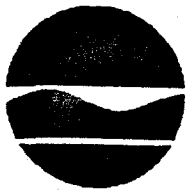
New York State Department of Environmental Conservation
Avon Field Station
6274 East Avon-Lima Road, Avon, NY 14414-9519
Telephone: 716-226-2466
Fax: 716-226-9062



Michael D. Zagata
Commissioner

MEMORANDUM

To: Larry Skinner

From: Robert Bauer

Subject: Comparison Study of Contract Labs for Total PCB and % Lipids

Date: January 17, 1996

A study was done to compare the four laboratories under contract with the Division of Fish & Wildlife for analysis of total PCB and % lipids. Six laboratories (four contract and two non-contract) were sent samples in February,1995, with results do back March 27,1995. The four contract laboratories responded with results for the study. The other two non-contract laboratories did not respond to date.

Fish samples were prepared at the Hale Creek Field Station with the help of George Kimber, Lab Technician. Each of the three homogenized tissue were prepared as follows. Scales were first removed from the fish and a standard fillet was taken. The fillets were then put through a large meat grinder. The ground tissue was then placed in a large mixing bowl and the tissue was mixed by a large mixer for three minutes. This composite sample was ground and mixed two more times before samples were dispensed into 250 ml amber widemouth bottles with Teflon-lined closure (I-CHEM® #341-0250). Approximately 50 grams of homogenized tissue was placed into each bottle. After the bottles were filled, the tissue samples were frozen and stored in DEC's Region 8 walk-in freezer. Frozen fish

tissue samples were shipped on ice via overnight courier to the participating laboratories. Each laboratory was shipped one set of samples, except Laboratory 1 was shipped four sets of samples. Sample 1 was a control blank made up a of composite of fish tissue from a number of different species of fish. All these fish had been previously analyzed by DEC's Analytical Service Unit at HCFS for PCB and found to have no detectable levels. Samples 2&3 were the same sample, a composite of striped bass fillets collected from New York City Harbor in the Hudson River. These samples were known to have high levels of PCB. Samples 2&3 were also used to show the laboratories' precision.

The results of the study are included in the attached tables. The results showed a very close comparison of all four labs. All laboratories were in the "acceptance limits" of ±3 standard deviations of the mean, with laboratory 2 being consistently higher than the rest. Three of the four laboratories were always within the "warning limits" of ±2 standard deviations of the mean. Laboratory 2 was outside the "warning limits" ±3 times (all three were for total PCB). In fairness to laboratory 2, the control limits for this study turned out to be very tight. Precision for the laboratories was measured by using the results from samples 2&3. Laboratory 4 had the highest % difference in both total PCB and % lipids, with 19.05% and 13.65% respectively. Laboratory #3 had the best precision for both total PCB and % lipids, with 1.46% and 1.21% respectively.

The comparison study would have been better if all the laboratories that were sent samples had responded. The study does show the four laboratories being used by the Division of Fish & Wildlife to be in agreement with one another for the analysis of total PCB and % lipids in fish tissue.

Laboratory Comparison Study 1995

Sample #1

Laboratories	Aroclor 1016/ 1242	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1016/ 1248	Aroclor 1254/ 1260	Total PCB	% Lipids
1						<0.02	<0.02	<0.02	1.08
Hale Creek						<0.02	<0.02	<0.02	1.03
						<0.02	<0.02	<0.02	0.99
						<0.02	<0.02	<0.02	1.02
Hazleton 2 Envirs.				0.084				0.084	1.69
Mississippi State		ND	ND	0.03	ND			0.03	1.30
NYSDOH 4	<0.05		<0.05	<0.05	<0.05			<0.05	2.40

Total PCB

Mean	0.035
STD Deviation	±0.024
Warning Limits	- 0.013 - 0.083
Acceptance Limits	- 0.037 - 0.107

% Lipids

Mean	1.36
STD Deviation	±0.52
Warning Limits	0.32 - 2.40
Acceptance Limits	- 0.20 - 2.92

Sample #2

Laboratories	Aroclor 1016/ 1242	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1016/ 1248	Aroclor 1254/ 1260	Total PCB	% Lipids
1						0.109	0.569	0.678	2.50
						0.108	0.567	0.675	2.51
						0.101	0.530	0.631	2.44
						0.110	0.563	0.673	2.44
2			0.091	0.645	0.183			0.919	2.77
3		ND	0.08	0.45	0.15			0.68	2.49
4	<0.05		<0.05	0.32	0.25			0.57	2.30

