800Δ	390Δ	1000Δ	940Δ	150Δ	160Δ	44	2.5	1	0.22	12000
Average*	3.98	8.82	283.63	639.83	192.25	1031.22	421.34	755.08	376.43	952.62	889.94	147.93	148.18	43.60	2.58	1.07	0.22	11797
Std. Dev.	0.04	0.05	11.88	30.48	3.82	51.75	16.67	40.44	16.06	47.54	51.12	0.45	12.82	0.22	0.08	0.04	0.01	549.37
R.S.D.	1.0%	0.5%	4.2%	4.8%	2.0%	5.0%	4.0%	5.4%	4.3%	5.0%	5.7%	0.3%	8.7%	0.5%	3.0%	3.9%	2.9%	4.7%

Δ Concentrations of these analytes were estimated because they exceeded the GC-ECD calibration range.

NR Samples in the HCBd exposure group were not analyzed for PCBs. NR is reported in place of concentrations of congeners that were not analyzed in these samples.

vPCBs 101 and 90 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "101".

PCBs 138, 163, and 164 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "138".

PCBs 153 and 122 are not resolved by our gas chromatographic procedure, therefore we report their combined concentrations as "153".

* PCB180 coelutes with an unidentified compound and its concentration is estimated based on a percentage determined by GC/MS.

PCBs (Est. Total) is an estimate of the total PCBs obtained by multiplying the sum of the concentrations of the 17 individual congeners reported here by 2.

• When an analyte was detected in some, but not all of the samples, the average concentration is based on the concentration when detected and zero when not detected. When an analyte was not detected in any of the samples, zero is reported for the average and the Std. Dev., and a "7" is reported for the R.S.D.

Table 1J-p. Continuing calibration verification data* (based on % recoveries for chlorinated pesticides in standards run before, during and after the samples analyzed as part of the 1997 Hylebos Salmon Growth Study and the 1997 Puget Sound Salmon Study.

HC8	LIND	HEPT	Aldrin	HFE	OXY	γ-Chlor	α-Chlor	1-Nona	DIEL	c-Nona	Mirex	o,p'-DDE	o,p'-DDD	o,p'-DDD	o,p'-DDT	p,p'-DDT
H506																
H506CHE3A	93	100	93	93	93	93	93	93	93	93	93	93	93	93	93	93
H506CHE3B	96	102	127	101	101	101	101	101	101	102	102	100	101	102	103	106
H506CHE3C	102	104	126	103	105	103	104	104	104	104	105	103	103	104	105	109
H506CHE3D	100	101	115	101	102	101	101	101	101	102	102	101	101	102	101	105
Average	96	100	117	100	100	100	100	100	100	100	100	99	99	100	101	103
Standard Deviation	3.4	4.2	11.1	3.9	4.5	4.0	4.0	3.9	4.1	4.0	4.4	3.7	3.9	4.3	4.6	7.5
Relative Standard Deviation	3.4%	4.2%	9.5%	3.9%	4.5%	4.0%	4.0%	3.9%	4.1%	4.0%	4.4%	3.7%	3.9%	4.3%	4.6%	7.1%
H507																
H507CHE3A	92	93	96	98	93	34	93	93	93	95	92	94	98	93	95	92
H507CHE3B	100	104	116	105	134	103	103	103	103	103	102	104	102	104	103	107
H507CHE3C	103	109	123	108	136	109	107	107	108	107	108	105	107	107	113	115
H507CHE3D	101	105	117	106	137	105	105	105	106	105	106	104	107	106	109	111
H507CHE3E	102	111	103	103	132	104	102	102	102	102	105	101	102	103	102	107
Average	99	103	112	104	133	103	102	102	103	102	103	101	104	102	105	107
Standard Deviation	3.7	5.3	9.2	3.5	4.7	5.3	4.6	4.1	4.7	4.5	5.2	3.8	3.4	4.9	6.0	9.3
Relative Standard Deviation	3.7%	5.1%	8.2%	3.4%	4.6%	5.2%	4.6%	4.0%	4.6%	4.4%	5.1%	3.7%	3.3%	4.8%	5.8%	8.6%
H508																
H508CHE3A	88	88	90	93	89	88	89	90	89	90	87	88	90	93	89	87
H508CHE3B	100	106	121	106	104	105	103	104	104	105	105	104	102	104	104	112
H508CHE3C	103	108	125	106	105	108	105	105	106	106	107	108	103	105	105	119
H508CHE3D	101	102	115	103	104	103	102	102	103	102	102	105	101	103	103	109
Average	98	101	113	102	131	101	100	100	100	101	100	101	99	101	100	105
Standard Deviation	5.9	7.6	13.6	5.3	6.6	7.7	6.5	6.0	6.7	6.3	7.6	8.0	5.4	4.8	6.7	13.0
Relative Standard Deviation	6.0%	7.5%	12.0%	5.2%	6.6%	7.7%	6.5%	6.0%	6.7%	6.2%	7.6%	7.9%	5.4%	4.7%	6.7%	12.1%
H509																
H509CHE3A	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H509CHE3B	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H509CHE3C	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H509CHE3D	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Standard Deviation	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Relative Standard Deviation	1.1%	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

HC8 = hexachlorobenzene; LIND = lindane; HEPT = heptachlor epoxide; OXY = oxychloridane; γ-Chlor = gamma-chloridane; α-Chlor = alpha-chloridane; Nona 3 = nonachlor III; t-Nona = trans-nonachlor; c-Nona = cis-nonachlor.
 *Data are reported as percent recovery calculated using the multilevel curve generated for each set.
 H509 was processed for HC8/HCBD only; calibration data for HCB are reported, but not for other pesticides.

TABLE 10 P.2. Community calibration verification data (based on % recoveries) for chlorinated pesticides in standards run before, during and after the samples analyzed as part of the 1997 Hylebos Salmon Growth Study and the 1997 Puget Sound Salmon Study.

