United States Department of the Interior

U. S. GEOLOGICAL SURVEY

Columbia Environmental Research Center
4200 New Haven Road
Columbia, Missouri 65201

October 25, 2000

Anne Secord
US Fish and Wildlife Service
New York Field Office
3817 Luker Road
Cortland, New York 13045

Dear Anne:

I am enclosing the report for congener specific PCBs, organochlorine pesticides, non-*ortho*-PCBs, and PCDD/PCDFs in the Eagle eggs. This "Report # 4"is part of the larger Hudson River investigation that examines exposure of biota to contaminants.

The analysis went very well and the quality of the data is well within our guidelines. The remainder of the project is going well. I will have the eagle prey items that we are re-analyzing reported to you before Thanksgiving. Give me a call if you have any questions.

Sincerely,

Carl E. Orazio
Leader, Organic Chemistry Section

USGS
science for a changing world

Columbia Environmental Research Center
U.S. Geological Survey- Biological Resources Division
4200 New Haven Road, Columbia, Missouri 65201

October 24, 2000

REPORT #4
Organochlorine Contaminants in Bald Eagle Eggs

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FWS NO: 1448-50181-99-H-007
CERC NO: 3307-70L1D

By

Organic Chemistry Section
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FWS Project Title:

Chemical Contamination of Nesting Tree Swallows, Great Blue Herons, and Resident/Nesting Bald Eagles Along the Hudson River, New York

Principal Investigator

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Project History:

The Hudson River is highly contaminated with PCBs from industrial sources, primarily two capacitor manufacturing facilities operated by General Electric. The 200 river miles from the New York Harbor upstream to Hudson Falls, New York, are designated a Superfund Site. From 1946 until 1977, it is estimated that between 209,000 and 1.3 million pounds of PCBs were discharged into the waters of the Hudson by these two plants. Downstream movement of the PCBs was retarded by the Ft. Edward Dam until its removal in 1973, at which time the heavily contaminated sediments and detritus began to migrate downstream. In addition to contamination of the river itself, dredging operations have deposited contaminated material at nine known upland sites adjacent to the river. In 1993, it was discovered that one of the facilities was continuing to discharge PCBs into the river.

Contamination of water, sediments, and fish along the Hudson River by PCBs has been examined, but less is known about the concentration and movement of the contaminants among other trophic levels. Many resident and migrating avian species may be affected, including a fairly substantial population of wintering bald eagles (*Haliaeetus leucocephalus*). The samples described in this report are part of a series of studies designed to expand the knowledge of PCB flux in the food chain of bird species and other biota on and around the Hudson River. In 1995-1997, we took part in a study involving tree swallows (*Tachycineta bicolor*) as the indicator species along the river. Eggs, pre-fledgling chicks, odonates (emergent insects which comprise a large percentage of the diet of the swallows), and two species of ducks were assessed for contaminant concentrations. In 1997-1998, the scope of the study expanded to include samples from a bald eagle and a number of bald eagle prey species. Several species of fish, tree swallows, bluebirds, wood ducks, and two species of sparrow were analyzed.

The present segment of the study expands the diversity of the sample matrices still further. In response to the growing number of wintering, and in some cases, nesting bald eagles on the Hudson, tissue and eggs from a larger group of bald eagles and prey species have been added. The great blue heron (*Ardea herodias*), another top predator inhabiting the area, was examined. To gain further understanding of the factors influencing the life cycles and reproduction of these animals, more comprehensive organic analyses were conducted. PCB congeners including non-*ortho*-chlorinated (dioxin-like) PCBs, polychlorinated dibenzo-dioxins and-furans (PCDDs, PCDFs), polycyclic aromatic hydrocarbons (PAHs), and a suite of organochlorine pesticides were targeted in this investigation. As the information base on this ecosystem grows, a clearer picture of the remedial efforts required to restore it to its normal function will hopefully emerge.

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Biota sampled by US F&WS were analyzed by the Organic Chemistry Section of the Columbia Environmental Research Center. A total of 124 samples were investigated, targeting selected analytes from the following list (each sample was not analyzed for all analytes):

Total PCBs and selected PCB congeners,
Organochlorine pesticides
2,3,7,8-substituted polychlorinated dibenzo-*p*-dioxins and -dibenzofurans
Non-*ortho* PCB congeners
Polycyclic aromatic hydrocarbons

Samples were generally grouped by analysis type. The various groups are reported separately. In addition to organic analysis, selected samples were analyzed for mercury, arsenic, and selenium; these are reported under a separate cover.

<u>This report contains the results for the 3 Bald Eagle Eggs:</u>

PCB congeners,
OC pesticides,
non-*ortho* PCB congeners,
2,3,7,8-substituted polychlorinated dibenzo-*p*-dioxins and -dibenzofurans

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Tables:

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I. Summary of Analytical Methods for Sample Preparation

The samples in this set consisted of 3 eagle eggs. After receipt, the samples were assigned CERC database numbers.

CERC Database Number	FWS Field Identifier
19861	BE-EG906-98
19862	BE-EG910-98
20032	BE-EG970-99

Quality Control:
The following QC samples were analyzed with the samples:

1 procedural blank
1 matrix blank (negative control bluegill)
2 matrix spikes (spiked negative control bluegill,
for OC pesticides and PCBs, non-*ortho* PCBs, PCDDs/PCDFs
1 positive control (Saginaw Bay carp)

Matrix QC samples (blanks and spikes) prepared from clean bluegill were analyzed with each set of samples. Positive control samples were prepared from CERC's standard positive control matrix (common carp tissue from Saginaw Bay, MI). One of each category of QC sample (procedural blank, matrix blank, matrix spike, and positive control) was analyzed with the samples. Additionally, one sample (20032) was prepared, processed, and analyzed in triplicate.

All samples, including QC samples were spiked with surrogate compounds before extraction to monitor recoveries through the cleanup procedures. Since the samples were processed through two separate analytical procedures, two different sets of internal standards were used. Where congener-specific PCBs, non-*ortho*-PCBs, PCDDs, and PCDFs were targeted, the following compounds were used:

PCB 029 (2,4,5-trichlorobiphenyl)
PCB 155 (2,2',4,4',6,6'-hexachlorobiphenyl)
PCB 204 (2,2',3,4,4',5,6,6'-octachlorobiphenyl)
Four ^{13}C-labeled non-*ortho* PCB congeners
Seventeen ^{13}C-labeled 2,3,7,8 substituted dioxin/furans

For analysis of organochlorine pesticides, the following compounds were added:

PCB 029 (2,4,5-trichlorobiphenyl)
PCB 155 (2,2',4,4',6,6'-hexachlorobiphenyl)
PCB 204 (2,2',3,4,4',5,6,6'-octachlorobiphenyl)
Tetrachloro-m-xylene
Di-n-butylchlorendate

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The following compounds were added to matrix spikes according to the analytical protocol to which they were subjected:

Organochlorine pesticides (27 compounds)
PCBs (mixed Aroclors 1242, 1248, 1254, 1260)
native (^{12}C) dioxin and furan congeners

Sample Preparation:
Two different analytical protocols were performed on portions of each sample. In each protocol, the samples were dehydrated by addition of anhydrous sodium sulfate and method recovery standards were added. Samples were extracted with methylene chloride, and a small portion of the extract (1%) was used to determine percent lipid (1). In the analytical protocol targeting congener-specific PCBs, PCDDs, and PCDFs, extracts were cleaned with acid- and base-treated silica gels and adsorbent chromatography on activated silica gel (2). All extracts were further purified by Gravity-Flow Gel Permeation Chromatography (3) followed by High Performance Gel Permeation Chromatography (HPGPC) (4) before fractionation on high performance Porous Graphitic Carbon (PGC) (5) into the following fractions:

PGC-1	*ortho*-chlorinated PCB congeners Analysis by gas chromatography (GC)/electron-capture detection (ECD)
PGC-2	non-*ortho*-chlorinated PCBs Analysis by GC/high resolution mass spectrometry (GC/HRMS)
PGC-3	polychlorinated dibenzo-*p*-dioxins and -furans (PCDD/PCDFs) Clean-up by alumina chromatography (6) before GC/HRMS analysis

Organochlorine pesticides extracts were first cleaned on gravity-GPC (3) followed by HPGPC (4). The extracts were then fractionated on a two-layered octadecyl silica/activated silica gel column into fractions containing PCBs and four of the targeted OCs (SODS-1), and a second fraction containing the remainder of the OCs (SODS-2) (7).

II. Congener-specific PCB Analysis and Results

Results for the congener-specific PCB analysis are given in Table 1, designated by their CERC database number and are cross-referenced to their field identification number. Concentrations are expressed as nanograms of analyte per gram of sample (wet weight). The quality control accompanying the data indicates the results are well within QC limits. Matrix and procedural blank results, spike recoveries, detection limits, method precision, and instrument precision are presented in Table 1. The matrix spike recovery for total-PCBs was 85%. Recoveries of the procedural internal standards were well within QC limits. The MDL for total PCBs was 140 ng/g. (See the tables for individual MDL values). Triplicate analysis of sample 20032 showed the PCB method to have a relative standard deviation of 11%.

Summary of gas chromatographic method for congener-specific PCBs
The sample extracts were adjusted to a final volume of 10 mL. Two instrumental internal standards were used: congeners 030 and 207 (400 ng each). Individual PCB congeners were measured in PGC1 fractions by GC/ECD. Analyses were performed using Hewlett-Packard 5890 Series II GCs with cool on-column capillary injection systems and Hewlett-Packard model 7673 autosamplers (8). For all analyses, a 3-m section of 0.53 mm i.d. uncoated and deactivated (Restek Corp., Inc.) capillary retention gap was attached to the front of each analytical column by a "Press-Tight" (Restek Corp., Inc.) union. The analytical columns were a 60-m x 0.25-mm DB-5 (0.25µm 5% phenyl-, 95% methylsilicone, J&W Scientific) and a 60-m x 0.25-mm DB-17 (0.25µm 50% phenyl-, 50% methylsilicone, J&W Scientific). The H_2-carrier gas was pressure regulated at 25 psi. The temperature program for the PCB analysis was as follows: initial temperature 60 °C, immediately ramped to 150 °C at 15 °C/min, then ramped to 250 °C at 1 °C/min, and finally ramped to 320 °C at 10 °C/min, and held for 1 min. The temperature of the electron capture detectors was 330 °C.

Capillary GC/ECD data were collected, archived in digital form, and processed using a PE-Nelson chromatography data system which included the model 970 interface and version 6.1 of Turbochrom Workstation™ chromatography software on a Pentium III microcomputer (9). Six levels of PCB standards, a combination of Aroclors 1242, 1248, 1254, 1260 in 1:1:1:1 w/w/w/w ratio (designated A1111), were used for PCB congeners calibration, with total PCB concentrations ranging from 200 to 8000 ng/mL. PCB congeners 030 and 207 were used as instrumental internal standards. The method detection limits (MDLs) for individual PCB congeners and for total PCBs are based on procedural blank (PB) results according to the method outlined by Keith *et al.* (10,11). Briefly, an average and standard deviation are determined. The MDL (ng) is calculated using the following formula:

$$MDL = (PB\ Avg) + 3(PB\ SD)$$

The MDL is then expressed in units of concentration, e.g. mass of analyte per mass of sample. An average mass for the set is used.

