U.S. Department of the Interior
NATIONAL BIOLOGICAL SERVICE
Midwest Science Center
4200 New Haven Rd, Columbia, Missouri 65201

Final Laboratory Report FY-95-30-41

GC/HRMS Analyses of 2,3,7,8-Substituted Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans in Tree Swallow Chicks from Upper Hudson River, NY

June 28, 1995

Submitted by:	Approved By:	Approved By:
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To: Ms. Anne Secord
US Fish and Wildlife Service
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Subject: Analytical results of tree swallow chick samples from the Hudson River area of New York for 2,3,7,8-substituted polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs).

Sample History: Four tree swallow chick samples were received from Ms. Secord. The samples were assigned individual data-base identification numbers and the descriptions were entered into a sample log. Labels on the sample containers were checked and reconciled with the packing list. Samples were stored frozen at -20°C in their original containers until sample processing began.

Analytical Preparation Methods Summary:

Eight additional quality control samples were also prepared and spiked: two procedural blanks, two bluegill (matrix) blanks, two bluegill spikes, and two positive control carp samples (6806-98/99, Saginaw Bay, Michigan). Approximately 25 g aliquots of the tissue samples were homogenized with three times their weight of anhydrous sodium sulfate [SOP C5.144]. The bluegill spikes were fortified with 250 pg of PCDFs/PCDDs (1250 pg OCDD/OCDF) before extraction.

All the concentrated extracts were then treated by a two-stage reactive cleanup; employing first, a sulfuric acid silica gel/potassium silicate (SASG/KS) column, and second, a column of sulfuric

acid silica gel/ potassium silicate/silica gel (SASG/KS/SG) [SOP C5.144]. The extracts were further purified using high performance GPC (HP-GPC).

HPLC-C loading levels were determined by GC/ECD analyses of total-PCBs in each extract. The analytes were then separated by HPLC-C, isolating four fractions: fraction 1, bulk and di-*ortho*-PCB congeners; fraction 2, mono-*ortho*-PCB congeners; fraction 3, non-*ortho*-PCB congeners; and fraction 4, PCDDs/PCDFs.

PCDD/PCDF fractions from HPLC-C were eluted through basic alumina [SOP C5.152] for removal of potential co-contaminants such as chlorinated diphenyl ethers and residual polychlorinated naphthalenes and PCBs. A total of 1 ng of the instrumental internal standard, ^{13}C-labeled 1,2,3,4-PCDD, was added to each semiconical autosampler vial prior to final transfer. The alumina fractions were then transferred, concentrated to a final volume of ~25 μL under a stream of nitrogen.

PCDFs and PCDDs were determined by Gas Chromatography/High Resolution Mass Spectrometry (GC/HRMS) by monitoring five sequential mass windows of selected ions during the chromatographic separation [SOP C5.183].

DETERMINATION OF 2,3,7,8-SUBSTITUTED PCDFS AND PCDDS

Capillary Gas Chromatography and Mass Spectrometry

Instrumentation GC/HRMS analysis was performed using a HP 5890A capillary gas chromatograph interfaced to a VG 70-250S high resolution mass spectrometer. An HP 7673 autosampler was used to introduce 2 of 25 μL of the enriched extract from a conical vial through a spiral uniliner onto a 5 m x 320 μm deactivated fused silica retention gap via a heated (285°C) direct inlet. The analytes of interest were separated on a new 50 m x 200 μm x 0.11 μm Ultra-2 (Hewlett Packard) capillary column with an initial hold of 1 min at 120°C followed by a ramp to 200°C at 20°C/min, another ramp to 300°C at 2.3°C/min, and a final hold of 5 mins. The carrier gas was He maintained at 49 psig with an initial linear velocity of 25 cm/s. All column-to-column connections were made using fused silica press-tight connectors.

General Detection Procedure The VG GC/HRMS system was tuned to 10,000 R.P. and calibrated using perfluorotetradecahydrophenanthrene, and mass windows were established for five ion groups to measure Cl_{4-8} PCDFs and PCDDs. These windows were monitored sequentially during the temperature program.

Within each mass window, two most abundant ions were measured for positive identification and quantitation of each analyte. The ion responses were quantitated and averaged, unless interferences occurred. Within each mass window, additional ions monitored the responses of Cl_{5-9} diphenyl ethers (Cl_{5-9} DPEs), Cl_{5-7} terphenyls (Cl_{5-7} PCTs), Cl_{6-7} naphthalenes (PCNs), and Cl_{3-8} dibenzothiophenes (Cl_{3-8} PCDTs).

Chromatographic and Mass Spectral Resolution Window switching times were established using a window-defining PCDF/PCDD standard mixture and the data acquisition windows set. Chromatographic columns were selected and temperature programmed on the basis that they must resolve 2,3,7,8-TCDD from 1,2,3,7/1,2,3,8-TCDD (and from 1,2,3,4-TCDD) by a resolution

factor of at least 0.5. Column performance was verified by analyzing standards of individual components, and observing the chromatographic resolution of the TCDDs, HxCDDs, and HxCDFs. Similarly, relative retention times for all other congeners of interest were evaluated with respect to labeled analogs. It should be noted that isomer-specific confirmation of all analytes cannot be attained on a DB-5 or Ultra-2 column; the greatest concern is co-elution of one or more TCDFs with 2,3,7,8-TCDF, and one or more PeCDFs with 2,3,4,7,8-PeCDF. A lesser concern is the potential co-elution of 1,2,3,6,8,9-HxCDD with 2,3,4,6,7,8-HxCDD.

Adequate mass resolution was verified while monitoring ions for Cl_{6-7} PCNs vs. ion responses of ^{13}C-TCDDs and of native TCDD vs. ^{13}C-TCDF throughout the sample set. The latter two ions, both at nominal m/z 320, differ by 0.04 Da, requiring a Resolving Power of at least 8000 for complete resolution thereby assuring a continual check on mass resolution. For each mass window, lock-mass and lock-mass-check ions were used to maintain and verify the accuracy of mass measurement.

Criteria for Confirmation: For the positive identification and quantitation of a particular congener, the following additional criteria had to be met:

(1) The peak areas for the selected ion responses must be greater than three times the background noise (S/N > 3);

(2a) For congeners with isotopically-labeled analogs, the ion peaks for the native must occur at retention times from -1 to +3 sec that for the corresponding ^{13}C-labeled ion peaks, which elute about 1 sec earlier than the native ion peaks;

(2b) For 1,2,4,7,8-Cl_5-PCDD, 2,3,4,6,7,8-Cl_6-PCDF, and OCDF without isotopically-labeled analogs, ion responses in sample analyses must occur at RRTs from -0.2 to 0.5% of ^{13}C-labelled 1,2,3,7,8-Cl_5-PCDD, 1,2,3,7,8,9-Cl_6-PCDF, and OCDD, respectively, analogous to the window above;

(3) For the two principal ion responses, the ion ratio must be within the acceptable range (generally ±15%). These ion ratios were determined experimentally for the system during calibrations, compared with the theoretical values, and were tracked for quality assurance.

For ion responses very near the noise levels, or analytes with interferences, the final confirmation is left to the judgment of the analyst.

Quantitation of Analytes: The amount of each analyte detected was inherently self-corrected to account for losses through the whole analysis (extraction, isolation of analytes, and instrumental analysis). A calibration curve describing the response of each native congener to that of a labeled procedural internal standard congener was used directly in the calculations and its range of values were determined in the calibration procedure. Each calibration curve was specifically matched to the range of analyte responses in the sample set.

Calculation of method efficiency (recovery): To account for variations in GC/MS analysis, a known amount of instrumental internal standard was spiked into the final extract and used to calculate the amounts of the procedural internal standards recovered in the final extract before

any dilution was made. The efficiency of the extraction and cleanup procedures was measured by comparing the quantity of the procedural internal standards detected in the final isolated extract (at GC/HRMS analysis) with the quantity spiked into the sample at the beginning of the extraction step.

RESULTS AND DISCUSSION:

General Considerations for GC/MS Analysis: Four samples and eight additional quality assurance samples were analyzed with a calibration set with the data file name DF17.

Analytical Results: Table 1 contains results of determination of the PCDFs and PCDDs. For quality assurance, detection limits for all analytes were near 0.1 pg/g based on a sample size of ~25 geq. Procedural blanks contained < 1 pg total for all analytes except OCDF (85 and 71 pg) and 1,2,3,4,6,7,8-HpCDF (3.5 pg in blank 1). Bluegill blanks contained ≤ 0.2 pg/g for all analytes except for HpCDD (< 0.5 pg/g), OCDD (≤ 13 pg/g), HpCDF (≤ 0.3 pg/g), and OCDF (≤ 3.5 pg/g). In the bluegill spikes, native PCDF/PCDD concentrations were within ± 30% of expected values (except for OCDF in spike 1) after accounting for residual levels in the bluegill matrix blanks. All analyte concentrations in the positive control Saginaw Bay carp compared closely with previous QA/QC data. Ion ratios of the primary ions for all detected analytes in both samples and calibration standards generally varied within the QC range (±15%) of theoretical, except where noted by NQ (not quantifiable).

Recoveries of the ^{13}C-labeled PCDFs and PCDDs (Table 2) were within the QC range (25-125%). Recoveries of TCDD in all of the samples ranged from 49% to 64%.

Although polychlorinated naphthalenes are eluted in the non-ortho PCB fraction from HPLC-C and also are partially removed using alumina, residual Cl_6 naphthalenes were detected (about < 500 pg/g) but sufficient mass resolution was maintained to prevent the Cl_6-PCNs from interfering with the ^{13}C-TCDDs. Several Cl_{5-10}-DPEs are also typically removed using HPLC-C and alumina, but were detected at < 20 pg/g (each congener). The Cl-DPEs did not interfere with the targeted 2,3,7,8-substituted PCDFs. Cl_{3-8} PCDTs were detected in only some samples at about < 10 pg/g.

Table 1. Concentrations (pg/g) of 2,3,7,8-Substituted Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans in Tree Swallow Chick Samples from Upper Hudson River, NY

Work Unit 30096
Lab Report: FY-95-30-41
Date Analyzed: June 8, 1995

					Quality Assurance Samples		
Sample Site:					Procedure Blank #1	Procedure Blank #2	Bluegill Blank 1
MSC Number:	11106	11107	11108	11109	Proc Blk #1	Proc Blk #2	353C Blank 1
GC/HRMS Set: DF17 Injection No.	24	33	34	35	3	4	5
					11/3/94	11/9/94	11/3/94
Sample Submitter No.	NYFO/C6	NYFO/C9	NYFO/C11	NYFO/C23	3	4	5
Sample Mass Extracted:	25 g	25 g	25 g	25 g	*Reported on total amount basis*	*Reported on total amount basis*	11/3/94 25 g
DIOXINS							
2,3,7,8-Tetrachloro	0.4	0.4	0.3	0.2	1 ND	1 ND	0.07
1,2,3,7,8-Pentachloro	1	0.8	0.7	0.9	1 ND	1 ND	0.07 NQ
1,2,4,7,8-Pentachloro	0.3	0.3	0.2	0.4	1 ND	1 ND	0.05 ND
1,2,3,4,7,8-Hexachloro	1.5	0.8	1	1	1 ND	1 ND	0.1 ND
1,2,3,6,7,8-Hexachloro	3.5	2.7	2.0	1.8	1 ND	1 ND	0.08
1,2,3,7,8,9-Hexachloro	0.6	0.4	0.6 NQ	0.8	1 ND	1 ND	0.1 ND
1,2,3,4,6,7,8-Heptachloro	9.0	4.6	7.0	5.7	1 ND	1 ND	0.4 NQ
Octachloro	38	12	13	15	1 ND	1 MD	12
FURANS							
2,3,7,8-Tetrachloro	16	29	9.1	4.6	0.7	1 ND	0.1
1,2,3,7,8-Pentachloro	1.5	1	0.9	0.2	1 ND	1 ND	0.05 ND
2,3,4,7,8-Pentachloro	6.7	3.3	3.5	0.6	1 ND	1 ND	0.05 NQ
1,2,3,4,7,8-Hexachloro	2.1	0.7	1.1	0.2 NQ	1 ND	1 ND	0.1 ND
1,2,3,6,7,8-Hexachloro	0.9	0.5	0.6	0.2	1 ND	1 ND	0.1 ND
1,2,3,7,8,9-Hexachloro	0.1 NQ	0.1 ND	0.08 NQ	0.07 NQ	1 ND	1 ND	0.1 ND
2,3,4,6,7,8-Hexachloro	0.7	0.5	0.5	0.2	1 ND	1 ND	0.1 ND
1,2,3,4,6,7,8-Heptachloro	1.3	0.6	1	0.5	3.5	1 ND	0.3
1,2,3,4,7,8,9-Heptachloro	0.2 NQ	0.1 ND	0.1 ND	0.2 NQ	1 ND	1 ND	0.1 ND
Octachloro	4.6	3.3	4.2	3.5	85	71	3.3

ND Not Detected at Specified Detection Limit
NQ Not Quantitated at Specified Average Concentration due to Inaccurate Ion Ratio

322931

Table 1. Concentrations (pg/g) of 2,3,7,8-Substituted Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans in Tree Swallow Chick Samples from Upper Hudson River, NY

Work Unit 30096
Lab Report: FY-95-30-41
Date Analyzed: June 8, 1995

	Quality Assurance Samples				
Sample Site:	Bluegill Blank 2	Bluegill Spike 1	Bluegill Spike 2	Pos.Control Carp 1	Pos.Control Carp 2
MSC Number:	353C Blank 2	353C Spike 1	353C Spike 2	6806-98/99	6806-98/99
GC/HRMS Set: DF17 Injection No.	7	18	19	20	22
	11/9/94	11/3/94	11/9/94	11/3/94	11/9/94
Sample Submitter No.	7	18	19	from Saginaw R., MI	from Saginaw R., MI
	11/9/94	11/3/94	11/9/94	11/3/94	11/9/94
Sample Mass Extracted:	25 g	25 g	25 g	25 g	25 g
DIOXINS					
2,3,7,8-Tetrachloro	0.1	9.3	9.2	17	25
1,2,3,7,8-Pentachloro	0.07 NQ	8.8	8.4	9.3	14
1,2,4,7,8-Pentachloro	0.1 ND	8.9	11	0.2	0.3
1,2,3,4,7,8-Hexachloro	0.1 ND	10	10	3.8	5.2
1,2,3,6,7,8-Hexachloro	0.2 NQ	9.8	10	11	17
1,2,3,7,8,9-Hexachloro	0.1 ND	11	11	1.6	2.1
1,2,3,4,6,7,8-Heptachloro	0.5 NQ	9.7	11	16	22
Octachloro	13	80	82	14	20
FURANS					
2,3,7,8-Tetrachloro	0.1 NQ	8.9	9.6	28	40
1,2,3,7,8-Pentachloro	0.1 ND	8.7	9.5	10	15
2,3,4,7,8-Pentachloro	0.06 NQ	9.6	10	31	47
1,2,3,4,7,8-Hexachloro	0.1 ND	10	11	8.5	12
1,2,3,6,7,8-Hexachloro	0.1 ND	8.8	9.5	6.8	8.4
1,2,3,7,8,9-Hexachloro	0.1 ND	10	10	0.2 NQ	0.1 NQ
2,3,4,6,7,8-Hexachloro	0.1 ND	10	12	9.7	8.2
1,2,3,4,6,7,8-Heptachloro	0.2	11	10	12	14
1,2,3,4,7,8,9-Heptachloro	0.1 ND	9.9	9.7	1	0.7
Octachloro	3.5	77	59	8.0	5.6

ND Not Detected at Specified Detection Limit
NQ Not Quantitated at Specified Average Concentration due to Inaccurate Ion Ratio

322932

Table 2. Percent Recovery of ^{13}C-2,3,7,8-Substituted Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans in Tree Swallow Chick Samples from Upper Hudson River, NY

Work Unit 30096
Lab Report: FY-95-30-41
Date Analyzed: June 8, 1995

Sample Site:					Quality Assurance Samples		
					Procedure Blank #1	Procedure Blank #2	Bluegill Blank 1
MSC Number:	11106	11107	11108	11109	Proc Blk #1	Proc Blk #2	353C Blank 1
GC/HRMS Set: DF17 Injection No.	24	33	34	35	3	4	5
					11/3/94	11/9/94	11/3/94
Sample Submitter No.	NYFO/C6	NYFO/C9	NYFO/C11	NYFO/C23			
Sample Mass Extracted:	25 g	25 g	25 g	25 g			25 g
DIOXINS							
2,3,7,8-Tetrachloro	59	54	61	63	64	59	60
1,2,3,7,8-Pentachloro	65	74	67	41	71	68	63
1,2,3,4,7,8-Hexachloro	61	70	44	68	44	50	53
1,2,3,6,7,8-Hexachloro	58	60	48	67	43	48	52
1,2,3,7,8,9-Hexachloro	55	59	46	56	43	42	41
1,2,3,4,6,7,8-Heptachloro	61	53	51	57	46	39	42
Octachloro	36	30	28	32	25	25	28
FURANS							
2,3,7,8-Tetrachloro	69	67	73	82	63	62	57
1,2,3,7,8-Pentachloro	71	79	50	69	83	84	80
2,3,4,7,8-Pentachloro	70	75	45	66	75	70	73
1,2,3,4,7,8-Hexachloro	55	54	53	52	44	43	38
1,2,3,6,7,8-Hexachloro	59	56	43	54	52	48	46
1,2,3,7,8,9-Hexachloro	63	60	55	60	42	43	38
1,2,3,4,6,7,8-Heptachloro	67	53	55	68	53	48	44
1,2,3,4,7,8,9-Heptachloro	61	51	40	62	48	40	49

Table 2. Percent Recovery of ^{13}C-2,3,7,8-Substituted Polychlorinated Dibenzo-*p*-dioxins a in Tree Swallow Chick Samples from Upper Hudson River, NY

Work Unit 30096
Lab Report: FY-95-30-41
Date Analyzed: June 8, 1995

	Quality Assurance Samples				
Sample Site:	Bluegill Blank 2	Bluegill Spike 1	Bluegill Spike 2	Pos.Control Carp 1	Pos.Control Carp 2
MSC Number:	353C Blank 2	353C Spike 1	353C Spike 2	6806-98/99	6806-98/99
GC/HRMS Set: DF17 Injection No.	7	18	19	20	22
Sample Submitter No.	11/9/94	11/3/94	11/9/94	11/3/94 from Saginaw R., MI	11/9/94 from Saginaw R., MI
Sample Mass Extracted:	25 g	25 g	25 g	25 g	25 g
DIOXINS					
2,3,7,8-Tetrachloro	60	60	52	53	49
1,2,3,7,8-Pentachloro	45	76	44	64	58
1,2,3,4,7,8-Hexachloro	36	31	32	54	54
1,2,3,6,7,8-Hexachloro	27	34	38	53	54
1,2,3,7,8,9-Hexachloro	34	40	43	43	45
1,2,3,4,6,7,8-Heptachloro	29	27	53	48	56
Octachloro	26	27	30	30	33
FURANS					
2,3,7,8-Tetrachloro	49	76	47	65	54
1,2,3,7,8-Pentachloro	86	87	39	70	62
2,3,4,7,8-Pentachloro	50	86	37	60	52
1,2,3,4,7,8-Hexachloro	39	54	30	50	50
1,2,3,6,7,8-Hexachloro	41	69	35	52	51
1,2,3,7,8,9-Hexachloro	40	41	43	53	51
1,2,3,4,6,7,8-Heptachloro	50	34	34	60	66
1,2,3,4,7,8,9-Heptachloro	41	34	34	49	55

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Final Laboratory Report FY-95-30-37

GC/HRMS ANALYSES of NON-*ortho*-CHLORO-SUBSTITUTED POLYCHLORINATED BIPHENYLS in TREE SWALLOW CHICKS from the UPPER HUDSON RIVER

WORK UNIT #30096

May 22, 1995

Submitted by:	Approved By:	Approved By:
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To: Ms. Anne Secord
US Fish & Wildlife Service
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Cortland, NY 13045

Sample History: Four tree swallow chick samples were received from Ms. Secord. The samples were assigned individual data-base identification numbers and the descriptions were entered into a sample log. Labels on the sample containers were checked and reconciled with the packing list. Samples were stored frozen at -20°C in their original containers until sample processing began.

Analytical Preparation Methods Summary:

The bird tissue samples were prepared according to MSC SOPC 5.143 (1). The samples were blended, and an aliquant (typically 25-g) was homogenized with three-to-four times its weight of anhydrous sodium sulfate.

Eight additional quality control samples were also prepared and spiked: two procedural blanks, two bluegill (matrix) blanks, two bluegill spikes, and two positive control carp samples (6806-98/99, Saginaw Bay, Michigan). Approximately 25-g aliquots of the samples were homogenized with three times their weight of anhydrous sodium sulfate [SOPC 5.144]. The bluegill spikes were fortified with 10 μg of a 1:1:1:1 mixture of Aroclors 1242:1248:1254:1260 using 10 μL of MSC Standard 88W-1 before extraction.

For the determination of non-*ortho*-chloro-substituted PCB congeners, each sample was spiked with 5 ng of ^{13}C-labeled non-*o*-PCBs (#77, 126, and 169) using 50 μL of MSC Standard 91W-2, and column-extracted with CH_2Cl_2. All the extracts were then treated by a two-stage reactive cleanup; employing first, a sulfuric acid silica gel/potassium silicate (SASG/KS) column, and second, a column of sulfuric acid silica gel/potassium silicate/silica gel (SASG/KS/SG). The extracts were further purified using HP-GPC.

HPLC-Carbon loading levels were determined by GC/ECD analyses of total-PCBs in each extract. Small 0.25-g portions of each extract were removed for GC/ECD analyses. The analytes were then separated by HPLC-Carbon according to MSC SOPC 5.202. HPLC-Carbon isolated four fractions: fraction 1, bulk and di-*ortho*-PCB congeners; fraction 2, mono-*ortho*-PCB congeners; fraction 3, non-*ortho*-PCB congeners; and fraction 4, PCDDs/PCDFs.

The non-*o*-PCB fractions from HPLC-Carbon were individually transferred to conical autosampler vials and evaporated to less than 50 μL with nitrogen. A total of 5 ng of the instrumental internal standard was added to each vial by using 50 μL of ^{13}C-labeled 2,2',4,5,5'-PeCB (PCB #101, MSC 90W-2) at 100 pg/μL nonane. The final volume of all of the sample fractions was ~100 μL.

Analytes in HPLC-Carbon fractions 1 and 2 were to be determined by capillary GC/ECD following the methods of Schwartz *et al* (3) for congener-specific analysis, and Schwartz *et al* (4) for mono-*o*-PCBs. Non-*o*-PCBs in fraction 3 of HPLC-Carbon were determined by GC/HRMS, monitoring two sequential mass windows of selected ions during the chromatographic separation (2). PCDFs and PCDDs in fraction 4 of HPLC-Carbon were also to be determined by GC/HRMS.

Determination of Non-*ortho*-chloro-substituted PCB Congeners

Capillary Gas Chromatography and Mass Spectrometry

Instrumentation GC/MS analysis was performed using a HP 5890A capillary gas chromatograph interfaced to a VG 70-250S high resolution mass spectrometer. An HP 7673 autosampler was used to introduce 2 μL of the enriched extract from a conical vial onto a 2.5 m x 530 μm deactivated fused silica retention gap via a cool on-column injection technique. A 50 m x 200 μm x 0.11 μm Ultra-1 capillary column (Hewlett-Packard's equivalent to DB-1) was used to better resolve non-*o*-PCBs from interferences. The GC oven was held at 120°C for 1 min, programmed to 240°C at 2.2°C/min, then ramped to 305 at 5°C/min, and a final hold of 10 mins. Helium carrier gas was maintained at 45 psig with an initial linear velocity of 25 cm/s. The analytical column was put into the MS interface, heated at 305°C. All column-to-column connections were made using fused silica press-tight connectors.

General Detection Procedure The VG GC/HRMS system was tuned to 10,000 R.P. and calibrated using perfluorodecalin, and mass windows were established for two groups of non-*o*-PCBs. Group 1 from 22-47 min included ions for Cl_4-biphenyls #77 and 81 and Cl_5-biphenyl #126; Group 2 from 47:05 min to 1 hr 10 min included ions for Cl_6-biphenyl #169. Within each mass window, two most abundant ions were measured for positive identification and quantitation of each analyte. The ion responses were quantitated and averaged, unless interferences occurred. Within each mass window, additional ions monitored the responses of higher chlorinated,

potential interfering PCB congeners, Cl_{4-8} naphthalenes (PCNs), Cl_{3-5} terphenyls (PCTs), Cl_6-diphenyl ethers, and Cl_4-PCDF to ensure no breakthrough of PCDFs.

Chromatographic and Mass Spectral Resolution HPLC-Carbon separations of non-*o*-PCBs from other PCB congeners typically results in a fraction with >99% enrichment and preferably >99.9%. Residual carryover of major PCB congeners may still interfere with subsequent chromatographic (and mass spectral) analysis. Molecular ion responses of these major PCB congeners were measured to ensure that their fragment ion responses did not contribute a significant interference (≥10%) to the responses of the respective non-*o*-PCB. For example, a significant interference to PCB #126 occurs at a PCB #129 concentration three times that of #126.

Chromatographic resolution of the selected non-*o*-chloro-substituted PCBs from other PCBs was at least partially attained on the Ultra-1 column, except for PCB #126 from #129:

3,4,4',5-TCB (#81) : 2,2',3,4,5'-PeCB (#87), elutes ~9 sec later than #81; fragment ion 3%

3,3',4,4'-TCB (#77) : 2,3,3',4',6-PeCB (#110), elutes ~10 sec later than #77;fragment ion 0.7%
: 2,2',3,3',6,6'-HxCB (#136), elutes ~10 sec earlier than #77

The Ultra-1 column does not resolve PCB #126 from #129, necessitating the removal of PCB #129 by the HPLC-Carbon column to minimize interference from the fragment ion (at 10,000 R.P.):

3,3',4,4',5-PeCB (#126) : 2,2',3,3',4,5-HxCB (#129), elutes ~1-2 sec later than #126; fragment ion 3.5%

Column performance was verified by analyzing standards of individual components and Aroclor mixtures. Similarly, relative retention times for all other congeners of interest were evaluated with respect to labeled analogs.

Adequate mass resolution was verified while monitoring ions for Cl_{4-8} PCNs throughout the sample set. The Cl_{5-7} PCNs ions monitored differ by about 0.1 Da from the ^{13}C-Cl_{4-6} PCB procedural internal standards, assuring a continual check on mass resolution. For each mass window, lock-mass and lock-mass-check ions were used to maintain and verify the accuracy of mass measurement.

Criteria for Confirmation: For the positive identification and quantitation of each congener, the following criteria were established and met in this study:

(1) The peak areas for the selected ion responses must be greater than three times the background noise (S/N > 3);

(2a) For congeners with isotopically-labeled analogs, the native ion peaks must occur at retention times from -1 to +3 sec that for the corresponding ^{13}C-labeled ion peaks, that elute about 1 sec earlier;

(2b) For PCB 81 without an isotopically-labeled analog, ion responses in sample analyses must occur at RRTs from -0.2 to 0.5% of those from a non-*o*-PCB standard analysis, analogous to the window above;

(3) The ion ratio for the two principal ion responses must be within the acceptable range (generally ±15%). These ion ratios were determined experimentally for the system during calibrations, compared with the theoretical values, and were tracked for quality assurance.

For ion responses very near the noise levels, or analytes with interferences, the final confirmation is left to the judgment of the analyst.

Quantitation of Analytes: The amount of each analyte detected was inherently self-corrected for losses through the whole analysis (extraction, isolation of analytes, and instrumental analysis). A calibration curve describing the response of each native congener to that of a labeled procedural internal standard congener was used directly in the calculations and its range of values were determined in the calibration procedure. Concentrations of the native PCB congeners in standards ranged from 0.25 to 2,500 pg/μL. Each calibration curve was specifically matched to the range of analyte responses in the sample set.

Calculation of method efficiency (recovery): To account for variations in GC/MS analysis, a known amount of instrumental internal standard was spiked into the final extract and used to calculate the amounts of the procedural internal standards recovered in the final extract before any dilution was made. The efficiency of the extraction and cleanup procedures was measured by comparing the quantity of the procedural internal standards detected in the *final* isolated extract (at GC/HRMS analysis) with the quantity spiked into the sample at the beginning of the extraction step.