HC	LIND	HEPT	Aldrin	HPE	OXY	γ-Chlor	α-Chlor	l-Nona	DEL	c-Nona	Mirex	o,p'-DDE	p,p'-DDE	o,p'-DDD	o,p'-DDT	p,p'-DDT	
H510																	
H510CHE3B	100	102	106	106	102	101	101	103	102	103	100	101	103	106	102	105	101
H510CHE3C	100	100	106	103	101	101	101	101	101	101	99	101	101	104	101	103	101
H510CHE3D	95	92	96	97	95	96	95	96	95	95	93	96	96	98	95	95	91
H510CHE3E	92	91	93	95	94	93	94	94	93	94	93	94	94	96	94	92	91
Average*	97	96	100	100	98	98	99	99	98	98	96	98	98	101	98	99	97
Standard Deviation	3.3	4.8	5.8	4.6	3.4	3.7	3.3	3.7	3.5	4.0	3.3	3.2	3.6	3.9	3.6	3.7	4.1
Relative Standard Deviation	3.4%	5.0%	5.8%	4.5%	3.5%	3.8%	3.4%	3.8%	3.5%	4.1%	3.4%	3.2%	3.7%	3.8%	3.6%	3.7%	4.2%
H511																	
H511CHE3A	96	100	104	105	101	100	101	102	101	102	99	100	102	105	101	104	100
H511CHE3B	100	101	107	103	102	100	100	101	101	101	100	100	101	103	101	102	101
H511CHE3C	100	100	107	102	103	98	101	101	101	101	101	101	101	103	101	102	101
H511CHE3D	96	98	104	100	100	98	99	99	99	99	98	99	99	101	99	99	98
Average*	98	100	105	103	101	99	100	101	100	101	100	100	101	103	100	102	100
Standard Deviation	0.9	1.2	1.4	1.8	1.2	0.9	0.8	1.0	0.8	1.0	0.9	0.8	1.0	1.7	0.8	1.7	1.0
Relative Standard Deviation	0.9%	1.2%	1.3%	1.7%	1.2%	0.9%	0.8%	1.0%	0.7%	1.0%	0.9%	0.8%	1.0%	1.6%	0.8%	1.7%	1.0%
H512																	
H512CHE3A	91	91	94	96	92	91	92	93	92	93	91	91	93	96	92	93	90
H512CHE3B	100	106	116	105	103	104	102	103	103	103	103	104	101	104	104	108	110
H512CHE3C	102	107	120	106	106	107	105	105	106	106	107	107	104	106	107	107	111
H512CHE3D	102	107	120	107	108	107	106	106	107	107	107	107	105	107	108	110	112
Average	96	103	112	104	102	102	101	102	102	102	102	102	101	103	102	105	105
Standard Deviation	4.7	6.7	11.0	4.4	6.0	6.3	5.7	5.2	6.0	5.4	6.7	6.9	4.7	4.3	6.4	6.7	8.9
Relative Standard Deviation	4.8%	6.5%	9.8%	4.2%	5.9%	6.2%	5.7%	5.1%	5.9%	5.2%	6.6%	6.8%	4.6%	4.1%	6.3%	6.4%	8.4%
H513																	
H513CHE3A	98	100	103	105	101	99	100	101	100	101	98	100	101	105	100	103	100
H513CHE3B	100	102	108	104	100	102	101	102	101	102	100	100	101	103	101	105	101
H513CHE3C	101	100	108	102	99	104	101	102	102	101	102	105	102	103	102	102	104
Average	100	100	106	104	100	102	100	102	101	102	100	102	101	104	101	103	102
Standard Deviation	1.3	0.9	2.1	1.2	0.7	1.7	0.6	0.2	0.8	0.2	1.6	2.4	0.3	0.6	0.9	1.1	1.6
Relative Standard Deviation	1.3%	0.9%	1.9%	1.1%	0.7%	1.7%	0.6%	0.2%	0.8%	0.2%	1.6%	2.3%	0.3%	0.6%	0.9%	1.1%	1.6%
H515																	
H515CHE3A	99	101	104	106	102	101	101	102	101	103	99	102	102	105	101	103	100

HC = hexachlorobenzene; LIND = lindane; HEPT = heptachlor; HPE = heptachlor epoxide; OXY = oxychlorodane; γ-Chlor = gamma-chlorodane; α-Chlor = alpha-chlorodane; Nona 3 = nonachlor III; l-Nona = trans-nonachlor; c-Nona = cis-nonachlor.
 * Data are reported as percent recovery calculated using the multilevel curve generated for each set.
 H509 was processed for HCB/HCBDD only; calibration data for HCB are reported, but not for other pesticides

Table 1J-p3: Continuing calibration verification data* (based on % recoveries) for chlorinated pesticides in standards run before, during and after the samples analyzed as part of the 1997 Hylebos Salmon Growth Study and the 1997 Puget Sound Salmon Study.

	HCB	LIND	HEPT	Aldrin	HPE	OXY	γ-Chlor	α-Chlor	t-Nona	DIEL	c-Nona	Mirex	e.p'-DDE	p,p'-DDE	o,p'-DDD	p,p'-DDD	o,p'-DDT	p,p'-DDT
HS16CHRE3B	100	103	108	103	101	101	100	101	101	101	100	101	101	103	101	104	101	101
HS16CHRE3C	97	94	98	98	96	96	96	97	95	96	94	95	97	98	95	95	93	92
Average	99	99	103	102	100	99	99	100	99	100	97	99	100	102	99	101	96	97
Standard Deviation	1.6	3.8	4.4	3.3	2.7	2.5	2.1	2.4	2.5	2.8	2.7	3.3	2.1	3.2	2.8	4.2	3.4	3.9
Relative Standard Deviation	1.0%	3.8%	4.2%	3.2%	2.8%	2.5%	2.2%	2.4%	2.6%	2.8%	2.8%	3.3%	2.1%	3.1%	2.8%	4.2%	3.5%	4.1%

HCB = hexachlorobenzene; LIND = lindane; HEPT = heptachlor; HPE = heptachlor epoxide; OXY = oxy. Heptachlor; γ-Chlor = gamma-chlorodane; α-Chlor = alpha-chlorodane; Nona 3 = nonachlor III; t-Nona = trans-nonachlor; c-Nona = cis-nonachlor.
 * Data are reported as percent recovery calculated using the multilevel curve generated for each set.
 H509 was processed for HCB/HCBDD only; calibration data for HCB are reported, but not for other pesticides.