Accuracy of the method is monitored through rigorous quality control. Analytical standards have been verified against certified standards (Accustandard, New Haven CT). The extraction efficiency and method are monitored by analysis of positive control, Saginaw Bay carp. Recoveries of analytes are monitored by the following measures:

1. procedural internal standards spiked into each sample
2. PCB-spiked control bluegill tissue analyzed with each set

PCB 029, a trichlorobiphenyl, is representative of more volatile early eluting PCBs (Cl_1 - Cl_3). PCB 155, a hexachlorobiphenyl, is representative of mid-range eluting congeners (Cl_4 - Cl_6). PCB 204), an octachlorobiphenyl, is less volatile and representative of later eluting PCBs (Cl_7 - Cl_{10}).

III. Organochlorine Pesticide Analysis and Results

Results of the OC pesticide analysis are presented in Table 3. Quality control data for procedural and matrix blanks, spikes, replicates, and positive controls are presented in Tables 3 and 4. The data are well within QC limits. The MDLs for the OC pesticides, and the precision of the triplicate analysis of sample 20032 are also shown the tables. All concentrations are reported in nanograms per gram, except for procedural blank samples, which are reported as a mass amount (ng). The method detection limits (MDLs) for individual compounds are calculated by the method already described in the previous section.

Summary of gas chromatographic method for OC pesticides
Organochlorine pesticide fractions (SODS-1 and SODS-2) were adjusted to a final volume of 4 mL and the instrumental internal standards (IIS) were added (PCB congeners 030 and 207). Individual organochlorine pesticides were measured in both fractions by GC/ECD. Analyses were performed using Hewlett-Packard 5890 Series II GCs with cool on-column capillary injection systems and Hewlett-Packard model 7673 autosamplers (12). For all analyses, a 3-m section of 0.53 mm i.d. uncoated and deactivated (Restek Corp., Inc.) capillary retention gap was attached to the front of the analytical column by a "Press-Tight" (Restek Corp., Inc.) union. The analytical column for the SODS-2 fraction was a 30-m x 0.25-mm DB-35ms (J&W Scientific). The H_2-carrier gas was pressure regulated at 11 psi. The temperature program for the analysis was as follows: initial temperature 90 °C, immediately ramped to 165 °C at 15 °C/min, held 3 minutes, then ramped to 260 °C at 2.5 °C/min with a 5 minute hold, and finally ramped to 320 °C at 10 °C/min, and held for 1 min. The ECD temperature was 330 °C.

Capillary GC/ECD data were collected, archived in digital form, and processed using a PE-Nelson chromatography data system that included the model 970- interface and version 6.1 of Turbochrom Workstation™ chromatography software on a Pentium III microcomputer (9). Six levels of OC pesticide standards were used for calibration, with each pesticide at concentrations ranging from 1 to 80 ng/mL. Organochlorine pesticide results are presented in Table 3, designated by their CERC database number and cross-referenced to their field identification number. Concentrations are expressed as nanograms of analyte per gram of sample (wet weight).

IV. Non-*ortho*-PCB Congener Analysis and Results

Results for the non-*ortho*-PCB congeners are presented in Table 5. Concentrations are expressed as picograms of analyte per gram of sample (wet weight). In the eagle egg samples, ion ratios of the primary ions for all detected analytes in both samples and calibration standards were within the QC range (±15% of theoretical). The quality control accompanying the data indicates high quality results, well within QC limits. Total mass (pg) of native non-*ortho*-PCBs in the procedural blanks is normalized to sample size (in this case 10 g in Table 5). In the procedural blank (PB 5/11/00), values are much below

the lowest concentrations in the sample. Non-*ortho*-PCB concentrations are also very low in the bluegill (matrix) blank. One of the triplicate eagle egg samples suffered from chromatographic interferences and could not be quantified with accuracy. The resulting duplicate analysis indicates high precision, however. In the Aroclor-spiked bluegill sample, the most abundant non-*ortho* congener, PCB 77, is within 25% of the historic mean determined for our mixed Aroclor spiking standard. Less abundant non-*ortho* congeners PCBs 81 and 126 in the Aroclor-spiked samples are also within 9% and 35% of their respective mean values. PCB 169 is too low for meaningful comparisons. The efficiency of the extraction and cleanup procedure was determined by measuring the ^{13}C-labeled surrogates in the *final* extract, using a ^{13}C-labeled compound as the instrumental internal standard. Percent recoveries of the ^{13}C-labeled surrogates in the eagle egg samples (Table 6) ranged 60 to 102%. This is within QC limits of 25-125%.

Summary of GC/HRMS method for non-*ortho*-PCB

The non-*ortho*-PCB fractions (PGC-2) were transferred to conical autosampler vials, evaporated to less than 50 µL with nitrogen, and then spiked with 5 ng of instrumental internal standard (50 µL of 100 pg/µL ^{13}C-labeled 2,2',4,5,5'-PeCB (PCB #101) in nonane). The final volume was adjusted to about 50 µL with nitrogen blow-down. Non-*ortho*-PCBs were determined by GC/HRMS, monitoring two sequential mass windows during the chromatographic separation (13,14). GC/HRMS analysis was performed with a HP 5890A capillary gas chromatograph interfaced to a VG 70-250AS high resolution mass spectrometer. An HP 7673 autosampler was used to introduce 2 µL of the extract from a conical vial onto a 5 m x 320 µm deactivated fused silica retention gap via heated (285 °C) direct on-column injection with a Restek spiral Uniliner. A 50 m x 200 µm x 0.11 µm Ultra-1 capillary column was used to resolve non-*ortho*-PCBs from most interferences. The GC oven was held at 120 °C for 1 min, programmed to 240 °C at 2.2 °C/min, then ramped to 310 °C at 5 °C/min, and a final hold of 5 min. Helium carrier gas was maintained at 45 psig with an initial linear velocity of 27 cm/s. The analytical column was put into the MS interface, heated at 310 °C. All column-to-column connections were made with fused silica press-tight connectors.

The VG GC/HRMS system was tuned to 10,000 resolution and calibrated using perfluorodecalin. Mass windows were established for two groups of non-*ortho*-PCBs. Group 1 from 23-47:00 min included ions for Cl_4-biphenyls #77 and 81 and Cl_5-biphenyl #126; Group 2 from 47:05-64 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 quantified and averaged. 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), Br_5- and Cl_6-diphenyl ethers (residual carryover from PGC-1), and Cl_4-PCDF (to ensure no breakthrough of PCDFs).

A calibration curve describing the response of each native congener (0.25 to 2,500 pg/µL) to that of its ^{13}C-labeled surrogate was used. Quantification is inherently corrected by the ^{13}C-isotopically labeled surrogates, which account for analytical losses during isolation procedures and variations in the instrumental analysis.

Molecular ion responses of certain PCB congeners are measured to ensure that their fragment ion responses do not contribute an interference >10% to the responses of the respective non-*ortho*-PCB. Column performance is verified by analyzing standards of individual congeners, labeled congeners, and congeners from Aroclor spiked mixtures. Because non-*ortho*-Cl_5-PCB 126 is only minimally resolved from Cl_6-PCB 129, PCB 129's molecular ion response is monitored to assure that its fragment ion response (3.5% abundance) does not contribute an interference of >10% to the response of PCB 126. PCB 129's molecular ion response must not exceed three times that of PCB 126. Adequate mass resolution is verified while monitoring ions $Cl_{4\text{-}8}$ PCNs.

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

1. Peak areas for the selected ion responses must be greater than three times background noise.
2. 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.
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.

V. 2,3,7,8-Cl Substituted Dioxin and Furan Analysis and Results

The results for the 2,3,7,8-substituted PCDDs and PCDFs are presented in Table 7, designated by their CERC database number and are cross-referenced to their field identification number. Concentrations are expressed as picograms of analyte per gram of sample (wet weight). Quality control results are well within QC limits. In the procedural blank, amounts of PCDFs and PCDDs are expressed as total mass (pg) divided by 10g to normalize to sample concentrations (Table 7). In this blank, values are at or below the lowest concentrations in the samples, with the exception of OCDF, which is elevated (~30 pg/g equivalent). Concentrations of native PCDFs and PCDDs in the spiked bluegill or chicken egg samples are within 25% of those expected except for OCDF and OCDD. Concentrations of 2,3,7,8-substituted PCDDs and PCDFs in the positive control Saginaw Bay carp matrix (Table 7) are within the QC range of the ongoing determinations of this matrix, again, with the exception of OCDF. The precision of the analysis is shown in Table 7. One of the triplicate samples suffered chromatographic losses on PGC and accurate quantification was not possible. No other samples were affected by this loss. The efficiency of the extraction and cleanup procedure was montitored by quantifying the ^{13}C-labeled surrogates in the *final* isolated extract, using a ^{13}C-labeled compound as an instrumental internal standard. Recoveries of the ^{13}C-labeled surrogates (Table 8) were within the expected QC range of 25-125%.

Summary of GC/HRMS method for 2,3,7,8-Cl substituted dioxins and furans
PCDD/PCDF fractions from PGC (PGC-3) were eluted through basic alumina to remove potential co-contaminants such as chlorinated diphenyl ethers and residual PCNs and PCBs (6). A total of 1 ng of the internal standard, ^{13}C-labeled 1,2,3,4-TCDD, was added to each semiconical autosampler vial prior to transferring the PCDDs/PCDFs. The final extract was concentrated to a volume of ~25 µL under a stream of nitrogen. PCDFs and PCDDs were determined by GC/HRMS by monitoring five sequential mass windows of selected ions during the chromatographic separation (15). The GC/HRMS analysis was performed using a HP 5890A capillary gas chromatograph interfaced to a VG 70-AS high-resolution mass spectrometer. An HP 7673 autosampler was used to introduce 2 of 25 µL of the 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 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 min. The helium carrier gas was maintained at 44 psig with an initial linear velocity of 25 cm/s. All column-to-column connections were made using fused silica press-tight connectors.

The VG GC/HRMS system was tuned to 10,000 resolution and calibrated using perfluorokerosene. Mass windows were established for five ion groups to measure Cl_{4-8} PCDFs and PCDDs. Within each mass window, two most abundant ions were measured for positive identification and quantitation of each analyte. The ion responses were quantified and averaged. Additional ions monitored any responses from potentially interfering Cl_{5-9}-polychlorinated diphenlyethers (PCDEs) and Cl_{5-7}-polychlorinated terphenyls (PCTs), and dioxin-like Cl_{6-7}-polychlorinated naphthalenes (PCNs), Cl_{3-8} dibenzothiophenes (PCDTs), and Cl_{3-8} phenanthrene and anthracenes. A calibration curve describing the response of each native congener to that of a ^{13}C-labeled surrogates congener was used for quantification.

Window switching times were established using a window-defining PCDF/PCDD standard mixture; relative retention times were then established for PCDTs. The chromatographic column resolved 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. Adequate mass resolution was verified while monitoring ions Cl_{6-7} PCNs vs. ion responses of ^{13}C-TCDDs and of native TCDD versus ^{13}C-TCDF. Lock-mass and lock-mass-check ions were used to maintain and verify the accuracy of mass measurement.

For the positive identification and quantitation of a particular congener, the following criteria were met:

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

2. 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;
3. For OCDF (without an isotopically-labeled analog), ion responses in sample analyses must occur at RRTs from -0.2 to 0.5% of ^{13}C-labeled OCDD, analogous to the window above;
4. 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.