RESULTS AND DISCUSSION:

Four samples and eight quality assurance samples were analyzed in a set with data file name N25PCB. Table 1 contains concentrations of the four selected non-*o*-PCBs, expressed in pg/g fresh weight of bird tissue. Detection limits for all analytes were about 1 pg/g based on 25-g samples. In three of the four samples, most analyte concentrations were higher than the calibration curve, requiring a 1/100 dilution of each sample final extract. Dilutions were done by removing 10 μL of each 100 μL final extract, combining it with 90 μL of nonane in another vial to make a 1/10 dilution. Another 1/10 dilution of the 1/10 dilution was prepared resulting in a 1/100 overall dilution. It was prepared by transfering 10 μL of the 1/10 dilution into a separate vial with 40 μL nonane and 50 μL of the standrad solution of ^{13}C-labelled PCBs 77, 126, and 169. Measured concentrations of the four native PCB congeners (Table 1) in the diluted extracts were then adjusted for the recovery of each ^{13}C-analyte in each undiluted final extract.

Average concentrations of native non-*o*-PCBs for the bluegill spike samples are compared below with expected concentrations estimated in the spiking standard. Concentrations of the non-*o*-PCBs determined compared closely to previous estimates.

		CONCENTRATIONS			
		25-g Bluegill Spiked with 10μg Aroclor (pg/g egg)			
Non-*ortho*-PCB	IUPAC #	Estimated (N=6)	%RSD	Determined (N=2)	%Difference
3,4,4',5-TeCB	81	43	16	54	3
3,3',4,4'-TeCB	77	833	14	1,000	< 1
3,3',4,4',5-PeCB	126	40	22	54	3
3,3',4,4',5,5'-HxCB	169	3.1	39	4.4	7

Concentrations of non-*o*-PCBs in the Saginaw River positive control carp samples also compared well with previous QC analyses as shown below:

	Concentrations (pg/g) in Saginaw River Positive Control Carp							
	#81	%RSD	#77	%RSD	#126	%RSD	#169	%RSD
Historical (N=25,30,30,& 30)	433	16%	3,103	12%	1,125	14%	69	18%
This Study (N=2)	495	13% *	2,800	14% *	1,112	19% *	70	17% *
(* denotes % Difference)								

For all samples, recoveries of the ^{13}C-labeled PCB congeners (Table 2) ranged from 42-95%, within the QC range (25-125%). Ion ratios of the primary ions for all detected analytes in both samples and calibration standards generally varied within the QC range (±15%) of theoretical, except where noted by NQ (not quantitated).

Non-*o*-PCB concentrations were not significantly affected by any interferences (≤ 10%). HPLC-Carbon enrichment removed PCB #129 and most of the other non-planar PCB congeners to acceptable residual levels in the samples.

Chlorinated naphthalenes (PCNs) were detected in the tree swallow chicks including Cl_{4-5}-PCNs (~100-600 pg/g), and Cl_6-PCNs (< 50 pg/g), but they did not interfere with any of the ^{13}C-PCB internal standards.

References

1. Meadows, J.C. "Extraction of PCBs, PCDDs, and PCDFs from Tissue Samples, and Cleanup of the Extracts in Preparation for GC/ECD Analysis for PCBs, then Fractionation of the Extracts on Dispersed Carbon," MSC SOPC 5.143 (January 23, 1992).

2. Peterman, P.H. "High Resolution Gas Chromatography/High Resolution Mass Spectrometry for the Determination of Selected Non-*o*-Chloro-Substituted Polychlorinated Biphenyls," MSC SOPC 5.181 (November 29, 1994).

3. Schwartz, T.R., *et al,* "Chemometric Comparison of Polychlorobiphenyl Residues and Toxicologically Active Polychlorobiphenyl Congeners in the Eggs of Forster's Terns (*Sterna fosteri*)" Arch. Environ. Contam. and Toxicol. 1991, 20, pp. 183-199.

4. Schwartz, T.R., *et al,* "Determination of Mono- and Non-*o,o'*-Chlorine Substituted Polychlorinated Biphenyls in Aroclors and Environmental Samples.", Chemosphere, 1993, 26(8), pp. 1443-1460.

Table 1. Concentrations (pg/g) of Non-*ortho*-Chloro-Substituted Polychlorinated Biphenyls in Tree Swallow Chicks from the Upper Hudson River

May 17, 1995
Work Unit 30096

GC/MS Set: N25PCB
Dates: 5/1/95

NFCR Number:	Submitter Number:	Sample Description:	GC/MS Set-No.	Non-*o*-Polychlorinated Biphenyls Tetra: 3,4,4',5-TCB Congener 81	 Tetra: 3,3',4,4'-TCB Congener 77	 Penta: 3,3',4,4',5-PeCB Congener 126	 Hexa: 3,3',4,4',5,5'-HxCB Congener 169
11106	NYFO/C6	Tree Swallow Chick, 25 g	25-37, 25-48	24,800	530,000	7,530	17
11107	NYFO/C9	Tree Swallow Chick, 25 g	25-38, 25-49	4,290	56,000	1,480	11
11108	NYFO/C11	Tree Swallow Chick, 25 g	25-39, 25-51	16,000	370,000	5,000	11
11109	NYFO/C23	Tree Swallow Chick, 25 g	25-41	115	1,240	67	3
	Quality Assurance Samples						
Proc Blank 45	Proc Blk #1	Procedure Blank #1, 11/3/94 ***Reported on total amount basis***	25-6	50 ND,c	95 c	68 c	35 NQ,c
Proc Blank 46	Proc Blk #2	Procedure Blank #2, 11/9/94 ***Reported on total amount basis***	25-7	50 ND,c	70 c	50 ND,c	35 ND,c
Bluegill Blk 1	11/3/94 353C Blk.	353C Bluegill Blank 1, 11/3/94, 25 g	25-9	4 NQ	30	5	1 ND
Bluegill Blk 2	11/9/94 353C Blk	353C Bluegill Blank 2, 11/9/94, 25 g	25-11	3	45	8	2 NQ
Bluegill Spk 1	11/3/94 353C Spk	Bluegill Spike 1, 11/3/94, 25 g w/10 μg 1:1:1:1 Aroclors	25-23	52	1,000	55	4.1
Bluegill Spk 2	11/9/94 353C Spk	Bluegill Spike 2, 11/9/94, 25 g w/10 μg 1:1:1:1 Aroclors	25-24	55	1,000	52	4.7
6806-98/99	PC #1 11/3/94	Positive Control Carp 1, 11/3/94 from Saginaw River, MI 25 g	25-26	430	2,400	903	58
6806-98/99	PC #2 11/9/94	Positive Control Carp 2, 11/9/94 from Saginaw River, MI 25 g	25-27	560	3,200	1,320	82

c Total pg in blank sample
NQ Not Quantitated at Specified Concentration due to Incomplete Ion Cluster or Inaccurate Ion Ratio
ND Not Detected at Specified Detection Limit

Table 2. Percent Recovery of ^{13}C-Non-*o*-Chloro-Substituted PCBs in Tree Swallow Chicks from the Upper Hudson River

May 15, 1995
Work Unit 30096

GC/MS Set: N25PCB
Date: 5/1/95

NFCR Number:	Submitter Number:	Sample Description:	GC/MS Set-No.	^{13}C-Non-*o*-Polychlorinated Biphenyls: Tetra: 3,3',4,4'-TCB (^{13}C-PCB #77)	Penta: 3,3',4,4',5-PeCB (^{13}C-PCB #126)	Hexa: 3,3',4,4',5,5'-HxCB (^{13}C-PCB #169)
11106	NYFO/C6	Tree Swallow Chick, 25 g	25-37,	65	66	63
11107	NYFO/C9	Tree Swallow Chick, 25 g	25-38,	81	73	70
11108	NYFO/C11	Tree Swallow Chick, 25 g	25-39,	75	73	72
11109	NYFO/C23	Tree Swallow Chick, 25 g	25-41	74	79	73
	Quality Assurance Samples					
Proc Blank 45	Proc Blk #1	Procedure Blank #1, 11/3/94	25-6	55	93	95
Proc Blank 46	Proc Blk #2	Procedure Blank #2, 11/9/94	25-7	49	54	60
Bluegill Blk 1	11/3/94 353C Blk	353C Bluegill Blank 1, 11/3/94, 25 g	25-9	72	62	61
Bluegill Blk 2	11/9/94 353C Blk	353C Bluegill Blank 2, 11/9/94, 25 g	25-11	69	70	61
Bluegill Spk 1	11/3/94 353C Spk	Bluegill Spike 1, 11/3/94, 25 g w/10 µg 1:1:1:1 Aroclors	25-23	64	68	63
Bluegill Spk 2	11/9/94 353C Spk	Bluegill Spike 2, 11/9/94, 25 g w/10 µg 1:1:1:1 Aroclors	25-24	64	80	72
6806-98/99	PC #1 11/3/94	Positive Control Carp 1, 11/3/94 from Saginaw River, MI 25 g	25-26	71	78	83
6806-98/99	PC #2 11/9/94	Positive Control Carp 2, 11/9/94	25-27	58	60	61

Midwest Science Center
National Biological Service
4200 New Haven Rd., Columbia, Missouri 65201

Final Laboratory Report FY-95-30-35

CONGENER-SPECIFIC AND MONO-ORTHO ANALYSIS OF POLYCHLORINATED BIPHENYL RESIDUES IN TREE SWALLOW CHICKS AND EGGS FROM THE HUDSON RIVER, W.U. 30096

July 10, 1995

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Subject: Results of the congener-specific PCB and mono-ortho PCB analysis of tree swallow chicks and eggs from the Hudson River.

Sample History:

The purpose of this study is to determine whether migratiory birds can accumulate detrimental levels of PCBs from various areas along the Hudson River. The indicator species chosen was the Tree Swallow (Tachycineta bicolor). Both eggs and pre-fledgling chicks have been assessed for contaminant concentrations. Higher burdens of PCBs in the chicks than those in the eggs represent local accumulation. Studies have indicated that pre-fledgling chicks can accumulate contaminants from sediment via consumption of adult midges, an emergent insect that comprises a large proportion of their diet. Since these midges spend their larval stages in sediment and emerge as breeding adults that do not feed, the contaminants that they contain must be derived from the sediment.

Analytical Methods Summary:

Sample Preparation: The samples were assigned individual data-base identification numbers and kept frozen until the initiation of sample processing. Samples were thawed at room temperature. Egg samples were homogenized in a blender and chick samples were ground. Matrix QC samples (blanks and spikes) prepared from chicken eggs, samples of MSC's standard positive control matrix (DB# 6806, common carp tissue), and procedural blanks were processed concurrently with the actual samples. The dehydrated samples were spiked with PCB congeners 030 and 204 as procedural internal standards (PIS). The four samples designated for PHH (planar halogenated hydrocarbon) analysis were also spiked with PCB congeners 155 and 162 as PIS. The sample/sodium sulfate mixture was homogenized in a blender, packed in an extraction column and extracted with CH_2Cl_2. The resultant extract was concentrated by rotoevaporation, taken through two stages of reactive column clean-up, followed by high performance gel permeation chromatography (1). The subset of samples (4 chicks) designated for PHH analyis was fractionated on an automated C-18/PX-21 carbon column system (2). The appropriate fraction was analyzed by GC/ECD for non-ortho PCB congeners. The PCDD/PCDF fraction from Carbon was further purified by Alumina column chromatography before analysis by GC/MS.

Capillary Gas Chromatography/ Electron Capture Detection (CGC/ECD) for congener PCB analysis: Aliquants (1 μL) of purified sample extracts were analyzed by CGC/ECD to measure the residues of the PCB congeners (cPCBs) listed in Table 1. The CGC/ECD analyses were performed as described in NFCRC SOP C5.154 (3). All CGC/ECD analyses were performed using Hewlett-Packard 5890 Series II GCs with cool on-column capillary injection systems. Analyses were automated using the Hewlett-Packard model 7673 autosamplers. The fused silica capillary column used was a 60-m x 0.25-mm id DB-5 (0.25 μm thick cross-linked and bonded 5% phenyl-, 95% dimethyl-polysiloxane film, J&W Scientific, Inc.). A 2-m x 0.53-mm id section of uncoated and deactivated (Restek Corp, Inc.) capillary retention gap was attached to the front of the analytical columns by a Press-Tight™ (Restek Corp, Inc.) union. The ECD temperature was 330°C, the H_2-carrier was pressure regulated at 25 psi for the 60-m capillary column. The total ECD gas flow (make-up N_2 + H_2 carrier) was about 64 mL/min. The GC oven temperature program started at 40°C, was immediately ramped to 120°C at 10°/min, then ramped at 2°/min to 260°C with a 2 minute hold, and finally ramped to 320°C at 10°/min and held for 24 minutes. Capillary GC/ECD data were collected, archived in digital form, and processed using a PE-Nelson chromatography data system which includes the model 900 interface and version 4 of Turbochrom™ chromatography software running on an IBM-compatible 80486 microcomputer.

We used 6 levels of A1111 mixed Aroclor standards (composed of equal parts, w/w/w/w%, of Aroclors 1242, 1248, 1254, and 1260) for instrument calibration. Concentrations of these A1111 standards ranged from 50 to 2000 ng/mL for each Aroclor (1242, 1248, 1254, and 1260) or 200 to 8,000 ng/mL of *total* PCBs. To calculate the

concentrations of the analytes, we used an internal standard method with octachloronaphthalene (OCN), spiked at 51 ng/mL, as the instrumental internal standard (IIS). Recovery of procedural internal standards (PIS) spiked into the samples were PCBs 030 and 204. Recoveries of these are presented in Table 3. All sample final concentrations are reported in nanograms/gram (ng/g) wet weight uncorrected for recovery (Tables 1, 2 and 4).

Capillary GC/ECD for mono-*ortho* PCB analysis: Aliquants (1 μL) of purified sample extracts were analyzed by CGC/ECD to measure the residues of the mono-*ortho*-PCBs (mPCBs) listed in Table 5. The CGC/ECD analyses were performed as described in MSC SOP C5.206 (3). All CGC/ECD analyses were performed using Hewlett-Packard 5890 Series II GCs with cool on-column capillary injection systems. Analyses were automated using the Hewlett-Packard model 7673 autosamplers. The fused silica capillary column used was a 30-m x 0.25-mm id DB-1 (0.25 μm thick cross-linked and bonded methyl-polysiloxane film, J&W Scientific, Inc.). A 1-m x 0.53-mm id uncoated and deactivated (Restek Corp, Inc.) capillary section, the retention gap, was attached to the front of the analytical columns by a Press-Tight™ (Restek Corp, Inc.) union. The ECD temperature was 330°C, the H_2-carrier was pressure regulated at 12 psi for the 30-m capillary column. The total ECD gas flow (make-up N_2 + H_2 carrier) was about 60 mL/min. The GC oven temperature program for the mono-*ortho* PCB analyses started at 60°C, immediately ramped to 140°C at 10°/min, then ramped to 240°C at 2°/min, and finally ramped to 290°C at 10°/min with a hold for 5 minutes. Capillary GC/ECD data were collected, archived in digital form, and processed using a PE-Nelson chromatography data system which includes the model 900 interface and version 4 of Turbochrom™ chromatography software running on an IBM-compatible 80486 microcomputer.

For mono-*ortho* PCB analyses, we used 6 levels of an AHH PCB standard (containing the 17 aryl hydrocarbon hydroxylase-inducing PCB congeners) for instrument calibration. Concentrations of these standards ranged from 7.9 ng/mL (1/500 dilution of stock AHH mPCB solution) to 158 ng/mL (1/25 dilution of stock solution). Octachloronaphthalene (OCN) was the instrumental internal standard (IIS), spiked at 51 ng/mL. To calculate the concentrations of the analytes, we used an internal standard method with OCN as the IIS. Recovery of the mono-*ortho* procedural internal standard (PIS), PCB congener 162, is reported in Table 7. All sample final concentrations are reported in nanograms per gram (ng/g) wet weight tissue for eggs and chicks (Table 5).

Results and Discussion:

Quality Control Procedures: The procedural blanks (PB) analyzed with each set of samples verified that solvents, reagents, lab-ware, and instrumentation did not add significant positive biases to the residue concentrations (Tables 2,4 and 5). Matrix effects were assessed in a similar manner by the analysis of aliquants of chicken egg tissue matrix blanks (MB). The matrix blanks for the non-carbon fractionated samples had a few positive residue biases for congener PCBs. Likewise, there were some positive biases for congener PCBs and mono-*ortho* PCBs in the

MBs that were carbon fractionated. Tables 2 and 4 also list the experimentally determined method detection limits (MDLs) and method quantitation limits (MQLs) for congener PCBs, determined from the procedural blanks according to the method outlined by Keith *et al.*(4,5). Since not all of the compounds analyzed showed positive responses, the average MDL and MQL were determined and used. The average MDL of the first set of congener PCBs (no carbon) was 0.4 ng/g; the average MQL was 1.2 ng/g (Table 2); for the second set (carbon fractionated) of congener PCBs, the MDL and MQL were 0.02 ng/g and 0.05 ng/g respectively (Table 4). For the mono-*ortho* PCBs MDL was 0.06 ng/g and MQL was 0.11 ng/g (Table 5).

Extraction efficiencies were monitored by the analysis of matrix spikes (MS) prepared from chicken eggs. PCBs (mixed Aroclors 1242, 1248, 1254, 1260 in a 1:1:1:1 ratio) were spiked into clean matrix samples at concentrations of 1000 ng/g and 400 ng/g (PHH sample set) total PCBs. Recoveries of total PCBs averaged 120% (Table 2) and 91% (Table 4). The recoveries of spiked recovery standards 030 and 204 in the samples are presented in Tables 3 and 6. Some were higher than expected, based on the external standard calibration and the results were corrected for the "Mock 100% PIS" standard analyzed with the samples. This comparison was more direct and brought the recoveries more in line with what was expected. The large dilutions which were necessary in the analysis of some of these samples may have contributed a bias toward high recoveries. Total method variability was assessed by analysis of triplicate aliquants of two samples: 11104 and 11105 (Table 2). The total variability for these samples averaged 6 $\pm$ 6%. Instrumental variability was checked by triplicate injections of some sample extracts. The gas chromatographic variability averaged 4 $\pm$ 4% for these samples. Aliquants of environmentally incorporated positive control tissue (PC), common carp from Saginaw Bay, were analyzed with the samples. The baseline data for our positive control tissue and the comparison with present data are shown in Tables 2,4 and 5 (6).

Residue Results: The PCB congener concentrations (Table 1) are reported in ng/g wet weight and were not corrected for PIS losses. The samples are listed according to their MSC Chemistry Division Data Base number and cross referenced to the field description. Percent lipid values were reported for all samples. Residue concentrations (ng/g) that were less than the MDL (0.4, 0.02, 0.06 ng/g) are listed as "< MDL value" and concentrations for compounds that are greater than the MDL and less than the MLQ (1.2, 0.04, 0.11 ng/g) are replaced by "< MQL value" in Tables 1, 2, 4, and 5.

REFERENCES

(1) Meadows, J.; 1991. NFCRC SOP: C5.143. "Extraction of PCBs, PCDDs, and PCDFs from tissue samples, and cleanup of the extracts in preparation for GC/ECD analysis for PCBs, then fractionation of the extracts on

dispersed carbon."

(2) Feltz, K. 1994. NFCRC SOP: C5.202. "Procedure for use of Automated Apparatus Employing Carbon Dispersed by C_{18} Columns to Produce Three PCB Fractions and a PCDD/PCDF Fraction."

(3) Zajicek, J.L.; 1991. NFCRC SOP: C5.154. "Capillary Gas Chromatography with Electron Capture Detection Procedure for Congener Specific Polychlorinated Biphenyl Analysis."

(4) Keith, L.H.; Crummet, W; Deegan, J., Jr; Libby, R.A.; Taylor, J.K.; and Wentler, G. 1983. "Principles of environmental analysis." Anal. Chem. 55: 2210-2218.

(5) Keith, L.H.; 1991. Environmental Sampling and Analysis. Lewis Publishers.

(6) unpublished baseline tracking data for congener PCBs in Saginaw Carp positive control.

Table 1. Congener PCBs Concentrations in Tree Swallow Chick and Egg Samples (ng/g) from Hudson River

MSC CHEMISTRY DATABASE #'s	Nest Box	FIELD ID	% Lipid	004,010	007,009	006	005,008	019	018	017,015	024,027
11090	419	Tree Swallow Egg NYFD/E1	8.1	< 0.4	< 0.4	< 0.4	< 1.2	2.8	7.2	23.4	10.3
11091	406	Tree Swallow Egg NYFD/E3	8.2	< 1.2	< 0.4	< 0.4	< 1.2	1.2	3.6	30.8	4.7
11092	305	Tree Swallow Egg NYFD/E6	7.1	14.9	< 1.2	1.9	11.9	25.0	85.1	96.7	46.4
11093*	327	Tree Swallow Egg NYFD/E7	7.1	77.5	3.0	10.8	99.8	64.2	270	344	157
11094	418	Tree Swallow Egg NYFD/E10	8.0	< 1.2	< 0.4	< 0.4	< 1.2	< 1.2	4.0	9.8	< 1.2
11095	332	Tree Swallow Egg NYFD/E12	7.7	< 1.2	< 0.4	< 0.4	< 1.2	< 1.2	4.7	24.6	4.0
11096	206	Tree Swallow Egg NYFD/E13	7.4	< 1.2	< 0.4	< 0.4	1.8	1.3	13.5	23.8	1.6
11097	113	Tree Swallow Egg NYFD/E16	7.3	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	6.7	< 0.4
11098	208	Tree Swallow Egg NYFD/E18	6.3	2.1	< 1.2	< 1.2	8.6	5.4	56.3	39.5	3.5
11099	221	Tree Swallow Egg NYFD/E19	6.6	17.7	< 1.2	1.3	12.8	5.8	39.3	50.1	3.3
11100	108	Tree Swallow Egg NYFD/E23	5.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 1.2	1.9	< 0.4
11101	101	Tree Swallow Egg NYFD/E29	8.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 1.2	1.4	< 0.4
11102	419	Tree Swallow Chick NYFD/C1	6.6	4.6	< 0.4	< 0.4	1.3	2.7	5.4	6.4	2.7
11103	332	Tree Swallow Chick NYFD/C12	9.3	221.1	34.0	28.1	239	215	1168	872	101
11104-A	221	Tree Swallow Chick NYFD/C15	8.5	26.2	10.1	4.1	48.0	51.2	559	298	24.0
11104-B		Tree Swallow Chick NYFD/C15	8.4	24.3	9.3	3.5	49.9	54.5	614	332	25.7
11104-C		Tree Swallow Chick NYFD/C15	8.4	24.6	9.2	3.4	47.0	52.3	575	308	24.4
11105-A	113	Tree Swallow Chick NYFD/C20	8.0	< 1.2	< 0.4	< 0.4	< 0.4	< 1.2	2.0	2.8	< 1.2
11105-B		Tree Swallow Chick NYFD/C20	7.9	< 1.2	< 0.4	< 0.4	< 0.4	< 1.2	1.7	2.6	< 1.2
11105-C		Tree Swallow Chick NYFD/C20	7.6	< 1.2	< 0.4	< 0.4	< 0.4	< 1.2	1.6	2.5	< 1.2

*Average of GC Replicates Note: These samples were not fractionated on carbon.
MDL = 0.4 ng/g
MQL = 1.2 ng/g

E = egg sample
C = chick sample

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Table 1. Congener PCBs Concentrations in Tree Swallow Chick and Egg Samples (ng/g) from Hudson River

MSC CHEMISTRY DATABASE #'s	016,032	029	026	025	031	028	020,033,053	051	022	045	046	052	049,043
11090	25.4	2.6	28.3	26.0	432	1188	90.4	15.2	8.2	< 1.2	2.3	1622	1256
11091	7.7	2.9	12.2	20.3	534	1666	101	13.6	3.0	< 1.2	1.3	2019	1543
11092	155	9.9	139	105	1267	2722	279	54.3	39.0	8.4	23.0	2907	2031
11093*	872	21.7	689	293	2270	6288	909	128	530	18.2	50.5	7412	5137
11094	4.0	< 1.2	4.5	8.6	50.7	160	7.7	1.2	4.2	< 1.2	< 1.2	161	134
11095	11.9	2.6	12.9	22.9	544	1742	< 1.2	13.1	4.2	< 1.2	2.0	1881	1412
11096	10.1	< 1.2	7.4	8.9	217	637	37.1	5.8	4.8	1.8	2.5	703	507
11097	< 1.2	< 1.2	< 1.2	2.1	151	558	21.9	1.7	< 0.4	< 0.4	2.1	657	436
11098	33.2	2.9	20.8	15.9	442	2144	102	9.5	16.7	6.4	7.1	2492	1798
11099	39.2	1.8	23.9	16.9	234	1224	54.7	7.5	20.2	3.5	4.2	1434	980
11100	< 0.4	< 0.4	< 0.4	1.4	28.5	223	< 1.2	< 0.4	< 0.4	< 0.4	< 0.4	260	161
11101	1.5	< 0.4	< 1.2	1.7	5.1	37.0	1.6	< 0.4	< 1.2	< 0.4	< 0.4	60.3	33.3
11102	9.6	< 0.4	9.5	3.7	17.4	33.5	9.2	3.5	3.7	< 1.2	< 1.2	61.6	51.9
11103	661	47.9	566	308	1702	4231	1291	175	862	178	145	4227	3634
11104–A	258	20.3	239	124	1091	2173	444	75.2	180	64.0	59.2	2330	1954
11104–B	284	20.4	256	134	1129	2545	481	81.8	192	66.5	60.6	2649	2205
11104–C	266	19.3	240	124	1116	2243	452	78.3	178	66.7	61.0	2465	2049
11105–A	1.5	< 0.4	< 1.2	1.6	5.0	31.4	4.6	< 1.2	< 1.2	< 1.2	< 1.2	53.9	37.5
11105–B	1.3	< 0.4	< 1.2	1.4	4.6	29.6	4.4	< 1.2	< 1.2	< 1.2	< 1.2	52.0	36.1
11105–C	1.3	< 0.4	< 1.2	1.4	4.0	27.9	4.2	< 1.2	< 1.2	< 1.2	< 1.2	49.4	34.1

*Average of GC Replicates
MDL = 0.4 ng/g
MQL = 1.2 ng/g

Table 1. Congener PCBs Concentrations in Tree Swallow Chick and Egg Samples (ng/g) from Hudson River

MSC CHEMISTRY DATABASE #'s	047	048	044	042	041	064	040	067	063	074	070,076	066,095,088	091
11090	929	125	129	351	105	312	7.1	41.0	149.2	768	789	1849	179
11091	1283	38.7	76.5	34.9	110	374	3.7	45.7	190.8	949	983	2268	217
11092	1265	320	680	853	504	760	47.0	94.8	240.2	1401	1949	3303	226
11093*	3427	1040	2462	3294	1219	1944	287	204	530	3332	3866	8045	621
11094	126	16.6	16.0	48.0	9.5	20.7	2.6	7.2	28.1	116	100	228	16.8
11095	1094	38.3	86.2	383	102	390	4.4	35.3	161.8	937	1044	2204	162
11096	265	27.1	50.5	195	40.5	129	4.8	13.1	51.6	323	427	801	50.5
11097	281	26.3	7.9	116	20.1	111	3.5	6.5	49.5	296	353	758	48.5
11098	1252	152	106	363	86.2	370	12.5	28.3	224.0	1280	1004	3043	221.6
11099	628	89.1	75.7	152	39.8	178	10.5	17.7	125.7	705	582	1671	116.7
11100	121	9.7	1.3	45.9	46.2	2.9	< 0.4	1.7	28.2	137	87.7	346	23.3
11101	19.0	3.8	4.1	12.4	2.2	5.9	< 1.2	1.4	5.7	23.0	28.4	74.9	6.2
11102	34.1	9.9	23.9	26.3	12.2	14.1	3.5	2.8	4.6	25.1	32.4	63.2	8.2
11103	1919	1273	2756	3426	820	1289	613	196	323	2354	2554	5031	329
11104-A	942	451	1011	1198	320	603	106	101	151	1190	1638	2662	196
11104-B	1075	485	1127	1395	368	682	113	104	162	1334	1842	3118	201
11104-C	997	443	1049	1171	360	603	107	100	148	1212	1680	2842	173
11105-A	22.0	7.9	12.5	15.0	5.4	8.1	1.8	1.3	4.6	22.2	19.7	60.5	4.7
11105-B	21.9	6.4	11.8	14.6	4.9	7.6	1.7	1.3	4.2	21.2	18.1	57.1	4.6
11105-C	20.1	6.8	11.1	14.9	4.7	7.1	1.6	< 1.2	4.4	20.1	17.1	54.2	4.3

*Average of GC Replicates
MDL = 0.4 ng/g
MQL = 1.2 ng/g

Table 1. Congener PCBs Concentrations in Tree Swallow Chick and Egg Samples (ng/g) from Hudson River