Table 1K-p1: Continuing calibration verification data' (based on % recoveries) for chlorinated biphenyl congeners (by IUPAC number) in standards run before, during and after the samples analyzed as part of the 1997 Hylebos Salmon Growth Study and the 1997 Puget Sound Salmon Study.

	18	21	44	52	56	101	105	118	128	138	153	170	180	187	195	206	209	
H506																		
H506CH5E3A	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93
H506CH5E3B	99	100	100	99	100	100	99	100	100	100	100	100	100	100	100	100	100	100
H506CH5E3C	102	103	102	102	103	102	103	103	103	103	103	103	103	103	103	104	103	103
H506CH5E3D	100	100	100	100	100	100	101	100	100	100	98	100	100	100	100	100	100	100
Average	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Standard Deviation	3.3	3.5	3.5	3.3	3.5	3.4	3.6	3.7	3.6	3.5	3.8	3.7	3.6	3.5	3.7	3.8	3.8	3.6
Relative Standard Deviation	3.1%	3.6%	3.5%	3.4%	3.6%	3.5%	3.6%	3.7%	3.7%	3.5%	3.8%	3.7%	3.6%	3.5%	3.7%	3.9%	3.9%	3.7%
H507																		
H507CH5E3A	92	94	94	92	94	93	94	94	94	93	93	93	93	93	93	93	92	92
H507CH5E3B	99	101	101	99	101	100	102	101	101	100	100	101	101	100	101	101	101	101
H507CH5E3C	102	104	104	103	105	103	107	105	104	104	102	104	104	104	104	104	104	104
H507CH5E3D	100	102	102	101	102	101	103	102	102	102	101	102	102	102	102	101	101	101
H507CH5E3E	101	99	101	100	99	100	100	98	100	100	100	100	100	100	101	100	100	101
Average	99	100	100	99	100	99	101	100	100	100	99	100	100	100	100	100	100	100
Standard Deviation	3.7	3.5	3.2	3.9	3.7	3.6	4.2	3.7	3.6	3.7	3.2	3.8	3.7	3.6	3.9	4.1	4.0	4.0
Relative Standard Deviation	3.8%	3.5%	3.2%	3.9%	3.7%	3.6%	4.1%	3.7%	3.6%	3.7%	3.3%	3.8%	3.7%	3.6%	3.8%	4.1%	4.0%	4.0%
H508																		
H508CH5E3A	87	89	90	87	89	88	89	89	88	88	88	88	89	89	98	88	88	88
H508CH5E3B	99	102	101	99	101	100	103	101	101	100	99	101	101	100	101	100	100	100
H508CH5E3C	103	104	104	103	104	103	105	105	104	104	104	105	105	104	105	105	105	105
H508CH5E3D	101	101	102	100	101	101	102	102	101	101	99	101	101	101	101	101	101	101
Average	97	99	99	97	99	98	100	99	99	98	98	99	99	98	99	99	99	98
Standard Deviation	5.9	5.8	5.4	6.0	5.8	5.8	6.0	6.0	5.8	5.9	5.8	6.3	6.1	5.8	6.4	6.8	6.5	6.5
Relative Standard Deviation	6.1%	5.7%	5.5%	6.2%	5.9%	6.0%	6.0%	6.0%	5.8%	6.0%	5.9%	6.4%	6.1%	5.9%	6.5%	6.7%	6.6%	6.6%
H509																		
H509CH5E3A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H509CH5E3B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H509CH5E3C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H509CH5E3D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Standard Deviation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Relative Standard Deviation	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
H510																		
H510CH5E3B	100	102	102	99	101	100	102	102	102	101	101	101	101	101	101	101	101	100
H510CH5E3C	99	100	101	99	100	100	102	100	101	100	98	100	100	100	100	100	100	100
H510CH5E3D	95	95	96	95	95	95	95	95	95	95	94	95	95	95	95	95	95	95

*Data are reported as percent recovery calculated using the multilevel curve generated for each set

H509 was processed for HCB/HCBd only; calibration data for HCB are reported, but not for PCBs

Table 1K-p2. Continuing calibration verification data* (based on % recovery) for chlorinated biphenyl congeners (by IUPAC number) in standards run before, during and after the samples analyzed as part of the 1997 Hylebos Salmon Growth Study and the 1997 Puget Sound Salmon Study.