VI. Summary

Eagle eggs were analyzed for congener specific and non-*ortho* PCBs, organochlorine pesticides, and polychlorinated dibenzo-*p*-dioxins and dibenzofurans. These eggs are part of the investigation of exposure of biota to contaminants along the Hudson River, NY. Included in this large project are fish, bird eggs, eagle prey items, and eagle bloods.

The quality control associated with the results for the eagle eggs are within our guidelines. Detections limits, precision of the methods, procedural blanks, and matrix spikes were used to monitor the quality of these data.

The levels of PCBs, pesticides, dioxins and furans in these eagle eggs are elevated. There is clear indication of exposure to these contaminants. The total dioxin toxic equivalents, using avian TEQs (16) are as follows:

BE-EG906-98..... 2100 pg/g
BE-EG910-98..... 1200 pg/g
BE-EG-270-99..... 520 pg/g

A large percent of the dioxin-like toxicity was from non-*ortho* PCBs (84%). The remainder of the dioxin-like toxicity was attributed to mono-*ortho*-PCBs (8%) and dioxins and furans (8%).

The major organochlorine pesticides found as contaminants in the eagle eggs were p,p'-DDE, p,p'-DDD, and chlordane constituents. Once site location and other information is available about egg related samples, patterns of PCBs can be interpreted to discern trends in PCB trophic transfer.

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Figure 1: Analysis for Congener-specific PCB, PCDD, and PCDF Residues

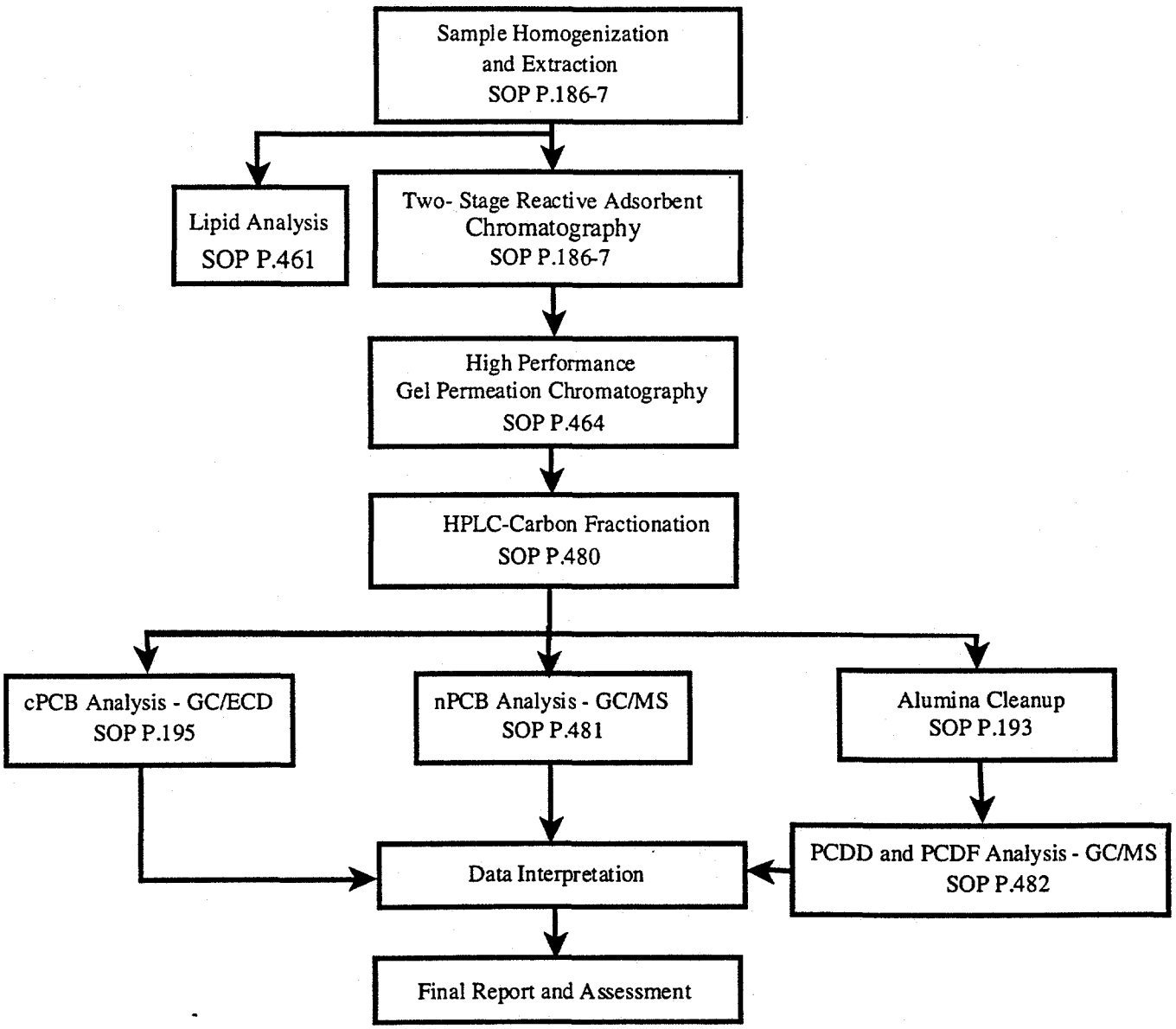
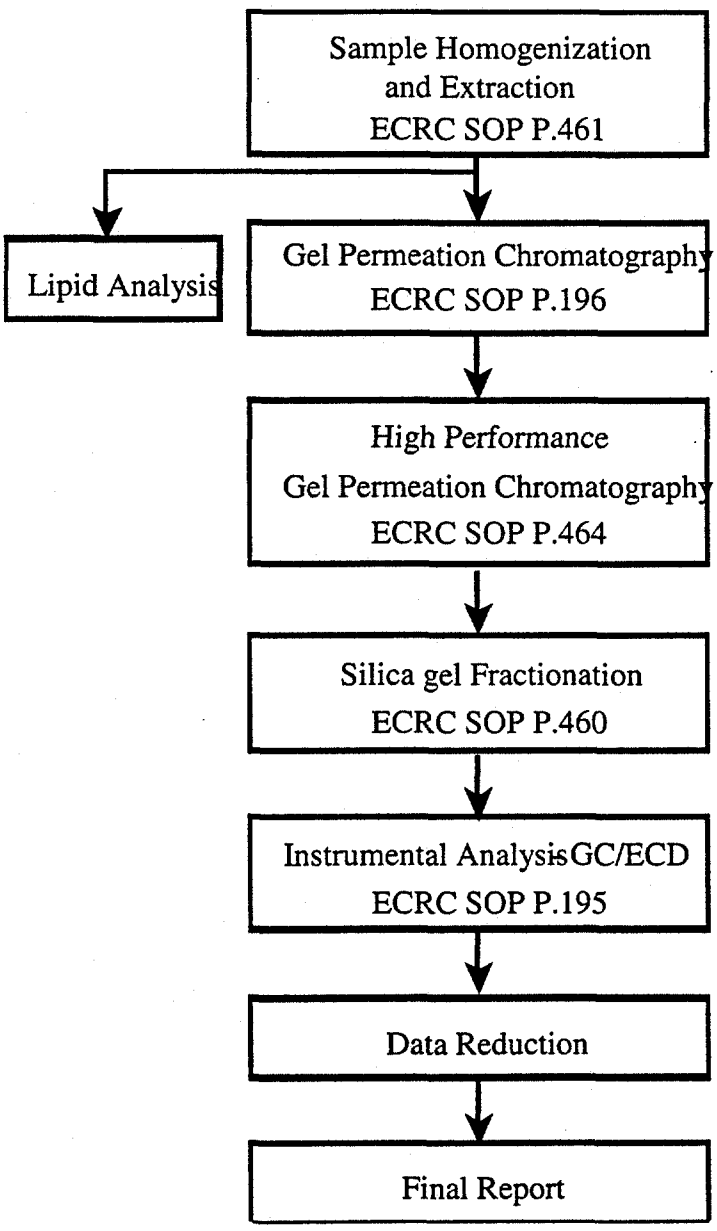


Figure 2: Analysis for Organochlorine Pesticides and Total PCB Residues



Chemical Contamination of Nesting Tree Swallows, Great Blue Herons, and Resident/Nesting Bald Eagles Along the Hudson River, New York

Final Report: October 24, 2000

Prepared By:

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Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	Gram-equivalents for Analysis (g)	% Lipid	001	003	004	005	006	007	008	009	010	015	016
19861	BE-EG906-98	Eagle Egg	10.08	8.6	16	0.36	95	0.07	7.9	0.22	21	1.8	26	0.56	19
19862	BE-EG910-98	Eagle Egg	9.83	4.5	18	< 0.36	120	0.08	11	0.28	31	2.1	37	0.16	39
20032-1	BE-EG-270-99	Eagle Egg	9.87	5.5	< 0.29	< 0.36	< 0.42	< 0.01	< 0.01	< 0.01	0.26	< 0.01	< 0.01	< 0.01	0.67
20032-2	BE-EG-270-99	Eagle Egg	9.97	5.4	< 0.29	< 0.36	< 0.42	< 0.01	< 0.01	< 0.01	0.32	< 0.01	< 0.01	< 0.01	0.57
20032-3	BE-EG-270-99	Eagle Egg	9.81	4.9	< 0.29	< 0.36	< 0.42	< 0.01	< 0.01	< 0.01	0.26	< 0.01	< 0.01	< 0.01	0.96
20032 Average			9.88	5.3							0.28				0.73
200032 SD(n-1)	(n=3)		0.08	0.32							0.04				0.20
%RSD			0.82	6							13				28
MS051100 GCR1	Matrix Spike	Bluegill	9.86	4.1	11	3.8	69	2.8	36	4.5	130	10	2.7	40	85
Recovery					*46*	*57*	*69*	*60*	*69*	*65*	*68*	*72*	*65*	*72*	*65*
Mock 100% PCBs					25	6.7	100	4.6	52	6.9	190	14	4.2	55	130
MB051100	Matrix Blank	Bluegill	9.89	3.8	< 0.29	< 0.36	< 0.42	< 0.01	< 0.01	< 0.01	0.08	0.04	< 0.01	< 0.01	0.05
	Average mass	=	*8.73*												
PB051100 GCR1	Procedure Blank	Na_2SO_4	---	---	1.9	2.9	2.9	0.03	0.00	0.02	0.15	0.05	0.03	0.05	0.00
PB051100 GCR2	Procedure Blank	Na_2SO_4	---	---	2.1	2.9	2.1	0.02	0.00	0.02	0.20	0.07	0.03	0.06	0.00
PB051100 GCR3	Procedure Blank	Na_2SO_4	---	---	2.2	3.0	2.2	0.03	0.00	0.03	0.19	0.05	0.04	0.05	0.00
Average					2.1	2.9	2.4	0.03	0.00	0.02	0.18	0.06	0.04	0.05	0.00
Standard Deviation					*0.14*	*0.07*	*0.42*	*0.00*	*0.00*	*0.00*	*0.03*	*0.01*	*0.01*	*0.01*	*0.00*
MDL	= PB Average + 3 (SD)				2.5	3.1	3.7	0.04	0.00	0.03	0.26	0.09	0.05	0.07	0.01
MDL (mass normalized)[1]					**0.29**	**0.36**	**0.42**	**0.01**	**0.01**	**0.01**	**0.03**	**0.01**	**0.01**	**0.01**	**0.01**