MSC CHEMISTRY DATABASE #'s	056,060	092	084	101,090	099	119	083	097	087	136	110	082	151
11090	285	198	16.6	711	525	36.1	8.7	131	279	17.8	449	17.2	67.9
11091	350	235	27.8	841	642	43.7	9.1	109	317	24.9	530	9.4	76.1
11092	606	260	76.4	1069	773	48.6	48.4	339	487	19.2	835	71.3	76.6
11093*	1726	672	196	2812	2002	119	89.1	1092	1182	45.4	2034	337	201
11094	41.0	31.1	1.9	107	96.5	6.7	1.8	17.3	30.5	6.5	50.6	5.2	12.2
11095	353	198	17.3	764	565	36.3	9.1	102	283	19.0	514	10.6	52.1
11096	137	64.5	4.1	281	188	9.6	3.6	40.0	111	6.9	176	5.3	17.1
11097	125	64.9	1.4	260	176	10.1	< 1.2	22.9	98.3	5.1	174	1.2	15.9
11098	513	257	21.6	1066	776	49.9	10.0	51.9	368	14.5	599	9.2	70.6
11099	292	157	14.2	639	445	23.8	5.0	34.7	184	7.9	324	9.0	38.5
11100	63.7	31.1	6.4	133	93.3	5.9	< 0.4	1.5	31.3	4.8	55.0	< 1.2	7.9
11101	13.6	8.7	< 0.4	44.2	23.8	1.4	< 0.4	6.9	12.5	7.4	18.1	2.2	3.6
11102	12.1	8.3	4.9	29.4	19.4	1.4	1.8	9.7	11.9	2.0	18.9	3.0	4.2
11103	1393	343	302	1720	1172	59.5	124	754	854	37.4	1206	288	94.7
11104–A	580	176	130	906	597	29.2	55.8	320	440	23.3	605	87.1	44.1
11104–B	628	199	146	999	655	31.2	61.5	351	472	23.0	656	92.3	48.4
11104–C	571	185	136	939	606	29.1	55.9	324	444	24.1	599	86.0	44.8
11105–A	11.4	6.2	2.4	29.3	17.8	< 1.2	< 1.2	6.8	10.7	< 1.2	16.4	1.8	2.0
11105–B	10.8	6.4	2.5	28.6	17.4	< 1.2	< 1.2	6.6	10.2	< 1.2	14.9	1.8	2.0
11105–C	10.2	6.0	2.3	27.1	16.5	< 1.2	< 1.2	6.2	9.7	< 1.2	13.3	1.7	1.9

*Average of GC Replicates
MDL = 0.4 ng/g
MQL = 1.2 ng/g

Table 1. Congener PCBs Concentrations in Tree Swallow Chick and Egg Samples (ng/g) from Hudson River

MSC CHEMISTRY DATABASE #'s	135,144,124	107	123,149	118	134	146	153	132	105	141	179	137	176
11090	71.1	58.0	271	459	5.0	59.6	161	< 0.4	331	46.8	28.9	28.6	5.0
11091	80.6	69.8	303	541	3.4	69.2	181	< 0.4	375	50.0	12.4	29.4	6.3
11092	96.2	79.5	278	735	3.5	71.4	201	< 0.4	542	60.5	5.4	39.7	8.2
11093*	208	199	841	1916	163	205	607	< 0.4	1269	125	45.4	101.9	19.6
11094	12.9	14.1	50.7	94.1	< 0.4	20.0	55.8	< 0.4	59.5	11.5	1.8	6.8	< 0.4
11095	62.8	60.6	230	515	42.7	54.2	149	< 0.4	341	35.3	14.8	25.1	6.1
11096	24.5	19.9	64.1	196	16.9	21.0	65.1	< 0.4	129	15.6	4.7	9.9	1.5
11097	21.0	21.1	80.4	186	15.3	19.3	58.7	< 0.4	123	13.2	3.6	9.3	< 0.4
11098	86.3	91.4	346	774	6.7	88.3	245	< 0.4	565	59.2	13.6	46.8	3.9
11099	51.0	49.1	195	464	40.3	50.1	146	< 0.4	305	32.1	9.4	24.1	5.0
11100	11.2	12.9	46.5	109	10.2	16.5	43.3	< 0.4	74.6	< 1.2	< 0.4	8.0	< 0.4
11101	4.5	4.7	20.1	40.2	< 0.4	12.9	34.2	< 0.4	23.3	4.4	< 1.2	4.3	< 1.2
11102	3.4	2.3	12.4	17.9	< 0.4	3.0	8.5	< 0.4	10.6	2.1	< 1.2	< 1.2	< 0.4
11103	116	128	299	1158	16.3	87.8	274	314	669	88.1	20.2	47.6	5.5
11104–A	68.5	66.0	205	618	5.5	44.2	147	< 0.4	415	48.6	10.0	26.5	6.6
11104–B	72.7	70.8	229	676	5.8	48.2	165	< 0.4	438	48.1	9.2	27.9	5.1
11104–C	67.2	64.2	207	592	5.7	43.8	148	< 0.4	395	43.7	11.9	24.9	5.3
11105–A	2.3	2.6	9.3	19.4	< 1.2	2.6	8.0	< 0.4	12.6	1.9	< 0.4	1.2	< 0.4
11105–B	2.2	2.2	8.7	18.2	< 1.2	2.5	7.6	< 0.4	11.4	1.9	< 1.2	< 1.2	< 0.4
11105–C	2.1	2.2	8.1	17.8	< 1.2	2.4	7.4	< 0.4	11.2	1.8	< 1.2	< 1.2	< 0.4

*Average of GC Replicates
MDL = 0.4 ng/g
MQL = 1.2 ng/g

Table 1. Congener PCBs Concentrations in Tree Swallow Chick and Egg Samples (ng/g) from Hudson River

MSC CHEMISTRY DATABASE #'s	157,201	172	180	193	191	200	170,190	199	196,203	208,195	194	Total-cPCBs
11090	15.9	4.4	91.3	3.8	1.8	1.6	31.4	16.8	13.7	5.4	8.1	15678
11091	16.0	5.1	92.9	5.9	3.0	1.6	35.6	19.7	16.0	5.8	9.4	18493
11092	19.8	5.2	106	4.4	2.8	1.2	43.5	15.9	16.1	5.3	10.6	29635
11093*	41.5	14.9	360	15.0	7.1	3.2	123	53.1	51.8	17.9	33.2	77346
11094	5.1	2.4	58.2	3.1	2.3	< 1.2	15.7	9.7	8.6	3.1	6.0	2370
11095	12.5	3.9	69.4	3.8	2.3	< 1.2	27.6	12.8	11.0	3.9	7.4	17591
11096	5.5	1.8	37.9	1.8	< 1.2	< 1.2	12.1	6.7	6.0	2.1	3.9	6548
11097	4.0	1.5	30.6	1.4	< 1.2	< 0.4	10.6	4.8	4.4	1.6	2.8	5724
11098	26.2	7.7	142	6.5	3.8	1.5	58.4	24.6	22.7	7.3	14.3	22888
11099	12.2	3.9	79.9	4.0	1.8	< 1.2	29.9	15.4	13.3	4.9	9.5	12923
11100	4.8	2.0	39.2	2.4	1.6	< 0.4	12.4	5.8	5.7	1.8	4.1	2566
11101	3.9	2.1	37.3	3.5	1.4	< 0.4	11.7	7.7	6.1	2.5	4.6	852
11102	< 1.2	< 0.4	3.8	< 0.4	< 0.4	< 0.4	1.5	< 1.2	< 1.2	< 0.4	< 1.2	721
11103	17.9	6.3	126	5.0	2.8	< 1.2	47.8	16.3	17.8	4.8	13.1	56770
11104-A	13.1	3.2	70.8	2.6	1.4	< 1.2	26.7	10.5	9.8	2.7	6.6	27063
11104-B	10.9	3.3	75.6	2.7	1.4	< 1.2	26.6	9.7	10.4	2.8	6.9	30195
11104-C	11.0	3.1	68.9	2.5	1.4	< 1.2	24.3	9.0	9.6	2.7	6.6	27691
11105-A	< 1.2	< 0.4	4.6	< 0.4	< 0.4	< 0.4	1.5	< 1.2	< 1.2	< 0.4	< 1.2	531
11105-B	< 1.2	< 0.4	4.2	< 0.4	< 0.4	< 0.4	1.4	< 1.2	< 1.2	< 0.4	< 0.4	512
11105-C	< 1.2	< 0.4	4.1	< 0.4	< 0.4	< 0.4	1.3	< 1.2	< 1.2	< 0.4	< 0.4	487

*Average of GC Replicates
MDL = 0.4 ng/g
MQL = 1.2 ng/g

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30096) QC Samples

MSC CHEMISTRY DATABASE #'s	FIELD ID	% Lipid	004,010	007,009	006	005,008	019	018	017,015	024,027	016,032	029	026	025
11104-A	Tree Swallow Chick NYFD/C15	8.5	26.2	10.1	4.1	48.0	51.2	559	298	24.0	258	20.3	239	124
11104-B	Tree Swallow Chick NYFD/C15	8.4	24.3	9.3	3.5	49.9	54.5	614	332	25.7	284	20.4	256	134
11104-C	Tree Swallow Chick NYFD/C15	8.4	24.6	9.2	3.4	47.0	52.3	575	308	24.4	266	19.3	240	124
AVERAGE			25.0	9.5	3.6	48.3	52.6	582	313	24.7	269	20.0	245	127
SD(N-1)			1.0	0.5	0.4	1.5	1.7	28	17	0.9	13	0.6	10	6
% RSD			4	5	11	3	3	5	5	4	5	3	4	5
11105-A	Tree Swallow Chick NYFD/C20	8.0	0.4	< 0.4	< 0.4	< 0.4	0.6	2.0	2.8	0.5	1.5	< 0.4	1.1	1.6
11105-B	Tree Swallow Chick NYFD/C20	7.9	0.5	< 0.4	< 0.4	< 0.4	0.6	1.7	2.6	0.5	1.3	< 0.4	0.9	1.4
11105-C	Tree Swallow Chick NYFD/C20	7.6	0.5	< 0.4	< 0.4	< 0.4	0.6	1.6	2.5	0.4	1.3	< 0.4	0.9	1.4
AVERAGE			0.4	< 0.4	< 0.4	< 0.4	0.6	1.7	2.7	0.5	1.4	< 0.4	0.9	1.5
SD(N-1)			0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.1	0.0	0.1	0.1
% RSD			10	22	35	9	2	12	6	4	9	18	11	8
11093 GCR1	Tree Swallow Egg NYFD/E7	7.1	79.3	3.3	10.6	101.6	63.4	270.7	339.0	156.1	868.5	21.5	692.6	289.8
11093 GCR2	Tree Swallow Egg NYFD/E7	7.1	82.1	2.7	12.0	105.4	68.6	288.2	361.8	165.4	916.1	22.7	726.2	302.8
11093 GCR3	Tree Swallow Egg NYFD/E7	7.1	71.0	3.0	9.7	92.5	60.5	252.0	331.5	149.0	831.5	21.0	649.0	287.0
AVERAGE			77.5	3.0	10.8	99.8	64.2	270.3	344.1	156.8	872.1	21.7	689.3	293.2
SD(N-1)			5.8	0.3	1.2	6.6	4.1	18.1	15.8	8.2	42.4	0.9	38.7	8.4
% RSD			7	10	11	7	6	7	5	5	5	4	6	3
MS 122094 GCR1	Matrix Spike, 353C Neg Cntl Bluegill	4.8	11.5	2.5	4.2	22.3	4.3	48.6	20.9	1.2	27.1	< 1.2	5.9	2.6
MS 122094 GCR2	Matrix Spike, 353C Neg Cntl Bluegill	4.8	11.7	2.5	4.3	22.8	4.4	50.3	21.4	1.3	27.9	< 1.2	5.9	2.6
MS 122094 GCR3	Matrix Spike, 353C Neg Cntl Bluegill	4.8	11.3	2.4	4.2	23.4	4.4	50.7	22.5	1.3	28.5	< 1.2	5.9	2.7
AVERAGE			11.5	2.4	4.2	22.9	4.4	49.8	21.6	1.3	27.8	< 1.2	5.9	2.6
SD(N-1)			0.2	0.1	0.1	0.6	0.1	1.1	0.8	0.0	0.7		0.0	0.1
% RSD			2	3	2	2	2	2	4	1	2		0	2
MS 122294	Matrix Spike, 353C Neg Cntl Bluegill	5.0	11.5	2.3	4.0	21.9	4.2	47.2	20.0	1.2	25.8	< 1.2	5.3	2.3
PC 122094	Saginaw Bay Carp Reference Material	13.2	2.8	< 1.2	2.9	3.7	4.1	100.0	35.9	3.2	45.5	< 0.4	93.7	21.5
PC 122294 GCR1	Saginaw Bay Carp Reference Material	12.6	3.4	< 1.2	2.8	3.6	4.6	91.0	33.7	3.1	43.2	< 0.4	82.9	17.2
PC 122294 GCR2	Saginaw Bay Carp Reference Material	12.6	3.1	< 1.2	5.9	3.5	4.7	94.9	34.5	3.2	44.9	< 0.4	86.7	17.3
PC 122294 GCR3	Saginaw Bay Carp Reference Material	12.6	2.6	< 1.2	2.8	3.2	4.5	93.3	34.1	3.0	44.1	< 0.4	84.5	17.0
AVERAGE			3.0	< 1.2	3.8	3.4	4.6	93.0	34.1	3.1	44.0	< 0.4	84.7	17.2
SD(N-1)			0.4		1.8	0.2	0.1	2.0	0.4	0.1	0.8		1.9	0.2
% RSD			14		48	6	2	2	1	2	2		2	1
PC Baseline	Positive Control Baseline	14.1	3.0	0.5	2.9	3.5	3.6	77.5	27.8	4.3	38.2	0.5	95.0	21.8
MB 122094	Matrix Blank, 353C Neg Cntl Bluegill	4.8	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 1.2	< 0.4	< 0.4	< 1.2	< 0.4	< 0.4	< 0.4
MB 122294	Matrix Blank, 353C Neg Cntl Bluegill	5.0	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 1.2	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30096) QC Samples

MSC CHEMISTRY DATABASE #'s	FIELD ID	% Lipid	004,010	007,009	006	005,008	019	018	017,015	024,027	016,032	029	026	025
PB 122094 GCR1	20g Na_2SO_4		0.00	0.00	0.00	0.07	0.25	0.75	0.45	0.05	0.77	0.00	0.00	0.00
PB 122094 GCR2	20g Na_2SO_4		0.00	0.00	0.00	0.07	0.26	0.80	0.32	0.06	0.82	0.00	0.06	0.04
PB 122294 GCR1	20g Na_2SO_4		0.00	0.00	0.00	0.00	0.17	0.45	0.28	0.03	0.29	0.00	0.05	0.06
PB 122294 GCR2	20g Na_2SO_4		0.00	0.04	0.00	0.00	0.12	0.39	0.20	0.02	0.28	0.00	0.05	0.00
AVERAGE			0.00	0.01	0.00	0.04	0.20	0.60	0.31	0.04	0.54	0.00	0.04	0.03
SD(N−1)			0.00	0.02	0.00	0.04	0.07	0.21	0.10	0.02	0.30	0.00	0.03	0.03
MDL=PB Avg + 3(PB SD)			0.00	0.08	0.00	0.16	0.27	0.83	0.42	0.07	1.18	0.00	0.11	0.12
MQL=PB Avg + 10(PB SD)			0.00	0.21	0.00	0.44	0.87	2.67	1.36	0.22	3.49	0.00	0.31	0.33

PC = Positive Control; MS = Matrix Spike; MB = Matrix Blank; PB = Procedure Blank

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30096) QC Samples

MSC CHEMISTRY DATABASE #'s	031	028	020,033,053	051	022	045	046	052	049,043	047	048	044	042	041	064	040	067
11104-A	1091	2173	444	75.2	180	64.0	59.2	2330	1954	942	451	1011	1198	320	603	106	101
11104-B	1129	2545	481	81.8	192	66.5	60.6	2649	2205	1075	485	1127	1395	368	682	113	104
11104-C	1116	2243	452	78.3	178	66.7	61.0	2465	2049	997	443	1049	1171	360	603	107	100
AVERAGE	1112	2320	459	78.4	183	65.7	60.3	2481	2070	1005	460	1062	1255	349	629	108	102
SD(N-1)	19	198	20	3.3	8	1.5	1.0	160	127	67	22	59	122	26	45	4	2
% RSD	2	9	4	4	4	2	2	6	6	7	5	6	10	7	7	3	2
11105-A	5.0	31.4	4.6	1.1	0.9	0.5	0.5	53.9	37.5	22.0	7.9	12.5	15.0	5.4	< 0.4	1.8	1.3
11105-B	4.6	29.6	4.4	1.0	0.8	0.5	0.5	52.0	36.1	21.9	6.4	11.8	14.6	4.9	7.6	1.7	1.3
11105-C	4.0	27.9	4.2	0.9	0.8	0.5	0.5	49.4	34.1	20.1	6.8	11.1	14.9	4.7	7.1	1.6	1.2
AVERAGE	4.5	29.6	4.4	1.0	0.8	0.5	0.5	51.8	35.9	21.3	7.0	11.8	14.8	5.0	4.9	1.7	1.3
SD(N-1)	0.5	1.7	0.2	0.1	0.1	0.0	0.0	2.2	1.7	1.0	0.8	0.7	0.2	0.3	4.2	0.1	0.1
% RSD	11	6	5	6	9	8	5	4	5	5	11	6	1	7	87	5	6
11093 GCR1	2362.2	6078.3	891.9	127.3	528.2	17.2	50.5	7344.9	5101.5	3479.8	1042.3	2448.7	3146.4	1227.6	1939.4	284.7	209.1
11093 GCR2	2375.0	6560.2	944.5	135.2	548.2	18.5	53.4	7851.9	5435.5	3441.5	1052.7	2601.2	3455.4	1180.5	2079.1	302.3	216.5
11093 GCR3	2073.0	6225.5	889.5	120.0	514.0	19.0	47.5	7039.5	4874.0	3359.1	1025.0	2337.0	3280.0	1248.5	1814.5	275.5	187.0
AVERAGE	2270.1	6288.0	908.6	127.5	530.1	18.2	50.5	7412.1	5137.0	3423.8	1040.0	2462.3	3293.9	1218.9	1944.3	287.5	204.2
SD(N-1)	170.8	246.9	31.1	7.6	17.2	0.9	2.9	410.3	282.5	61.7	14.0	132.6	155.0	34.8	132.3	13.6	15.3
% RSD	8	4	3	6	3	5	6	6	5	2	1	5	5	3	7	5	8
MS 122094 GCR1	19.8	28.1	31.4	2.4	11.0	8.6	4.1	61.2	38.0	11.9	18.0	39.8	29.2	13.7	17.9	8.2	1.3
MS 122094 GCR2	19.7	28.7	31.8	2.5	11.0	8.9	4.2	63.3	39.0	11.6	19.3	40.9	27.7	15.1	17.8	9.1	1.3
MS 122094 GCR3	20.0	30.3	32.8	2.4	11.3	9.0	4.3	65.6	40.3	11.5	20.7	42.1	29.9	15.4	18.4	8.4	1.3
AVERAGE	19.9	29.0	32.0	2.5	11.1	8.8	4.2	63.4	39.1	11.6	19.3	40.9	28.9	14.7	18.0	8.6	1.3
SD(N-1)	0.1	1.1	0.7	0.0	0.2	0.2	0.1	2.2	1.2	0.2	1.4	1.1	1.1	0.9	0.3	0.4	0.0
% RSD	1	4	2	2	1	2	2	3	3	2	7	3	4	6	2	5	1
MS 122294	18.2	25.7	28.4	2.2	9.6	7.8	3.6	56.1	34.2	10.4	16.7	35.0	23.1	14.9	13.4	7.3	< 1.2
PC 122094	38.0	70.4	42.7	14.6	10.1	28.9	11.1	443.3	433.0	177.8	83.4	258.8	210.9	126.5	106.6	49.7	5.1
PC 122294 GCR1	36.2	63.9	39.0	13.0	9.9	26.0	10.0	393.8	386.6	169.3	74.6	231.1	195.9	101.7	96.9	44.4	4.7
PC 122294 GCR2	37.3	64.8	40.6	13.9	9.8	27.4	10.5	417.4	405.6	169.9	70.3	242.1	200.1	103.9	101.3	46.3	4.8
PC 122294 GCR3	33.7	68.7	39.4	13.2	9.7	26.9	10.3	411.4	400.6	164.6	73.3	239.7	217.4	102.5	101.8	46.1	4.7
AVERAGE	35.8	65.8	39.7	13.4	9.8	26.8	10.3	407.5	397.6	167.9	72.7	237.6	204.5	102.7	100.0	45.6	4.7
SD(N-1)	1.9	2.5	0.8	0.4	0.1	0.7	0.3	12.3	9.9	2.9	2.2	5.8	11.4	1.2	2.7	1.0	0.1
% RSD	5	4	2	3	1	3	3	3	2	2	3	2	6	1	3	2	1
PC Baseline	38.8	61.3	35.2	13.6	10.1	25.1	9.8	433.7	457.7	330.8	47.2	252.8	194.3	122.9	108.1	51.7	7.4
MB 122094	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	2.0	< 1.2	< 1.2	< 0.4	< 1.2	< 1.2	< 1.2	< 1.2	< 0.4	< 0.4
MB 122294	< 0.4	< 1.2	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	2.2	< 1.2	< 1.2	< 0.4	< 1.2	< 1.2	< 0.4	< 0.4	< 0.4	< 0.4

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30096) QC Samples

MSC CHEMISTRY DATABASE #'s	031	028	020,033,053	051	022	045	046	052	049,043	047	048	044	042	041	064	040	067
PB 122094 GCR1	0.10	0.32	0.26	0.00	0.13	0.32	0.14	1.68	0.94	0.32	0.18	1.11	0.70	0.38	0.46	0.18	0.00
PB 122094 GCR2	0.12	0.29	0.28	0.07	0.11	0.32	0.13	1.83	0.98	0.34	0.18	1.11	0.48	0.52	0.41	0.19	0.00
PB 122294 GCR1	0.22	0.68	0.21	0.03	0.07	0.07	0.00	1.29	0.73	0.37	0.16	0.58	0.46	0.22	0.25	0.10	0.01
PB 122294 GCR2	0.21	0.65	0.19	0.03	0.07	0.07	0.00	1.29	0.74	0.39	0.14	1.00	0.54	0.22	0.25	0.10	0.11
AVERAGE	0.16	0.49	0.24	0.03	0.10	0.20	0.07	1.52	0.85	0.36	0.17	0.95	0.55	0.34	0.34	0.14	0.03
SD(N−1)	0.06	0.21	0.04	0.03	0.03	0.14	0.08	0.28	0.13	0.03	0.02	0.25	0.11	0.14	0.11	0.05	0.05
MDL=PB Avg + 3(PB SD)	0.25	0.83	0.17	0.11	0.12	0.58	0.31	1.10	0.52	0.12	0.08	1.01	0.44	0.58	0.43	0.20	0.21
MQL=PB Avg + 10(PB SD)	0.78	2.57	0.66	0.32	0.40	1.64	0.85	4.28	2.16	0.67	0.36	3.47	1.63	1.78	1.43	0.63	0.57

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30096) QC Samples

MSC CHEMISTRY DATABASE #'s	063	074	070,076	066,095,088	091	056,060	092	084	101,090	099	119	083	097	087	136	110
11104-A	151	1190	1638	2662	196	580	176	130	906	597	29.2	55.8	320.1	440.1	23.3	605.0
11104-B	162	1334	1842	3118	201	628	199	146	999	635	31.2	61.5	351.1	472.5	23.0	655.8
11104-C	148	1212	1680	2842	173	571	185	136	939	606	29.1	55.9	323.6	444.3	24.1	598.8
AVERAGE	154	1245	1720	2874	190	593	187	137	948	619	29.8	57.7	331.6	452.3	23.5	619.9
SD(N-1)	7	77	107	230	15	30	12	8	47	31	1.2	3.3	17.0	17.6	0.6	31.3
% RSD	5	6	6	8	8	5	6	6	5	5	4	6	5	4	2	5
11105-A	4.6	22.2	19.7	60.5	4.7	11.4	6.2	2.4	29.3	17.8	1.1	1.1	6.8	10.7	0.7	16.4
11105-B	4.2	21.2	18.1	57.1	4.6	10.8	6.4	2.5	28.6	17.4	1.2	1.0	6.6	10.2	0.7	14.9
11105-C	4.4	20.1	17.1	54.2	4.3	10.2	6.0	2.3	27.1	16.5	1.1	0.9	6.2	9.7	0.7	13.3
AVERAGE	4.4	21.1	18.3	57.3	4.5	10.8	6.2	2.4	28.3	17.2	1.1	1.0	6.5	10.2	0.7	14.8
SD(N-1)	0.2	1.1	1.3	3.2	0.2	0.6	0.2	0.1	1.1	0.7	0.1	0.1	0.3	0.5	0.0	1.6
% RSD	4	5	7	6	5	6	3	3	4	4	5	8	4	5	3	11
11093 GCR1	532.5	3301.4	3871.4	7873.0	615.1	1724.0	654.2	180.4	2765.2	1956.6	108.7	82.5	1072.6	1159.8	42.7	2029.4
11093 GCR2	553.6	3450.9	4030.8	8459.2	649.0	1797.1	708.5	215.4	2970.9	2117.4	128.3	94.9	1152.8	1232.7	46.6	2109.0
11093 GCR3	503.0	3244.0	3696.5	7803.0	598.5	1656.5	654.0	193.5	2699.5	1933.0	119.0	90.0	1050.0	1153.0	47.0	1964.5
AVERAGE	529.7	3332.1	3866.2	8045.1	620.8	1725.9	672.2	196.4	2811.9	2002.3	118.7	89.1	1091.8	1181.8	45.4	2034.3
SD(N-1)	25.4	106.8	167.2	360.4	25.7	70.3	31.4	17.7	141.6	100.3	9.8	6.3	54.0	44.2	2.4	72.4
% RSD	5	3	4	4	4	4	5	9	5	5	8	7	5	4	5	4
MS 122094 GCR1	1.6	16.6	39.8	71.9	8.0	13.0	9.2	13.4	54.6	20.9	< 1.2	2.7	15.8	22.8	10.1	35.1
MS 122094 GCR2	1.6	16.4	39.8	73.0	7.4	12.9	9.4	13.9	56.2	21.3	< 1.2	2.8	15.6	22.2	10.4	35.4
MS 122094 GCR3	1.6	17.2	41.7	78.6	8.3	13.3	10.1	14.4	58.6	22.3	< 1.2	2.8	16.6	24.1	11.0	36.4
AVERAGE	1.6	16.7	40.4	74.5	7.9	13.0	9.5	13.9	56.5	21.5	< 1.2	2.8	16.0	23.0	10.5	35.6
SD(N-1)	0.0	0.4	1.1	3.6	0.4	0.2	0.5	0.5	2.0	0.7		0.0	0.6	1.0	0.5	0.7
% RSD	0	3	3	5	6	2	5	4	4	3		2	4	4	4	2
MS 122294	1.3	14.0	34.4	63.7	6.4	10.7	8.4	12.1	50.0	19.0	< 1.2	2.4	13.7	19.4	9.3	30.8
PC 122094	25.1	156.0	96.9	496.5	76.3	51.5	76.3	80.8	368.4	272.5	17.0	33.0	152.4	157.5	20.2	222.0
PC 122294 GCR1	23.4	144.7	92.6	463.6	67.9	47.7	69.4	71.8	327.5	244.0	14.9	29.5	137.5	141.5	17.6	201.2
PC 122294 GCR2	23.9	147.1	94.2	478.5	71.1	47.8	73.6	75.6	345.4	250.0	15.9	30.8	137.6	144.3	19.2	208.3
PC 122294 GCR3	23.8	148.5	94.0	479.2	70.0	48.5	71.6	75.7	345.2	250.3	16.0	30.6	142.3	150.5	18.8	210.0
AVERAGE	23.7	146.8	93.6	473.8	69.7	48.0	71.5	74.3	339.3	248.1	15.6	30.3	139.1	145.4	18.5	206.5
SD(N-1)	0.3	1.9	0.9	8.8	1.6	0.4	2.1	2.2	10.3	3.5	0.6	0.7	2.8	4.6	0.8	4.7
% RSD	1	1	1	2	2	1	3	3	3	1	4	2	2	3	4	2
PC Baseline	33.9	131.3	81.1	425.8	81.8	43.7	83.6	84.4	360.3	328.1	20.0	46.8	166.6	164.3	36.2	231.8
MB 122094	< 0.4	< 1.2	< 1.2	1.9	< 0.4	< 0.4	< 1.2	< 0.4	3.0	2.1	< 0.4	< 0.4	< 1.2	< 1.2	< 0.4	1.4
MB 122294	< 0.4	< 1.2	< 1.2	2.1	< 0.4	< 0.4	< 1.2	< 1.2	3.3	2.3	< 0.4	< 0.4	< 1.2	< 1.2	< 0.4	1.6