	18	28	44	52	66	101	105	118	128	138	153	170	180	187	195	206	209	
H510CH6E3E	92	53	93	92	92	93	91	92	93	92	83	92	92	93	93	92	93	
Average	97	57	98	97	97	97	98	97	98	97	97	97	97	97	97	97	97	
Standard Deviation	3.0	3.8	3.6	3.0	3.9	3.2	4.5	4.1	3.9	3.5	3.2	3.8	3.7	3.3	3.5	3.5	3.2	
Relative Standard Deviation	3.1%	3.9%	3.7%	3.1%	4.0%	3.3%	4.6%	4.2%	4.0%	3.6%	3.3%	3.9%	3.8%	3.4%	3.6%	3.6%	3.4%	
H511																		
H511CH6E3A	99	101	101	98	100	100	101	101	101	100	100	100	100	100	100	100	99	
H511CH6E3B	100	101	101	100	100	100	100	101	101	100	101	100	100	100	100	100	100	
H511CH6E3C	99	100	101	100	100	100	101	101	101	100	101	100	100	100	100	100	100	
H511CH6E3D	98	98	99	98	98	98	98	98	98	98	98	98	98	98	98	98	98	
Average	99	100	101	99	100	100	100	100	100	99	100	100	100	100	100	100	99	
Standard Deviation	0.7	1.1	1.1	0.7	1.0	0.8	1.1	1.0	1.0	0.8	1.1	0.8	0.9	0.8	0.9	0.8	0.8	
Relative Standard Deviation	0.7%	1.1%	1.1%	0.7%	1.0%	0.8%	1.1%	1.0%	1.0%	0.8%	1.1%	0.8%	0.9%	0.8%	0.9%	0.8%	0.8%	
H512																		
H512CH6E3A	90	92	93	90	92	91	93	92	92	91	91	91	92	91	91	91	90	
H512CH6E3B	99	101	101	99	101	100	102	100	101	101	100	101	101	100	101	101	100	
H512CH6E3C	102	103	103	102	103	103	102	103	104	103	106	104	104	103	104	104	103	
H512CH6E3D	102	103	104	102	103	103	104	103	104	104	104	104	104	104	104	104	103	
Average	98	100	100	98	100	99	100	100	100	100	100	100	100	100	100	100	99	
Standard Deviation	4.9	4.3	4.4	5.0	4.8	4.9	4.4	4.6	4.8	5.0	5.7	5.2	5.0	4.9	5.2	5.2	5.3	
Relative Standard Deviation	5.0%	4.3%	4.3%	5.1%	4.8%	4.9%	4.4%	4.6%	4.8%	5.0%	5.7%	5.2%	5.0%	5.0%	5.2%	5.3%	5.3%	
H513																		
H513CH6E3A	97	100	100	97	99	98	100	100	100	99	99	99	99	99	99	99	98	
H513CH6E3B	100	101	101	99	101	100	102	101	101	100	99	100	100	100	100	99	99	
H513CH6E3C	102	101	102	101	102	103	102	104	104	104	105	105	105	104	105	106	105	
Average	100	101	101	99	101	100	102	102	102	101	101	101	101	101	101	101	101	
Standard Deviation	1.8	0.8	0.7	1.6	1.0	1.7	1.0	1.9	1.8	2.0	3.1	2.6	2.4	2.3	2.9	3.2	3.1	
Relative Standard Deviation	1.8%	0.6%	0.7%	1.6%	1.0%	1.7%	1.0%	1.9%	1.8%	2.0%	3.1%	2.6%	2.3%	2.3%	2.9%	3.1%	3.1%	
H515																		
H515CH6E3A	98	100	101	98	100	99	101	101	101	100	100	100	100	100	100	100	99	
H515CH6E3B	99	101	100	99	100	99	101	100	100	100	98	100	100	99	100	99	99	
H515CH6E3C	97	97	98	97	97	97	97	97	97	96	96	96	97	97	96	96	96	
Average	98	99	100	98	99	98	100	99	99	99	98	99	99	99	99	99	98	
Standard Deviation	0.7	1.5	1.5	0.8	1.5	1.1	1.7	1.7	1.9	1.5	1.7	1.8	1.6	1.4	1.6	1.6	1.4	
Relative Standard Deviation	0.7%	1.5%	1.5%	0.8%	1.5%	1.2%	1.7%	1.8%	1.9%	1.6%	1.7%	1.9%	1.6%	1.5%	1.6%	1.6%	1.4%	

*Data are reported as percent recovery calculated using the multilevel curve generated for each sei.

H509 was processed for HCB/HCB3 only; calibration data for HCB are reported, but not for PCBs.

Table 1L-p1: Standard curve correlation (r) from the 2nd order regression of the amount ratio of the analyte (versus the Internal standard) to the area response ratio (versus the Internal standard) for the multilevel standards.

Analyte	H506	H507	H508	H509*	H510	H511	H512	H513	H515
	r	r	r	r	r	r	r	r	r
hexachlorobenzene	0.9999	1.0000	1.0000	1.0000	1.0000	0.9999	1.0000	1.0000	1.0000
lindane	0.9995	0.9997	0.9997	0.9997	0.9998	1.0000	0.9997	0.9999	0.9998
3/18	0.9999	1.0000	1.0000	1.0000	1.0000	0.9999	1.0000	1.0000	1.0000
3/28	1.0000	0.9998	0.9998	0.9999	0.9999	0.9998	0.9999	0.9999	0.9999
heptachlor	0.9922	0.9991	0.9986	0.9998	0.9998	1.0000	0.9989	0.9999	0.9998
4/52	0.9999	1.0000	1.0000	1.0000	1.0000	0.9995	1.0000	1.0000	1.0000
aldrin	0.9998	0.9993	0.9994	0.9995	0.9995	0.9998	0.9994	0.9994	0.9994
4/44	0.9999	0.9997	0.9997	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
HPE	0.9992	0.9997	0.9998	0.9998	0.9998	0.9999	0.9998	0.9998	0.9998
oxychlorthane	0.9995	0.9997	0.9998	0.9998	0.9998	0.9999	0.9998	0.9999	0.9998
4/66	1.0000	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
gamma-chlordane	0.9998	0.9998	0.9998	0.9998	0.9999	0.9998	0.9998	0.9999	0.9998
o,p'-DDE	1.0000	0.9998	0.9998	0.9998	0.9998	1.0000	0.9998	0.9998	0.9998
5/101	0.9999	0.9996	1.0000	1.0000	1.0000	0.9998	1.0000	1.0000	1.0000
alpha-chlordane	0.9998	0.9997	0.9998	0.9998	0.9998	0.9999	0.9998	0.9999	0.9997
trans-nonachlor	0.9997	0.9998	0.9998	0.9998	0.9999	0.9998	0.9999	0.9999	0.9999
dieldrin	0.9997	0.9997	0.9997	0.9997	0.9998	0.9994	0.9998	0.9998	0.9997
p,p'-DDE	0.9998	0.9993	0.9993	0.9994	0.9994	0.9999	0.9994	0.9993	0.9994
o,p'-DDD	0.9995	0.9998	0.9998	0.9998	0.9999	0.9999	0.9998	0.9999	0.9999
5/118	0.9999	0.9998	0.9998	0.9998	0.9999	1.0000	0.9999	0.9998	0.9999
cis-nona	0.9993	1.0000	0.9998	0.9998	0.9999	0.9996	0.9998	0.9999	0.9999
p,p'-DDD	0.9978	0.9994	0.9995	0.9995	0.9996	0.9999	0.9995	0.9996	0.9997
o,p'-DDT	0.9939	0.9991	0.9990	0.9990	0.9999	1.0000	0.9994	0.9999	0.9999
6/153	0.9997	0.9999	0.9999	0.9999	0.9999	0.9998	0.9999	0.9998	0.9999
5/105	1.0000	0.9997	0.9998	0.9998	0.9998	1.0000	0.9998	0.9998	0.9999
p,p'-DDT	0.9857	0.9990	0.9987	0.9987	0.9999	1.0000	0.9992	0.9999	0.9999
6/138	1.0000	0.9999	0.9999	0.9999	0.9999	1.0000	0.9999	0.9999	0.9999
7/187	1.0000	0.9999	0.9999	0.9999	0.9999	0.9999	1.0000	0.9999	0.9999
6/128	0.9999	0.9998	0.9998	0.9998	0.9998	0.9999	0.9998	0.9998	0.9998
7/180	1.0000	0.9999	0.9999	0.9999	0.9999	1.0000	0.9999	0.9999	0.9999
milrex	0.9994	0.9997	0.9998	0.9998	0.9999	0.9999	0.9998	0.9999	0.9998
7/170	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
8/195	0.9995	0.9999	0.9999	1.0000	1.0000	1.0000	0.9999	0.9999	0.9999
9/206	0.9999	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998	1.0000
10/209	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	1.0000