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

305709

Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	017	018	019	020	022	024	025	026	027	028	031	032	033	034	035
19861	BE-EG906-98	Eagle Egg	160	90	55	5.1	57	2.9	34	110	37	850	420	220	14	9.8	2.5
19862	BE-EG910-98	Eagle Egg	160	84	73	5.3	56	3.5	39	120	44	590	370	200	15	9.4	1.7
20032-1	BE-EG-270-99	Eagle Egg	4.2	1.9	0.99	0.50	4.5	0.04	2.6	8.3	0.20	44	37	6.0	2.0	0.27	1.7
20032-2	BE-EG-270-99	Eagle Egg	4.2	1.6	1.2	0.67	4.6	< 0.01	2.9	9.0	0.24	45	30	6.4	2.2	0.33	2.2
20032-3	BE-EG-270-99	Eagle Egg	3.1	1.3	0.99	0.54	4.2	< 0.01	3.0	7.8	0.18	41	20	5.4	1.9	0.32	1.9
20032 Average			3.8	1.6	1.0	0.57	4.4		2.8	8.4	0.21	43	29	5.9	2.0	0.31	1.9
200032 SD(n-1)	(n=3)		0.65	0.30	0.10	0.09	0.22		0.17	0.60	0.03	2.3	8.2	0.49	0.15	0.03	0.22
%RSD			**17**	**18**	**9**	**15**	**5**		**6**	**7**	**15**	**5**	**28**	**8**	**8**	**11**	**11**
MS051100 GCR1	Matrix Spike	Bluegill	91	250	22	12	80	2.8	14	43	11	190	180	79	120	0.73	0.50
Recovery			***61***	***76***	***86***	***75***	***72***	***65***	***71***	***77***	***74***	***70***	***75***	***79***	***75***	***96***	***81***
Mock 100% PCBs			150	330	26	15	110	4.3	20	56	15	270	240	100	160	0.76	0.62
MB051100	Matrix Blank	Bluegill	0.07	0.14	0.02	< 0.01	0.04	< 0.01	< 0.05	< 0.05	< 0.01	0.14	0.08	< 0.08	0.08	< 0.05	< 0.01
	Average mass	=															
PB051100 GCR1	Procedure Blank	Na_2SO_4	0.00	0.00	0.07	0.04	0.08	0.00	0.09	0.37	0.06	0.76	0.44	0.48	0.23	0.00	0.03
PB051100 GCR2	Procedure Blank	Na_2SO_4	0.18	0.30	0.64	0.03	0.11	0.00	0.00	0.29	0.06	0.89	0.45	0.59	0.24	0.00	0.02
PB051100 GCR3	Procedure Blank	Na_2SO_4	0.13	0.35	0.16	0.03	0.06	0.00	0.22	0.26	0.06	0.87	0.47	0.46	0.28	0.23	0.03
Average			0.10	0.22	0.29	0.03	0.08	0.00	0.10	0.30	0.06	0.84	0.45	0.51	0.25	0.08	0.02
Standard Deviation			0.09	0.19	0.31	0.00	0.02	0.00	0.11	0.06	0.00	0.07	0.01	0.07	0.03	0.13	0.00
MDL	= PB Average + 3 (SD)		0.38	0.79	1.2	0.05	0.15	0.00	0.44	0.47	0.06	1.1	0.49	0.72	0.33	0.47	0.04
MDL (mass normalized)[1]			**0.04**	**0.09**	**0.14**	**0.01**	**0.02**	**0.01**	**0.05**	**0.05**	**0.01**	**0.12**	**0.06**	**0.08**	**0.04**	**0.05**	**0.01**

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

305710

Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	037,059	040	041	042	043	044	045	046	047	048	049	051	052	053	*054*
19861	BE-EG906-98	Eagle Egg	23	42	10	420	29	330	50	8.0	2,100	34	1,800	25	1,100	34	0.04
19862	BE-EG910-98	Eagle Egg	22	45	11	360	9.0	280	54	9.3	760	33	1,500	27	910	33	0.01
20032-1	BE-EG-270-99	Eagle Egg	1.7	7.3	1.2	38	1.7	31	2.2	0.19	96	2.9	130	1.9	63	0.46	0.18
20032-2	BE-EG-270-99	Eagle Egg	1.7	6.1	1.3	39	1.4	31	2.1	0.30	100	2.9	140	2.1	70	0.95	0.18
20032-3	BE-EG-270-99	Eagle Egg	1.6	4.8	1.1	35	1.4	27	2.1	0.11	89	3.1	120	2.1	61	0.30	0.23
20032 Average			1.7	6.1	1.2	37	1.5	30	2.1	0.20	95	3.0	130	2.0	65	0.57	0.20
200032 SD(n-1)	(n=3)		0.05	1.2	0.09	1.7	0.1	2.3	0.05	0.10	5.4	0.15	9.9	0.07	4.9	0.34	0.03
%RSD			3	20	8	5	10	8	2	48	6	5	8	3	8	60	16
MS051100 GCR1	Matrix Spike	Bluegill	18	53	29	77	14	230	47	21	76	69	170	10	320	47	< 0.01
Recovery			*66*	*82*	*79*	*82*	*83*	*77*	*72*	*73*	*95*	*80*	*81*	*81*	*78*	*74*	
Mock 100% PCBs			28	65	37	95	16	300	65	28	80	87	210	13	410	64	< 0.01
MB051100	Matrix Blank	Bluegill	< 0.01	0.03	< 0.01	< 0.12	0.04	0.16	< 0.01	< 0.02	< 0.74	< 0.01	< 0.43	< 0.03	0.47	< 0.03	< 0.01
	Average mass	=															
PB051100 GCR1	Procedure Blank	Na_2SO_4	0.04	0.04	0.05	0.84	0.00	0.63	0.04	0.05	5.9	0.00	3.5	0.25	2.5	0.18	0.01
PB051100 GCR2	Procedure Blank	Na_2SO_4	0.00	0.04	0.07	0.79	0.00	0.70	0.00	0.07	6.0	0.00	3.6	0.20	2.5	0.24	0.01
PB051100 GCR3	Procedure Blank	Na_2SO_4	0.06	0.04	0.06	0.90	0.00	0.73	0.03	0.07	6.2	0.00	3.6	0.22	2.5	0.20	0.02
Average			0.03	0.04	0.06	0.84	0.00	0.69	0.02	0.04	6.0	0.00	3.6	0.23	2.5	0.21	0.01
Standard Deviation			0.03	0.00	0.01	0.06	0.00	0.05	0.02	0.03	0.14	0.00	0.07	0.02	0.02	0.03	0.00
MDL	= PB Average + 3 (SD)		0.12	0.05	0.08	1.0	0.00	0.84	0.08	0.14	6.4	0.00	3.8	0.30	2.6	0.30	0.02
MDL (mass normalized)[1]			**0.01**	**0.01**	**0.01**	**0.12**	**0.01**	**0.10**	**0.01**	**0.02**	**0.74**	**0.01**	**0.43**	**0.03**	**0.29**	**0.03**	**0.01**

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

305711

Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	055	*056,060*	*057*	*058*	063	064	066	067	*069*	070	071	*072*	074	075	082
19861	BE-EG906-98	Eagle Egg	1.1	390	< 0.01	7.0	250	700	1,100	3.1	11	350	200	53	1,300	110	89
19862	BE-EG910-98	Eagle Egg	1.4	330	< 0.01	6.4	160	520	800	4.3	10	320	150	51	890	97	85
20032-1	BE-EG-270-99	Eagle Egg	0.11	34	< 0.01	2.3	24	52	140	0.85	0.80	90	19	6.5	81	9.0	26
20032-2	BE-EG-270-99	Eagle Egg	0.11	33	< 0.01	2.4	25	50	160	0.93	0.94	88	22	6.6	79	9.7	26
20032-3	BE-EG-270-99	Eagle Egg	0.13	32	< 0.01	2.1	21	48	140	0.94	0.82	86	19	6.0	73	9.1	24
20032 Average			0.12	33		2.2	23	50	150	0.91	0.85	88	20	6.4	78	9.2	25
200032 SD(n-1)	(n=3)		0.01	1.0		0.11	2.0	1.8	12	0.05	0.08	2.0	2.1	0.33	4.1	0.36	0.77
%RSD			**12**	**3**		**5**	**8**	**4**	**8**	**6**	**9**	**2**	**10**	**5**	**5**	**4**	**3**
MS051100 GCR1	Matrix Spike	Bluegill	2.7	150	< 0.01	0.49	8.2	87	150	4.9	0.30	260	73	0.69	120	4.1	36
Recovery			***73***	***75***		***52***	***88***	***79***	***75***	***78***	***145***	***76***	***82***	***62***	***86***	***105***	***80***
Mock 100% PCBs			3.7	200	< 0.01	0.93	9.3	110	200	6.3	0.21	340	90	1.1	140	3.9	45
MB051100	Matrix Blank	Bluegill	< 0.01	0.24	< 0.01	< 0.08	0.04	< 0.09	0.63	< 0.02	< 0.01	0.76	< 0.13	< 0.06	0.41	< 0.01	0.12
	Average mass	=															
PB051100 GCR1	Procedure Blank	Na_2SO_4	0.02	1.1	0.00	0.33	0.20	0.62	2.3	0.11	0.07	1.6	0.80	0.49	1.7	0.10	0.57
PB051100 GCR2	Procedure Blank	Na_2SO_4	0.03	1.1	0.00	0.00	0.19	0.70	2.3	0.09	0.06	1.6	0.87	0.45	1.7	0.11	0.55
PB051100 GCR3	Procedure Blank	Na_2SO_4	0.03	1.1	0.00	0.00	0.19	0.71	2.5	0.09	0.05	1.6	0.96	0.44	1.6	0.11	0.55
Average			0.02	1.1	0.00	0.11	0.19	0.68	2.4	0.10	0.06	1.6	0.87	0.46	1.7	0.10	0.56
Standard Deviation			0.00	0.04	0.00	0.19	0.01	0.05	0.14	0.01	0.01	0.01	0.08	0.03	0.02	0.00	0.01
MDL	= PB Average + 3 (SD)		0.03	1.2	0.00	0.68	0.21	0.82	2.8	0.13	0.09	1.6	1.1	0.55	1.7	0.11	0.60
MDL (mass normalized)[1]			**0.01**	**0.14**	**0.01**	**0.08**	**0.02**	**0.09**	**0.32**	**0.02**	**0.01**	**0.19**	**0.13**	**0.06**	**0.20**	**0.01**	**0.07**