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30096) QC Samples

MSC CHEMISTRY DATABASE #'s	063	074	070,076	066,095,088	091	056,060	092	084	101,090	099	119	083	097	087	136	110
PB 122094 GCR1	0.00	0.22	0.47	1.06	0.10	0.22	0.10	0.20	0.59	0.26	0.00	0.00	0.19	0.00	0.00	0.43
PB 122094 GCR2	0.02	0.21	0.45	1.07	0.10	0.17	0.07	0.20	0.61	0.27	0.00	0.02	0.18	0.25	0.06	0.43
PB 122294 GCR1	0.00	0.37	0.49	1.05	0.10	0.19	0.08	0.13	0.59	0.30	0.01	0.08	0.17	0.27	0.04	0.42
PB 122294 GCR2	0.00	0.39	0.46	1.01	0.37	0.20	0.07	0.14	0.61	0.31	0.01	0.09	0.18	0.29	0.04	0.42
AVERAGE	0.01	0.30	0.47	1.05	0.17	0.20	0.08	0.17	0.60	0.29	0.01	0.05	0.18	0.20	0.03	0.43
SD(N−1)	0.01	0.10	0.02	0.03	0.14	0.02	0.01	0.04	0.01	0.02	0.01	0.04	0.01	0.14	0.03	0.01
MDL=PB Avg + 3(PB SD)	0.04	0.38	0.07	0.11	0.54	0.08	0.06	0.15	0.05	0.10	0.02	0.18	0.03	0.54	0.10	0.02
MQL=PB Avg + 10(PB SD)	0.11	1.25	0.64	1.31	1.52	0.40	0.22	0.54	0.72	0.52	0.06	0.49	0.26	1.56	0.29	0.48

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30096) QC Samples

MSC CHEMISTRY DATABASE #'s	082	151	135,144,124	107	123,149	118	134	146	153	132	105	141	179	137	176	130	138
11104-A	87.1	44.1	68.5	66.0	205.0	618.5	5.5	44.2	147.0	< 0.4	414.5	48.6	10.0	26.5	6.6	22.9	329.8
11104-B	92.3	48.4	72.7	70.8	229.3	675.5	5.8	48.2	165.3	< 0.4	438.4	48.1	9.2	27.9	5.1	23.9	316.2
11104-C	86.0	44.8	67.2	64.2	207.4	592.3	5.7	43.8	148.0	< 0.4	395.2	43.7	11.9	24.9	5.3	18.9	296.7
AVERAGE	88.5	45.8	69.4	67.0	213.9	628.8	5.7	45.4	153.4	< 0.4	416.1	46.8	10.4	26.5	5.6	21.9	314.2
SD(N-1)	3.4	2.3	2.9	3.4	13.4	42.5	0.2	2.4	10.3	0.0	21.6	2.7	1.4	1.5	0.8	2.7	16.7
% RSD	4	5	4	5	6	7	3	5	7		5	6	13	6	15	12	5
11105-A	1.8	2.0	2.3	2.6	9.3	19.4	0.8	2.6	8.0	< 0.4	12.6	1.9	< 0.4	1.2	< 0.4	1.1	13.3
11105-B	1.8	2.0	2.2	2.2	8.7	18.2	0.6	2.5	7.6	< 0.4	11.4	1.9	0.5	1.1	< 0.4	1.1	12.8
11105-C	1.7	1.9	2.1	2.2	8.1	17.8	0.7	2.4	7.4	< 0.4	11.2	1.8	0.4	1.1	< 0.4	1.0	12.0
AVERAGE	1.7	2.0	2.2	2.3	8.7	18.4	0.7	2.5	7.7	< 0.4	11.7	1.9	< 0.4	1.1	< 0.4	1.1	12.7
SD(N-1)	0.1	0.1	0.1	0.2	0.6	0.8	0.1	0.1	0.3	0.0	0.8	0.1	0.3	0.1	0.0	0.0	0.6
% RSD	4	4	5	8	7	4	14	5	4		6	4	87	6	16	4	5
11093 GCR1	337.8	197.6	203.1	199.5	833.9	1876.8	161.6	203.1	605.7	< 0.4	1271.5	125.2	45.0	103.8	20.0	90.9	1215.3
11093 GCR2	350.6	209.1	218.6	195.8	876.2	1951.9	163.8	212.1	635.6	< 0.4	1307.5	129.4	44.8	103.0	16.8	83.5	1197.9
11093 GCR3	322.5	195.5	203.5	202.5	813.0	1918.5	164.5	200.0	579.0	< 0.4	1228.5	119.3	46.3	99.0	21.9	83.1	1129.0
AVERAGE	337.0	200.7	208.4	199.2	841.0	1915.7	163.3	205.1	606.8	< 0.4	1269.2	124.6	45.4	101.9	19.6	85.8	1180.7
SD(N-1)	14.1	7.3	8.8	3.4	32.2	37.6	1.5	6.3	28.3	0.0	39.6	5.1	0.8	2.6	2.6	4.4	45.6
% RSD	4	4	4	2	4	2	1	3	5		3	4	2	3	13	5	4
MS 122094 GCR1	5.5	16.4	11.7	2.2	43.4	24.8	3.6	6.9	24.6	45.5	10.8	10.7	9.7	2.2	2.9	3.1	45.2
MS 122094 GCR2	5.5	16.9	11.9	2.0	44.0	24.3	3.6	7.1	25.7	49.0	9.3	11.1	9.6	2.2	3.1	3.0	44.1
MS 122094 GCR3	5.7	17.6	12.3	2.2	46.3	26.2	3.7	7.3	23.9	59.5	11.3	11.5	10.1	2.2	3.3	3.0	45.9
AVERAGE	5.5	17.0	11.9	2.1	44.6	25.1	3.6	7.1	24.7	51.3	10.4	11.1	9.8	2.2	3.1	3.1	45.1
SD(N-1)	0.1	0.6	0.3	0.1	1.5	0.9	0.1	0.2	0.9	7.3	1.0	0.4	0.3	0.0	0.2	0.0	0.9
% RSD	2	4	3	4	3	4	2	3	4	14	10	4	3	1	7	2	2
MS 122294	4.8	15.0	10.5	1.9	39.6	21.4	3.3	6.3	23.4	35.8	8.9	9.5	8.9	1.9	2.8	2.4	39.1
PC 122094	55.2	44.8	33.1	33.5	134.3	222.3	11.7	41.7	97.5	110.7	90.3	28.0	17.8	14.2	6.9	17.4	199.7
PC 122294 GCR1	50.0	39.7	28.7	30.1	120.9	209.8	13.4	38.6	89.1	100.9	85.6	25.3	15.5	13.2	6.1	16.2	190.6
PC 122294 GCR2	50.0	41.8	30.9	29.5	127.3	203.9	14.6	39.4	92.9	102.3	81.6	25.8	17.6	13.6	5.9	16.7	189.2
PC 122294 GCR3	51.0	41.5	30.3	29.1	126.3	216.5	13.7	40.3	93.2	120.2	79.6	26.6	15.8	13.5	5.5	16.3	188.4
AVERAGE	50.3	41.0	30.0	29.6	124.9	210.1	13.9	39.4	91.7	107.8	82.3	25.9	16.3	13.4	5.8	16.4	189.4
SD(N-1)	0.6	1.2	1.1	0.5	3.4	6.3	0.7	0.8	2.3	10.8	3.1	0.7	1.1	0.2	0.3	0.3	1.1
% RSD	1	3	4	2	3	3	5	2	2	10	4	3	7	2	5	2	1
PC Baseline	58.2	40.5	24.6	42.9	109.0	47.4	86.7	47.9	117.4	91.5	15.8	28.9	15.7	21.3	6.2	22.8	189.0
MB 122094	< 0.4	< 1.2	< 0.4	< 0.4	1.8	2.2	< 0.4	< 1.2	2.7	< 0.4	< 1.2	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	4.1
MB 122294	< 0.4	< 1.2	< 1.2	< 0.4	1.9	2.2	< 0.4	< 1.2	2.2	1.5	< 1.2	< 0.4	< 0.4	< 0.4	< 0.4	< 1.2	5.1

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30096) QC Samples

MSC CHEMISTRY DATABASE #'s	082	151	135,144,124	107	123,149	118	134	146	153	132	105	141	179	137	176	130	138
PB 122094 GCR1	0.07	0.07	0.09	0.00	0.26	0.23	0.00	0.04	0.00	0.75	0.00	0.00	0.07	0.00	0.00	0.00	4.00
PB 122094 GCR2	0.06	0.07	0.06	0.01	0.26	0.20	0.00	0.04	0.19	0.40	0.07	0.03	0.03	0.00	0.00	0.07	2.10
PB 122294 GCR1	0.06	0.09	0.07	0.01	0.23	0.44	0.06	0.04	0.19	0.29	0.17	0.04	0.04	0.02	0.03	0.03	2.65
PB 122294 GCR2	0.06	0.08	0.09	0.03	0.24	0.45	0.00	0.03	0.19	0.28	0.17	0.03	0.03	0.04	0.03	0.03	2.11
AVERAGE	0.06	0.08	0.08	0.01	0.25	0.33	0.02	0.04	0.14	0.43	0.10	0.03	0.04	0.02	0.02	0.03	2.72
SD(N−1)	0.01	0.01	0.02	0.01	0.01	0.13	0.03	0.01	0.10	0.22	0.08	0.02	0.02	0.02	0.02	0.03	0.89
MDL=PB Avg + 3(PB SD)	0.02	0.04	0.06	0.05	0.06	0.53	0.12	0.02	0.38	0.88	0.33	0.07	0.08	0.08	0.07	0.11	3.58
MQL=PB Avg + 10(PB SD)	0.11	0.17	0.23	0.14	0.40	1.66	0.31	0.09	1.09	2.63	0.93	0.20	0.23	0.21	0.19	0.32	11.66

322960

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30096) QC Samples

MSC CHEMISTRY DATABASE #'s	158	129	178	182,187	183	128	167	185	174	177	202,171,156	157,201	172	180	193	191	200
11104-A	31.4	19.4	6.9	41.4	20.7	73.1	12.3	2.3	22.0	14.9	62.0	13.1	3.2	70.8	2.6	1.4	< 1.2
11104-B	33.6	19.1	7.8	45.8	22.1	77.3	12.4	2.1	23.5	15.7	63.0	10.9	3.3	75.6	2.7	1.4	< 1.2
11104-C	31.3	18.2	7.1	40.4	20.2	70.6	11.2	2.2	21.7	14.8	57.8	11.0	3.1	68.9	2.5	1.4	< 1.2
AVERAGE	32.1	18.9	7.3	42.5	21.0	73.7	12.0	2.2	22.4	15.1	61.0	11.6	3.2	71.8	2.6	1.4	< 1.2
SD(N-1)	1.3	0.6	0.5	2.9	1.0	3.4	0.7	0.1	1.0	0.5	2.8	1.2	0.1	3.4	0.1	0.0	
% RSD	4	3	7	7	5	5	6	4	4	3	5	11	4	5	3	0	
11105-A	1.2	0.6	1.5	2.9	< 0.4	3.5	0.6	< 0.4	1.1	0.9	3.0	0.5	< 0.4	4.6	< 0.4	< 0.4	< 0.4
11105-B	1.2	0.6	0.5	2.5	1.1	3.2	0.6	< 0.4	1.1	0.9	2.7	0.5	< 0.4	4.2	< 0.4	< 0.4	< 0.4
11105-C	1.2	0.6	0.5	2.5	1.1	3.1	0.6	< 0.4	1.0	0.8	2.6	0.6	< 0.4	4.1	< 0.4	< 0.4	< 0.4
AVERAGE	1.2	0.6	0.8	2.7	0.8	3.3	0.6	< 0.4	1.1	0.9	2.7	0.5	< 0.4	4.3	< 0.4	< 0.4	< 0.4
SD(N-1)	0.0	0.0	0.6	0.2	0.5	0.2	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.2	0.0	0.0	0.0
% RSD	2	2	70	9	57	6	3	5	5	5	7	10	0	6	16	14	25
11093 GCR1	117.4	55.7	42.3	224.5	98.8	269.3	49.9	5.9	86.7	85.7	241.2	41.1	15.0	361.9	13.9	7.1	3.1
11093 GCR2	113.2	57.2	44.3	235.4	103.1	277.3	49.6	6.0	90.6	89.7	243.8	43.3	15.6	371.2	15.4	7.1	3.3
11093 GCR3	120.5	52.2	48.5	222.0	94.5	263.5	53.0	5.5	82.5	79.5	236.5	40.1	14.0	346.0	15.5	7.0	3.0
AVERAGE	117.0	55.0	45.0	227.3	98.8	270.0	50.8	5.8	86.6	85.0	240.5	41.5	14.9	359.7	15.0	7.1	3.2
SD(N-1)	3.7	2.6	3.2	7.1	4.3	6.9	1.9	0.3	4.0	5.2	3.7	1.6	0.8	12.7	0.9	0.1	0.2
% RSD	3	5	7	3	4	3	4	4	5	6	2	4	6	4	6	1	5
MS 122094 GCR1	4.8	2.4	3.1	18.6	9.3	8.4	1.6	1.5	14.0	8.5	12.3	2.1	1.6	24.6	1.3	< 1.2	< 1.2
MS 122094 GCR2	4.8	2.4	3.2	19.2	9.5	8.5	1.6	1.5	14.3	8.7	12.3	2.0	1.6	25.1	1.3	< 1.2	< 1.2
MS 122094 GCR3	4.8	2.4	3.3	20.5	10.1	9.0	1.8	1.6	15.1	9.1	12.8	2.1	1.7	26.8	1.4	< 1.2	< 1.2
AVERAGE	4.8	2.4	3.2	19.4	9.7	8.6	1.7	1.6	14.5	8.8	12.5	2.1	1.6	25.5	1.3	< 1.2	< 1.2
SD(N-1)	0.0	0.0	0.1	1.0	0.4	0.3	0.1	0.1	0.6	0.3	0.3	0.0	0.0	1.2	0.1		
% RSD	1	1	3	5	5	4	6	4	4	4	2	1	3	5	4		
MS 122294	4.1	2.1	2.8	17.3	8.4	7.4	1.4	1.4	12.7	7.7	10.8	1.8	1.4	22.1	< 1.2	< 1.2	< 1.2
PC 122094	17.4	10.8	11.1	89.7	30.7	44.7	13.9	3.4	28.1	27.9	59.8	26.8	7.3	85.3	5.4	3.6	3.3
PC 122294 GCR1	15.6	9.9	9.8	82.6	27.8	40.6	12.8	3.0	20.8	23.7	49.5	19.4	6.1	76.4	4.8	2.7	2.3
PC 122294 GCR2	15.8	10.1	10.3	84.1	27.9	41.6	13.0	3.2	24.6	25.6	51.7	20.1	6.4	79.4	4.9	2.7	2.5
PC 122294 GCR3	17.0	9.9	10.1	82.2	28.6	42.5	13.3	3.1	24.0	26.8	52.7	18.9	6.3	81.0	4.9	2.6	2.3
AVERAGE	16.2	9.9	10.1	83.0	28.1	41.6	13.0	3.1	23.1	25.4	51.3	19.5	6.3	78.9	4.9	2.7	2.4
SD(N-1)	0.8	0.1	0.3	1.0	0.5	0.9	0.3	0.1	2.0	1.6	1.6	0.6	0.2	2.4	0.1	0.1	0.1
% RSD	5	1	3	1	2	2	2	2	9	6	3	3	3	3	2	2	4
PC Baseline	19.7	20.6	8.0	88.0	34.0	55.0	10.4	6.3	25.3	26.9	29.3	13.0	9.5	81.0	7.8	6.3	5.4
MB 122094	< 0.4	< 0.4	< 1.2	2.4	< 0.4	< 1.2	< 0.4	< 0.4	< 0.4	< 0.4	< 1.2	< 0.4	< 0.4	1.7	< 0.4	< 0.4	< 0.4
MB 122294	< 1.2	< 0.4	< 1.2	2.7	< 1.2	< 1.2	< 0.4	< 0.4	< 0.4	< 0.4	< 1.2	< 0.4	< 0.4	1.5	< 0.4	< 0.4	< 0.4

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30096) QC Samples

MSC CHEMISTRY DATABASE #'s	158	129	178	182,187	183	128	167	185	174	177	202,171,156	157,201	172	180	193	191	200
PB 122094 GCR1	0.43	0.00	0.00	0.08	0.10	0.07	0.00	0.01	0.03	0.02	0.03	0.00	0.00	0.11	0.00	0.00	0.00
PB 122094 GCR2	0.18	0.00	0.00	0.08	0.10	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00
PB 122294 GCR1	0.06	0.01	0.28	0.11	0.04	0.09	0.01	0.00	0.03	0.02	0.00	0.00	0.00	0.12	0.00	0.00	0.00
PB 122294 GCR2	0.00	0.00	0.26	0.11	0.03	0.07	0.01	0.00	0.03	0.00	0.00	0.00	0.05	0.18	0.00	0.00	0.23
AVERAGE	0.17	0.00	0.14	0.10	0.07	0.07	0.01	0.00	0.02	0.01	0.01	0.00	0.01	0.13	0.00	0.00	0.06
SD(N−1)	0.19	0.01	0.16	0.02	0.04	0.02	0.01	0.01	0.02	0.01	0.02	0.00	0.03	0.04	0.00	0.00	0.12
MDL=PB Avg + 3(PB SD)	0.76	0.02	0.62	0.07	0.15	0.07	0.02	0.02	0.06	0.05	0.06	0.00	0.10	0.15	0.00	0.00	0.46
MQL=PB Avg + 10(PB SD)	2.07	0.05	1.70	0.27	0.44	0.23	0.06	0.05	0.17	0.13	0.16	0.00	0.26	0.51	0.00	0.00	1.21

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30095) QC Samples

MSC CHEMISTRY DATABASE #'s	170,190	199	196,203	208,195	194	Total cPCBs	% Recovery
11104-A	26.7	10.5	9.8	2.7	6.6	27062	
11104-B	26.6	9.7	10.4	2.8	6.9	30195	
11104-C	24.3	9.0	9.6	2.7	6.6	27690	
AVERAGE	25.9	9.7	9.9	2.7	6.7	28316	
SD(N-1)	1.4	0.8	0.4	0.0	0.2	1657	
% RSD	5	8	4	1	3	6	
11105-A	1.5	0.6	0.6	< 0.4	0.4	530	
11105-B	1.4	0.6	0.6	< 0.4	< 0.4	510	
11105-C	1.3	0.6	0.5	< 0.4	< 0.4	486	
AVERAGE	1.4	0.6	0.6	< 0.4	< 0.4	510	
SD(N-1)	0.1	0.0	0.0	0.0	0.0	22	
% RSD	7	6	5	5	4	4	
11093 GCR1	119.1	50.3	51.8	17.8	33.1	76628	
11093 GCR2	127.4	52.9	54.1	18.5	34.0	80772	
11093 GCR3	122.5	56.0	49.5	17.5	32.5	74639	
AVERAGE	123.0	53.1	51.8	17.9	33.2	77346	
SD(N-1)	4.2	2.9	2.3	0.5	0.7	3129	
% RSD	3	5	4	3	2	4	
MS 122094 GCR1	12.1	5.0	5.3	2.0	4.2	1246	125
MS 122094 GCR2	12.2	5.2	5.4	2.1	4.3	1265	127
MS 122094 GCR3	13.0	5.8	5.7	2.2	4.4	1326	133
AVERAGE	12.4	5.3	5.5	2.1	4.3	1279	128
SD(N-1)	0.5	0.4	0.2	0.1	0.1	42	
% RSD	4	7	4	3	3	3	
MS 122294	10.7	4.6	4.9	1.9	3.8	1110	111
PC 122094	38.3	23.4	22.3	9.4	16.5	6465	
PC 122294 GCR1	35.0	20.9	19.9	8.4	14.9	5858	
PC 122294 GCR2	35.5	21.7	20.7	8.8	15.4	6037	
PC 122294 GCR3	36.2	22.5	21.2	8.8	15.4	6067	
AVERAGE	35.6	21.7	20.6	8.6	15.2	5988	
SD(N-1)	0.6	0.8	0.6	0.2	0.3	113	
% RSD	2	4	3	2	2	2	
PC Baseline	38.4	23.0	22.8	10.9	18.2	6082	
MB 122094	< 1.2	< 1.2	< 0.4	< 0.4	< 0.4	46	
MB 122294	< 1.2	< 1.2	< 0.4	< 0.4	< 0.4	52	

Table 2. Hudson River Tree Swallow Eggs and Chicks (WU 30098) QC Samples

MSC CHEMISTRY DATABASE #'s	170,190	199	196,203	208,195	194	Total cPCBs	
PB 122094 GCR1	0.08	3.27	0.00	0.12	0.00	23	
PB 122094 GCR2	2.70	0.00	0.00	0.16	0.03	21	
PB 122294 GCR1	0.02	0.01	0.00	0.11	0.00	16	
PB 122294 GCR2	0.01	1.22	0.00	0.11	0.01	18	
AVERAGE	0.70	1.13	0.00	0.13	0.01	20	
SD(N−1)	1.33	1.54	0.00	0.02	0.01	3	
MDL=PB Avg + 3(PB SD)	5.33	6.16	0.00	0.10	0.06	12	AVG MDL= 0.4
MQL=PB Avg + 10(PB SD)	14.02	16.53	0.00	0.36	0.15	50	AVG MQL= 1.2

Table 3. PIS Recoveries for Hudson River Tree Swallow Chicks and Eggs

MSC CHEMISTRY DATABASE #'s	FIELD ID	030 (ng/g)	030 % REC	204 (ng)	204 % REC
11090	Tree Swallow Egg NYFD/E1	150.4	82	159.8	87
11091	Tree Swallow Egg NYFD/E3	159.7	87	162.8	89
11092	Tree Swallow Egg NYFD/E6	157.1	86	162.5	89
11094	Tree Swallow Egg NYFD/E10	125.8	69	126.7	69
11095	Tree Swallow Egg NYFD/E12	130.9	71	179.3	98
11096	Tree Swallow Egg NYFD/E13	126.1	69	166.5	91
11097	Tree Swallow Egg NYFD/E16	115.5	63	165.6	90
11098	Tree Swallow Egg NYFD/E18	141.8	77	173.9	95
11099	Tree Swallow Egg NYFD/E19	139.5	76	174.6	95
11100	Tree Swallow Egg NYFD/E23	89.9	49	111.4	61
11101	Tree Swallow Egg NYFD/E29	98.4	54	131.0	71
11102	Tree Swallow Chick NYFD/C1	16.2	9	17.2	9
11103	Tree Swallow Chick NYFD/C12	220.6	120	229.1	125
11104–A	Tree Swallow Chick NYFD/C15	221.5	106	226.6	109
11104–B	Tree Swallow Chick NYFD/C15	191.4	104	220.3	120
11104–C	Tree Swallow Chick NYFD/C15	202.3	110	215.1	117
11105–A	Tree Swallow Chick NYFD/C20	129.9	62	129.1	62
11105–B	Tree Swallow Chick NYFD/C20	148.6	81	143.0	78
11105–C	Tree Swallow Chick NYFD/C20	118.2	64	118.7	65
11093 GCR1	Tree Swallow Egg NYFD/E7	193.3	105	209.0	114
11093 GCR2	Tree Swallow Egg NYFD/E7	191.6	105	199.8	109
11093 GCR3	Tree Swallow Egg NYFD/E7	180.6	99	204.3	111
AVERAGE		188.5	103	204.4	112
MS 122095 GCR1	353C Neg Control Bluegill	127.8	70	140.0	76
MS 122095 GCR2	353C Neg Control Bluegill	134.4	73	148.2	81
MS 122095 GCR3	353C Neg Control Bluegill	140.3	77	157.2	86
AVERAGE		134.2	73	148.5	81
MS 122294	353C Neg Control Bluegill	130.4	71	126.9	69
PC 122094	Sag Bay Carp Ref Material	161.5	88	182.5	100
PC 122294 GCR1	Sag Bay Carp Ref Material	149.5	82	168.9	92
PC 122294 GCR2	Sag Bay Carp Ref Material	155.6	85	177.0	97
PC 122294 GCR3	Sag Bay Carp Ref Material	155.9	85	176.2	96
AVERAGE		153.6	84	174.0	95
MB 122094	353C Neg Control Bluegill	127.8	70	134.8	74
MB 122294	353C Neg Control Bluegill	112.1	61	120.7	66
PB 122094 GCR1	20g Na_2SO_4	121.5	66	127.5	70
PB 122094 GCR2	20g Na_2SO_4	132.7	72	135.9	74
PB 122294 GCR1	20g Na_2SO_4	92.1	50	99.0	54
PB 122294 GCR2	20g Na_2SO_4	91.7	50	99.3	54

Table 4. Congener PCB Concentrations (ng/g) in Tree Swallow Chicks and QC--Carbon Fractionated

Sample Name	Field ID	Sample Matrix	% Lipid	004,010	007,009	006	005,008	019	018	017,015	024,027	016,032
11106	NYFO/C6	Tree Swallow Chick (25g)	9.2	276.6	39.7	26.8	247.4	187.3	1298.8	886.6	82.1	837.2
11107	NYFO/C9	Tree Swallow Chick (25g)	9.0	13.8	0.7	0.9	7.0	5.0	29.4	53.4	23.9	76.1
11108	NYFO/C11	Tree Swallow Chick (25g)	7.1	23.7	8.7	5.3	51.5	72.4	619.5	448.6	40.1	484.5
11109	NYFO/C23	Tree Swallow Chick (25g)	8.5	0.6	< 0.05	< 0.02	0.2	< 0.02	2.4	3.4	0.5	1.6
PC 110394 GCR1	Sag Carp Ref Material	Carp Tissue	14.3	2.2	0.3	2.6	2.6	3.2	69.3	24.6	2.5	32.9
PC 110394 GCR2	Sag Carp Ref Material	Carp Tissue	14.3	2.0	0.3	2.6	2.3	3.1	65.8	23.7	2.5	31.7
PC 110394 GCR3	Sag Carp Ref Material	Carp Tissue	14.3	2.0	0.3	2.4	2.6	3.0	63.0	22.3	2.4	30.8
AVG				2.1	0.3	2.5	2.5	3.1	66.0	23.6	2.5	31.8
SD(N-1)				0.1	0.0	0.1	0.2	0.1	3.1	1.2	0.1	1.0
% RSD				6	4	4	8	3	5	5	3	3
PC 110994	Sag Carp Ref Material	Carp Tissue	14.4	2.0	0.3	2.6	2.6	3.4	75.7	27.1	2.8	36.9
PC Baseline			**14.1**	**3.0**	**0.5**	**2.9**	**3.5**	**3.6**	**77.5**	**27.8**	**4.3**	**38.2**
MS 110994 GCR1	Neg Cntl 353C	Bluegill Tissue	4.3	4.0	0.8	1.4	6.9	1.4	15.7	5.8	0.4	8.5
MS 110994 GCR2	Neg Cntl 353C	Bluegill Tissue	4.3	3.7	0.8	1.3	6.5	1.3	14.4	5.4	0.4	8.0
MS 110994 GCR3	Neg Cntl 353C	Bluegill Tissue	4.3	3.5	0.8	1.3	6.5	1.3	13.7	5.3	0.4	7.7
AVG				3.7	0.8	1.3	6.6	1.3	14.6	5.5	0.4	8.1
SD(N-1)				0.2	0.0	0.0	0.2	0.1	1.0	0.3	0.0	0.4
% RSD				7	3	3	4	5	7	5	4	5
MS 110394	Neg Cntl 353C	Bluegill Tissue	4.6	3.53	0.78	1.38	6.88	1.24	14.36	5.43	0.36	8.01
MB 110394	Neg Cntl 353C	Bluegill Tissue	4.6	< 0.02	< 0.02	< 0.02	0.07	< 0.02	0.05	< 0.05	< 0.02	< 0.05
MB 110994	Neg Cntl 353C	Bluegill Tissue	4.3	0.19	< 0.05	< 0.05	0.12	< 0.02	0.08	< 0.05	< 0.02	0.07
PB 110394 GCR1	Procedureal Blank	100g Na_2SO_4		0.00	0.03	0.00	0.00	0.00	0.01	0.02	0.00	0.00
PB 110394 GCR2	Procedureal Blank	100g Na_2SO_4		0.00	0.02	0.00	0.01	0.00	0.00	0.01	0.00	0.00
PB 110994 GCR1	Procedureal Blank	100g Na_2SO_4		0.00	0.02	0.00	0.01	0.00	0.01	0.03	0.00	0.00
PB 110994 GCR2	Procedureal Blank	100g Na_2SO_4		0.00	0.02	0.05	0.00	0.00	0.01	0.01	0.00	0.00
AVG				0.00	0.02	0.01	0.01	0.00	0.01	0.02	0.00	0.00
SD(N-1)				0.00	0.01	0.03	0.01	0.00	0.01	0.01	0.00	0.00
MDL = PB Avg + 3(PB SD)	(Method Detection Limit)			0.00	0.04	0.09	0.02	0.00	0.02	0.05	0.00	0.00
MQL = PB Avg + 10(PB SD)	(Method Quantitation Limit)			0.00	0.07	0.26	0.06	0.01	0.06	0.11	0.00	0.00

Note: These samples 11106-11109 were run through carbon procedure with a different set of samples.