HES

Total PCB

Mean	0.689
Std Deviation	±0.109
Warning Limits	0.471 - 0.907
Acceptance Limits	0.362 - 1.016

% Lipids

Mean	2.49
Std Deviation	±0.141
Warning Limits	2.208 - 2.772
Acceptance Limits	2.067 - 2.913

Sample #3

Laboratories	Aroclor 1016/ 1242	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1016/ 1248	Aroclor 1254/ 1260	Total PCB	% Lipids
1						0.152	0.535	0.687	2.46
						0.158	0.554	0.712	2.53
						0.155	0.546	0.701	2.55
						0.155	0.559	0.714	2.52
2			0.100	0.694	0.195			0.989	2.97
3		ND	0.08	0.44	0.15			0.67	2.46
4	<0.05		<0.05	0.40	0.29			0.69	2.00

Total PCB

Mean	0.738
STD Deviation	±0.112
Warning Limits	0.514 - 0.962
Acceptance Limits	0.402 - 1.074

% Lipids

Mean	2.50
STD Deviation	±0.282
Warning Limits	1.936 - 3.064
Acceptance Limits	1.654 - 3.346

Samples #2 & 3

Laboratories	Total PCB		Average Total PCB	% Difference	% Lipids		Average % Lipids	% Difference
	2	3			2	3		
1	0.678	0.687	0.682	1.32	2.50	2.46	2.48	1.61
	0.675	0.712	0.694	5.33	2.51	2.53	2.52	0.79
	0.631	0.701	0.666	10.51	2.44	2.55	2.50	4.40
	0.673	0.714	0.694	5.91	2.44	2.52	2.48	3.22
Average of 1	0.664	0.704	0.684	5.85	2.47	2.52	2.50	2.00
2	0.919	0.989	0.954	7.34	2.77	2.97	2.87	6.97
3	0.68	0.67	0.68	1.47	2.49	2.46	2.48	1.21
4	0.57	0.69	0.63	19.05	2.30	2.00	2.15	13.65

MARYLAND
ENVIRONMENTAL
SERVICE

Parris N. Glendening
Governor

James W. Peck
Director

September 13, 1995

Mr. Robert Bauer
New York State Department of Environmental Conservation
Division of Fish and Wildlife
6274 East Avon-Lima Road
Avon, New York 14485

Dear Mr. Bauer:

Please find enclosed results on the striped bass performance evaluation samples provided by New York State for PCB aroclor and lipid analysis by Hazelton Environmental Services (HES). The samples were used as additional quality assurance/quality control in the Maryland Department of Natural Resources (MDNR) Striped Bass Study.

Tables 5-1 through 5-3 present HES' results from the MDNR project in addition to the information provided by your office from the Laboratory Comparison Study (LCS). Because Hazelton had previously analyzed the samples as Laboratory 2 in the LCS, the Maryland Environmental Service (MES) re-labeled the New York samples in an effort to blind them. They were re-labeled as follows:

NY sample number 1 = MES 31
NY sample number 2 = MES 39
NY sample number 3 = MES 63

The top portion of each table presents the New York Laboratory Comparison Study results and statistics on each data set. The bottom portion of each table presents results from HES on the performance evaluation samples analyzed as part of the MDNR project.

Also included is a analytical chronology on NY sample number 2 (MES 39) as provided by HES. Initially, HES was outside acceptance limits for total aroclors and lipid content and corrective measures were necessary. MES requested that the laboratory re-quantify the aroclors and re-analyze for lipid content to determine whether the results would fall within acceptance limits. Re-quantification brought the aroclor results within acceptance limits, however, lipid content remained outside the upper acceptance limit. The laboratory was then instructed to re-extract and analyze both parameters. Once again the aroclor results fell within limits and the lipid content outside the upper limits.

The laboratory stated that the high recovery for lipids may have been due to their efficient extraction process which was demonstrated by obtaining good precision throughout re-extraction and analysis of lipid content on this sample. The lipid results were 3.14%, 3.10%, and 3.09%, respectively.

2011 Commerce Park Drive • Annapolis, Maryland 21401 • 410.974.7281 • Fax 410.974.7267

MES would like to thank you for providing the samples and associated acceptance limits for use in the MDNR study. MES would like to further commend you for your helpfulness and your overall interest in establishing good quality assurance/quality control project frameworks.