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	083	084	*086*	087	089	090	091	092	095	096	097	099	101	102
19861	BE-EG906-98	Eagle Egg	47	100	< 0.01	780	< 0.01	480	530	800	600	2.1	460	1,800	1,500	6.5
19862	BE-EG910-98	Eagle Egg	34	110	5.0	520	< 0.01	270	360	500	460	2.2	330	1,100	960	5.9
20032-1	BE-EG-270-99	Eagle Egg	5.8	25	1.5	250	< 0.01	73	77	100	120	0.88	87	350	490	2.2
20032-2	BE-EG-270-99	Eagle Egg	5.9	25	1.2	250	< 0.01	69	81	110	130	0.96	88	440	460	2.5
20032-3	BE-EG-270-99	Eagle Egg	5.2	24	1.8	250	< 0.01	61	70	87	120	0.43	82	430	480	2.1
20032 Average			5.6	25	1.5	250		68	76	99	120	0.75	86	410	480	2.3
200032 SD(n-1)	(n=3)		0.35	0.73	0.32	0		5.8	5.6	11	5.8	0.29	3.2	49	15	0.21
%RSD			**6**	**3**	**21**	**0**		**9**	**7**	**11**	**5**	**38**	**4**	**12**	**3**	**9**
MS051100 GCR1	Matrix Spike	Bluegill	4.8	83	1.9	150	< 0.01	7.6	45	58	250	2.1	92	100	260	5.4
Recovery			***82***	***83***	***92***	***83***		***122***	***91***	***90***	***83***	***64***	***83***	***91***	***84***	***36***
Mock 100% PCBs			5.9	100	2.1	180	< 0.01	6.2	50	65	300	3.3	110	110	310	15
MB051100	Matrix Blank	Bluegill	0.03	0.69	< 0.01	1.0	< 0.01	0.35	< 0.33	< 0.64	< 0.67	< 0.01	0.64	1.5	2.0	< 0.01
	Average mass	=														
PB051100 GCR1	Procedure Blank	Na_2SO_4	0.20	0.62	0.00	5.7	0.00	2.7	2.7	5.5	5.5	0.0	3.1	9	16	0.00
PB051100 GCR2	Procedure Blank	Na_2SO_4	0.18	0.59	0.00	5.9	0.00	2.8	2.6	5.5	5.1	0.0	3.1	10	16	0.00
PB051100 GCR3	Procedure Blank	Na_2SO_4	0.19	0.65	0.06	6.1	0.00	2.8	2.6	5.5	5.2	0.0	3.1	10	17	0.00
Average			0.19	0.62	0.02	5.9	0.00	2.8	2.6	5.5	5.3	0.0	3.1	10	16	0.00
Standard Deviation			0.01	0.03	0.04	0.20	0.00	0.06	0.09	0.01	0.18	0.01	0.02	0.20	0.42	0.00
MDL	= PB Average + 3 (SD)		0.23	0.70	0.13	6.5	0.00	3.0	2.9	5.5	5.8	0.0	3	10	18	0.00
MDL (mass normalized)[1]			**0.03**	**0.08**	**0.01**	**0.75**	**0.01**	**0.34**	**0.33**	**0.64**	**0.67**	**0.01**	**0.36**	**1.2**	**2.0**	**0.01**

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

305713

Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	105	109	110	*112*	*113*	114	115	117	118	119	122	123	128
19861	BE-EG906-98	Eagle Egg	1,100	380	1,400	25	68	230	71	420	3,000	300	0.61	48	700
19862	BE-EG910-98	Eagle Egg	590	230	1,000	23	53	52	52	240	1,600	180	1.4	30	340
20032-1	BE-EG-270-99	Eagle Egg	270	79	290	7.6	110	13	14	34	790	42	0.53	11	250
20032-2	BE-EG-270-99	Eagle Egg	260	75	290	7.1	110	13	14	33	780	43	0.64	9.4	250
20032-3	BE-EG-270-99	Eagle Egg	260	58	300	11	98	11	13	30	780	38	0.52	8.6	250
20032 Average			260	71	290	8.4	110	13	14	32	780	41	0.56	9.5	250
200032 SD(n-1)	(n=3)		5.7	11	5.8	1.9	7	0.94	0.87	1.8	5.8	2.6	0.06	1.0	0
%RSD			**2**	**16**	**2**	**23**	**6**	**8**	**6**	**5**	**1**	**6**	**11**	**11**	**0**
MS051100 GCR1	Matrix Spike	Bluegill	100	21	270	1.3	2.1	7.7	7.0	12	200	4.7	2.8	3.7	54
Recovery			***83***	***131***	***90***	***104***	***142***	***79***	***89***	***93***	***83***	***108***	***82***	***99***	***92***
Mock 100% PCBs			120	16	300	1.3	1.5	9.8	7.8	13	240	4.4	3.4	3.7	58
MB051100	Matrix Blank	Bluegill	0.98	< 1.2	< 1.7	< 0.01	0.93	< 0.08	0.11	< 0.20	< 3.5	0.57	< 0.02	< 0.08	< 1.1
	Average mass	=													
PB051100 GCR1	Procedure Blank	Na_2SO_4	7.2	2.8	14	0.00	0.30	0.62	0.3	1.5	26	1.8	0.11	0.3	9.5
PB051100 GCR2	Procedure Blank	Na_2SO_4	7.6	2.5	13	0.00	0.38	0.59	0.4	1.4	23	1.8	0.09	0.3	9.5
PB051100 GCR3	Procedure Blank	Na_2SO_4	7.5	6.5	14	0.00	0.46	0.66	0.5	1.4	22	1.9	0.10	0.5	9.6
Average			7.4	4.0	14	0.00	0.38	0.62	0.4	1.4	24	1.8	0.10	0.4	9.5
Standard Deviation			0.2	2.2	0.37	0.00	0.08	0.03	0.07	0.10	2.1	0.09	0.01	0.12	0.04
MDL	= PB Average + 3 (SD)		8	11	15	0.00	0.61	0.72	0.6	1.7	30	2.1	0.13	0.7	9.6
MDL (mass normalized)[1]			**0.93**	**1.2**	**1.7**	**0.01**	**0.07**	**0.08**	**0.07**	**0.20**	**3.5**	**0.24**	**0.02**	**0.08**	**1.1**

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

305714

Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	129	130	131	132	133	134	136	137	138	139	141	144	146
19861	BE-EG906-98	Eagle Egg	82	240	12	570	160	36	45	220	4,000	50	560	230	1,200
19862	BE-EG910-98	Eagle Egg	39	120	10	330	57	39	44	110	2,100	30	280	54	570
20032-1	BE-EG-270-99	Eagle Egg	21	68	6.7	300	21	20	32	44	1,800	13	260	48	360
20032-2	BE-EG-270-99	Eagle Egg	22	71	7.6	280	22	21	38	45	1,900	15	270	53	380
20032-3	BE-EG-270-99	Eagle Egg	20	63	6.1	280	21	21	31	42	1,900	12	280	45	380
20032 Average			21	67	6.8	290	21	21	33	44	1,900	13	270	49	370
200032 SD(n-1)	(n=3)		*0.95*	*4.1*	*0.77*	*12*	*0.89*	*0.59*	*3.9*	*1.3*	*58*	*1.2*	*10*	*4.4*	*12*
%RSD			**5**	**6**	**11**	**4**	**4**	**3**	**12**	**3**	**3**	**9**	**4**	**9**	**3**
MS051100 GCR1	Matrix Spike	Bluegill	15	17	5.5	150	5.4	30	56	15	330	5.1	96	33	57
Recovery			***81***	***94***	***82***	***94***	***97***	***117***	***81***	***95***	***97***	***89***	***96***	***91***	***107***
Mock 100% PCBs			19	18	6.7	160	5.5	26	69	16	340	5.8	100	36	53
MB051100	Matrix Blank	Bluegill	< 0.27	< 0.55	< 0.09	< 2.3	< 0.26	0.67	< 0.27	< 0.27	< 14	< 0.47	< 3.0	< 0.72	< 2.6
	Average mass	=													
PB051100 GCR1	Procedure Blank	Na_2SO_4	2.1	4.4	0.43	18	1.4	1.5	2.3	2.3	100	3.0	26	5.1	22
PB051100 GCR2	Procedure Blank	Na_2SO_4	1.8	4.4	0.57	19	1.8	1.8	2.3	2.3	110	2.1	26	5.3	22
PB051100 GCR3	Procedure Blank	Na_2SO_4	1.8	4.6	0.39	18	1.8	2.5	2.3	2.3	110	2.8	26	4.5	22
Average			1.9	4.5	0.46	19	1.7	1.9	2.3	2.3	107	2.6	26	5.0	22
Standard Deviation			0.16	0.10	0.09	0.54	0.21	0.52	0.03	0.02	5.8	0.50	0.08	0.43	0.15
MDL	= PB Average + 3 (SD)		2.4	4.8	0.75	20	2.3	3.5	2.4	2.4	124	4.1	26	6.3	22
MDL (mass normalized)[1]			**0.27**	**0.55**	**0.09**	**2.3**	**0.26**	**0.40**	**0.27**	**0.27**	**14**	**0.47**	**3.0**	**0.72**	**2.6**

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	147	149	151	153	156	157	158	163	164	166	167	170	171
19861	**BE-EG906-98**	**Eagle Egg**	48	1,400	350	5,600	260	100	440	1,100	220	13	180	1,600	380
19862	BE-EG910-98	Eagle Egg	21	790	270	2,600	110	31	200	500	160	18	56	970	140
20032-1	BE-EG-270-99	Eagle Egg	7.7	750	270	2,400	86	17	170	370	150	19	45	660	170
20032-2	BE-EG-270-99	Eagle Egg	8.8	820	280	2,500	90	19	180	360	89	18	45	710	190
20032-3	BE-EG-270-99	Eagle Egg	9.7	780	280	2,500	81	17	170	370	150	17	39	620	160
20032 Average			8.7	780	280	2,500	86	17	170	370	130	18	43	660	170
200032 SD(n-1)	(n=3)		1.0	35	5.8	58	4.4	1.1	5.8	5.8	35	0.65	3.6	45	15
%RSD			12	5	2	2	5	6	3	2	27	4	9	7	9
MS051100 GCR1	Matrix Spike	Bluegill	1.7	300	110	370	22	5.2	43	73	32	1.8	10	140	37
Recovery			***58***	***91***	***92***	***103***	***90***	***83***	***89***	***101***	***93***	***143***	***98***	***93***	***96***
Mock 100% PCBs			2.9	330	120	360	25	6.2	48	73	35	1.2	10	150	39
MB051100	Matrix Blank	Bluegill	< 0.12	< 8.8	< 2.3	< 20	< 0.56	< 0.10	< 1.3	< 3.2	< 1.4	< 0.09	< 0.34	< 5.4	< 1.3
	Average mass	=													
PB051100 GCR1	Procedure Blank	Na_2SO_4	0.65	66	20	150	3.8	0.83	11	27	7.2	0.00	2.8	40	11
PB051100 GCR2	Procedure Blank	Na_2SO_4	0.70	67	20	160	3.9	0.77	11	27	8.0	0.32	2.8	41	11
PB051100 GCR3	Procedure Blank	Na_2SO_4	0.39	60	20	160	4.4	0.74	11	27	9.8	0.33	2.9	44	11
Average			0.58	65	20	157	4.0	0.78	11	27	8.3	0.21	2.8	41	11
Standard Deviation			0.17	4.1	0.04	5.77	0.31	0.04	0.13	0.32	1.3	0.18	0.04	1.9	0.24
MDL	= PB Average + 3 (SD)		1.1	77	20	174	4.9	0.91	11	28	12	0.77	2.9	47	12
MDL (mass normalized)[1]			**0.12**	**8.8**	**2.3**	**20**	**0.56**	**0.10**	**1.3**	**3.2**	**1.4**	**0.09**	**0.34**	**5.4**	**1.3**