PB= Procedure Blank; MB = Matrix Blank; MS = Matrix Spike; PC = Positive Control

Table 4. Congener PCB Concentrations (ng/g) in Tree Swallow Chicks and QC--Carbon Fractionated

Sample Name	029	026	025	031	028	020,033,053	051	022	045	046	052	049,043	047	048
11106	51.5	690.8	333.0	1820.1	4270.4	1468.4	177.6	867.9	173.2	152.7	4528.7	3569.4	1919.1	1210.0
11107	3.8	109.8	51.5	196.2	548.6	99.5	47.0	41.0	8.5	4.4	905.5	757.3	495.8	140.8
11108	28.2	400.7	179.9	1247.0	2682.6	642.4	132.8	308.5	65.6	108.4	2869.1	2423.1	471.2	< 0.02
11109	< 0.05	0.9	1.5	3.1	10.8	2.9	0.9	1.0	0.8	0.4	32.4	22.7	13.4	4.7
PC 110394 GCR1	0.0	78.9	16.2	30.0	51.4	28.8	12.4	8.1	22.3	7.9	375.4	366.6	172.5	46.9
PC 110394 GCR2	0.0	79.3	16.3	29.8	51.5	28.2	11.7	7.7	21.4	7.6	359.4	352.7	162.1	53.9
PC 110394 GCR3	0.0	81.2	17.0	29.5	52.9	27.5	11.5	8.1	21.1	7.5	354.7	347.2	158.1	47.7
AVG	0.0	79.8	16.5	29.8	51.9	28.2	11.9	8.0	21.6	7.7	363.1	355.5	164.3	49.5
SD(N-1)	0.0	1.2	0.5	0.3	0.8	0.6	0.5	0.2	0.6	0.2	10.9	10.0	7.4	3.8
% RSD	0	2	3	1	2	2	4	3	3	3	3	3	5	8
PC 110994	2.3	92.2	18.9	36.2	60.1	33.2	14.2	9.4	25.8	9.4	424.0	415.3	199.9	48.8
PC Baseline	0.5	95.0	21.8	38.8	61.3	35.2	13.6	10.1	25.1	9.8	433.7	457.7	330.8	47.2
MS 110994 GCR1	0.2	1.8	0.8	6.4	8.0	9.3	0.8	3.3	2.6	1.2	18.7	11.3	3.5	5.3
MS 110994 GCR2	0.2	1.7	0.8	6.1	7.9	9.0	0.7	3.3	2.4	1.2	17.4	10.7	3.4	5.1
MS 110994 GCR3	0.2	1.7	0.8	5.9	8.0	8.8	0.7	3.3	2.3	1.1	16.6	10.2	3.3	4.9
AVG	0.2	1.8	0.8	6.2	8.0	9.1	0.7	3.3	2.4	1.2	17.6	10.7	3.4	5.1
SD(N-1)	0.0	0.0	0.0	0.3	0.1	0.3	0.0	0.0	0.1	0.1	1.0	0.6	0.1	0.2
% RSD	0	2	1	4	1	3	6	1	5	5	6	5	4	5
MS 110394	0.15	1.75	0.80	6.07	8.24	9.25	0.73	3.32	2.35	1.12	17.17	10.53	3.25	5.09
MB 110394	< 0.02	< 0.05	0.10	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.02	< 0.02	0.31	0.09	0.09	< 0.02
MB 110994	< 0.02	< 0.05	0.10	0.06	0.12	0.06	< 0.02	< 0.05	< 0.05	< 0.05	0.50	0.20	0.14	< 0.05
PB 110394 GCR1	0.00	0.01	0.02	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.03	0.01	0.02	0.00
PB 110394 GCR2	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.03	0.02	0.03	0.00
PB 110994 GCR1	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.03	0.01	0.02	0.00
PB 110994 GCR2	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.03	0.01	0.02	0.00
AVG	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.03	0.01	0.02	0.00
SD(N-1)	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00
MDL = PB Avg + 3(PB SD)	0.00	0.02	0.04	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.03	0.03	0.04	0.00
MQL = PB Avg + 10(PB SD)	0.00	0.06	0.10	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.03	0.06	0.07	0.00

Table 4. Congener PCB Concentrations (ng/g) in Tree Swallow Chicks and QC--Carbon Fractionated

Sample Name	044	042	041	064	040	067	063	074	070,076	066,095,088	091	056,060	092	084
11106	2993.6	2855.1	1033.2	1243.2	534.6	196.9	285.9	2108.3	2981.6	4907.8	317.9	1267.4	351.1	326.7
11107	351.3	381.2	209.7	188.9	46.9	41.0	76.7	381.1	474.7	958.4	118.0	155.7	118.4	57.2
11108	1774.6	1723.4	699.6	851.5	186.6	122.2	177.8	1140.8	2106.5	2956.2	229.1	< 0.02	213.5	169.2
11109	11.5	12.9	7.0	4.0	2.3	0.4	1.4	1.2	4.3	8.9	2.5	0.8	3.0	1.5
PC 110394 GCR1	221.6	204.6	106.1	91.2	37.6	4.2	23.9	99.7	71.0	393.1	69.1	32.1	66.0	61.9
PC 110394 GCR2	216.4	199.0	107.5	88.3	37.2	3.5	21.7	101.1	73.7	377.9	68.8	31.5	64.0	57.7
PC 110394 GCR3	212.9	200.9	111.3	86.0	37.1	3.5	22.2	102.0	73.3	383.9	63.6	34.8	66.0	68.2
AVG	217.0	201.5	108.3	88.5	37.3	3.7	22.6	100.9	72.6	385.0	67.2	32.8	65.4	62.6
SD(N-1)	4.4	2.9	2.7	2.6	0.3	0.4	1.1	1.2	1.5	7.6	3.1	1.8	1.2	5.3
% RSD	2	1	2	3	1	11	5	1	2	2	5	5	2	8
PC 110994	257.0	231.2	133.1	103.5	44.6	4.4	24.7	112.5	87.1	444.4	79.6	38.6	80.9	81.0
PC Baseline	252.8	194.3	122.9	108.1	51.7	7.4	33.9	131.3	81.1	425.8	81.8	43.7	83.6	84.4
MS 110994 GCR1	11.9	7.2	5.9	4.7	2.5	0.2	0.4	0.6	5.4	11.5	2.4	1.1	3.2	4.3
MS 110994 GCR2	11.3	6.6	4.8	4.6	2.4	0.2	0.2	0.6	5.3	10.9	2.4	0.9	3.0	4.1
MS 110994 GCR3	10.8	6.3	4.7	4.4	2.4	0.2	0.3	0.5	5.3	10.5	2.3	1.0	2.9	3.9
AVG	11.3	6.7	5.1	4.5	2.4	0.2	0.3	0.5	5.3	10.9	2.4	1.0	3.0	4.1
SD(N-1)	0.5	0.5	0.7	0.2	0.1	0.0	0.1	0.0	0.1	0.5	0.1	0.1	0.1	0.2
% RSD	5	7	13	3	3	10	19	3	1	4	3	12	4	4
MS 110394	11.08	6.74	4.73	4.70	2.38	0.19	0.30	0.66	5.95	11.01	2.28	1.02	2.94	3.98
MB 110394	0.07	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.02	< 0.02	0.14	0.31	0.17	< 0.02	0.27	< 0.02
MB 110994	0.16	0.10	0.08	0.11	< 0.05	< 0.05	< 0.02	< 0.05	0.18	0.45	0.23	< 0.02	0.37	< 0.02
PB 110394 GCR1	0.05	0.03	0.01	0.03	0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.00	0.01	0.01
PB 110394 GCR2	0.04	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.04	0.01	0.00	0.00	0.01
PB 110994 GCR1	0.02	0.01	0.01	0.03	0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.00	0.01	0.01
PB 110994 GCR2	0.04	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.00	0.01	0.01
AVG	0.04	0.02	0.01	0.02	0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.00	0.01	0.01
SD(N-1)	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
MDL = PB Avg + 3(PB SD)	0.08	0.05	0.02	0.05	0.00	0.02	0.00	0.00	0.01	0.05	0.01	0.00	0.02	0.01
MQL = PB Avg + 10(PB SD)	0.16	0.12	0.06	0.14	0.00	0.05	0.00	0.00	0.01	0.08	0.01	0.00	0.06	0.01

Table 4. Congener PCB Concentrations (ng/g) in Tree Swallow Chicks and QC--Carbon Fractionated

Sample Name	101,090	099	119	083	097	087	136	110	082	151	135,144,124	107	123,149	118
11106	1729.2	1205.5	59.5	124.4	802.3	877.6	33.5	1040.6	298.0	75.4	60.0	100.9	245.6	32.3
11107	427.7	304.7	19.5	22.7	161.3	191.4	20.0	250.8	44.6	46.1	31.0	27.7	160.0	5.6
11108	1091.6	712.3	36.9	67.2	528.9	640.0	24.9	710.7	178.5	42.5	42.5	60.2	177.3	16.1
11109	16.5	9.5	0.5	0.9	5.3	4.8	0.4	6.1	1.4	0.8	0.7	0.2	3.6	0.1
PC 110394 GCR1	300.7	233.1	14.9	33.9	138.9	145.4	12.4	195.6	51.1	33.6	20.0	20.9	101.8	3.2
PC 110394 GCR2	291.8	222.6	14.7	33.4	136.8	144.5	11.8	193.2	49.6	32.4	18.7	19.7	97.4	2.8
PC 110394 GCR3	306.7	237.7	16.0	33.4	135.9	142.4	11.8	191.6	51.1	32.2	19.2	19.2	97.7	3.2
AVG	299.7	231.1	15.2	33.6	137.2	144.1	12.0	193.5	50.6	32.7	19.3	19.9	99.0	3.1
SD(N-1)	7.5	7.7	0.7	0.3	1.6	1.5	0.3	2.0	0.9	0.8	0.6	0.9	2.5	0.2
% RSD	3	3	5	1	1	1	3	1	2	2	3	4	2	6
PC 110994	369.9	281.6	18.9	41.7	162.3	173.3	13.8	231.8	60.9	40.2	23.9	23.7	120.0	3.7
PC Baseline	**360.3**	**328.1**	**20.0**	**46.8**	**166.6**	**164.3**	**36.2**	**231.8**	**58.2**	**40.5**	**24.6**	**42.9**	**109.0**	**47.4**
MS 110994 GCR1	17.5	7.3	0.4	0.9	5.2	7.3	3.3	10.9	1.8	5.4	3.3	0.1	14.3	0.1
MS 110994 GCR2	16.5	7.0	0.3	0.9	4.9	7.0	3.0	10.5	1.8	5.1	3.1	0.1	13.7	0.1
MS 110994 GCR3	16.0	6.8	0.3	0.8	4.8	7.0	2.9	10.3	1.8	4.9	3.0	0.1	13.0	0.1
AVG	16.7	7.0	0.3	0.9	5.0	7.1	3.1	10.6	1.8	5.1	3.1	0.1	13.6	0.1
SD(N-1)	0.8	0.3	0.1	0.0	0.2	0.2	0.2	0.3	0.0	0.2	0.1	0.0	0.7	0.0
% RSD	5	4	18	4	4	3	5	3	2	4	5	4	5	0
MS 110394	16.24	6.78	0.27	0.81	4.93	7.09	3.06	10.45	1.78	4.96	3.07	0.15	13.45	0.06
MB 110394	1.49	1.18	< 0.05	< 0.05	0.33	0.53	< 0.02	0.67	< 0.02	0.29	0.10	< 0.02	0.86	< 0.02
MB 110994	2.06	1.58	< 0.05	< 0.05	0.44	0.73	< 0.02	0.96	< 0.02	0.33	0.13	< 0.02	1.15	< 0.02
PB 110394 GCR1	0.04	0.03	0.00	0.01	0.02	0.02	0.00	0.03	0.01	0.00	0.01	0.00	0.03	0.00
PB 110394 GCR2	0.04	0.03	0.00	0.00	0.01	0.02	0.00	0.04	0.01	0.00	0.01	0.00	0.03	0.00
PB 110994 GCR1	0.04	0.03	0.01	0.00	0.01	0.01	0.00	0.03	0.01	0.00	0.00	0.00	0.02	0.00
PB 110994 GCR2	0.04	0.02	0.00	0.00	0.01	0.01	0.00	0.03	0.00	0.00	0.01	0.00	0.02	0.00
AVG	0.04	0.03	0.00	0.00	0.01	0.02	0.00	0.03	0.01	0.00	0.01	0.00	0.03	0.00
SD(N-1)	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.00
MDL = PB Avg + 3(PB SD)	0.04	0.04	0.02	0.02	0.03	0.03	0.00	0.05	0.02	0.00	0.02	0.00	0.04	0.00
MQL = PB Avg + 10(PB SD)	0.04	0.08	0.05	0.05	0.06	0.07	0.00	0.08	0.06	0.00	0.06	0.00	0.08	0.00

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Table 4. Congener PCB Concentrations (ng/g) in Tree Swallow Chicks and QC--Carbon Fractionated

Sample Name	134	146	153	132	105	141	179	137	176	130	138	158	129	178	182,187
11106	14.5	69.7	211.2	213.4	22.8	70.2	7.3	42.1	2.0	32.0	410.8	31.3	32.4	10.4	58.1
11107	5.7	47.0	112.5	136.9	< 0.02	27.1	10.3	17.0	2.5	21.0	211.2	14.4	11.9	12.4	53.7
11108	6.9	40.4	135.2	189.0	< 0.02	52.7	5.1	26.4	< 0.02	18.4	283.9	29.2	26.2	6.8	37.7
11109	< 0.02	1.7	4.3	1.9	< 0.02	1.0	0.1	0.6	< 0.05	0.6	6.6	0.6	0.3	0.3	1.7
PC 110394 GCR1	9.2	35.8	90.8	113.7	< 0.02	21.8	12.6	13.8	3.8	17.2	168.3	15.3	10.4	9.5	71.7
PC 110394 GCR2	6.9	37.1	91.9	100.4	< 0.02	19.1	9.6	13.5	2.5	16.4	163.4	12.2	8.6	8.7	74.3
PC 110394 GCR3	5.8	35.7	89.8	102.6	< 0.02	21.8	11.0	13.9	2.7	18.0	165.7	15.4	9.4	9.1	69.5
AVG	7.3	36.2	90.8	105.6	< 0.02	20.9	11.0	13.7	3.0	17.2	165.8	14.3	9.5	9.1	71.8
SD(N-1)	1.7	0.8	1.0	7.1	0.0	1.6	1.5	0.2	0.7	0.8	2.5	1.8	0.9	0.4	2.4
% RSD	24	2	1	7	0	7	14	2	24	5	1	13	9	4	3
PC 110994	6.7	43.3	113.4	118.1	< 0.02	23.7	13.3	16.6	3.1	20.4	198.5	15.3	10.9	10.9	86.0
PC Baseline	86.7	47.9	117.4	91.5	15.8	28.9	15.7	21.3	6.2	22.8	189.0	19.7	20.6	8.0	88.0
MS 110994 GCR1	< 0.02	2.5	9.0	13.0	< 0.02	3.6	3.2	0.8	1.1	1.0	15.4	1.5	0.8	1.1	7.2
MS 110994 GCR2	< 0.02	2.4	8.7	13.0	< 0.02	3.6	3.0	0.7	1.0	0.9	14.5	1.3	0.8	1.0	7.0
MS 110994 GCR3	< 0.02	2.4	8.6	11.9	< 0.02	3.5	2.8	0.8	0.9	1.0	14.5	1.5	0.8	1.0	6.8
AVG	< 0.02	2.4	8.8	12.6	< 0.02	3.6	3.0	0.8	1.0	1.0	14.8	1.4	0.8	1.0	7.0
SD(N-1)	0.0	0.1	0.2	0.7	0.0	0.1	0.2	0.0	0.1	0.0	0.5	0.1	0.0	0.0	0.2
% RSD	0	3	2	5	0	2	7	5	8	4	4	6	3	3	3
MS 110394	< 0.02	2.38	8.84	11.91	< 0.02	3.61	2.76	0.77	0.96	1.01	14.71	1.51	0.79	1.02	6.69
MB 110394	< 0.02	0.44	1.40	0.43	< 0.02	0.19	0.07	0.15	0.05	0.14	2.08	0.15	< 0.05	0.15	1.57
MB 110994	< 0.02	0.61	1.88	0.70	< 0.02	0.31	0.07	0.20	0.06	0.18	2.72	0.21	0.06	0.19	1.97
PB 110394 GCR1	0.00	0.01	0.02	0.04	0.00	0.00	0.00	0.01	0.00	0.01	0.08	0.01	0.00	0.00	0.02
PB 110394 GCR2	0.00	0.01	0.02	0.03	0.00	0.00	0.00	0.01	0.00	0.01	0.08	0.01	0.00	0.00	0.01
PB 110994 GCR1	0.00	0.01	0.02	0.04	0.00	0.01	0.00	0.01	0.00	0.02	0.14	0.02	0.01	0.00	0.02
PB 110994 GCR2	0.00	0.01	0.02	0.03	0.00	0.00	0.00	0.01	0.00	0.01	0.10	0.01	0.00	0.00	0.02
AVG	0.00	0.01	0.02	0.04	0.00	0.00	0.00	0.01	0.00	0.01	0.10	0.01	0.00	0.00	0.02
SD(N-1)	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.03	0.01	0.00	0.00	0.01
MDL = PB Avg + 3(PB SD)	0.00	0.01	0.02	0.05	0.00	0.02	0.00	0.01	0.00	0.03	0.18	0.03	0.02	0.00	0.03
MQL = PB Avg + 10(PB SD)	0.00	0.01	0.02	0.09	0.00	0.05	0.00	0.01	0.00	0.06	0.38	0.06	0.05	0.00	0.07

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Table 4. Congener PCB Concentrations (ng/g) in Tree Swallow Chicks and QC--Carbon Fractionated

Sample Name	183	128	167	185	174	177	202,171,156	157,201	172	180	193	191	200	170,190
11106	29.4	95.6	< 0.02	3.7	30.8	22.7	21.7	2.6	5.7	93.6	4.6	2.9	1.2	40.4
11107	11.9	34.2	< 0.02	1.9	19.7	16.1	12.4	1.5	3.4	47.2	2.3	0.9	1.4	20.0
11108	19.9	61.3	< 0.02	2.9	22.8	15.4	14.8	1.8	3.4	62.9	3.0	1.6	1.1	28.0
11109	< 0.02	1.1	< 0.02	0.1	0.4	0.4	0.5	0.1	0.2	3.1	0.2	0.1	< 0.05	0.8
PC 110394 GCR1	24.9	29.3	< 0.02	2.6	18.1	21.0	19.7	12.8	5.1	68.2	3.8	2.3	2.1	29.7
PC 110394 GCR2	26.1	29.6	< 0.02	2.7	17.6	20.9	20.5	12.9	5.1	67.9	4.1	3.1	2.8	29.8
PC 110394 GCR3	23.7	29.9	< 0.02	2.7	18.4	21.0	20.6	12.9	5.2	68.8	4.3	3.3	2.7	30.1
AVG	24.9	29.6	< 0.02	2.6	18.0	21.0	20.2	12.8	5.1	68.3	4.0	2.9	2.5	29.9
SD(N-1)	1.2	0.3	0.0	0.1	0.4	0.1	0.5	0.1	0.1	0.4	0.3	0.5	0.4	0.2
% RSD	5	1	0	3	2	0	2	1	1	1	6	18	15	1
PC 110994	28.5	37.2	< 0.02	3.5	22.3	25.8	25.0	15.0	6.2	83.0	4.8	3.5	3.3	37.2
PC Baseline	34.0	55.0	10.4	6.3	25.3	26.9	29.3	13.0	9.5	81.0	7.8	6.3	5.4	38.4
MS 110994 GCR1	3.9	2.3	< 0.02	0.5	4.4	2.8	2.1	0.3	0.5	8.4	0.4	0.3	0.3	4.0
MS 110994 GCR2	3.8	2.3	< 0.02	0.5	4.3	2.7	2.0	0.3	0.5	8.3	0.5	0.3	0.3	4.0
MS 110994 GCR3	3.7	2.3	< 0.02	0.5	4.2	2.7	2.0	0.3	0.5	8.1	0.4	0.3	0.3	3.9
AVG	3.8	2.3	< 0.02	0.5	4.3	2.7	2.0	0.3	0.5	8.3	0.4	0.3	0.3	4.0
SD(N-1)	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
% RSD	2	1	0	2	3	3	2	7	2	1	9	9	2	1
MS 110394	3.99	2.26	< 0.02	0.49	4.34	2.73	2.01	0.33	0.49	8.19	0.44	0.33	0.30	3.84
MB 110394	< 0.02	0.27	< 0.02	< 0.05	0.17	0.21	0.20	< 0.05	0.08	0.96	0.09	< 0.05	< 0.02	0.33
MB 110994	< 0.02	0.38	< 0.02	< 0.05	0.21	0.29	0.30	< 0.05	0.10	1.32	0.10	< 0.05	< 0.02	0.45
PB 110394 GCR1	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.03	0.00	0.00	0.00	0.00
PB 110394 GCR2	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.00
PB 110994 GCR1	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.01	0.00	0.01
PB 110994 GCR2	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.02	0.00	0.01
AVG	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.03	0.00	0.01	0.00	0.01
SD(N-1)	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.01
MDL = PB Avg + 3(PB SD)	0.03	0.01	0.00	0.00	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.04	0.00	0.02
MQL = PB Avg + 10(PB SD)	0.07	0.01	0.00	0.00	0.00	0.05	0.06	0.00	0.06	0.03	0.00	0.10	0.00	0.06

Table 4. Congener PCB Concentrations (ng/g) in Tree Swallow Chicks and QC--Carbon Fractionated

Sample Name	199	196,203	208,195	194	Total cPCBs	Total mPCBs	Total PCBs	
11106	14.9	15.4	4.3	10.9	54832	2996	57828	
11107	12.5	8.6	3.5	5.7	9779	871	10650	
11108	9.8	9.9	2.8	6.5	31120	2453	33573	
11109	0.4	0.4	0.1	0.3	244	26	270	
PC 110394 GCR1	17.4	16.7	6.9	12.9	5032	454	5486	
PC 110394 GCR2	17.7	16.6	6.2	13.0	4894	497	5391	
PC 110394 GCR3	17.2	16.5	6.0	13.0	4923	641	5564	
AVG	17.4	16.6	6.4	13.0	4950	531	5480	
SD(N-1)	0.3	0.1	0.5	0.1	73	98	87	
% RSD	1	1	7	0	1	18	2	
PC 110994	21.6	20.7	7.6	16.0	5872	596	6468	
PC Baseline	23.0	22.8	10.9	18.2	6082	500	6582	
								% Rec
MS 110994 GCR1	1.8	1.8	0.6	1.4	353	22	375	94
MS 110994 GCR2	1.7	1.8	0.6	1.4	336	23	359	90
MS 110994 GCR3	1.7	1.7	0.6	1.4	326	29	355	89
AVG	1.7	1.8	0.6	1.4	338	25	363	91
SD(N-1)	0.0	0.0	0.0	0.0	14	4		
% RSD	2	2	2	0	4	14		
MS 110394	1.67	1.75	0.61	1.33	335	25	360	90
MB 110394	0.26	0.18	0.08	0.15	17	3.9	21	
MB 110994	0.33	0.25	0.10	0.20	24	4.0	28	
PB 110394 GCR1	0.00	0.00	0.00	0.00	0.83	0.11	1	
PB 110394 GCR2	0.00	0.00	0.00	0.00	0.74	0.12	1	
PB 110994 GCR1	0.01	0.00	0.00	0.01	0.87	0.12	1	
PB 110994 GCR2	0.01	0.00	0.00	0.00	0.77	0.13	1	
AVG	0.01	0.00	0.00	0.00	0.80	0.12		
SD(N-1)	0.01	0.00	0.00	0.01	0.06	0.01		
MDL = PB Avg + 3(PB SD)	0.02	0.00	0.00	0.02	AVG MDL=	0.02		
MQL = PB Avg + 10(PB SD)	0.06	0.00	0.00	0.05	AVG MQL=	0.05		

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Table 5. Mono-o-PCB concentrations (ng/g) in Tree Swallow Eggs and Chicks, Plus QC Samples (WU 30096)

Sample Name	Sample Matrix	Grams Extracted	% Lipid	123	118	114	105	167	156	157	189	Total mPCBs
11106	Tree Swallow Chick	25	9.2	31.61	1815.42	85.23	961.56	28.62	54.75	17.1	2.17	2996
11107	Tree Swallow Chick	25	9.0	9.17	560.15	22.88	234.27	13.31	22.82	7.49	1.26	871
11108	Tree Swallow Chick	25	7.1	25.31	1489.07	66.71	794.56	21.06	42.75	12.13	1.53	2453
11109	Tree Swallow Chick	25	8.5	0.35	16.06	0.75	7.07	0.71	0.92	0.29	< 0.11	26
PC 110394 GCR1	Carp Tissue	25		4.8	311.3	10.8	99.4	9.9	12.1	3.6	1.9	454
PC 110394 GCR2	Carp Tissue	25		5.3	343.3	12.1	107.7	10.4	12.6	3.6	2.0	497
PC 110394 GCR3	Carp Tissue	25		5.9	452.3	13.2	137.2	11.9	14.6	3.6	2.5	641
AVG:				5.3	369.0	12.0	114.8	10.7	13.1	3.6	2.1	531
SD(N-1):				0.6	73.9	1.2	19.9	1.0	1.3	0.0	0.3	98
% RSD:				11	20	10	17	9	10	1	15	18
PC 110994	Carp Tissue	25		6.2	407.6	13.9	132.9	12.5	15.6	4.8	2.2	596
PC Baseline	Carp Tissue			4.1	329.4	10.8	120.4	12.4	16.1	4.6	2.6	500
MS 110994 GCR1	Bluegill Tissue	25		0.2	13.7	0.4	5.4	0.8	1.2	0.3	0.2	22
MS 110994 GCR2	Bluegill Tissue	25		0.2	14.5	0.4	5.7	0.8	1.3	0.3	0.2	23
MS 110994 GCR3	Bluegill Tissue	25		0.2	18.5	0.5	6.6	0.9	1.5	0.4	0.2	29
AVG:				0.2	15.5	0.5	5.9	0.8	1.3	0.3	0.2	25
SD(N-1):				0.0	2.5	0.1	0.7	0.1	0.1	0.0	0.0	4
% RSD:				14	16	12	11	8	11	11	7	14
MS 110394	Bluegill Tissue	25		0.2	15.7	0.5	6.0	0.8	1.4	0.3	0.2	25
MB 110394	Bluegill Tissue	25		< 0.06	2.57	< 0.11	0.76	0.25	0.14	< 0.06	< 0.06	3.9
MB 110994	Bluegill Tissue	25		< 0.06	2.67	< 0.11	0.81	0.18	0.17	< 0.11	< 0.06	4.0
PB 110394 GCR1	100g Na_2SO_4			0.00	0.08	0.00	0.03	0.00	0.00	0.00	0.00	0.11
PB 110394 GCR2	100g Na_2SO_4			0.00	0.09	0.00	0.03	0.00	0.00	0.00	0.00	0.12
PB 110994 GCR1	100g Na_2SO_4			0.00	0.09	0.00	0.02	0.00	0.01	0.00	0.00	0.12
PB 110994 GCR2	100g Na_2SO_4			0.00	0.10	0.00	0.02	0.00	0.01	0.00	0.00	0.13
AVG:				0.00	0.09	0.00	0.03	0.00	0.01	0.00	0.00	0.12
SD(N-1):				0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.01
MDL = PB Avg +				0.00	0.11	0.00	0.04	0.00	0.02	0.00	0.00	AVG MDL= 0.06
MDL = PB Avg +				0.00	0.17	0.00	0.08	0.00	0.06	0.00	0.00	AVG MQL= 0.11