Based on six concentration levels of standards, except H506, which is based on five levels of standards.
 * H509 was analyzed for HCB and HCBDD only.

Table 1M-p1: Concentrations of analytes in 7 replicates of spiked clean tissue and calculated method detection limits (MDL, ng/g, wet weight) for pesticides, DDTs and chlorobiphenyl congeners calculated by the method in appendix B of 40CFR part 136 (sample set H376 spiked at low level, 5/96).

Sample#	HCB	LIND	HEPT	Aldrin	HPE	alpha chlordane	gamma chlordane	t-NONA	Dieldrin	Mirex	o,p'-DDE	p,p'-DDE
110-471	1.4	0.85	1.1	0.56	0.89	1	0.97	1.4	0.76	1	0.79	1.8
110-472	1	0.71	0.98	0.5	0.74	0.75	0.8	0.95	0.62	0.9	0.75	1
110-473	1.2	0.75	0.98	0.51	0.77	0.82	0.83	1.1	0.66	0.9	0.74	1.2
110-474	1.2	0.81	1.1	0.55	0.84	0.88	0.91	1.2	0.73	1	0.79	1.4
110-475	1.2	0.81	1	0.56	0.83	0.86	0.93	1.1	0.73	1	0.82	1.3
110-476	1.1	0.76	0.95	0.52	0.76	0.77	0.84	1	0.67	0.9	0.75	1.1
110-477	1.1	0.75	0.94	0.52	0.77	0.79	0.83	1	0.66	0.98	0.77	1.2
Average	1.2	0.8	1.0	0.5	0.8	0.8	0.9	1.1	0.7	1.0	0.8	1.3
Std Dev	0.13	0.05	0.07	0.02	0.05	0.09	0.06	0.15	0.05	0.05	0.03	0.26
MDL	0.39	0.15	0.21	0.08	0.17	0.27	0.20	0.48	0.16	0.16	0.09	0.82

Sample#	o,p'-DDD	p,p'-DDD	o,p'-DDT	p,p'-DDT	3118	3228	4444	4522	4666	51101	51105	51118	61128	61138
110-471	1.1	1.3	1.6	1.4	1.6	1.7	2	1.9	1.4	2	0.95	1.3	0.95	1.7
110-472	0.95	0.99	1.1	1	1.4	1.4	1.8	1.6	1.2	1.5	0.9	1.1	0.86	1.3
110-473	0.98	1.1	1.2	1.1	1.4	1.5	1.8	1.7	1.2	1.6	0.85	1.1	0.87	1.4
110-474	1.1	1.2	1.4	1.2	1.5	1.6	2.1	1.9	1.4	1.8	1.1	1.2	0.98	1.6
110-475	1.1	1.1	1.3	1.2	1.6	1.6	2	1.9	1.4	1.7	1	1.2	0.99	1.5
110-476	0.96	1	1.2	1.1	1.4	1.5	1.9	1.7	1.3	1.6	0.92	1.1	0.91	1.4
110-477	1	1.1	1.2	1.1	1.5	1.5	1.9	1.8	1.3	1.7	0.98	1.2	0.94	1.5
Average	1.0	1.1	1.3	1.2	1.5	1.5	1.9	1.8	1.3	1.7	1.0	1.2	0.9	1.5
Std Dev	0.07	0.11	0.17	0.13	0.09	0.10	0.11	0.12	0.09	0.16	0.08	0.08	0.05	0.13
MDL	0.22	0.34	0.53	0.40	0.28	0.31	0.35	0.38	0.28	0.51	0.25	0.24	0.16	0.42

Sample#	61153	71170	71180	71187	81195	9206	10209	Sample#	HCB
110-471	1.9	2.3	0.99	1.1	0.8	0.78	0.82	110-471RH	0.93
110-472	1.4	2	0.85	1	0.77	0.75	0.79	110-472RH	0.87
110-473	1.6	2.5	0.88	1	0.76	0.74	0.79	110-473RH	0.86
110-474	1.7	3.5	0.99	1.1	0.84	0.86	0.89	110-474RH	0.86
110-475	1.8	2.5	0.99	1.2	0.89	0.87	0.91	110-475RH	0.97
110-476	1.6	2.2	0.9	1	0.78	0.81	0.83	110-476RH	0.91
110-477	1.7	2	0.94	1.1	0.83	0.81	0.86	110-477RH	0.96
Average	1.7	2.4	0.9	1.1	0.8	0.8	0.8	Average	0.9
Std Dev	0.16	0.52	0.06	0.08	0.05	0.05	0.05	Std Dev	0.05
MDL	0.50	1.62	0.18	0.24	0.15	0.16	0.15	MDL	0.15

HCB = Hexachlorobenzene, HCBBD = Hexachlorobutadiene, LIND = Lindane, HEPT = Heptachlor.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 Hepatic PCB levels from biomarker study samples (6, 20 d post exposure) and growth study
 samples (60 d post exposure).