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

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Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	172	173	174	175	176	177	178	179	180	183	185	187	189
19861	BE-EG906-98	Eagle Egg	300	8.6	570	61	61	620	450	28	3,700	1,300	72	2,800	42
19862	BE-EG910-98	Eagle Egg	100	4.3	250	26	39	250	180	31	1,400	540	39	1,100	18
20032-1	BE-EG-270-99	Eagle Egg	130	6.9	350	24	27	370	200	22	1,800	680	40	1,100	17
20032-2	BE-EG-270-99	Eagle Egg	130	5.2	380	26	25	390	210	32	1,900	740	49	1,200	19
20032-3	BE-EG-270-99	Eagle Egg	130	5.2	340	22	20	370	200	21	1,800	670	36	1,100	16
20032 Average			130	5.8	360	24	24	380	200	25	1,800	700	42	1,100	17
200032 SD(n-1)	(n=3)		0.0	1.0	21	2.1	3.6	12	5.8	6.2	58	38	7.0	58	1.6
%RSD			**0**	**17**	**6**	**9**	**15**	**3**	**3**	**25**	**3**	**5**	**17**	**5**	**9**
MS051100 GCR1	Matrix Spike	Bluegill	23	3.1	140	7.0	16	68	28	51	250	100	15	160	5.3
Recovery			***99***	***94***	***93***	***94***	***95***	***96***	***99***	***85***	***100***	***91***	***94***	***114***	***101***
Mock 100% PCBs			23	3.3	150	7.4	16	71	28	59	250	110	16	140	5.3
MB051100	Matrix Blank	Bluegill	< 0.98	< 0.15	< 3.9	< 0.18	< 0.47	< 2.4	< 1.1	< 0.80	< 14	< 5.6	< 0.65	< 8.8	< 0.22
	Average mass	=													
PB051100 GCR1	Procedure Blank	Na_2SO_4	8.3	0.79	31	1.6	2.0	20	10	6.6	120	45	5.3	76	1.8
PB051100 GCR2	Procedure Blank	Na_2SO_4	8.4	1.0	31	1.6	2.7	20	9.6	6.6	120	46	4.9	76	1.8
PB051100 GCR3	Procedure Blank	Na_2SO_4	8.5	1.0	33	1.6	3.0	20	9.6	6.8	120	47	5.1	75	1.8
Average			8.4	0.93	32	1.6	2.6	20	9.7	6.7	120	46	5.1	76	1.8
Standard Deviation			0.05	0.12	0.87	0.01	0.52	0.13	0.08	0.09	0.00	1.0	0.19	0.41	0.03
MDL	= PB Average + 3 (SD)		8.6	1.3	34	1.6	4.1	21	9.9	7.0	120	49	5.7	77	1.9
MDL (mass normalized)[1]			**0.98**	**0.15**	**3.9**	**0.18**	**0.47**	**2.4**	**1.1**	**0.80**	**14**	**5.6**	**0.65**	**8.8**	**0.22**

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	190	191	193	194	195	196	197	198	199	200	201	202	203
19861	BE-EG906-98	Eagle Egg	830	55	240	600	200	330	31	30	1,000	15	63	180	600
19862	BE-EG910-98	Eagle Egg	270	23	94	200	86	120	9	12	290	12	27	59	210
20032-1	BE-EG-270-99	Eagle Egg	400	21	75	280	86	210	11	13	350	13	29	56	220
20032-2	BE-EG-270-99	Eagle Egg	420	24	83	290	100	210	12	14	370	15	31	56	260
20032-3	BE-EG-270-99	Eagle Egg	380	20	70	280	76	210	10	12	350	11	27	48	210
20032 Average			400	22	76	280	87	210	11	13	360	13	29	54	230
200032 SD(n-1)	(n=3)		20	2.0	7	5.8	12	0.0	0.80	1.0	12	1.9	2.1	4.6	26
%RSD			5	9	9	2	14	0	7	8	3	15	7	9	12
MS051100 GCR1	Matrix Spike	Bluegill	53	5.3	15	45	25	28	4.5	3.1	49	7.7	6.7	10	36
Recovery			*99*	*100*	*110*	*89*	*94*	*93*	*98*	*90*	*99*	*89*	*94*	*101*	*97*
Mock 100% PCBs			54	5.3	14	50	26	30	4.6	3.5	50	8.7	7.2	10	37
MB051100	Matrix Blank	Bluegill	< 2.9	< 0.20	< 0.93	< 1.6	< 0.85	< 1.3	< 0.30	< 0.07	< 1.6	< 0.16	< 0.27	< 0.43	< 1.7
	Average mass	=													
PB051100 GCR1	Procedure Blank	Na_2SO_4	20	1.5	7.6	14	6.7	9.8	2.1	0.61	14	1.3	2.2	3.2	11
PB051100 GCR2	Procedure Blank	Na_2SO_4	21	1.5	7.6	14	6.8	10	2.2	0.60	14	1.4	2.2	3.4	12
PB051100 GCR3	Procedure Blank	Na_2SO_4	23	1.6	7.9	14	7.1	9.7	2.4	0.60	14	1.3	2.3	3.5	13
Average			21	1.6	7.7	14	6.9	9.9	2.2	0.60	14	1.3	2.2	3.4	12
Standard Deviation			1.4	0.06	0.14	0.01	0.19	0.36	0.12	0.00	0.05	0.01	0.06	0.13	1.1
MDL	= PB Average + 3 (SD)		26	1.7	8.1	14	7.4	11	2.6	0.61	14	1.4	2.4	3.8	15
MDL (mass normalized)[1]			2.9	0.20	0.93	1.6	0.85	1.3	0.30	0.07	1.6	0.16	0.27	0.43	1.7

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

Table 1. Congener PCBs in Eagle Eggs, plus Quality Control Samples

Sample ID	Field ID	Sample Type	205	206	208	Total PCBs	(units)
19861	BE-EG906-98	Eagle Egg	70	810	320	62,000	ng/g
19862	BE-EG910-98	Eagle Egg	27	160	31	34,000	ng/g
20032-1	BE-EG-270-99	Eagle Egg	27	360	55	20,000	ng/g
20032-2	BE-EG-270-99	Eagle Egg	29	400	58	20,000	ng/g
20032-3	BE-EG-270-99	Eagle Egg	24	320	48	20,000	ng/g
20032 Average			27	360	54	20,000	ng/g
200032 SD(n-1)	(n=3)		2.4	40	5.1	0	ng/g
%RSD			**9**	**11**	**9**	**0**	**%**
MS051100 GCR1	Matrix Spike	Bluegill	3.4	13	2.9	8,500	ng
Recovery			***106***	***94***	***95***	***85***	%
Mock 100% PCBs			3.2	14	3.0	10,000	ng
MB051100	Matrix Blank	Bluegill	< 0.14	< 0.43	< 0.22	< 130	ng/g
	Average mass	=					
PB051100 GCR1	Procedure Blank	Na_2SO_4	1.2	3.1	1.5	1,100	ng
PB051100 GCR2	Procedure Blank	Na_2SO_4	1.2	3.1	1.6	1,100	ng
PB051100 GCR3	Procedure Blank	Na_2SO_4	1.2	3.4	1.3	1,100	ng
Average			1.2	3.2	1.4	1,100	ng
Standard Deviation			0.01	0.18	0.16	0	ng
MDL	= PB Average + 3 (SD)		1.2	3.7	1.9	1,100	ng
MDL (mass normalized)[1]			**0.14**	**0.43**	**0.22**	**130**	ng/g

Sample concentrations were recovery corrected.
All values are rounded to 2 significant figures.
[1] *MDLs below 0.01 are reported as the instrument detection limit of 0.01.*

Table 2. Procedural Standard Recoveries in Eagle Eggs

Sample ID	Field ID	Sample Type	Gram-equivalents for Analysis (g)	% Lipid	029			155			204		
					Amount or Concentration		% Recovery	Amount or Concentration		% Recovery	Amount or Concentration		% Recovery
MS051100	Matrix Spike	Bluegill	---	4.1	310	ng	*72*	330	ng	*77*	330	ng	*79*
MB051100	Matrix Blank	Bluegill	9.89	3.8	24	ng/g	*56*	27	ng/g	*62*	27	ng/g	*62*
PB051100	Procedure Blank	Na_2SO_4	---	---	240	ng	*56*	274	ng	*64*	275	ng	*66*
19861	BE-EG906-98	Eagle Egg	10.08	8.6	35	ng/g	*84*	49	ng/g	*115*	37	ng/g	*89*
19862	BE-EG910-98	Eagle Egg	9.83	4.5	36	ng/g	*83*	43	ng/g	*100*	37	ng/g	*88*
20032-1	BE-EG-270-99	Eagle Egg	9.87	5.5	33	ng/g	*76*	39	ng/g	*91*	33	ng/g	*78*
20032-2	BE-EG-270-99	Eagle Egg	9.97	5.4	32	ng/g	*76*	40	ng/g	*94*	33	ng/g	*79*
20032-3	BE-EG-270-99	Eagle Egg	9.81	4.9	34	ng/g	*77*	41	ng/g	*94*	36	ng/g	*83*
Average Recovery							*72*			*87*			*78*
SD							*11*			*18*			*10*
MOCK 100% PCBs #1	240W + 237W-3		---	---	430		*100*	430		*100*	420		*100*

Table 3. Organochlorine Pesticides in Eagle Eggs, plus Quality Control Samples

Sample Name	Field ID	Sample Type	Total geq for Analysis	% Lipid	HCB	PCA	alpha-BHC	beta-BHC	Lindane	delta-BHC	Heptachlor
19861	BE-EG906-98 EGG	BALD EAGLE EGG	1.99	7.14	23	4.0	< 0.02	2.2	< 0.41	< 0.11	< 0.01
19862	BE-EG910-98 EGG	BALD EAGLE EGG	2.05	5.74	16	1.8	< 0.02	1.7	< 0.41	0.77	0.79
20032-1	BE-EG970-99 EGG	BALD EAGLE EGG REP #1	2.09	6.34	19	3.0	0.49	3.7	< 0.41	2.2	0.18
20032-2	BE-EG970-99 EGG	BALD EAGLE EGG REP #2	1.99	6.9	19	3.1	0.46	4.0	< 0.41	1.8	0.16
20032-3	BE-EG970-99 EGG	BALD EAGLE EGG REP #3	1.96	6.25	19	3.3	0.92	5.8	< 0.41	1.4	0.16
20032 Average					19	3.1	0.62	4.5		1.8	0.17
20032 SD (n-1)	(n=3)				0.15	0.16	0.26	1.1		0.39	0.01
%RSD					0.78	5.0	42	25		22	6.5
MS051100 OC	Matrix Spike OCPs	Bluegill	2.00	5.64	120	130	120	120	120	130	120
% Recovery					***67***	***72***	***67***	***67***	***67***	***72***	***71***
MB051100	Matrix Blank	Bluegill	2.24	5.02	0.27	0.55	0.80	< 0.01	< 0.41	0.28	< 0.01
PB051100 GCR1	Procedure Blank	Na_2SO_4	---	---	0.08	0.17	0.02	0.00	0.08	0.11	0.00
PB051100 GCR2	Procedure Blank	Na_2SO_4	---	---	0.10	0.21	0.02	0.00	0.41	0.14	0.00
PB051100 GCR3	Procedure Blank	Na_2SO_4	---	---	0.07	0.30	0.03	0.00	0.37	0.17	0.00
Average					0.08	0.23	0.02	0.00	0.29	0.14	0.00
Standard Deviation					0.02	0.07	0.01	0.00	0.18	0.03	0.00
Method Detection Limit (MDL) = PB Average + 3 (SD)					0.13	0.43	0.04	0.00	0.83	0.23	0.00
MDL[1]	mass normalized	*average mass=*	*2.03*		***0.06***	***0.21***	***0.02***	***0.01***	***0.41***	***0.11***	***0.01***

Note: Values are recovery corrected.