USDI, NBS, MSC, 10-Jul-95, File=FTSWMPCB.WK3

Table 6. Procedural Recovery Data for the Hudson River Tree Swallows

Sample Name	I–030 (total ng)	Percent Recovery	Corrected Recovery [a]	I–204 (total ng)	Percent Recovery	Corrected Recovery [a]
11106	425.9	85	87	436.1	87	89
11107	408.0	82	83	466.1	93	95
11108	414.1	83	85	442.3	88	90
11109	297.1	59	61	390.2	78	80
PC 110394 GCR1	352.6	71	72	415.0	83	85
PC 110394 GCR2	370.7	74	76	393.4	79	80
PC 110394 GCR3	392.8	79	80	477.6	96	97
PC 110994	297.5	59	61	393.3	79	80
MS 110394	321.0	64	66	380.3	76	78
MS 110994 GCR1	312.3	62	64	349.3	70	71
MS 110994 GCR2	333.1	67	68	393.0	79	80
MS 110994 GCR3	336.9	67	69	401.4	80	82
MB 110394	307.6	62	63	384.2	77	78
MB 110994	308.9	62	63	360.0	72	73
PB 110394 GCR1	286.7	57	59	421.1	84	86
PB 110394 GCR2	313.2	63	64	488.0	98	100
PB 110994 GCR1	297.5	60	61	345.4	69	70
PB 110994 GCR2	325.7	65	66	388.3	78	79
MOCK 100% Spiking Mix	488.7	98	100	489.6	98	100

[a]Corrected for Mock 100% amount

USDI, NBS, MSC, 10–Jul–95/FILE=MAHFCPIS.WK3

Table 7. Recoveries of Mono-ortho Procedural Spike in Tree Swallow Egg Samples

Sample Name	162 (total ng)	Percent Recovery	Corrected Recovery[a]
11106	45.56	89	74
11107	47.68	93	78
11108	45.29	89	74
11109	39.15	77	64
PC 110394 GCR1	38.47	75	63
PC 110394 GCR2	42.8	84	70
PC 110394 GCR3	52.93	104	86
PC 110994	38.36	75	62
MS 110394	35.55	70	58
MS 110994 GCR1	30.77	60	50
MS 110994 GCR2	32.7	64	53
MS 110994 GCR3	39.94	78	65
MB 110394	37.79	74	62
MB 110994	30.39	60	49
PB 110394 GCR1	31.29	61	51
PB 110394 GCR2	37.14	73	60
PB 110994 GCR1	32.86	64	53
PB 110994 GCR2	41.44	81	67
MOCK 100% Spiking Mix	59.44	117	100

[a] Corrected for Mock 100% amount

Table 1. Congener PCBs Concentrations in Tree Swallow Chick and Egg Samples (ng/g) from Hudson River

MSC CHEMISTRY DATABASE #'s	130	138	158	129	178	182,187	183	128	167	185	174	177	202,171,156
11090	30.8	331	30.6	14.8	15.6	73.5	26.1	80.1	13.3	2.6	29.6	26.3	67.0
11091	26.7	360	33.9	13.5	17.8	81.8	28.4	88.7	14.6	2.9	33.3	29.4	74.2
11092	37.1	414	45.9	23.0	15.3	73.6	32.0	107	20.1	2.7	31.8	28.1	89.3
11093*	85.8	1181	117	55.0	45.0	227	98.8	270	50.8	5.8	86.6	85.0	241
11094	7.9	91.3	8.6	2.6	6.5	31.8	12.6	19.1	4.2	< 1.2	9.6	10.0	22.9
11095	25.0	294	30.3	12.8	12.6	56.3	22.8	75.5	12.3	2.1	23.4	18.5	58.3
11096	7.9	122	11.6	4.1	4.8	20.3	10.7	28.7	5.3	< 1.2	11.5	8.1	25.0
11097	9.7	111	10.1	3.0	4.1	22.7	9.0	28.8	5.0	< 1.2	8.3	7.2	21.4
11098	45.2	478	58.6	12.3	20.7	99.1	43.8	123	24.3	3.1	37.7	33.7	113
11099	22.2	284	26.7	4.2	12.2	63.1	24.4	70.6	13.4	1.6	21.1	21.5	59.1
11100	7.0	78.9	9.3	< 1.2	3.8	20.2	9.1	21.0	5.4	< 1.2	6.9	5.0	21.3
11101	3.7	52.1	6.1	< 1.2	4.5	26.1	8.1	10.9	4.4	< 1.2	4.1	5.3	16.1
11102	1.2	14.3	< 1.2	< 1.2	< 1.2	4.1	< 1.2	3.4	< 1.2	< 0.4	1.7	1.3	2.6
11103	38.0	544	55.0	41.3	13.2	73.8	36.5	144	26.1	4.6	36.5	27.0	111
11104–A	22.9	330	31.4	19.4	6.9	41.4	20.7	73.1	12.3	2.3	22.0	14.9	62.0
11104–B	23.9	316	33.6	19.1	7.8	45.8	22.1	77.3	12.4	2.1	23.5	15.7	63.0
11104–C	18.9	297	31.3	18.2	7.1	40.4	20.2	70.6	11.2	2.2	21.7	14.8	57.8
11105–A	< 1.2	13.3	1.2	< 1.2	1.5	2.9	< 0.4	3.5	< 1.2	< 0.4	< 1.2	< 1.2	3.0
11105–B	< 1.2	12.8	1.2	< 1.2	< 1.2	2.5	< 1.2	3.2	< 1.2	< 0.4	< 1.2	< 1.2	2.7
11105–C	< 1.2	12.0	< 1.2	< 1.2	< 1.2	2.5	< 1.2	3.1	< 1.2	< 0.4	< 1.2	< 1.2	2.6

*Average of GC Replicates
MDL = 0.4 ng/g
MQL = 1.2 ng/g

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Total PCB Concentrations (ppm) in tree swallow eggs (E) and chicks (C) collected from the Hudson River in 1994.

Species	Life Stage	Site	Sample #	Total PCB (ng/g)	Average by Site
TS	E	101	E29	852	3047
TS	E	108	E23	2566	
TS	E	113	E16	5724	
TS	E	206	E13	6548	14120
TS	E	208	E18	22888	
TS	E	221	E19	12923	
TS	E	325	E6	29635	41524
TS	E	327	E7	77346	
TS	E	332	E12	17591	
TS	E	406	E3	18493	12180
TS	E	418	E10	2370	
TS	E	419	E1	15678	
TS	C	113	C20	531	377
				512	
				487	
TS	C	101	C23	244	
TS	C	206	C11	31120	29092
TS	C	221	C15	27063	
TS	C	327	C6	54832	55801
TS	C	332	C12	56770	
TS	C	418	C9	9779	5250
TS	C	419	C1	721	
TS	E	122	E11	16000	PACF
TS	E	226	E20	4600	PACF
TS	E	302	E4	44000	PACF
TS	E	428	E2	13000	PACF

All data except that labelled PACF is from BRD/USGS lab at Columbia, Missouri; PACF data is from Patuxent Analytical Control Facility.

Analyte		122E (ug/g)	226E (ug/g)	302E (ug/g)	428E (ug/g)
HCB		<.043	<.052	<.057	<.052
alpha BHC		<.043	<.052	<.057	<.052
alpha chlordane		<.27	<.077	<.58	<.24
beta BHC		<.043	<.052	<.057	<.052
dieldrin		<.043	<.052	<.057	<.052
endrin		<.043	<.052	<.057	<.052
gamma BHC		<.043	<.052	<.057	<.052
gamma chlordane		<.043	<.052	<.057	<.052
heptachlor epoxide		<.043	<.052	<.057	<.052
mirex		<.043	<.08	<.057	<.052
o,p'-DDD		<.043	<.052	<.057	<.052
o,p'-DDE		<.043	<.052	<.057	<.052
o,p'-DDT		<.11	<.052	<.057	<.052
oxychlordane		<.33	<.052	<.057	<.052
p,p'-DDD		<.043	<.052	<.057	<.052
p,p'-DDE		<.54	<.052	<.86	<.052
p,p'-DDT		<.05	<.052	<.057	<.052
toxaphene		<.22	<.26	<.29	<.26
trans-nonachlor		<.067	<.052	<.057	<.052

Congener #	101E (ng/g)	108E (ng/g)	113E (ng/g)	206E (ng/g)	208E (ng/g)	221E (ng/g)	325E (ng/g)	327E (ng/g)	332E (ng/g)	406E (ng/g)	418E (ng/g)	419E (ng/g)	101C (ng/g)*	113C (ng/g)	206C (ng/g)*	221C (ng/g)	327C (ng/g)*
4;10	0.2	0.2	0.2	0.6	2.1	17.7	14.9	77.5	0.6	0.6	0.6	0.2	0.6	0.6	23.7	25.0	276.6
7;9	0.2	0.2	0.2	0.2	0.6	0.6	0.6	3.0	0.2	0.2	0.2	0.2	0.0	0.2	8.7	9.5	39.7
6	0.2	0.2	0.2	0.2	0.6	1.3	1.9	10.8	0.2	0.2	0.2	0.2	0.0	0.2	5.3	3.7	26.8
5,8	0.2	0.2	0.2	1.8	8.6	12.8	11.9	99.8	0.6	0.6	0.6	0.6	0.2	0.2	51.5	48.3	247.4
19	0.2	0.2	0.2	1.3	5.4	5.8	25.0	64.2	0.6	1.2	0.6	2.8	0.0	0.6	72.4	52.7	187.3
18	0.6	0.6	0.2	13.5	56.3	39.3	85.1	270.0	4.7	3.6	4.0	7.2	2.4	1.8	619.5	582.7	1298.8
17;15	1.4	1.9	6.7	23.8	39.5	50.1	96.7	344.0	24.6	30.8	9.8	23.4	3.4	2.6	448.6	312.7	886.6
24;27	0.2	0.2	0.2	1.6	3.5	3.3	46.4	157.0	4.0	4.7	0.6	10.3	0.5	0.6	40.1	24.7	82.1
16;32	1.5	0.2	0.6	10.1	33.2	39.2	155.0	872.0	11.9	7.7	4.0	25.4	1.6	1.4	484.5	269.3	837.2
29	0.2	0.2	0.6	0.6	2.9	1.8	9.9	21.7	2.6	2.9	0.6	2.6	0.0	0.2	28.2	20.0	51.5
26	0.6	0.2	0.6	7.4	20.8	23.9	139.0	689.0	12.9	12.2	4.5	28.3	0.9	0.6	400.7	245.0	690.8
25	1.7	1.4	2.1	8.9	15.9	16.9	105.0	293.0	22.9	20.3	8.6	26.0	1.5	1.5	179.9	127.3	333.0
31	5.1	28.5	151.0	217.0	442.0	234.0	1267.0	2270.0	114.0	534.0	50.7	432.0	3.1	4.5	1247.0	1112.0	1820.1
28	37.0	223.0	558.0	637.0	2144.0	1224.0	2722.0	6288.0	1742.0	1666.0	160.0	1138.0	10.8	29.6	2682.6	2320.3	4270.4
20;33;53	1.6	0.6	21.9	37.1	102.0	54.7	279.0	909.0	0.6	101.0	7.7	90.4	2.9	4.4	642.4	459.0	1468.4
51	0.2	0.2	1.7	5.8	9.5	7.5	54.3	128.0	13.1	13.6	1.2	15.2	0.9	0.6	132.8	78.4	177.6
22	0.6	0.2	0.2	4.8	16.7	20.2	39.0	530.0	4.2	3.0	4.2	8.2	1.0	0.6	308.5	183.3	867.9
45	0.2	0.2	0.2	1.8	6.4	3.5	8.4	18.2	0.6	0.6	0.6	0.6	0.8	0.6	65.6	65.7	173.3
46	0.2	0.2	2.1	2.5	7.1	4.2	23.0	50.5	2.0	1.3	0.6	2.3	0.4	0.6	108.4	60.3	152.7
52	60.3	260.0	657.0	703.0	2492.0	1434.0	2907.0	7412.0	1881.0	2019.0	161.0	1622.0	32.4	51.8	2869.1	2481.3	4528.7
49;43	33.3	161.0	436.0	507.0	1798.0	980.0	2031.0	5137.0	1412.0	1543.0	134.0	1256.0	22.7	35.9	2423.1	2069.3	3569.4
47	19.0	121.0	281.0	265.0	1252.0	628.0	1265.0	3427.0	1094.0	1283.0	126.0	929.0	13.4	21.3	471.2	1004.7	1919.1
48	3.8	9.7	26.3	27.1	152.0	89.1	320.0	1040.0	38.3	38.7	16.6	125.0	4.7	7.0	0.0	459.7	1210.0
44	4.1	1.3	7.9	50.5	106.0	75.7	680.0	2462.0	86.2	76.5	16.0	129.0	11.5	11.8	1774.6	1062.3	2993.6
42	12.4	45.9	116.0	195.0	363.0	152.0	853.0	3294.0	383.0	34.9	48.0	351.0	12.9	14.8	1723.4	1254.7	2855.1
41	2.2	46.2	20.1	40.5	86.2	39.8	504.0	1219.0	102.0	110.0	9.5	105.0	7.0	5.0	699.6	349.3	1033.2
64	5.9	2.9	111.0	129.0	370.0	178.0	780.0	1944.0	390.0	374.0	20.7	312.0	4.0	7.6	851.5	629.3	1243.2
40	0.6	0.2	3.5	4.8	12.5	10.5	47.0	287.0	4.4	3.7	2.6	7.1	2.3	1.7	186.6	108.7	534.6
67	1.4	1.7	6.5	13.1	28.3	17.7	94.8	204.0	35.3	45.7	7.2	41.0	0.4	1.1	122.2	101.7	196.9
63	5.7	28.2	49.5	51.6	224.0	125.7	240.2	530.0	161.8	190.8	28.1	149.2	1.4	4.4	177.8	153.7	285.9
74	23.0	137.0	296.0	323.0	1280.0	705.0	1401.0	3332.0	937.0	949.0	116.0	788.0	1.2	21.2	1140.8	1245.3	2108.3
70;76	28.4	87.7	353.0	427.0	1004.0	582.0	1949.0	3866.0	1044.0	983.0	100.0	789.0	4.3	18.3	2106.5	1720.0	2981.6
66;95;88	74.9	346.0	758.0	801.0	3043.0	1671.0	3303.0	8045.0	2204.0	2268.0	228.0	1849.0	8.9	57.3	2956.2	2874.0	4907.8
91	6.2	23.3	48.5	50.5	221.6	116.7	226.0	621.0	162.0	217.0	16.8	179.0	2.5	4.5	229.1	190.0	317.9
56;60	13.6	63.7	125.0	137.0	513.0	292.0	606.0	1726.0	353.0	350.0	41.0	285.0	0.8	10.8	0.0	593.0	1267.4
92	8.7	31.1	64.9	64.5	257.0	157.0	260.0	672.0	198.0	235.0	31.1	198.0	3.0	6.2	213.5	186.7	351.1
84	0.2	6.4	1.4	4.1	21.6	14.2	76.4	196.0	17.3	27.8	1.9	16.6	1.5	2.4	169.2	137.3	326.7
101;90	44.2	133.0	260.0	281.0	1066.0	639.0	1069.0	2812.0	764.0	841.0	107.0	711.0	16.5	28.3	1091.6	948.0	1729.2
99	23.8	93.3	176.0	188.0	776.0	445.0	773.0	2002.0	565.0	642.0	96.5	525.0	9.5	17.2	712.3	619.3	1205.5
119	1.4	5.9	10.1	9.6	49.9	23.8	48.6	119.0	36.3	43.7	6.7	36.1	0.5	0.6	36.9	29.8	59.5
83	0.2	0.2	0.6	3.6	10.0	5.0	48.4	89.1	9.1	9.1	1.8	8.7	0.9	0.6	67.2	57.7	124.4
97	6.9	1.5	22.9	40.0	51.9	34.7	339.0	1092.0	102.0	109.0	17.3	131.0	5.3	6.5	528.9	331.7	802.3
87	12.5	31.3	98.3	111.0	368.0	184.0	487.0	1182.0	283.0	317.0	30.5	279.0	4.8	10.2	640.0	452.0	877.6
136	7.4	4.8	5.1	6.9	14.5	7.9	19.2	45.4	19.0	24.9	6.5	17.8	0.4	0.6	24.9	23.5	33.5
110	18.1	55.0	174.0	176.0	599.0	324.0	835.0	2034.0	514.0	530.0	50.6	449.0	6.1	14.9	710.7	620.0	1040.6
82	2.2	0.6	1.2	5.3	9.2	9.0	71.3	337.0	10.6	9.4	5.2	17.2	1.4	1.8	178.5	88.5	298.0
151	3.6	7.9	15.9	17.1	70.6	38.5	76.6	201.0	52.1	76.1	12.2	67.9	0.8	2.0	42.5	45.8	75.4
135;144;124	4.5	11.2	21.0	24.5	86.3	51.0	96.2	208.0	62.8	80.6	12.9	71.1	0.7	2.2	42.5	69.5	60.0
107	4.7	12.9	21.1	19.9	91.4	49.1	79.5	199.0	60.6	69.8	14.1	58.0	0.2	2.3	60.2	67.0	100.9
123;149	20.1	46.5	80.4	64.1	346.0	195.0	278.0	841.0	230.0	303.0	50.7	271.0	3.6	8.7	177.3	213.7	245.6
118	40.2	109.0	186.0	196.0	774.0	464.0	735.0	1916.0	515.0	541.0	94.1	459.0	0.1	18.5	16.1	628.7	32.3
134	0.2	10.2	15.3	16.9	6.7	40.3	3.5	163.0	42.7	3.4	0.2	5.0	0.0	0.6	6.9	5.7	14.5
146	12.9	16.5	19.3	21.0	88.3	50.1	71.4	205.0	54.2	69.2	20.0	59.6	1.7	2.5	40.4	45.4	69.7
153	34.2	43.3	58.7	65.1	245.0	146.0	201.0	607.0	149.0	181.0	55.8	161.0	4.3	7.7	135.2	153.3	211.2
132	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.9	0.2	189.0	0.2	213.4
105	23.3	74.6	123.0	129.0	565.0	305.0	542.0	1269.0	341.0	375.0	59.5	331.0	0.0	11.7	0.0	416.0	22.8
141	4.4	0.6	13.2	15.6	59.2	32.1	60.5	125.0	35.3	50.0	11.5	46.8	1.0	1.9	52.7	46.8	70.2
179	0.6	0.2	3.6	4.7	13.6	9.4	5.4	45.4	14.8	12.4	1.8	28.9	0.1	0.6	5.1	10.4	7.3
137	4.3	8.0	9.3	9.9	46.8	24.1	39.7	101.9	25.1	29.4	6.8	28.6	0.6	0.8	26.4	26.4	42.1
176	0.6	0.2	0.2	1.5	3.9	5.0	8.2	19.6	6.1	6.3	0.2	5.0	0.0	0.6	0.0	5.7	2.0
130	3.7	7.0	9.7	7.9	45.2	22.2	37.1	85.8	25.0	26.7	7.9	30.8	0.6	0.6	18.4	21.9	32.0

138	52.1	78.9	111.0	122.0	478.0	284.0	414.0	1181.0	294.0	360.0	91.3	331.0	6.6	12.7	283.9	314.3	410.8
158	6.1	9.3	10.1	11.6	58.6	26.7	45.9	117.0	30.3	33.9	8.6	30.6	0.6	1.0	29.2	32.1	31.3
129	0.6	0.6	3.0	4.1	12.3	4.2	23.0	55.0	12.8	13.5	2.6	14.8	0.3	0.2	26.2	18.9	32.4
178	4.5	3.8	4.1	4.8	20.7	12.2	15.3	45.0	12.6	17.8	6.5	15.6	0.3	0.9	6.8	7.3	10.4
182;187	26.1	20.2	22.7	26.3	99.1	63.1	73.6	227.0	56.3	81.8	31.8	73.5	1.7	2.6	37.7	42.5	58.1
183	8.1	9.1	9.0	10.7	43.8	24.4	32.0	98.8	22.8	28.4	12.6	26.1	0.0	0.6	19.9	21.0	29.4
128	10.9	21.0	28.8	28.7	123.0	70.6	107.0	270.0	75.5	88.7	19.1	80.1	1.1	3.3	61.3	73.7	95.6
167	4.4	21.3	5.0	5.3	24.3	13.4	20.1	50.8	12.3	14.6	4.2	13.3	0.0	0.6	0.0	12.0	0.0
185	0.6	0.6	0.6	0.6	3.1	1.6	2.7	5.8	2.1	2.9	0.6	2.6	0.1	0.2	2.9	2.2	3.7
174	4.1	6.9	8.3	11.5	37.7	21.1	31.8	86.6	23.4	33.3	9.6	29.6	0.4	0.6	22.8	22.4	30.8
177	5.3	5.0	7.2	8.1	33.7	21.5	28.1	85.0	18.5	29.4	10.0	26.3	0.4	0.6	15.4	15.1	22.7
202;171;156	16.1	21.3	21.4	25.0	113.0	59.1	89.3	241.0	58.3	74.2	22.9	67.0	0.5	2.8	14.8	60.9	21.7
157;201	3.9	4.8	4.0	5.5	26.2	12.2	19.8	41.5	12.5	16.0	5.1	15.9	0.1	0.6	1.8	11.7	2.6
172	2.1	2.0	1.5	1.8	7.7	3.9	5.2	14.9	3.9	5.1	2.4	4.4	0.2	0.2	3.4	3.2	5.7
180	37.3	39.2	30.6	37.9	142.0	79.9	106.0	360.0	69.4	92.9	58.2	91.3	3.1	4.3	62.9	71.8	93.6
193	3.5	2.4	1.4	1.8	6.5	4.0	4.4	15.0	3.8	5.9	3.1	3.8	0.2	0.2	3.0	2.6	4.6
191	1.4	1.6	0.6	0.6	3.8	1.8	2.8	7.1	2.3	3.0	2.3	1.8	0.1	0.2	1.6	1.4	2.9
200	0.2	0.2	0.2	0.6	1.5	0.6	1.2	3.2	0.6	1.6	0.6	1.6	0.0	0.2	1.1	0.6	1.2
170;190	11.7	12.4	10.6	12.1	58.4	29.9	43.5	123.0	27.6	35.6	15.7	31.4	0.0	1.4	28.0	25.9	40.4
199	7.7	5.8	4.8	6.7	24.6	15.4	15.9	53.1	12.8	19.7	9.7	16.8	0.4	0.6	9.8	9.7	14.9
196;203	6.1	5.7	4.4	6.0	22.7	13.3	16.1	51.8	11.0	16.0	8.6	13.7	0.4	0.6	9.9	9.9	15.4
208;195	2.5	1.8	1.6	2.1	7.3	4.9	5.3	17.9	3.9	5.8	3.1	5.4	0.1	0.2	2.8	2.7	4.3
194	4.6	4.1	2.8	3.9	14.3	9.5	10.6	33.2	7.4	9.4	6.0	9.1	0.3	0.2	6.5	6.7	10.9
123													0.4		25.3		31.6
118													16.1		1489.1		1815.4
114													0.8		66.7		85.2
105													7.1		794.6		961.6
167													0.7		21.1		28.6
156													0.9		42.8		54.8
157													0.3		12.1		17.1
189													0.1		1.5		2.2
													26.2		2453.1		2996.5
81													0.1		16.0		24.8
77													1.2		370.0		530.0
126													0.1		5.0		7.5
169													0.0		0.0		0.0

322980

332C (ng/g)	418C (ng/g)*	419C (ng/g)
221.1	13.8	4.6
34.0	0.7	0.2
28.1	0.9	0.2
239.0	7.0	1.3
215.0	5.0	2.7
1168.0	29.4	5.4
872.0	53.4	6.4
101.0	23.9	2.7
661.0	76.1	9.6
47.9	3.8	0.2
566.0	109.8	9.5
308.0	51.5	3.7
1702.0	196.2	17.4
4231.0	548.6	33.5
1291.0	99.5	9.2
175.0	47.0	3.5
862.0	41.0	3.7
178.0	8.5	0.6
145.0	4.4	0.6
4227.0	905.5	61.6
3634.0	757.3	51.9
1919.0	495.8	34.1
1273.0	140.8	9.9
2756.0	351.3	23.9
3426.0	381.2	26.3
820.0	209.7	12.2
1289.0	188.9	14.1
613.0	46.9	3.5
196.0	41.0	2.8
323.0	76.7	4.6
2354.0	381.1	25.1
2554.0	474.7	32.4
5031.0	958.4	63.2
329.0	118.0	8.2
1393.0	155.7	12.1
343.0	118.4	8.3
302.0	57.2	4.9
1720.0	427.7	29.4
1172.0	304.7	19.4
59.5	19.5	1.4
124.0	22.7	1.8
754.0	161.3	9.7
854.0	191.4	11.9
37.4	20.0	2.0
1206.0	250.8	18.9
288.0	44.6	3.0
94.7	46.1	4.2
116.0	31.0	3.4
128.0	27.7	2.3
299.0	160.0	12.4
1158.0	5.6	17.9
16.3	5.7	0.2
87.8	47.0	3.0
274.0	112.5	8.5
314.0	136.9	0.2
669.0	0.0	10.6
88.1	27.1	2.1
20.2	10.3	0.6
47.6	17.0	0.6
5.5	2.5	0.2
38.0	21.0	1.2

544.0	211.2	14.3
55.0	14.4	0.6
41.3	11.9	0.6
13.2	12.4	0.6
73.8	53.7	4.1
36.5	11.9	0.6
144.0	34.2	3.4
26.1	0.0	0.6
4.6	1.9	0.2
36.5	19.7	1.7
27.0	16.1	1.3
111.0	12.4	2.6
17.9	1.5	0.6
6.3	3.4	0.2
126.0	47.2	3.8
5.0	2.3	0.2
2.8	0.9	0.2
0.6	1.4	0.2
47.8	20.0	1.5
16.3	12.5	0.6
17.8	8.6	0.6
4.8	3.5	0.2
13.1	5.7	0.6
	9.2	
	560.2	
	22.9	
	234.3	
	13.3	
	22.8	
	7.5	
	1.3	
	871.4	
	4.3	
	56.0	
	1.5	
	0.0	