Please call me at (410) 974-7261 if you have any questions concerning the data.

Sincerely,

Tammy Banta
Environmental Specialist
Environmental Dredging Program

TRB/trb
Attachments
cc: Mr. Harry Hornick (MDNR)
Mr. Wayne Young (MES)

Table 5–1

NY Performance Evaluation Sample 1 (MES 31)
Analyzed by HES as part of MDNR Striped Bass Project

New York State Laboratory Comparison Study									
Laboratories	Aroclor 1016/1242 ppm	Aroclor 1242 ppm	Aroclor 1248 ppm	Aroclor 1254 ppm	Aroclor 1260 ppm	Aroclor 1016/1248 ppm	Aroclor 1254/1260 ppm	Total Aroclor ppm	% Lipids
1						<0.02	<0.02	<0.02	1.06
						<0.02	<0.02	<0.02	1.03
						<0.02	<0.02	<0.02	0.99
						<0.02	<0.02	<0.02	1.02
2				0.084				0.084	1.69
3		ND	ND	0.03	ND			0.03	1.30
4	<0.05			<0.05	<0.05			<0.05	2.40

Statistics on Data Set				
Parameter	Mean	Standard Deviation	Warning Limits	Acceptance Limits
Total Aroclor	0.035	+ or – 0.024	– 0.013 – 0.083	– 0.037 – 0.107
% Lipids	1.36	+ or – 0.52	0.32 – 2.40	– 0.20 – 2.92

Hazelton Results on Sample # 1 (MES 31) Analyzed on MDNR Striped Bass Project									
Laboratory	Aroclor 1016/1242 ppm	Aroclor 1242 ppm	Aroclor 1248 ppm	Aroclor 1254 ppm	Aroclor 1260 ppm	Aroclor 1016/1248 ppm	Aroclor 1254/1260 ppm	Total Aroclor ppm	% Lipids
Hazelton		<0.050	<0.050	<0.050	<0.050			<0.050	1.79

Table 5–2

NY Performance Evaluation Sample 2 (MES 39)
Analyzed by HES as part of MDNR Striped Bass Project

New York State Laboratory Comparison Study									
Laboratories	Aroclor 1016/1242 ppm	Aroclor 1242 ppm	Aroclor 1248 ppm	Aroclor 1254 ppm	Aroclor 1260 ppm	Aroclor 1016/1248 ppm	Aroclor 1254/1260 ppm	Total Aroclor ppm	% Lipids
1						0.109	0.569	0.678	2.50
						0.108	0.567	0.675	2.51
						0.101	0.530	0.631	2.44
						0.110	0.563	0.673	2.44
2			0.091	0.645	0.183			0.919	2.77
3		ND	0.08	0.45	0.15			0.68	2.49
4	<0.05			0.32	0.25			0.57	2.30

Statistics on Data Set				
Parameter	Mean	Standard Deviation	Warning Limits	Acceptance Limits
Total Aroclor	0.689	+ or – 0.109	0.471 – 0.907	0.362 – 1.016
% Lipids	2.49	+ or – 0.141	2.208 – 2.772	2.067 – 2.913

Hazelton Results on Sample # 2 (MES 39) Analyzed on MDNR Striped Bass Project										
Date	Laboratory	Aroclor 1016/1242 ppm	Aroclor 1242 ppm	Aroclor 1248 ppm	Aroclor 1254 ppm	Aroclor 1260 ppm	Aroclor 1016/1248 ppm	Aroclor 1254/1260 ppm	Total Aroclor ppm	% Lipids	Comments
06/07/95	Hazelton		<0.050	0.092	<0.050	0.150			0.242	3.14	sample extracted and analyzed
06/30/95	Hazelton		<0.050	0.092	0.440	0.150			0.680	3.10	lipid re–analyzed, aroclors re–quantified
07/06/95	Hazelton		<0.050	0.090	0.380	0.200			0.670	3.09	sample re–extracted & analyzed

Table 5–3

NY Performance Evaluation Sample 3 (MES 63)
Analyzed by HES as part of MDNR Striped Bass Project