Note: values rounded to 2 significant figures.

[1] *If MDL is zero value set to instrument detection limit.*

Table 3. Organochlorine Pesticides in Eagle Eggs, plus Quality Control Samples

Sample Name	Field ID	Sample Type	Heptachlor Epoxide	Dacthal	Dieldrin	Endrin	Oxychlordane	*cis*-Chlordane	*trans*-Chlordane
19861	BE-EG906-98 EGG	BALD EAGLE EGG	33	13	320	< 0.02	120	73	14
19862	BE-EG910-98 EGG	BALD EAGLE EGG	11	9.4	73	< 0.02	36	41	6.3
20032-1	BE-EG970-99 EGG	BALD EAGLE EGG REP #1	19	< 0.52	130	4.8	74	88	11
20032-2	BE-EG970-99 EGG	BALD EAGLE EGG REP #2	19	< 0.52	130	4.9	74	87	10
20032-3	BE-EG970-99 EGG	BALD EAGLE EGG REP #3	24	< 0.52	140	5.5	83	95	11
20032 Average			21		130	5.1	77	90	10
20032 SD (n-1)	(n=3)		3.1		5.8	0.39	5.1	4.3	0.30
%RSD			15		4.4	7.6	6.7	4.8	2.8
MS051100 OC	Matrix Spike OCPs	Bluegill	130	130	130	120	130	120	130
% Recovery			***76***	***72***	***76***	***71***	***76***	***71***	***76***
MB051100	Matrix Blank	Bluegill	0.29	0.93	3.0	4.3	1.5	2.1	0.64
PB051100 GCR1	Procedure Blank	Na_2SO_4	0.00	0.95	0.07	0.03	0.00	0.03	0.02
PB051100 GCR2	Procedure Blank	Na_2SO_4	0.00	0.98	0.03	0.02	0.00	0.01	0.01
PB051100 GCR3	Procedure Blank	Na_2SO_4	0.00	1.00	0.01	0.02	0.00	0.38	0.01
Average			0.00	0.98	0.04	0.02	0.00	0.14	0.01
Standard Deviation			0.00	0.03	0.03	0.01	0.00	0.21	0.01
Method Detection Limit (MDL) = PB Average + 3 (SD)			0.00	1.05	0.13	0.04	0.00	0.76	0.03
MDL[1]	mass normalized	*average mass=*	***0.01***	***0.52***	***0.06***	***0.02***	***0.01***	***0.38***	***0.02***

Note: Values are recovery corrected.

Note: values rounded to 2 significant figures.

[1] *If MDL is zero value set to instrument detection limit.*

Table 3. Organochlorine Pesticides in Eagle Eggs, plus Quality Control Samples

Sample Name	Field ID	Sample Type	*cis*-Nonachlor	*trans*-Nonachlor	o,p'-DDE	o,p'-DDD	o,p'-DDT	p,p'-DDE	p,p'-DDD	p,p'-DDT
19861	BE-EG906-98 EGG	BALD EAGLE EGG	170	540	4.6	15	< 0.01	6800	590	< 0.01
19862	BE-EG910-98 EGG	BALD EAGLE EGG	63	180	1.1	9.2	3.5	4100	320	10
20032-1	BE-EG970-99 EGG	BALD EAGLE EGG REP #1	130	360	4.9	11	< 0.01	4900	500	< 0.01
20032-2	BE-EG970-99 EGG	BALD EAGLE EGG REP #2	130	340	4.3	12	< 0.01	5200	490	< 0.01
20032-3	BE-EG970-99 EGG	BALD EAGLE EGG REP #3	140	370	4.2	13	< 0.01	5000	520	< 0.01
20032 Average			130	360	4.5	12		5000	500	
20032 SD (n-1)	(n=3)		5.8	15	0.40	0.87		153	15	
%RSD			4.4	4.2	8.9	7.2		3.1	3.1	
MS051100 OC	Matrix Spike OCPs	Bluegill	130	130	130	130	110	120	130	140
% Recovery			***76***	***76***	***76***	***76***	***65***	***71***	***76***	***78***
MB051100	Matrix Blank	Bluegill	0.66	4.0	4.7	2.4	0.20	4.3	0.42	16
PB051100 GCR1	Procedure Blank	Na_2SO_4	0.01	0.06	0.00	0.80	0.00	0.65	0.00	0.60
PB051100 GCR2	Procedure Blank	Na_2SO_4	0.00	0.05	0.00	0.78	0.00	0.62	0.00	0.54
PB051100 GCR3	Procedure Blank	Na_2SO_4	0.00	0.07	0.00	0.88	0.00	0.59	0.00	0.42
Average			0.00	0.06	0.00	0.82	0.00	0.62	0.00	0.52
Standard Deviation			0.01	0.01	0.00	0.05	0.00	0.03	0.00	0.09
Method Detection Limit (MDL) = PB Average + 3 (SD)			0.02	0.09	0.00	0.98	0.00	0.71	0.00	0.79
MDL[1]	mass normalized	*average mass=*	***0.01***	***0.04***	***0.01***	***0.48***	***0.01***	***0.35***	***0.01***	***0.39***

Note: Values are recovery corrected.

Note: values rounded to 2 significant figures.

[1] *If MDL is zero value set to instrument detection limit.*

Table 3. Organochlorine Pesticides in Eagle Eggs, plus Quality Control Samples

Sample Name	Field ID	Sample Type	Endosulfan I	Endosulfan II	Endosulfate	Methoxychlor	Mirex	*units*
19861	BE-EG906-98 EGG	BALD EAGLE EGG	< 0.01	< 0.01	< 0.01	1.3	53	ng/g
19862 ,	BE-EG910-98 EGG	BALD EAGLE EGG	0.58	< 0.01	< 0.01	< 0.48	23	ng/g
20032-1	BE-EG970-99 EGG	BALD EAGLE EGG REP #1	< 0.01	< 0.01	< 0.01	16	22	ng/g
20032-2	BE-EG970-99 EGG	BALD EAGLE EGG REP #2	< 0.01	< 0.01	< 0.01	17	24	ng/g
20032-3	BE-EG970-99 EGG	BALD EAGLE EGG REP #3	< 0.01	< 0.01	< 0.01	18	24	ng/g
20032 Average						17	23	ng/g
20032 SD (n-1)	(n=3)					1.0	1.1	ng/g
%RSD						6.1	4.7	%
MS051100 OC	Matrix Spike OCPs	Bluegill	130	130	140	140	150	ng
% Recovery			***76***	***72***	***82***	***78***	***83***	%
MB051100	Matrix Blank	Bluegill	< 0.01	< 0.01	0.81	2.3	0.07	ng/g
PB051100 GCR1	Procedure Blank	Na_2SO_4	0.00	0.00	0.00	0.77	0.00	ng
PB051100 GCR2	Procedure Blank	Na_2SO_4	0.00	0.00	0.00	0.74	0.00	ng
PB051100 GCR3	Procedure Blank	Na_2SO_4	0.00	0.00	0.00	0.86	0.00	ng
Average			0.00	0.00	0.00	0.79	0.00	ng
Standard Deviation			0.00	0.00	0.00	0.06	0.00	ng
Method Detection Limit (MDL) = PB Average + 3 (SD)			0.00	0.00	0.00	0.98	0.00	ng
MDL[1]	mass normalized	*average mass=*	***0.01***	***0.01***	***0.01***	***0.48***	***0.01***	ng/g

Note: Values are recovery corrected.

Note: values rounded to 2 significant figures.

[1] *If MDL is zero value set to instrument detection limit.*

Table 4. Recoveries of PCB and OC Pesticide Procedural Internal Standards

Sample ID	Field ID	Sample Type	Gram-equivalents for Analysis (g)	% Lipid	TCM-Xylene (ng/g)	TCM-Xylene % Recovery	029 ng/g	029 % Recovery	155* ng/g	155* % Recovery	204 ng/g	204 % Recovery	DBC ng/g	DBC % Recovery
PB051100 GCR1	Proc Blank	Na2so4	0.00	0.00	110	**61**	110	**58**	180	**90**	170	**89**	180	**95**
PB051100 GCR2	Proc Blank	Na2so4	0.00	0.00	110	**61**	120	**63**	180	**90**	180	**95**	190	**100**
PB051100 GCR3	Proc Blank	Na2so4	0.00	0.00	110	**61**	110	**58**	180	**90**	180	**95**	170	**89**
MB051100	Matrix Blank	Bluegill	2.24	5.02	67	**83**	62	**73**	89	**100**	82	**96**	85	**100**
MS051100 OC	Matrix Spike OCPs	Bluegill	2.00	5.64	120	**67**	120	**63**	170	**85**	160	**84**	140	**74**
19861	BE-EG906-98 EGG	BALD EAGLE EGG	1.99	7.14	77	**85**	73	**76**	150	**149**	93	**97**	82	**86**
19862	BE-EG910-98 EGG	BALD EAGLE EGG	2.05	5.74	64	**73**	60	**64**	130	**133**	58	**63**	87	**94**
20032-1	BE-EG970-99 EGG	BALD EAGLE EGG REP #1	2.09	6.34	72	**83**	77	**85**	100	**105**	72	**79**	94	**103**
20032-2	BE-EG970-99 EGG	BALD EAGLE EGG REP #2	1.99	6.90	74	**82**	74	**78**	110	**109**	71	**74**	100	**105**
20032-3	BE-EG970-99 EGG	BALD EAGLE EGG REP #3	1.96	6.25	73	**79**	77	**80**	110	**108**	71	**73**	94	**97**
Average Recovery						***74***		***70***		***106***		***85***		***94***
SD						***10***		***10***		***21***		***12***		***9***
*PCB 155 may have an interference contributing to higher recovery.														