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	6.715E8	1.343E8	1.587E3	.0001
Time	2	84216513.402	4.211E7	4.98E2	.0001
Treatment * Time	10	3.829E8	3.829E7	4.52E2	.0001
Residual	24	2031151.250	84631.302		

Dependent: total_PCB_conc

Means Table

Effect: Treatment * Time

Dependent: total_PCB_conc

	Count	Mean	Std. Dev.	Std. Error
NONE, 0 day	4	81.750	10.874	5.437
Ace/Emulphor, 06 days	2	72.000	5.657	4.000
Ace/Emulphor, 20 days	2	58.000	8.485	6.000
Ace/Emulphor, 60 days	2	16.000	2.828	2.000
HCBD, 06 days	2	0.000	0.000	0.000
HCBD, 20 days	2	0.000	0.000	0.000
HCBD, 60 days	4	8.500	9.950	4.975
HWSE-M, 06 days	2	170.000	14.142	10.000
HWSE-M, 20 days	2	55.500	.707	.500
HWSE-M, 60 days	2	17.000	1.414	1.000
HWSE-P, 06 days	2	165.000	7.071	5.000
HWSE-P, 20 days	2	81.000	7.071	5.000
HWSE-P, 60 days	2	19.000	2.828	2.000
NQSE, 06 days	2	71.000	8.485	6.000
NQSE, 20 days	2	42.500	2.121	1.500
NQSE, 60 days	2	14.500	.707	.500
PCBs, 06 days	1	23000.000	0.000	0.000
PCBs, 20 days	2	13000.000	1414.214	1000.000
PCBs, 60 days	4	1150.000	100.000	50.000

from both biomarker and growth studies

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 Whole body PCB levels from biomarkert study samples (6, 20 d post exposure) and growth study samples (60 d post exposure).

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	4.438E8	8.875E7	1.896E3	.0001
Time	2	17708903.714	8854451.857	1.89E2	.0001
Treatment * Time	10	60509456.581	6050945.658	1.29E2	.0001
Residual	25	1170003.167	46800.127		

Dependent: total_PCB_conc

Means Table

Effect: Treatment * Time

Dependent: total_PCB_conc

	Count	Mean	Std. Dev.	Std. Error
NONE, 0 day	4	35.500	11.091	5.545
Ace/Emulphor, 06 days	2	28.000	2.828	2.000
Ace/Emulphor, 20 days	2	26.000	0.000	0.000
Ace/Emulphor, 60 days	2	34.000	8.485	6.000
HCBD, 06 days	2	0.000	0.000	0.000
HCBD, 20 days	2	0.000	0.000	0.000
HCBD, 60 days	3	50.000	37.323	21.548
HWSE-M, 06 days	2	46.000	0.000	0.000
HWSE-M, 20 days	2	40.000	2.828	2.000
HWSE-M, 60 days	3	37.333	3.512	2.028
HWSE-P, 06 days	3	50.667	2.517	1.453
HWSE-P, 20 days	2	44.000	4.243	3.000
HWSE-P, 60 days	2	33.500	2.121	1.500
NQSE, 06 days	3	28.333	2.082	1.202
NQSE, 20 days	2	26.500	.707	.500
NQSE, 60 days	2	31.500	4.950	3.500
PCBs, 06 days	2	14500.000	707.107	500.000
PCBs, 20 days	3	11666.667	577.350	333.333
PCBs, 60 days	1	4500.000	0.000	0.000

from both biomarker and growth studies

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 Hepatic HCBd levels from biomarkert study samples (6, 20 d post exposure) and growth study samples (60 d post exposure).

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	5595214.226	1119042.845	3.26E2	.0001
Time	2	1704297.803	852148.902	2.48E2	.0001
Treatment * Time	10	9975821.458	997582.146	2.91E2	.0001
Residual	24	82387.045	3432.794		

Dependent: HCBd_conc

Means Table

Effect: Treatment * Time

Dependent: HCBd_conc

	Count	Mean	Std. Dev.	Std. Error
NONE, 0 day	4	.892	.415	.207
Ace/Emulphor, 06 days	2	.430	.057	.040
Ace/Emulphor, 20 days	2	.320	.042	.030
Ace/Emulphor, 60 days	2	.151	.098	.069
HCBd, 06 days	2	2900.000	282.843	200.000
HCBd, 20 days	2	54.500	48.790	34.500
HCBd, 60 days	4	.362	.192	.096
HWSE-M, 06 days	2	2.595	2.270	1.605
HWSE-M, 20 days	2	.260	.014	.010
HWSE-M, 60 days	2	.170	.099	.070
HWSE-P, 06 days	2	1.275	.601	.425
HWSE-P, 20 days	2	.235	.078	.055
HWSE-P, 60 days	2	.185	.106	.075
NQSE, 06 days	2	.310	.014	.010
NQSE, 20 days	2	.540	.438	.310
NQSE, 60 days	2	.335	.049	.035
PCBs, 06 days	1	.350	0.000	0.000
PCBs, 20 days	2	.305	.021	.015
PCBs, 60 days	4	.290	.236	.118

from both biomarker and growth studies

ANOVA Output: Treatment Effects (SuperANOVA. Abacus Concepts Inc., Berkeley, CA).
 Whole body HCBd levels from biomarkert study samples (6, 20 d post exposure) and growth study
 samples (60 d post exposure).