322982

	10	108E	113E	206E	208E	221E	325E	327E	3	406E	418E	419E	101C	113C	206C	221C	C
Di-*ortho*																	
4,10	0.2	0.2	0.2	0.6	2.1	17.7	14.9	77.5	0.6	0.6	0.6	0.2	0.6	0.6	23.7	25.0	276.6
7,9	0.2	0.2	0.2	0.2	0.6	0.6	0.6	3.0	0.2	0.2	0.2	0.2	0.0	0.2	8.7	9.5	39.7
6	0.2	0.2	0.2	0.2	0.6	1.3	1.9	10.8	0.2	0.2	0.2	0.2	0.0	0.2	5.3	3.7	26.8
5,8	0.2	0.2	0.2	1.8	8.6	12.8	11.9	99.8	0.6	0.6	0.6	0.6	0.2	0.2	51.5	48.3	247.4
17,15	1.4	1.9	6.7	23.8	39.5	50.1	96.7	344	24.6	30.8	9.8	23.4	3.4	2.6	448.6	312.7	886.6
TOTAL	**2.2**	**2.7**	**7.5**	**26.6**	**51.4**	**82.5**	**126.0**	**535.1**	**26.2**	**32.4**	**11.4**	**24.6**	**4.2**	**3.8**	**537.8**	**399.2**	**1477.1**
Di-*ortho*	**2.2**	**2.7**	**7.5**	**26.6**	**51.4**	**82.5**	**126**	**535.1**	**26.2**	**32.4**	**11.4**	**24.6**	**4.2**	**3.8**	**537.8**	**399.2**	**1477.1**
Tri-*ortho*																	
19	0.2	0.2	0.2	1.3	5.4	5.8	25.0	64.2	0.6	1.2	0.6	2.8	0.0	0.6	72.4	52.7	187.3
18	0.6	0.6	0.2	13.5	56.3	39.3	85.1	270.0	4.7	3.6	4.0	7.2	2.4	1.8	619.5	582.7	1298.8
24,27	0.2	0.2	0.2	1.6	3.5	3.3	46.4	157.0	4.0	4.7	0.6	10.3	0.5	0.6	40.1	24.7	82.1
16,32	1.5	0.2	0.6	10.1	33.2	39.2	155.0	872.0	11.9	7.7	4.0	25.4	1.6	1.4	484.5	269.3	837.2
29	0.2	0.2	0.6	0.6	2.9	1.8	9.9	21.7	2.6	2.9	0.6	2.8	0.0	0.2	28.2	20.0	51.5
26	0.6	0.2	0.6	7.4	20.8	23.9	139.0	689.0	12.9	12.2	4.5	28.3	0.9	0.6	400.7	245.0	690.8
25	1.7	1.4	2.1	8.9	15.9	16.9	105.0	293.0	22.9	20.3	8.6	26.0	1.5	1.5	179.9	127.3	333.0
31	5.1	28.5	151.0	217.0	442.0	234.0	1267.0	2270.0	544.0	534.0	50.7	432.0	3.1	4.5	1247.0	1112.0	1820.1
28	37.0	223.0	558.0	637.0	2144.0	1224.0	2722.0	6288.0	1742.0	1666.0	160.0	1188.0	10.8	29.6	2682.6	2320.3	4270.4
20,33,53	1.6	0.6	21.9	37.1	102.0	54.7	279.0	909.0	0.6	101.0	7.7	90.4	2.9	4.4	642.4	459.0	1468.4
22	0.6	0.2	0.2	4.8	16.7	20.2	39.0	530.0	4.2	3.0	4.2	8.2	1.0	0.6	308.5	183.3	867.9
TOTAL	**49.3**	**255.3**	**735.6**	**939.3**	**2842.7**	**1663.1**	**4872.4**	**12363.9**	**2350.4**	**2356.6**	**245.5**	**1821.2**	**24.7**	**45.8**	**6705.8**	**5396.4**	**11907.5**
Tri-*ortho*	49.3	255.3	735.6	939.3	2842.7	1663.1	4872.4	12363.9	2350.4	2356.6	245.5	1821.2	24.7	45.8	6705.8	5396.4	11907.5
Tetra-*ortho*																	
51	0.2	0.2	1.7	5.8	9.5	7.5	54.3	128.0	13.1	13.6	1.2	15.2	0.9	0.6	132.8	78.4	177.6
45	0.2	0.2	0.2	1.8	6.4	3.5	8.4	18.2	0.6	0.6	0.6	0.6	0.8	0.6	65.6	65.7	173.3
46	0.2	0.2	2.1	2.5	7.1	4.2	23.0	50.5	2.0	1.3	0.6	2.3	0.4	0.6	108.4	60.3	152.7
52	60.3	260.0	657.0	703.0	2492.0	1434.0	2907.0	7412.0	1881.0	2019.0	161.0	1622.0	32.4	51.8	2869.1	2481.3	4528.7
49;43	33.3	161.0	436.0	507.0	1798.0	980.0	2031.0	5137.0	1412.0	1543.0	134.0	1256.0	22.7	35.9	2423.1	2069.3	3569.4
47	19.0	121.0	281.0	265.0	1252.0	628.0	1265.0	3427.0	1094.0	1283.0	126.0	929.0	13.4	21.3	471.2	1004.7	1919.1
48	3.8	9.7	26.3	27.1	152.0	89.1	320.0	1040.0	38.3	38.7	16.6	125.0	4.7	7.0	0.0	459.7	1210.0
44	4.1	1.3	7.9	50.5	106.0	75.7	680.0	2462.0	86.2	76.5	16.0	129.0	11.5	11.8	1774.6	1062.3	2993.6
42	12.4	45.9	116.0	195.0	363.0	152.0	853.0	3294.0	383.0	34.9	48.0	351.0	12.9	14.8	1723.4	1254.7	2855.1
41	2.2	46.2	20.1	40.5	86.2	39.8	504.0	1219.0	102.0	110.0	9.5	105.0	7.0	5.0	699.6	349.3	1033.2
64	5.9	2.9	111.0	129.0	370.0	178.0	780.0	1944.0	390.0	374.0	20.7	312.0	4.0	7.6	851.5	629.3	1243.2
40	0.6	0.2	3.5	4.8	12.5	10.5	47.0	287.0	4.4	3.7	2.6	7.1	2.3	1.7	186.6	108.7	534.6
67	1.4	1.7	6.5	13.1	28.3	17.7	94.8	204.0	35.3	45.7	7.2	41.0	0.4	1.1	122.2	101.7	196.9
63	5.7	28.2	49.5	51.6	224.0	125.7	240.2	530.0	161.8	190.8	28.1	149.2	1.4	4.4	177.8	153.7	285.9
74	23.0	137.0	296.0	323.0	1280.0	705.0	1401.0	3332.0	937.0	949.0	116.0	768.0	1.2	21.2	1140.8	1245.3	2108.3
70;76	28.4	87.7	353.0	427.0	1004.0	582.0	1949.0	3866.0	1044.0	983.0	100.0	789.0	4.3	18.3	2106.5	1720.0	2981.6
66;95;88	74.9	346.0	758.0	801.0	3043.0	1671.0	3303.0	8045.0	2204.0	2268.0	228.0	1849.0	8.9	57.3	2956.2	2874.0	4907.8
56;60	13.6	63.7	125.0	137.0	513.0	292.0	606.0	1726.0	353.0	350.0	41.0	285.0	0.8	10.8	0.0	593.0	1267.4
81													0.1		16.0		24.8
77													1.2		370.0		530.0
TOTAL	**289.2**	**1313.1**	**3250.8**	**3684.7**	**12747.0**	**6995.7**	**17066.7**	**44121.7**	**10141.7**	**10284.8**	**1057.1**	**8735.4**	**131.4**	**271.8**	**18195.4**	**16311.4**	**32693.2**
Tetra-*ortho*	289.2	1313.1	3250.8	3684.7	12747	6995.7	17066.7	44121.7	10141.7	10284.8	1057.1	8735.4	131.4	271.8	18195.4	16311.4	32693.2
Penta-*ortho*																	
91	6.2	23.3	48.5	50.5	221.6	116.7	226.0	621.0	162.0	217.0	16.8	179.0	2.5	4.5	229.1	190.0	317.9
92	8.7	31.1	64.9	64.5	257	157	260	672	198	235	31.1	198	3	6.2	213.5	186.7	351.1
84	0.2	6.4	1.4	4.1	21.6	14.2	76.4	196.0	17.3	27.8	1.9	16.6	1.5	2.4	169.2	137.3	326.7
101,90	44.2	133	260	281	1066	639	1069	2812	764	841	107	711	16.5	28.3	1091.6	948.0	1729.2
99	23.8	93.3	176	188	776	445	773	2002	565	642	96.5	525	9.5	17.2	712.3	619.3	1205.5
119	1.4	5.9	10.1	9.6	49.9	23.8	48.6	119.0	36.3	43.7	6.7	36.1	0.5	0.6	36.9	29.8	59.5
83	0.2	0.2	0.6	3.6	10.0	5.0	48.4	89.1	9.1	9.1	1.8	8.7	0.9	0.6	67.2	57.7	124.4
97	6.9	1.5	22.9	40	51.9	34.7	339	1092	102	109	17.3	131	5.3	6.5	528.9	331.7	802.3
87	12.5	31.3	98.3	111	368	184	487	1182	283	317	30.5	279	4.8	10.2	640	452.0	877.6
110	18.1	55	174	176	599	324	835	2034	514	530	50.6	449	6.1	14.9	710.7	620.0	1040.6
82	2.2	0.6	1.2	5.3	9.2	9.0	71.3	337.0	10.6	9.4	5.2	17.2	1.4	1.8	178.5	88.5	298.0
107	4.7	12.9	21.1	19.9	91.4	49.1	79.5	199	60.6	69.8	14.1	58	0.2	2.3	60.2	67.0	100.9
123,149	20.1	46.5	80.4	64.1	346	195	278	841	230	303	50.7	271	3.6	8.7	177.3	213.7	245.6
118	40.2	109	186	196	774	464	735	1916	515	541	94.1	459	0.1	18.5	16.1	628.7	32.3
105	23.3	74.6	123.0	129.0	565.0	305.0	542.0	1269.0	341.0	375.0	59.5	331.0	0.0	11.7	0.0	416.0	0.0
123													0.35		25.31		31.61
118													16.06		1489.07		1815.42
114													0.75		66.71		85.23
105													7.07		794.56		961.56
TOTAL	**212.7**	**624.6**	**1268.4**	**1342.6**	**5206.6**	**2965.5**	**5868.2**	**15381.1**	**3807.9**	**4269.8**	**583.8**	**3669.6**	**80.1**	**134.5**	**7207.2**	**4986.4**	**10405.4**
Penta-*ortho*	212.7	624.6	1268.4	1342.6	5206.6	2965.5	5868.2	15381.1	3807.9	4269.8	583.8	3669.6	80.1	134.5	7207.2	4986.4	10405.4
Hexa-*ortho*																	
136	7.4	4.8	5.1	6.9	14.5	7.9	19.2	45.4	19	24.9	6.5	17.8	0.4	0.6	24.9	23.5	33.5

Cong wksh homologues

322983

151	3.	7.9	15.9	17.1	70.6	38.5	76.6	201		76.1	12.2	67.9	0.8	2.0	42.5	45.8	.4
135,144,124	4.	11.2	21	24.5	86.3	51	96.2	208	6.	80.6	12.9	71.1	0.7	2.2	42.5	69.5	60
134	0.2	10.2	15.3	16.9	6.7	40.3	3.5	163.0	42.7	3.4	0.2	5.0	0.0	0.6	6.9	5.7	14.5
146	12.9	16.5	19.3	21	88.3	50.1	71.4	205	54.2	69.2	20	59.6	1.7	2.5	40.4	45.4	69.7
153	34.2	43.3	58.7	65.1	245	146	201	607	149	181	55.8	161	4.3	7.7	135.2	153.3	211.2
132	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.9	0.2	189.0	0.2	213.4
141	4.4	0.6	13.2	15.6	59.2	32.1	60.5	125.0	35.3	50.0	11.5	46.8	1.0	1.9	52.7	46.8	70.2
137	4.3	8.0	9.3	9.9	46.8	24.1	39.7	101.9	25.1	29.4	6.8	28.6	0.6	0.8	26.4	26.4	42.1
130	3.7	7.0	9.7	7.9	45.2	22.2	37.1	85.8	25.0	26.7	7.9	30.8	0.6	0.6	18.4	21.9	32.0
138	52.1	78.9	111	122	478	284	414	1181	294	360	91.3	331	6.6	12.7	283.9	314.3	410.8
158	6.1	9.3	10.1	11.6	58.6	26.7	45.9	117.0	30.3	33.9	8.6	30.6	0.6	1.0	29.2	32.1	31.3
129	0.6	0.6	3.0	4.1	12.3	4.2	23.0	55.0	12.8	13.5	2.6	14.8	0.3	0.2	26.2	18.9	32.4
128	10.9	21	28.8	28.7	123	70.6	107	270	75.5	88.7	19.1	80.1	1.1	3.3	61.3	73.7	95.6
167	4.4	21.3	5.0	5.3	24.3	13.4	20.1	50.8	12.3	14.6	4.2	13.3	0.0	0.6	0.0	12.0	0.0
167													0.71		21.06		28.62
156													0.92		42.75		54.75
157													0.29		12.13		17.1
126													0.067		5		7.53
169													0.003		0.011		0.017
TOTAL	**149.5**	**240.8**	**325.6**	**356.8**	**1359**	**811.3**	**1215.4**	**3416.1**	**890.3**	**1052.2**	**259.8**	**958.6**	**22.61**	**36.8**	**1060.461**	**889.4**	**1500.127**
Hexa-*ortho*	149.5	240.8	325.6	356.8	1359	811.3	1215.4	3416.1	890.3	1052.2	259.8	958.6	22.61	36.8	1060.461	889.4	1500.127
Hepta-*ortho*																	
179	0.6	0.2	3.6	4.7	13.6	9.4	5.4	45.4	14.8	12.4	1.8	28.9	0.1	0.6	5.1	10.4	7.3
176	0.6	0.2	0.2	1.5	3.9	5.0	8.2	19.6	6.1	6.3	0.2	5.0	0.0	0.6	0.0	5.7	2.0
178	4.5	3.8	4.1	4.8	20.7	12.2	15.3	45.0	12.6	17.8	6.5	15.6	0.3	0.9	6.8	7.3	10.4
182,187	26.1	20.2	22.7	26.3	99.1	63.1	73.6	227	56.3	81.8	31.8	73.5	1.7	2.6	37.7	42.5	58.1
183	8.1	9.1	9.0	10.7	43.8	24.4	32.0	98.8	22.8	28.4	12.6	26.1	0.0	0.6	19.9	21.0	29.4
185	0.6	0.6	0.6	0.6	3.1	1.6	2.7	5.8	2.1	2.9	0.6	2.6	0.1	0.2	2.9	2.2	3.7
174	4.1	6.9	8.3	11.5	37.7	21.1	31.8	86.6	23.4	33.3	9.6	29.6	0.4	0.6	22.8	22.4	30.8
177	5.3	5.0	7.2	8.1	33.7	21.5	28.1	85.0	18.5	29.4	10.0	26.3	0.4	0.6	15.4	15.1	22.7
202,171,156	16.1	21.3	21.4	25	113	59.1	89.3	241	58.3	74.2	22.9	67	0.5	2.8	14.8	60.9	21.7
172	2.1	2.0	1.5	1.8	7.7	3.9	5.2	14.9	3.9	5.1	2.4	4.4	0.2	0.2	3.4	3.2	5.7
180	37.3	39.2	30.6	37.9	142	79.9	106	360	69.4	92.9	58.2	91.3	3.1	4.3	62.9	71.8	93.6
193	3.5	2.4	1.4	1.8	6.5	4.0	4.4	15.0	3.8	5.9	3.1	3.8	0.2	0.2	3.0	2.6	4.6
191	1.4	1.6	0.6	0.6	3.8	1.8	2.8	7.1	2.3	3.0	2.3	1.8	0.1	0.2	1.6	1.4	2.9
170,190	11.7	12.4	10.6	12.1	58.4	29.9	43.5	123	27.6	35.6	15.7	31.4	0.8	1.4	28	25.9	40.4
189													0.1		1.5		2.2
TOTAL	**122.0**	**124.9**	**121.8**	**147.4**	**587.0**	**336.9**	**448.3**	**1374.2**	**321.9**	**429.0**	**177.7**	**407.3**	**8.0**	**15.8**	**225.8**	**292.3**	**335.5**
Hepta-*ortho*	122	124.9	121.8	147.4	587	336.9	448.3	1374.2	321.9	429	177.7	407.3	8	15.8	225.8	292.3	335.5
Octa-*ortho*																	
157;201	3.9	4.8	4.0	5.5	26.2	12.2	19.8	41.5	12.5	16.0	5.1	15.9	0.1	0.6	1.8	11.7	2.6
200	0.2	0.2	0.2	0.6	1.5	0.6	1.2	3.2	0.6	1.6	0.6	1.6	0.0	0.2	1.1	0.6	1.2
199	7.7	5.8	4.8	6.7	24.6	15.4	15.9	53.1	12.8	19.7	9.7	16.8	0.4	0.6	9.8	9.7	14.9
196;203	6.1	5.7	4.4	6.0	22.7	13.3	16.1	51.8	11.0	16.0	8.6	13.7	0.4	0.6	9.9	9.9	15.4
208;195	2.5	1.8	1.6	2.1	7.3	4.9	5.3	17.9	3.9	5.8	3.1	5.4	0.1	0.2	2.8	2.7	4.3
194	4.6	4.1	2.8	3.9	14.3	9.5	10.6	33.2	7.4	9.4	6.0	8.1	0.3	0.2	6.5	6.7	10.9
TOTAL	**25.0**	**22.4**	**17.8**	**24.8**	**96.6**	**55.9**	**68.9**	**200.7**	**48.2**	**68.5**	**33.1**	**61.5**	**1.3**	**2.4**	**31.9**	**41.4**	**49.3**
Octa-*ortho*	25	22.4	17.8	24.8	96.6	55.9	68.9	200.7	48.2	68.5	33.1	61.5	1.3	2.4	31.9	41.4	49.3

Cong wksh Homologues

322984

332C	418	419C
221.1	13.8	4.6
34.0	0.7	0 .2
28.1	0.9	0.2
239.0	7.0	1.3
872	53.4	6.4
1394.2	**75.8**	**12.5**
1394.2	**75.8**	**12.5**
215.0	5.0	2.7
1168.0	29.4	5.4
101.0	23.9	2.7
661.0	76.1	9.6
47.9	3.8	0.2
566.0	109.8	9.5
308.0	51.5	3.7
1702.0	196.2	17.4
4231.0	548.6	33.5
1291.0	99.5	9.2
862.0	41.0	3.7
11152.9	**1184.8**	**97.6**
11152.9	1184.8	97.6
175.0	47.0	3.5
178.0	8.5	0.6
145.0	4.4	0.6
4227.0	905.5	61.6
3634.0	757.3	51.9
1919.0	495.8	34.1
1273.0	140.8	9.9
2756.0	351.3	23.9
3426.0	381.2	26.3
820.0	209.7	12.2
1289.0	188.9	14.1
613.0	46.9	3.5
196.0	41.0	2.8
323.0	76.7	4.6
2354.0	381.1	25.1
2554.0	474.7	32.4
5031.0	958.4	63.2
1393.0	155.7	12.1
	4.3	
	56.0	
32306.0	**5685.2**	**382.4**
32306	5685.2	382.4
329.0	118.0	8.2
343	118.4	8.3
302.0	57.2	4.9
1720	427.7	29.4
1172	304.7	19.4
59.5	19.5	1.4
124.0	22.7	1.8
754	161.3	9.7
854	191.4	11.9
1206	250.8	18.9
288.0	44.6	3.0
128	27.7	2.3
299	160	12.4
1158	5.6	17.9
669.0	0.0	10.6
	9.17	
	560.15	
	22.88	
	234.27	
9405.5	**2736.1**	**160.1**
9405.5	2736.1	160.1
37.4	20	2

94.7	46.	4.2
116	31	3.4
16.3	5.7	0.2
87.8	47	3
274	112.5	8.5
314.0	136.9	0.2
88.1	27.1	2.1
47.6	17.0	0.6
38.0	21.0	1.2
544	211.2	14.3
55.0	14.4	0.6
41.3	11.9	0.6
144	34.2	3.4
26.1	0.0	0.6
	13.31	
	22.82	
	7.49	
	1.48	
	0.011	
1924.3	**781.121**	**44.9**
1924.3	781.121	44.9
20.2	10.3	0.6
5.5	2.5	0.2
13.2	12.4	0.6
73.8	53.7	4.1
36.5	11.9	0.6
4.6	1.9	0.2
36.5	19.7	1.7
27.0	16.1	1.3
111	12.4	2.6
6.3	3.4	0.2
126	47.2	3.8
5.0	2.3	0.2
2.8	0.9	0.2
47.8	20	1.5
	1.3	
516.2	**216.0**	**17.8**
516.2	216	17.8
17.9	1.5	0.6
0.6	1.4	0.2
16.3	12.5	0.6
17.8	8.6	0.6
4.8	3.5	0.2
13.1	5.7	0.6
70.5	**33.2**	**2.8**
70.5	33.2	2.8

322986

	101E	108E	113E	Av Lk9E	206E	208E	221E	Av RemnE	325E	327E	332E	Av SA13E	406E	418E
Di-*ortho*	**2.2**	**2.7**	**7.5**	**4**	**26.6**	**51.4**	**82.5**	**54**	**126**	**535.1**	**26.2**	**229**	**32.4**	**11.4**
Tri-*ortho*	49.3	255.3	735.6	**347**	939.3	2842.7	1663.1	**1815**	4872.4	12363.9	2350.4	**6529**	2356.6	245.5
Tetra-*ortho*	289.2	1313.1	3250.8	**1618**	3684.7	12747	6995.7	**7809**	17066.7	44121.7	10141.7	**23777**	10284.8	1057.1
Penta-*ortho*	212.7	624.6	1268.4	**702**	1342.6	5206.6	2965.5	**3172**	5868.2	15381.1	3807.9	**8352**	4269.8	583.8
Hexa-*ortho*	149.5	240.8	325.6	**239**	356.8	1359	811.3	**842**	1215.4	3416.1	890.3	**1841**	1052.2	259.8
Hepta-*ortho*	122	124.9	121.8	**123**	147.4	587	336.9	**357**	448.3	1374.2	321.9	**715**	429	177.7
Octa-*ortho*	25	22.4	17.8	**22**	24.8	96.6	55.9	**59**	68.9	200.7	48.2	**106**	68.5	33.1

419E	Av SaraE	101C	113C	Av Lk9C	206C	221C	Av RemnC	327C	332C	Av SA13C	418C	419C	Av SaraC
24.6	**23**	**4.2**	**3.8**	**4**	**537.8**	**399.2**	**469**	**1477.1**	**1394.2**	**1436**	**75.8**	**12.5**	**44**
1821.2	**1474**	24.7	45.8	**35**	6705.8	5396.4	**6051**	11907.5	11152.9	**11530**	1184.8	97.6	**641**
8735.4	**6692**	131.4	271.8	**202**	18195.4	16311.4	**17253**	32693.2	32306	**32500**	5685.2	382.4	**3034**
3669.6	**2841**	80.1	134.5	**107**	7207.2	4986.4	**6097**	10405.4	9405.5	**9905**	2736.1	160.1	**1448**
958.6	**757**	22.61	36.8	**30**	1060.461	889.4	**975**	1500.127	1924.3	**1718**	781.121	44.9	**413**
407.3	**338**	8	15.8	**12**	225.8	292.3	**259**	335.5	516.2	**426**	216	17.8	**117**
61.5	**54**	1.3	2.4	**2**	31.9	41.4	**37**	49.3	70.5	**60**	33.2	2.8	**18**

322988

Dioxins and Dibenzofurans in 1994 tree swallow nestlings

	101C	206C	327C	418C
DIOXINS				
2,3,7,8-Tetra	0.2	0.3	0.4	0.4
1,2,3,7,8-Penta	0.9	0.7	1	0.8
1,2,4,7,8-Penta	0.4	0.2	0.3	0.3
1,2,3,4,7,8-Hexa	1	1	1.5	0.8
1,2,3,6,7,8-Hexa	1.8	2	3.5	2.7
1,2,3,7,8,9-Hexa	0.8	.6NQ	0.6	0.4
1,2,3,4,6,7,8-Hepta	5.7	7	9	4.6
Octachloro	15	13	38	12
	25.8	24.5	54.3	22
FURANS				
2,3,7,8-Tetra	4.6	9.1	16	29
1,2,3,7,8-Penta	0.2	0.9	1.5	1
2,3,4,7,8-Penta	0.6	3.5	6.7	3.3
1,2,3,4,7,8-Hexa	.2NQ	1.1	2.1	0.7
1,2,3,6,7,8-Hexa	0.2	0.6	0.9	0.5
1,2,3,7,8,9-Hexa	.07NQ	.08NQ	.1NQ	.1ND
2,3,4,6,7,8-Hexa	0.2	0.5	0.7	0.5
1.2,3,4,6,7,8-Hepta	0.5	1	1.3	0.6
1,2,3,4,7,8,9-Hepta	.2NQ	.1ND	.2NQ	.1ND
Octachloro	3.5	4.2	4.6	3.3
	10	21	34	39

See Table 3.2.2 of 1994 tree swallow report

ECDMS ANALYTICAL REPORT (6)

03-Apr-95

322990

Catalog: 5050031 Regional Study Id: 5F01 Purchase Order: 98210-4-1716

User Id: R5CFO Submitter: [redacted] Cortland, NY

Lab Name: Hazleton Environmental Services, Inc. (HAZL)

Report Includes the Following Sections:

- Weight, % Moisture, % Lipid, Total Suspended Solids
- Soil / Sediment Parameters
- Contaminant Concentrations
- Procedural Blanks
- Duplicates
- Reference Materials
- Spike Recoveries
- Comments (Result Modifers and QA/QC Comments)
- Analytical Methods

322991

WEIGHT, % MOISTURE, % LIPID, TOTAL SUSPENDED SOLIDS

Sample Number	Sample Matrix	Sample Weight (g)	Percent Moisture	Percent Lipid	Total Suspended Solids (%)
NYFO/E11	Avian Egg Ref-Lock9	1.9	0	6.23	
NYFO/E2	Avian Egg Saratoga	1.9	0	7.24	
NYFO/E20	Avian Egg Renmart	1.6	0	7.24	
NYFO/E4	Avian Egg SA13	1.7	0	8.74	

322992

SOIL / SEDIMENT PARAMETERS

Sample Number	Percent TVS	Percent TOC	Particle Size %Sand	%Silt	%Clay

- NO DATA EXIST FOR THIS SECTION.

322993

CONTAMINANT CONCENTRATIONS

Analyte	Sample Number	Sample Matrix	Result (ppm Dry Wt.)	Detection Limit (ppm Dry Wt.)	Result (ppm Wet Wt.)	Detection Limit (ppm Wet Wt.)
HCB	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
PCB-TOTAL	NYFO/E11	Avian Egg	16 Pub-LK9	.22	16	.22
	NYFO/E2	Avian Egg	13 4126	.26	13	.26
	NYFO/E20	Avian Egg	4.6 Rerun	.26	4.6	.26
	NYFO/E4	Avian Egg	44 SA13	1.4	44	1.4
alpha BHC	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
alpha chlordane	NYFO/E11	Avian Egg	< .27	.27	< .27	.27
	NYFO/E2	Avian Egg	< .24	.24	< .24	.24
	NYFO/E20	Avian Egg	< .077	.077	< .077	.077
	NYFO/E4	Avian Egg	< .58	.58	< .58	.58
beta BHC	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
dieldrin	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
endrin	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057

322994

CONTAMINANT CONCENTRATIONS (Cont.)

Analyte	Sample Number	Sample Matrix	Result (ppm Dry Wt.)	Detection Limit (ppm Dry Wt.)	Result (ppm Wet Wt.)	Detection Limit (ppm Wet Wt.)
gamma BHC	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
gamma chlordane	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
heptachlor epoxide	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
mirex	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .08	.08	< .08	.08
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
o,p'-DDD	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
o,p'-DDE	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
o,p'-DDT	NYFO/E11	Avian Egg	< .11	.11	< .11	.11
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057

CONTAMINANT CONCENTRATIONS (Cont.)

Analyte	Sample Number	Sample Matrix	Result (ppm Dry Wt.)	Detection Limit (ppm Dry Wt.)	Result (ppm Wet Wt.)	Detection Limit (ppm Wet Wt.)
oxychlordane	NYFO/E11	Avian Egg	< .33	.33	< .33	.33
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
p,p'-DDD	NYFO/E11	Avian Egg	< .043	.043	< .043	.043
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
p,p'-DDE	NYFO/E11	Avian Egg	< .54	.54	< .54	.54
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .86	.86	< .86	.86
p,p'-DDT	NYFO/E11	Avian Egg	< .05	.05	< .05	.05
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057
toxaphene	NYFO/E11	Avian Egg	< .22	.22	< .22	.22
	NYFO/E2	Avian Egg	< .26	.26	< .26	.26
	NYFO/E20	Avian Egg	< .26	.26	< .26	.26
	NYFO/E4	Avian Egg	< .29	.29	< .29	.29
trans-nonachlor	NYFO/E11	Avian Egg	< .067	.067	< .067	.067
	NYFO/E2	Avian Egg	< .052	.052	< .052	.052
	NYFO/E20	Avian Egg	< .052	.052	< .052	.052
	NYFO/E4	Avian Egg	< .057	.057	< .057	.057

322996

PROCEDURAL BLANKS

Analyte	Lab Sample Number	Result Total UG

- NO DATA EXIST FOR THIS SECTION.

322997

DUPLICATES

Analyte	Sample Number	Sample Matrix	Initial Result (ppm / %)	Duplicate Result (ppm / %)	Average	Relative % Difference

- NO DATA EXIST FOR THIS SECTION.

322998

REFERENCE MATERIALS

Analyte	Lab Sample Number	S.R.M. ID	S.R.M. Name	* Certified Reference Value (ppm / %)	95% Confidence Interval	Result (ppm / %)	Percent Recovery

- NO DATA EXIST FOR THIS SECTION.

322999

SPIKE RECOVERIES

Analyte	Sample Number	Sample Matrix	Spike Level (ppm / %)	Amount Recovered (ppm / %)	* Spike / Background	Percent Recovery

- NO DATA EXIST FOR THIS SECTION.

323000

COMMENTS (RESULT MODIFERS AND QA/QC COMMENTS)

Analyte	Sample Number	Result Modifier
% Moisture	NYFO/E11	Q Insufficient sample quantity to perform requested analysis.
	NYFO/E2	Q Insufficient sample quantity to perform requested analysis.
	NYFO/E20	Q Insufficient sample quantity to perform requested analysis.
	NYFO/E4	Q Insufficient sample quantity to perform requested analysis.
HCB	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
PCB-TOTAL	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
alpha BHC	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
alpha chlordane	NYFO/E11	Detection limit raised due to insufficient sample and interferences
	NYFO/E2	Detection limit raised due to insufficient sample and interferences
	NYFO/E20	Detection limit raised due to insufficient sample and interferences
	NYFO/E4	Detection limit raised due to insufficient sample and interferences
beta BHC	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
dieldrin	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample

* Result Modifier 'M' = Compound identiy was confirmed by GC/MS.