Table 5. Non-*o*-Chloro-Substituted PCBs (pg/g) in Bald Eagle Eggs from the Hudson River Area, NY

22-Sep-00
N42-secordnye-eggs.xls

GC/MS Sets: N42PCB
Dates: Sept. 15-18, 2000

NFCR Number:	Field Number:	Sample Description:	GC/MS Run No.	Non-o-Polychlorinated Biphenyls: Tetra: 3,4,4',5-TCB (81)	Tetra: 3,3',4,4'-TCB (77)	Penta: 3,3',4,4',5-PeCB (126)	Hexa: 3,3',4,4',5,5'-HxCB (169)
19861	BE-EG906-98	Bald Eagle Egg, 10.21 g	42-10	4,700	11,000	7,300	460
19862	BE-EG910-98	Bald Eagle Egg, 10.03 g	42-11	2,400	8,200	3,600	190
20032-2	BE-EG970-99	Bald Eagle Egg, 10.17 g, Replicate 2	42-14	390	3,200	2,200	270
20032-3	BE-EG970-99	Bald Eagle Egg, 10.01 g, Replicate 3	42-15	430	3,000	1,900	250
		Quality Control Samples:					
Proc. Blk 5/11/2000		Procedure Blank, 5/11/2000 **(10 g sample basis)**	42-5	**2**	**68**	**48**	**5**
Bluegill Blk 5/11/2000		Bluegill Matrix Blank, 5/11/2000, 10.09 g	42-6	2 LQ	57	14	2 LQ
Matrix Spike 5/11/2000		Bluegill Matrix Spike, 5/11/2000, 10.06 g (Spiked with 10 µg Aroclors: 1242, 1248, 1254, 1260)	42-7	100	1,400	69	3
Pos. Ctrl 5/11/2000		Positive Control Saginaw Carp, 5/11/2000, 5.12 g	42-9	390	2,600	960	72

LQ Less than Method Quantification Limit due to Incomplete Ion Cluster or Inaccurate Ion Ratio (Outside +/- 15% Tolerances)
ND Not Detected at Specified Detection Limit

Table 6. Percent Recoveries of ^{13}C-Non-*o*-Chloro-Substituted PCBs in Bald Eagle Eggs from the Hudson River Area, NY

22-Sep-00
N42-secordnye-eggs.xls

GC/MS Sets: N42PCB
Dates: Sept. 15-18, 2000

NFCR Number:	Submitter Number:	Sample Description:	GC/MS Run No.	^{13}C-Non-*o*-Polychlorinated Biphenyls: Tetra: 3,4,4',5-TCB (^{13}C-PCB #81)	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)
19861	BE-EG906-98	Bald Eagle Egg, 10.21 g	42-10	96	83	70	91
19862	BE-EG910-98	Bald Eagle Egg, 10.03 g	42-11	102	89	68	94
20032-1	BE-EG970-99	Bald Eagle Egg, 10.17 g, Replicate 2	42-14	75	74	60	79
20032-1	BE-EG970-99	Bald Eagle Egg, 10.01 g, Replicate 3	42-15	77	94	77	93
		Quality Control Samples:					
Proc. Blk 5/11/2000		Procedure Blank, 5/11/2000	42-5	22	26	33	25
Bluegill Blk 5/11/2000		Bluegill Matrix Blank, 5/11/2000, 10.09 g	42-6	40	37	42	39
Matrix Spike 5/11/2000		Bluegill Matrix Spike, 5/11/2000, 10.06 g Spiked with 10 µg Aroclors	42-7	50	52	65	51
Pos. Ctrl 5/11/2000		Positive Control Saginaw Carp, 5/11/2000, 5.12 g	42-9	80	71	69	86

Table 7. 2,3,7,8-Substituted Polychlorinated Dibenzo-*p*-dioxin and Dibenzofuran Concentrations (pg/g) in Eagle Egg Samples from the Hudson River Area

File: DF34secord-eggs.xls
Date Reported: Oct. 5, 2000
Date Analyzed: Sept. 28-29, 2000

Sample Site/Matrix:		Egg	Egg	Egg	Egg
CERC Number:		19861	19862	20032-2	20032-3
GC/HRMS Sets: DF34- Injection No.		34-10	34-11	34-14	34-15
				Replicate 2	Replicate 3
Sample Submitter No.		BE-EG906-98	BE-EG910-98	BE-EG970-99	BE-EG970-99
Sample Mass Extracted (grams):		10.21	10.03	10.17	10.01
DIOXINS					
	2,3,7,8-Tetrachloro	43	23	15	13
	1,2,3,7,8-Pentachloro	15	5.6	7.7	7.8
	1,2,3,4,7,8-Hexachloro	2.2 LQ	1.6 LQ	1.7 LQ	0.9 LQ
	1,2,3,6,7,8-Hexachloro	15	8.7	11	11
	1,2,3,7,8,9-Hexachloro	0.1 ND	1.1 LQ	1.0 LQ	0.9 LQ
	1,2,3,4,6,7,8-Heptachloro	9.1	2.0	1.7	2.3 LQ
	Octachloro	250	16	17	17 LQ
FURANS	2,3,7,8-Tetrachloro	10	10	12	11
	1,2,3,7,8-Pentachloro	1.1	1.0	2.9	2.9 LQ
	2,3,4,7,8-Pentachloro	52	26	19	19
	1,2,3,4,7,8-Hexachloro	1.6 LQ	1.3 LQ	1.0 LQ	1.5 LQ
	1,2,3,6,7,8-Hexachloro	1.6 LQ	1.3 LQ	1.8 LQ	1.0 LQ
	1,2,3,7,8,9-Hexachloro	0.1 ND	0.1 ND	0.1 ND	0.1 ND
	2,3,4,6,7,8-Hexachloro	1.5	1.8	2.9	1.4 LQ
	1,2,3,4,6,7,8-Heptachloro	2.7 LQ	1.9 LQ	4.0	2.4 LQ
	1,2,3,4,7,8,9-Heptachloro	1.0 LQ	1.2 LQ	1.3 LQ	0.8 LQ
	Octachloro	34	34	30	29

LQ Less than Method Quantification Limit due to Incomplete Ion Cluster or Ion Ratio Outside of +/- 15% T
ND Not Detected at Specified Detection Limit

Table 7. 2,3,7,8-Substituted Polychlorinated Dibenzo-*p*-dioxin and Dibenzofuran Concentrations (pg/g) in Eagle Egg Samples from the Hudson River Area

File: DF34secord-eggs.xls
Date Reported: Oct. 5, 2000
Date Analyzed: Sept. 28-29, 2000

Sample Site/Matrix:	Quality Assurance:	Quality Assurance Samples			
CERC Number:	Procedure Blank	Bluegill Blank	Bluegill Spike	Pos.Ctrl Sag.Carp	*CARP*
GC/HRMS Sets: DF34- Injection No.	34-5	34-6	34-7	34-8	*QC AVG.*
	5/11/2000	5/11/2000	5/11/2000	5/11/2000	*from*
Sample Submitter No.	**Conc. (pg/g-eq)**		250 or 1250 pg total		*1994-1997*
	based on sample		(25 or 125 pg/g)		
Sample Mass Extracted (grams):	**wgts 10 g**	10.09	10.06	5.12	
DIOXINS					
2,3,7,8-Tetrachloro	**0.2 LQ**	0.1 ND	23	38	*21.6*
1,2,3,7,8-Pentachloro	**0.1 ND**	0.1 ND	26	12 LQ	*11.4*
1,2,3,4,7,8-Hexachloro	**0.1 ND**	0.1 ND	25	4.6 LQ	*4.4*
1,2,3,6,7,8-Hexachloro	**0.1 ND**	0.1 ND	31	13	*14.8*
1,2,3,7,8,9-Hexachloro	**0.1 ND**	0.1 ND	34	2.2 LQ	*2.1*
1,2,3,4,6,7,8-Heptachloro	**0.1 ND**	1.0 LQ	31	19	*18.5*
Octachloro	**0.2 LQ**	11 LQ	202	18	*16.9*
FURANS 2,3,7,8-Tetrachloro	**0.2 LQ**	0.2 LQ	38	57	*34.2*
1,2,3,7,8-Pentachloro	**0.1 ND**	0.1 LQ	33	15 LQ	*12.5*
2,3,4,7,8-Pentachloro	**2.1 LQ**	0.2 LQ	36	61	*36.1*
1,2,3,4,7,8-Hexachloro	**0.1 ND**	0.1 ND	34	13	*9.2*
1,2,3,6,7,8-Hexachloro	**0.1 ND**	0.1 ND	34	7.8	*6.4*
1,2,3,7,8,9-Hexachloro	**0.1 ND**	0.1 ND	27	0.1 ND	*0.2*
2,3,4,6,7,8-Hexachloro	**0.1 ND**	0.1 ND	35	6.8 LQ	*5.4*
1,2,3,4,6,7,8-Heptachloro	**1.9 LQ**	1.6 LQ	57	13	*11.9*
1,2,3,4,7,8,9-Heptachloro	**1.0 LQ**	0.7 LQ	29	2.5 LQ	*0.6*
Octachloro	**29**	30 LQ	173	59	*3.6*

LQ Less than Method Quantification Limit due to Incomplete Ion Cluster or Ion Ratio Outside of +/- 15% Tolerances
ND Not Detected at Specified Detection Limit

Table 8. Percent Recovery of ^{13}C-Substituted Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans in Eagle Egg Samples from the Hudson River Area

File: DF34secord-eggs.xls
Date Reported: Oct. 5, 2000
Date Analyzed: Sept. 28-29, 2000

Sample Site/Matrix:	Egg	Egg	Egg	Egg
CERC Number:	19861	19862	20032-2	20032-3
GC/HRMS Sets: DF34- Injection No.	34-10	34-11	34-14	34-15
			Replicate 2	Replicate 3
Sample Submitter No.	BE-EG906-98	BE-EG910-98	BE-EG970-99	BE-EG970-99
Sample Mass Extracted (grams):	10.21	10.03	10.17	10.01
DIOXINS				
2,3,7,8-Tetrachloro	42	44	37	40
1,2,3,7,8-Pentachloro	67	83	63	60
1,2,3,4,7,8-Hexachloro	58	63	52	56
1,2,3,6,7,8-Hexachloro	64	73	59	58
1,2,3,7,8,9-Hexachloro	53	56	47	51
1,2,3,4,6,7,8-Heptachloro	62	70	58	60
Octachloro	41	49	37	41
FURANS 2,3,7,8-Tetrachloro	46	48	39	37
1,2,3,7,8-Pentachloro	65	69	54	52
2,3,4,7,8-Pentachloro	44	49	43	41
1,2,3,4,7,8-Hexachloro	31	44	27	23
1,2,3,6,7,8-Hexachloro	29	45	23	19
1,2,3,7,8,9-Hexachloro	46	49	40	47
1,2,3,4,6,7,8-Heptachloro	35	43	27	27
1,2,3,4,7,8,9-Heptachloro	44	54	40	50

Table 8. Percent Recovery of ^{13}C-Substituted Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans in Eagle Egg Samples from the Hudson River Area

File: DF34secord-eggs.xls
Date Reported: Oct. 5, 2000
Date Analyzed: Sept. 28-29, 2000

Sample Site/Matrix:	Quality Assurance Samples			
CERC Number:	Procedure Blank	Bluegill Blank	Bluegill Spike	Pos.Ctrl Sag.Carp
GC/HRMS Sets: DF34- Injection No.	34-5	34-6	34-7	34-8
	5/11/2000	5/11/2000	5/11/2000	5/11/2000
Sample Submitter No.				
Sample Mass Extracted (grams):		10.09	10.06	5.12
DIOXINS				
2,3,7,8-Tetrachloro	36	33	38	38
1,2,3,7,8-Pentachloro	53	48	59	57
1,2,3,4,7,8-Hexachloro	49	45	50	53
1,2,3,6,7,8-Hexachloro	53	50	55	58
1,2,3,7,8,9-Hexachloro	41	39	42	44
1,2,3,4,6,7,8-Heptachloro	49	44	54	54
Octachloro	37	32	37	37
FURANS 2,3,7,8-Tetrachloro	36	34	37	39
1,2,3,7,8-Pentachloro	52	45	56	54
2,3,4,7,8-Pentachloro	39	33	39	40
1,2,3,4,7,8-Hexachloro	33	28	20	34
1,2,3,6,7,8-Hexachloro	30	24	18	35
1,2,3,7,8,9-Hexachloro	41	32	37	38
1,2,3,4,6,7,8-Heptachloro	34	30	22	36
1,2,3,4,7,8,9-Heptachloro	43	34	39	39