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	327204.976	65440.995	70.014	.0001
Time	2	100833.573	50416.787	53.940	.0001
Treatment * Time	10	497362.097	49736.210	53.212	.0001
Residual	25	23367.172	934.687		

Dependent: HCBd_conc

Means Table

Effect: Treatment * Time

Dependent: HCBd_conc

	Count	Mean	Std. Dev.	Std. Error
NONE, 0 day	4	.037	.009	.004
Ace/Emulphor, 06 days	2	.064	.036	.026
Ace/Emulphor, 20 days	2	.059	.033	.023
Ace/Emulphor, 60 days	2	.311	.380	.269
HCBd, 06 days	2	670.000	141.421	100.000
HCBd, 20 days	2	59.000	57.983	41.000
HCBd, 60 days	3	1.567	.115	.067
HWSE-M, 06 days	2	7.000	.141	.100
HWSE-M, 20 days	2	.086	.047	.034
HWSE-M, 60 days	3	.277	.427	.247
HWSE-P, 06 days	3	1.328	1.515	.875
HWSE-P, 20 days	2	.128	.130	.092
HWSE-P, 60 days	2	.036	.004	.003
NQSE, 06 days	3	.046	.029	.017
NQSE, 20 days	2	.031	.001	.001
NQSE, 60 days	2	.037	.011	.008
PCBs, 06 days	2	.040	.006	.004
PCBs, 20 days	3	.053	.009	.005
PCBs, 60 days	1	.049	0.000	0.000

from both biomarker and growth studies

ANOVA output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 Hepatic PCB levels (log transformed) at 6 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	4	5.073	1.268	917.595	.0001
Residual	4	.006	.001		

Dependent: Log PCB

Means Table

Effect: Treatment

Dependent: Log PCB

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	1.857	.034	.024
HWSE-M	2	2.230	.036	.026
HWSE-P	2	2.217	.019	.013
NQSE	2	1.850	.052	.037
PCBs	1	4.362	0.000	0.000

Fisher's Protected LSD

Effect: Treatment

Dependent: Log PCB

Significance level: .05

	Vs.	Diff.	Crit. diff.	P-Value	
NQSE	Ace/Emulphor	.007	.103	.8606	
	HWSE-P	.368	.103	.0006	S
	HWSE-M	.380	.103	.0005	S
	PCBs	2.512	.126	.0001	S
Ace/Emulphor	HWSE-P	.361	.103	.0006	S
	HWSE-M	.373	.103	.0006	S
	PCBs	2.505	.126	.0001	S
HWSE-P	HWSE-M	.012	.103	.7553	
	PCBs	2.144	.126	.0001	S
HWSE-M	PCBs	2.132	.126	.0001	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 Hepatic HCBd levels (log transformed) at 6 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	22.423	4.485	90.510	.0001
Residual	5	.248	.050		

Dependent: Log HCBd

Means Table

Effect: Treatment

Dependent: Log HCBd

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	-.368	.057	.041
HCBd	2	3.461	.042	.030
HWSE-M	2	.309	.444	.314
HWSE-P	2	.080	.213	.151
NOSE	2	-.509	.020	.014
PCBs	1	-.456	0.000	0.000

Dunnett Two-Tailed

Effect: Treatment

Dependent: Log HCBd

Significance level: .05

	Vs.	Diff.	Crit. diff.	
Ace/Emulphor	NOSE	-.140	.806	
	PCBs	-.088	.987	
	HWSE-P	.448	.806	
	HWSE-M	.678	.806	
	HCBd	3.830	.806	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 Whole body PCB levels (log transformed) at 6 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	4	11.347	2.837	3656.255	.0001
Residual	7	.005	.001		

Dependent: Log PCB

Means Table

Effect: Treatment

Dependent: Log PCB

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	1.446	.044	.031
HWSE-M	2	1.663	0.000	0.000
HWSE-P	3	1.704	.022	.013
NOSE	3	1.451	.032	.019
PCBs	2	4.161	.021	.015

Dunnett Two-Tailed

Effect: Treatment

Dependent: Log PCB

Significance level: .05

	Vs.	Diff.	Crit. diff.	
Ace/Emulphor	NOSE	.005	.079	
	HWSE-M	.217	.087	S
	HWSE-P	.258	.079	S
	PCBs	2.715	.087	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
Whole body HCBd levels (log transformed) at 6 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	29.772	5.954	23.792	.0001
Residual	8	2.002	.250		

Dependent: Log HCBd

Means Table

Effect: Treatment

Dependent: Log HCBd

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	-1.235	.261	.185
HCBd	2	2.821	.092	.065
HWSE-M	2	.845	.009	.006
HWSE-P	3	-.299	.942	.544
NOSE	3	-1.395	.271	.157
PCBs	2	-1.400	.062	.044

Dunnett Two-Tailed

Effect: Treatment

Dependent: Log HCBd

Significance level: .05

	Vs.	Diff.	Crit. diff.	
Ace/Emulphor	PCBs	-.165	1.566	
	NOSE	-.159	1.429	
	HWSE-P	.937	1.429	
	HWSE-M	2.080	1.566	S
	HCBd	4.057	1.566	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 Hepatic PCB levels (log transformed) at 20 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	4	8.933	2.233	1353.640	.0001
Residual	5	.008	.002		

Dependent: Log PCB

Means Table

Effect: Treatment

Dependent: Log PCB

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	1.761	.064	.045
HWSE-M	2	1.744	.006	.004
HWSE-P	2	1.908	.038	.027
NOSE	2	1.628	.022	.015
PCBs	2	4.113	.047	.033

Dunnnett Two-Tailed

Effect: Treatment

Dependent: Log PCB

Significance level: .05

	Vs.	Diff.	Crit. diff.	
Ace/Emulphor	NOSE	-.133	.141	
	HWSE-M	-.017	.141	
	HWSE-P	.147	.141	S
	PCBs	2.352	.141	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 Hepatic HCBD levels (log transformed) at 20 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	7.755	1.551	23.407	.0007
Residual	6	.398	.066		