COMMENTS (RESULT MODIFERS AND QA/QC COMMENTS) (Cont.)

Analyte	Sample Number	Result Modifier
dieldrin	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
endrin	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
gamma BHC	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
gamma chlordane	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
heptachlor epoxide	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
mirex	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample and interferences
	NYFO/E4	Detection limit raised due to insufficient sample
o,p'-DDD	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample

* Result Modifier 'M' = Compound identiy was confirmed by GC/MS.

COMMENTS (RESULT MODIFERS AND QA/QC COMMENTS) (Cont.)

Analyte	Sample Number	Result Modifier
o,p'-DDE	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
o,p'-DDT	NYFO/E11	Detection limit raised due to insufficient sample and interferences
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
oxychlordane	NYFO/E11	Detection limit raised due to insufficient sample and interferences
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
p,p'-DDD	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
p,p'-DDE	NYFO/E11	Detection limit raised due to insufficient sample and interferences
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample and interferences
p,p'-DDT	NYFO/E11	Detection limit raised due to insufficient sample and interferences
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
toxaphene	NYFO/E11	Detection limit raised due to insufficient sample
	NYFO/E2	Detection limit raised due to insufficient sample

* Result Modifier 'M' = Compound identiy was confirmed by GC/MS.

COMMENTS (RESULT MODIFERS AND QA/QC COMMENTS) (Cont.)

Analyte	Sample Number	Result Modifier
toxaphene	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample
trans-nonachlor	NYFO/E11	Detection limit raised due to insufficient sample and interferences
	NYFO/E2	Detection limit raised due to insufficient sample
	NYFO/E20	Detection limit raised due to insufficient sample
	NYFO/E4	Detection limit raised due to insufficient sample

* Result Modifier 'M' = Compound identiy was confirmed by GC/MS.

QA/QC Comments

Accuracy and precision, as measured by spike sample recovery and duplicate sample analysis, were generally acceptable. Please note that these samples were analyzed along with catalog 7020034 and that the QC samples were from that catalog. Therefore, the QC results are not reported with this catalog.

APPROVED, CSH

ECDMS ANALYTICAL REPORT (6)

13-Feb-95

323004

Catalog: 5050031 Regional Study Id: 5F01 Purchase Order: 98210-4-1715

User Id: R5CFO Submitter: John Hickey - Cortland, NY

Lab Name: Hazleton Environmental Services, Inc. (HAZL)

Report Includes the Following Sections:

- Weight, % Moisture, % Lipid, Total Suspended Solids
- Soil / Sediment Parameters
- Contaminant Concentrations
- Procedural Blanks
- Duplicates
- Reference Materials
- Spike Recoveries
- Comments (Result Modifers and QA/QC Comments)
- Analytical Methods

323005

WEIGHT, % MOISTURE, % LIPID, TOTAL SUSPENDED SOLIDS

Sample Number	Sample Matrix	Sample Weight (g)	Percent Moisture	Percent Lipid	Total Suspended Solids (%)
NYFO/E11 122	Avian Egg	125.8	0		
NYFO/E2 428	Avian Egg	125.7	0		
NYFO/E20226	Avian Egg	125.66	0		
NYFO/E4 302	Avian Egg	125.12	0		

323006

SOIL / SEDIMENT PARAMETERS

Sample Number	Percent TVS	Percent TOC	Particle Size %Sand	%Silt	%Clay

- NO DATA EXIST FOR THIS SECTION.

323007

CONTAMINANT CONCENTRATIONS

Analyte	Sample Number	Sample Matrix	Result (ppm Dry Wt.)	Detection Limit (ppm Dry Wt.)	Result (ppm Wet Wt.)	Detection Limit (ppm Wet Wt.)
Al	NYFO/E11	Avian Egg	< 2.3	2.3	< 2.3	2.3
	NYFO/E2	Avian Egg	< 2.44	2.44	< 2.44	2.44
	NYFO/E20	Avian Egg	< 2.46	2.46	< 2.46	2.46
	NYFO/E4	Avian Egg	< 2.37	2.37	< 2.37	2.37
As	NYFO/E11	Avian Egg	.55	.1	.55	.1
	NYFO/E2	Avian Egg	.66	.1	.66	.1
	NYFO/E20	Avian Egg	.82	.1	.82	.1
	NYFO/E4	Avian Egg	.75	.1	.75	.1
B	NYFO/E11	Avian Egg	2.04	.4	2.04	.4
	NYFO/E2	Avian Egg	1.52	.4	1.52	.4
	NYFO/E20	Avian Egg	< .98	.98	< .98	.98
	NYFO/E4	Avian Egg	2.55	.4	2.55	.4
Ba	NYFO/E11	Avian Egg	.5	.2	.5	.2
	NYFO/E2	Avian Egg	.87	.2	.87	.2
	NYFO/E20	Avian Egg	< .49	.49	< .49	.49
	NYFO/E4	Avian Egg	< .47	.47	< .47	.47
Be	NYFO/E11	Avian Egg	< .05	.05	< .05	.05
	NYFO/E2	Avian Egg	< .05	.05	< .05	.05
	NYFO/E20	Avian Egg	< .05	.05	< .05	.05
	NYFO/E4	Avian Egg	< .05	.05	< .05	.05
Cd	NYFO/E11	Avian Egg	< .14	.14	< .14	.14
	NYFO/E2	Avian Egg	< .15	.15	< .15	.15
	NYFO/E20	Avian Egg	< .15	.15	< .15	.15
	NYFO/E4	Avian Egg	< .14	.14	< .14	.14
Cr	NYFO/E11	Avian Egg	< .23	.23	< .23	.23
	NYFO/E2	Avian Egg	< .24	.24	< .24	.24
	NYFO/E20	Avian Egg	< .25	.25	< .25	.25
	NYFO/E4	Avian Egg	< .24	.24	< .24	.24

323008

CONTAMINANT CONCENTRATIONS (Cont.)

Analyte	Sample Number	Sample Matrix	Result (ppm Dry Wt.)	Detection Limit (ppm Dry Wt.)	Result (ppm Wet Wt.)	Detection Limit (ppm Wet Wt.)
Cu	NYFO/E11	Avian Egg	.48	.1	.48	.1
	NYFO/E2	Avian Egg	.45	.1	.45	.1
	NYFO/E20	Avian Egg	.47	.1	.47	.1
	NYFO/E4	Avian Egg	.44	.1	.44	.1
Fe	NYFO/E11	Avian Egg	24.1	1	24.1	1
	NYFO/E2	Avian Egg	16.9	1	16.9	1
	NYFO/E20	Avian Egg	25.9	1	25.9	1
	NYFO/E4	Avian Egg	23.6	1	23.6	1
Hg	NYFO/E11	Avian Egg	.095	.01	.095	.01
	NYFO/E2	Avian Egg	.066	.01	.066	.01
	NYFO/E20	Avian Egg	.051	.01	.051	.01
	NYFO/E4	Avian Egg	< .05	.05	< .05	.05
Mg	NYFO/E11	Avian Egg	72.3	1	72.3	1
	NYFO/E2	Avian Egg	71.6	1	71.6	1
	NYFO/E20	Avian Egg	72.6	1	72.6	1
	NYFO/E4	Avian Egg	71.7	1	71.7	1
Mn	NYFO/E11	Avian Egg	.89	.1	.89	.1
	NYFO/E2	Avian Egg	.63	.1	.63	.1
	NYFO/E20	Avian Egg	.7	.1	.7	.1
	NYFO/E4	Avian Egg	1.35	.1	1.35	.1
Mo	NYFO/E11	Avian Egg	< .92	.92	< .92	.92
	NYFO/E2	Avian Egg	< .98	.98	< .98	.98
	NYFO/E20	Avian Egg	< .98	.98	< .98	.98
	NYFO/E4	Avian Egg	< .95	.95	< .95	.95
Ni	NYFO/E11	Avian Egg	< .28	.28	< .28	.28
	NYFO/E2	Avian Egg	< .29	.29	< .29	.29
	NYFO/E20	Avian Egg	< .3	.3	< .3	.3
	NYFO/E4	Avian Egg	< .29	.29	< .29	.29

122
428
226
302

323009

CONTAMINANT CONCENTRATIONS (Cont.)

Analyte	Sample Number	Sample Matrix	Result (ppm Dry Wt.)	Detection Limit (ppm Dry Wt.)	Result (ppm Wet Wt.)	Detection Limit (ppm Wet Wt.)
Cu	NYFO/E11	Avian Egg	.48	.1	.48	.1
	NYFO/E2	Avian Egg	.45	.1	.45	.1
	NYFO/E20	Avian Egg	.47	.1	.47	.1
	NYFO/E4	Avian Egg	.44	.1	.44	.1
Fe	NYFO/E11	Avian Egg	24.1	1	24.1	1
	NYFO/E2	Avian Egg	16.9	1	16.9	1
	NYFO/E20	Avian Egg	25.9	1	25.9	1
	NYFO/E4	Avian Egg	23.6	1	23.6	1
Hg	NYFO/E11	Avian Egg	.095	.01	.095	.01
	NYFO/E2	Avian Egg	.066	.01	.066	.01
	NYFO/E20	Avian Egg	.051	.01	.051	.01
	NYFO/E4	Avian Egg	< .05	.05	< .05	.05
Mg	NYFO/E11	Avian Egg	72.3	1	72.3	1
	NYFO/E2	Avian Egg	71.6	1	71.6	1
	NYFO/E20	Avian Egg	72.6	1	72.6	1
	NYFO/E4	Avian Egg	71.7	1	71.7	1
Mn	NYFO/E11	Avian Egg	.89	.1	.89	.1
	NYFO/E2	Avian Egg	.63	.1	.63	.1
	NYFO/E20	Avian Egg	.7	.1	.7	.1
	NYFO/E4	Avian Egg	1.35	.1	1.35	.1
Mo	NYFO/E11	Avian Egg	< .92	.92	< .92	.92
	NYFO/E2	Avian Egg	< .98	.98	< .98	.98
	NYFO/E20	Avian Egg	< .98	.98	< .98	.98
	NYFO/E4	Avian Egg	< .95	.95	< .95	.95
Ni	NYFO/E11	Avian Egg	< .28	.28	< .28	.28
	NYFO/E2	Avian Egg	< .29	.29	< .29	.29
	NYFO/E20	Avian Egg	< .3	.3	< .3	.3
	NYFO/E4	Avian Egg	< .29	.29	< .29	.29

122
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226
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323010

CONTAMINANT CONCENTRATIONS (Cont.)

Analyte	Sample Number	Sample Matrix	Result (ppm Dry Wt.)	Detection Limit (ppm Dry Wt.)	Result (ppm Wet Wt.)	Detection Limit (ppm Wet Wt.)
Pb	NYFO/E11	Avian Egg	< 1.15	1.15	< 1.15	1.15
	NYFO/E2	Avian Egg	< 1.22	1.22	< 1.22	1.22
	NYFO/E20	Avian Egg	< 1.23	1.23	< 1.23	1.23
	NYFO/E4	Avian Egg	< 1.19	1.19	< 1.19	1.19
Se	NYFO/E11	Avian Egg	1.82	.1	1.82	.1
	NYFO/E2	Avian Egg	3.08	.1	3.08	.1
	NYFO/E20	Avian Egg	6.24	.1	6.24	.1
	NYFO/E4	Avian Egg	2.72	.1	2.72	.1
Sr	NYFO/E11	Avian Egg	1.83	.05	1.83	.05
	NYFO/E2	Avian Egg	1.48	.05	1.48	.05
	NYFO/E20	Avian Egg	1.1	.05	1.1	.05
	NYFO/E4	Avian Egg	1.08	.05	1.08	.05
V	NYFO/E11	Avian Egg	< .11	.11	< .11	.11
	NYFO/E2	Avian Egg	< .12	.12	< .12	.12
	NYFO/E20	Avian Egg	< .12	.12	< .12	.12
	NYFO/E4	Avian Egg	< .12	.12	< .12	.12
Zn	NYFO/E11	Avian Egg	14.6	.2	14.6	.2
	NYFO/E2	Avian Egg	15.3	.2	15.3	.2
	NYFO/E20	Avian Egg	15.3	.2	15.3	.2
	NYFO/E4	Avian Egg	15.6	.2	15.6	.2

John Moore assumed didn't do Fix moisture on metals samples - these are wet wt

3/11/96 John Moore checked with Hazleton. Unspiked ref. egg samples had Selenium @ 2 ppm. Data is biased high and should be rejected. other metals do looks okay.

323011

CONTAMINANT CONCENTRATIONS (Cont.)

Analyte	Sample Number	Sample Matrix	Result (ppm Dry Wt.)	Detection Limit (ppm Dry Wt.)	Result (ppm Wet Wt.)	Detection Limit (ppm Wet Wt.)
Pb	NYFO/E11	Avian Egg	< 1.15	1.15	< 1.15	1.15
	NYFO/E2	Avian Egg	< 1.22	1.22	< 1.22	1.22
	NYFO/E20	Avian Egg	< 1.23	1.23	< 1.23	1.23
	NYFO/E4	Avian Egg	< 1.19	1.19	< 1.19	1.19
Se	NYFO/E11	Avian Egg	1.82	.1	1.82	.1
	NYFO/E2	Avian Egg	3.08	.1	3.08	.1
	NYFO/E20	Avian Egg	6.24	.1	6.24	.1
	NYFO/E4	Avian Egg	2.72	.1	2.72	.1
Sr	NYFO/E11	Avian Egg	1.83	.05	1.83	.05
	NYFO/E2	Avian Egg	1.48	.05	1.48	.05
	NYFO/E20	Avian Egg	1.1	.05	1.1	.05
	NYFO/E4	Avian Egg	1.08	.05	1.08	.05
V	NYFO/E11	Avian Egg	< .11	.11	< .11	.11
	NYFO/E2	Avian Egg	< .12	.12	< .12	.12
	NYFO/E20	Avian Egg	< .12	.12	< .12	.12
	NYFO/E4	Avian Egg	< .12	.12	< .12	.12
Zn	NYFO/E11	Avian Egg	14.6	.2	14.6	.2
	NYFO/E2	Avian Egg	15.3	.2	15.3	.2
	NYFO/E20	Avian Egg	15.3	.2	15.3	.2
	NYFO/E4	Avian Egg	15.6	.2	15.6	.2

John Moore assumes didn't do % moisture on metals samples - these are wet wt

3/11/96 John Moore checked with Hazleton. Unspiked ref. egg samples had Selenium @ 2 ppm. Data is biased high and should be rejected other metals data looks okay.

PROCEDURAL BLANKS

Analyte	Lab Sample Number	Result Total UG
Al	41002192	< 5
As	41002192	< .03
B	41002192	< 2
Ba	41002192	< 1
Be	41002192	< .1
Cd	41002192	< .3
Cr	41002192	< .5
Cu	41002192	< .5
Fe	41002192	< 5
Hg	41002192	< .01
Mg	41002192	< 5
Mn	41002192	< .5
Mo	41002192	< 2
Ni	41002192	< .6
Pb	41002192	< 2.5
Se	41002192	< .05
Sr	41002192	< .25
V	41002192	< .25

323013

PROCEDURAL BLANKS

Analyte	Lab Sample Number	Result Total UG
Al	41002192	< 5
As	41002192	< .03
B	41002192	< 2
Ba	41002192	< 1
Be	41002192	< .1
Cd	41002192	< .3
Cr	41002192	< .5
Cu	41002192	< .5
Fe	41002192	< 5
Hg	41002192	< .01
Mg	41002192	< 5
Mn	41002192	< .5
Mo	41002192	< 2
Ni	41002192	< .6
Pb	41002192	< 2.5
Se	41002192	< .05
Sr	41002192	< .25
V	41002192	< .25

PROCEDURAL BLANKS (Cont.)

Analyte	Lab Sample Number	Result Total UG
Zn	41002192	< 1

323015

DUPLICATES

Analyte	Sample Number	Sample Matrix	Initial Result (ppm / %)	Duplicate Result (ppm / %)	Average	Relative % Difference

- NO DATA EXIST FOR THIS SECTION.

REFERENCE MATERIALS

Analyte	Lab Sample Number	S.R.M. ID	S.R.M. Name	* Certified Reference Value (ppm / %)	95% Confidence Interval	Result (ppm / %)	Percent Recovery
Al	41002195	NIST 1577b	Bovine Liver	3 Dry		< 5 Dry	166.67
As	41002195	NRCC DOLT-2	Dogfish Liver	16.6 Dry	1.1	13.6 Dry	81.93
B	41002195	NIST 1577b				< 2 Dry	
Ba	41002195	NIST 1577b				< 1 Dry	
Be	41002195	NIST 1577b				< .1 Dry	
Cd	41002195	NIST 1577b	Bovine Liver	.5 Dry	.03	.43 Dry	86
Cr	41002195	NIST 1577b				.58 Dry	
Cu	41002195	NIST 1577b	Bovine Liver	160 Dry	8	162 Dry	101.25
Fe	41002195	NIST 1577b	Bovine Liver	184 Dry	15	196 Dry	106.52
Hg	41002195	NRCC DORM-1	Dogfish Muscle	.798 Dry	.074	.794 Dry	99.5
Mg	41002195	NIST 1577b	Bovine Liver	601 Dry	28	533 Dry	88.69
Mn	41002195	NIST 1577b	Bovine Liver	10.5 Dry	1.7	9.57 Dry	91.14
Mo	41002195	NIST 1577b	Bovine Liver	3.5 Dry	.3	3.54 Dry	101.14
Ni	41002195	NIST 1577b				< .6 Dry	
Pb	41002195	NIST 1577b	Bovine Liver	.129 Dry	.004	< 2.5 Dry	1937.98
Se	41002195	NRCC DOLT-2	Dogfish Liver	6.06 Dry	.49	6.62 Dry	109.24

* Only certified analytes list a confidence interval - all others are considered reference values.

REFERENCE MATERIALS (Cont.)

Analyte	Lab Sample Number	S.R.M. ID	S.R.M. Name	* Certified Reference Value (ppm / %)	95% Confidence Interval	Result (ppm / %)	Percent Recovery
Sr	41002195	NIST 1577b	Bovine Liver	.136 Dry	.001	< .25 Dry	183.82
V	41002195	NIST 1577b	Bovine Liver	.123 Dry		< .25 Dry	203.25
Zn	41002195	NIST 1577b	Bovine Liver	127 Dry	16	108 Dry	85.04

* Only certified analytes list a confidence interval - all others are considered reference values.

SPIKE RECOVERIES

Analyte	Sample Number	Sample Matrix	Spike Level (ppm / %)	Amount Recovered (ppm / %)	* Spike / Background	Percent Recovery
Al	EGG	Animal Tissue	491.67 Dry	462.5 Dry	50.02	94.07
As	EGG	Animal Tissue	39.71 Dry	44.42 Dry	79.42	111.86
B	EGG	Animal Tissue	98.33 Dry	93.38 Dry	23.87	94.97
Ba	EGG	Animal Tissue	98.33 Dry	96.25 Dry	49.91	97.88
Be	EGG	Animal Tissue	9.83 Dry	10 Dry	49.15	101.73
Cd	EGG	Animal Tissue	9.83 Dry	9.63 Dry	16.66	97.97
Cr	EGG	Animal Tissue	49.17 Dry	49.17 Dry	50.17	100
Cu	EGG	Animal Tissue	49.17 Dry	48.63 Dry	18.77	98.9
Fe	EGG	Animal Tissue	491.67 Dry	507.5 Dry	5.57	103.22
Hg	EGG	Animal Tissue	.99 Dry	0.98 Dry	4.71	98.99
Mg	EGG	Animal Tissue	491.67 Dry	429.17 Dry	1.02	87.29
Mn	EGG	Animal Tissue	98.33 Dry	91.51 Dry	99.32	93.06
Mo	EGG	Animal Tissue	98.33 Dry	95.83 Dry	24.96	97.46
Ni	EGG	Animal Tissue	49.17 Dry	49.17 Dry	41.67	100
Pb	EGG	Animal Tissue	19.67 Dry	18.63 Dry	4	94.71
Se	EGG	Animal Tissue	7.96 Dry	7.88 Dry	1.57	98.99

* For a spike to be a valid measure of method accuracy, this ratio must be higher than 1.0.

SPIKE RECOVERIES (Cont.)

Analyte	Sample Number	Sample Matrix	Spike Level (ppm / %)	Amount Recovered (ppm / %)	* Spike / Background	Percent Recovery
Sr	EGG	Animal Tissue	49.17 Dry	47.39 Dry	27.62	96.38
V	EGG	Animal Tissue	68.96 Dry	67.08 Dry	140.73	97.27
Zn	EGG	Animal Tissue	98.33 Dry	87.5 Dry	1.83	88.99

* For a spike to be a valid measure of method accuracy, this ratio must be higher than 1.0.

323020

COMMENTS (RESULT MODIFERS AND QA/QC COMMENTS)

Analyte	Sample Number	Result Modifier

- NO DATA EXIST FOR THIS SECTION.

QA/QC Comments
APPROVED, JM

ANALYTICAL METHODS

Method Code	Method Description
001	LABORATORY: Hazleton Laboratories America, Inc.

Elemental Analysis by Inductively Coupled Plasma Spectroscopy

I. SCOPE:

This method is applicable to plant and animal tissue, soil/sediment, and water.

Sample Preparation:

1) Plant and Animal Tissue

- Digest 5.00 g of tissue in Teflon vessel with 5 mL nitric acid in microwave digester. Transfer into 50 mL volumetric flask and dilute to volume with 0.005% Triton X-100 solution. Filter.

2) Soil/Sediment

- Digest 1.00 g in covered Teflon beaker on hot plate using 10 mL nitric acid. Add 30% hydrogen peroxide in 1 mL aliquots until effervescence no longer occurs. Add 1.25 mL hydrochloric acid, heat 10 minutes, and transfer to a 50 mL volumetric flask. Dilute to volume with DDI water. Filter.

3) Water

- Digest 100.0 mL sample in Teflon beaker on hot plate with 0.5 mL nitric acid and 2.5 mL hydrochloric acid. Reduce volume to 15 to 20 mL. Transfer into 50 mL volumetric flask. Dilute to volume with DDI water. Filter.

PRINCIPLE:

ANALYTICAL METHODS (Cont.)

Method Code	Method Description
001	Each analyte concentration in the sample solution is determined by comparing its emission intensity with the emission intensities of a known series of analyte standards. The analytical wavelengths are tabulated with the raw concentration data. Analytical data is corrected for background and interfering element effects by the spectrometer program. The detection limit of each analyte is listed in the data report with each respective unknown value, it is a function of the instrument detection limit (IDL), and the sample mass and volume to which it is diluted. With each batch of 20 samples of the same matrix type, at least one duplicate, one sample spike, one analytical blank, and one appropriate reference material are assayed.

REFERENCE:

1. Test Methods for Evaluating Solid Waste - EPA Publication No. SW-846, 3rd edition, Methods (3030, 3040, or 3050) and 6010, US EPA, Washington DC (revised December 1987).

2. Dahlquist, R.L. and Knoll, J.W., "Inductively coupled Plasma - Atomic Emission Spectrometry: Analysis of Biological Materials and Soils for Major, Trace, and Ultra-Trace Elements," Applied Spectroscopy, 32 (1) 1-29 (January/February 1978).

3. Official Methods of Analysis - 14th Edition, method 43.292-43.296, AOAC: Arlington, Virginia (1984).

4. Official Methods of Analysis - 1st Supplement, 14th Edition, Method 3.A01-3.A04, AOAC, Arlington, Virginia (1985).

5. U.S. Environmental Protection Agency Contract Laboratory program, Statement of Work, Inorganic Analysis, Multimedia, Multi-concentration, S.O.W. 7/88.

6. "Inductively Coupled Plasma-Atomic Emission Spectrometric Method of

ANALYTICAL METHODS (Cont.)

Method Code	Method Description
001	Trace Element Analysis of Water and Wastes," Method 200.7, edited by Theodore D. Martin and John F. Kopp, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. 7. "Method Procedures, Analytical Chemistry Department, Inorganic Chemistry." Method MP-ICPS-MA, Hazleton Laboratories America, Inc., Madison, Wisconsin.
002	LABORATORY: Hazleton Laboratories America, Inc. Mercury by Cold Vapor Atomic Absorption II. SCOPE: This method is applicable to most materials including animal tissues, plants, soils. PRINCIPLE: Sample weight: 2.00 g Sample volume: 100 mL. Samples are digested with a mixture of sulfuric and nitric acid. Mercury is reduced with sodium borohydride for determination. The amount of mercury is determined at a wavelength of 253.7 nm by comparing the signal of the unknown sample, measured by the atomic absorption spectrophotometer with the MHS-20 hydride generation unit, with the signal of the standard solutions. Using a 2.0-g sample, the lowest detection limit of this assay is 0.025 ppm. REFERENCES:

ANALYTICAL METHODS (Cont.)

Method Code	Method Description
002	1. Digestion: Analyst, 86:608 (1961) with modifications. 2. Determination: Analytical Chemistry, 40:2085 (1968). 3. Test Methods for Evaluating Solid Waste, EPA Publication No. SW-846, 2nd Ed., Methods 3030, 3040 or 3050 and 7470, U.S. EPA: Washington, D.C. (revised April 1984).
004	LABORATORY: Hazleton Laboratories America, Inc. Arsenic by Graphite Furnace IV. SCOPE: This method is applicable to animal tissues, plants, sediments, sludges, and soils. SAMPLE PREPARATION: 1) Animal or Plant Tissue Digest 1.00 g with nitric acid in a microwave digestor. Transfer to 100 mL. 2) Sediment or Soil Digest 1.00 g with nitric acid and 30% hydrogen peroxide using covered glass beakers on hot plates. Transfer to 100 mL. PRINCIPLE: The amount of arsenic is determined at a wave length of 193.7 nm by comparing the signal of the unknown sample, measured by the graphite furnace atomic absorption spectrophotometer, with the signal of the

ANALYTICAL METHODS (Cont.)

Method Code	Method Description
004	standard solutions. The method of standard additions is used where interferences are indicated. Nickel matrix modification is employed in the analysis. Using a 1.00-g sample, the lowest detection limit of this assay is 0.1 ppm. REFERENCES: 1. Test Methods for Evaluating Solid Waste, EPA Publication No. SW-846, 2nd Ed., Methods 3030, 3040 or 3050 and 7060, U.S. EPA: Washington, D.C. (revised April 1984). 2. Contract Laboratory Program Statement of Work No. 785, Method 206.2 CLP-M, U.S. EPA: Cincinnati, Ohio.
006	LABORATORY: Hazleton Laboratories America, Inc. Selenium by Graphite Furnace VI. SCOPE: This method is applicable to animal tissues, plants, sediments, sludges, and soils. SAMPLE PREPARATION: 1) Animal or Plant Tissue Digest 1.00 g with nitric acid in a microwave digestor. Transfer to 100 mL. 2) Sediment or Soil Digest 1.00 g with nitric acid and 30% hydrogen peroxide using

ANALYTICAL METHODS (Cont.)

Method Code	Method Description
006	covered glass beakers on hot plates. Transfer to 100 mL.

PRINCIPLE:

The amount of selenium is determined at a wavelength of 196.0 nm by comparing the signal of the unknown sample, measured by the graphite furnace atomic absorption spectrophotometer, with the signal of the standard solutions. The method of standard additions is used along with nickel matrix modification in the analysis.

Using a 1.00-g sample, the lowest detection limit of this assay is 0.1 ppm.

REFERENCE;

1. Test Methods for Evaluating Solid Waste, EPA Publication No. SW-846, 2nd Ed., Methods 3030, 3040, or 3050 and 7740, U.S. EPA: Washington, D.C. (revised April 1984).

019 LABORATORY: Hazleton Laboratories America, Inc.

Moisture Determination

XIX. SCOPE:

This method is applicable to plant tissue, animal tissue, and soil/sediment.

PRINCIPLE:

The prepared sample is weighed into a tared aluminum dish and is dried in an oven to constant weight (approximately 12-18 hours) at 100 C.

ANALYTICAL METHODS (Cont.)

Method Code	Method Description
019	SENSITIVITY:
	This method is capable of detecting 0.1% moisture.
	REFERENCES:
	1. Official Methods of Analysis, 15th Ed., Methods 926.08, 925.09, Assoc. of Off. Analytical Chemists, Arlington, VA (1990) modified.
	2. USEPA Contract Laboratory Program, Statement of Work for Inorganics Analysis, Exhibit D, S.O.W. 3/90, Document No. ILM01.0.