Dependent: Log HCBD

Means Table

Effect: Treatment

Dependent: Log HCBD

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	-.497	.058	.041
HCBD	2	1.625	.458	.324
HWSE-M	2	-.585	.024	.017
HWSE-P	2	-.641	.146	.104
NQSE	2	-.354	.401	.284
PCBs	2	-.516	.030	.021

Dunnett Two-Tailed

Effect: Treatment

Dependent: Log HCBD

Significance level: .05

	Vs.	Diff.	Crit. diff.	
Ace/Emulphor	HWSE-P	-.144	.873	
	HWSE-M	-.089	.873	
	PCBs	-.019	.873	
	NQSE	.142	.873	
	HCBD	2.122	.873	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
Whole body PCB levels (log transformed) at 20 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	4	14.228	3.557	5630.935	.0001
Residual	6	.004	.001		

Dependent: Log PCB

Means Table

Effect: Treatment

Dependent: Log PCB

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	1.415	0.000	0.000
HWSE-M	2	1.602	.031	.022
HWSE-P	2	1.642	.042	.030
NOSE	2	1.423	.012	.008
PCBs	3	4.067	.022	.013

Dunnett Two-Tailed

Effect: Treatment

Dependent: Log PCB

Significance level: .05

	Vs.	Diff.	Crit. diff.	
Ace/Emulphor	NOSE	.008	.082	
	HWSE-M	.187	.082	S
	HWSE-P	.227	.082	S
	PCBs	2.652	.075	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
Whole body HCBD levels (log transformed) at 20 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	14.212	2.842	27.402	.0002
Residual	7	.726	.104		

Dependent: Log HCBD

Means Table

Effect: Treatment

Dependent: Log HCBD

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	-1.265	.253	.179
HCBD	2	1.628	.527	.372
HWSE-M	2	-1.098	.251	.177
HWSE-P	2	-1.051	.556	.393
NQSE	2	-1.509	.020	.014
PCBs	3	-1.278	.079	.046

Dunnnett Two-Tailed

Effect: Treatment

Dependent: Log HCBD

Significance level: .05

	Vs.	Diff.	Crit. diff.
Ace/Emulphor	NQSE	-.244	1.044
	PCBs	-.013	.953
	HWSE-M	.167	1.044
	HWSE-P	.214	1.044
	HCBD	2.893	1.044

S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 Hepatic PCB levels (log transformed) at 60 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	9.692	1.938	733.521	.0001
Residual	8	.021	.003		

Dependent: Log PCB

Means Table

Effect: Treatment

Dependent: Log PCB

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	1.201	.077	.055
HCBD	2	1.227	.073	.051
HWSE-M	2	1.230	.036	.026
HWSE-P	2	1.276	.065	.046
NOSE	2	1.161	.021	.015
PCBs	4	3.060	.036	.018

Dunnett Two-Tailed

Effect: Treatment

Dependent: Log PCB

Significance level: .05

	Vs.	Diff.	Crit. diff.	
Ace/Emulphor	NOSE	-.040	.161	
	HCBD	.027	.161	
	HWSE-M	.029	.161	
	HWSE-P	.076	.161	
	PCBs	1.859	.139	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
Whole Body PCB levels (log transformed) at 60 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	4.085	.817	28.490	.0002
Residual	7	.201	.029		

Dependent: Log PCB

Means Table

Effect: Treatment

Dependent: Log PCB

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	1.525	.110	.077
HCBD	3	1.625	.300	.173
HWSE-M	3	1.571	.041	.024
HWSE-P	2	1.525	.028	.019
NQSE	2	1.496	.069	.048
PCBs	1	3.653	0.000	0.000

Dunnnett Two-Tailed

Effect: Treatment

Dependent: Log PCB

Significance level: .05

	Vs.	Diff.	Crit. diff.	
Ace/Emulphor	NQSE	-.029	.549	
	HWSE-P	2.168E-19	.549	
	HWSE-M	.046	.501	
	HCBD	.100	.501	
	PCBs	2.129	.672	S

S = Significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
 Hepatic HCBD levels (log transformed) at 60 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	.325	.065	.755	.6016
Residual	10	.861	.086		

Dependent: Log HCBD

Means Table

Effect: Treatment

Dependent: Log HCBD

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	-.872	.303	.214
HCBD	4	-.503	.294	.147
HWSE-M	2	-.810	.269	.190
HWSE-P	2	-.772	.264	.187
NOSE	2	-.477	.064	.046
PCBs	4	-.644	.348	.174

Dunnett Two-Tailed

Effect: Treatment

Dependent: Log HCBD

Significance level: .05

	Vs.	Diff.	Crit. diff.
Ace/Emulphor	HWSE-M	.062	.877
	HWSE-P	.100	.877
	PCBs	.228	.760
	HCBD	.368	.760
	NOSE	.395	.877

None were significantly different at this level.

ANOVA Output: Treatment Effects (SuperANOVA, Abacus Concepts Inc., Berkeley, CA).
Whole body HCBD levels (log transformed) at 60 d post exposure.

Type III Sums of Squares

Source	df	Sum of Squares	Mean Square	F-Value	P-Value
Treatment	5	5.016	1.003	3.495	.0667
Residual	7	2.010	.287		

Dependent: Log HCBD

Means Table

Effect: Treatment

Dependent: Log HCBD

	Count	Mean	Std. Dev.	Std. Error
Ace/Emulphor	2	-.807	.806	.570
HCBD	3	.194	.031	.018
HWSE-M	3	-1.053	.818	.472
HWSE-P	2	-1.445	.051	.036
NOSE	2	-1.442	.135	.095
PCBs	1	-1.310	0.000	0.000

Dunnnett Two-Tailed

Effect: Treatment

Dependent: Log HCBD

Significance level: .05

	Vs.	Diff.	Crit. diff.
Ace/Emulphor	HWSE-P	-.639	1.736
	NOSE	-.636	1.736
	PCBs	-.503	2.126
	HWSE-M	-.246	1.585
	HCBD	1.001	1.585

None were significantly different at this level.