New York State Laboratory Comparison Study									
Laboratories	Aroclor 1016/1242 ppm	Aroclor 1242 ppm	Aroclor 1248 ppm	Aroclor 1254 ppm	Aroclor 1260 ppm	Aroclor 1016/1248 ppm	Aroclor 1254/1260 ppm	Total Aroclor ppm	% Lipids
1						0.152	0.535	0.687	2.46
						0.158	0.554	0.712	2.53
						0.155	0.546	0.701	2.55
						0.155	0.559	0.714	2.52
2			0.100	0.694	0.195			0.989	2.97
3		ND	0.08	0.44	0.15			0.67	2.46
4	<0.05			0.40	0.29			0.69	2.00

Statistics on Data Set				
Parameter	Mean	Standard Deviation	Warning Limits	Acceptance Limits
Total Aroclor	0.738	+ or – 0.112	0.514 – 0.962	0.402 – 1.074
% Lipids	2.50	+ or – 0.282	1.936 – 3.064	1.654 – 3.346

Hazelton Results on Sample # 3 (MES 63) Analyzed on MDNR Striped Bass Project									
Laboratory	Aroclor 1016/1242 ppm	Aroclor 1242 ppm	Aroclor 1248 ppm	Aroclor 1254 ppm	Aroclor 1260 ppm	Aroclor 1016/1248 ppm	Aroclor 1254/1260 ppm	Total Aroclor ppm	% Lipids
Hazelton		<0.050	0.19	0.41	0.28			0.88	2.84

Hazleton
Environmental
Services, Inc.

525 SCIENCE DRIVE • MADISON, WISCONSIN 53711

HES, Inc.

July 17, 1995

Tammy Banta
Maryland Environmental Service
2011 Commerce Park Drive
Annapolis, MD 21401

Dear Ms. Banta:

This letter will explain the analytical results obtained from the % Lipids and PCB analyses that were conducted on sample SRM: MES 39 (HES # 50500476). All PCB values are expressed in part per million (ppm) on a wet weight basis.

The initial extraction of sample SRM: MES 39 (50500476) was conducted on 06/07/95. The % Lipids and PCB analyses produced the following results.

% Lipid	PCB 1242	PCB 1248	PCB 1254	PCB 1260
3.14	< 0.050	0.092	< 0.050	0.150

PCB 1016, 1221, and 1232 were not present in the sample. These results were sent to the Maryland Environmental Service in a letter dated 06/28/95.

The sample extract of SRM: MES 39 (50500476) was re-analyzed for % Lipids on 06/30/95. The raw chromatographic data for the sample was reviewed and PCBs were identified and quantitated. These actions produced the following results.

% Lipid	PCB 1242	PCB 1248	PCB 1254	PCB 1260	Total PCB
3.10	< 0.050	0.092	0.440	0.150	0.680

PCB 1016, 1221, and 1232 were not present in the sample. These results were sent to the Maryland Environmental Service in a letter dated 07/05/95.

Sample SRM: MES 39 (50500476) was re-extracted on 07/06/95 and re-analyzed for % Lipids and PCBs. These actions produced the following results.

% Lipid	PCB 1242	PCB 1248	PCB 1254	PCB 1260	Total PCB
3.09	< 0.050	0.090	0.380	0.200	0.670

PCB 1016, 1221, and 1232 were not present in the sample. These results were sent to the Maryland Environmental Service in a letter dated 07/10/95.

If you have any questions concerning these results, I may be contacted at (608) 232-3321.

317146

Sincerely,

Robert B. Osmundson

Robert B. Osmundson
Project Manager

cc: Case file

MEMORANDUM

TO: The Record

FROM: Lawrence C. Skinner

SUBJECT: Potential Contract Laboratory Quality Assurance Results.

DATE: March 5, 1989

In my memorandum to the record dated March 21, 1989 on the captioned subject, I neglected to enter a key to the laboratories that participated in the analyses. They are:

Lab.Key	Laboratory
1	Environmental Monitoring Laboratory,Inc. 59 N. Plains Industrial Park Wallingford, CT 06492
2	Hazleton Laboratories America, Inc. 3301 Kinsman Blvd. Madison, WI 53707
3	Keystone Environmental Resources, Inc. 3911 Fondren St. Houston, TX 77063
4	ECS/Normandeau Associates, Inc. 603 Main St. New Ellentown, SC 29809
5	Southwest Research Institute 6220 Culebra Rd. San Antonio, TX 78284
7	NYS Dept. of Environmental Conservation Coxsackie Analytical Laboratory Route 9W, Building 47 Coxsackie, N.Y. 12192
8	NYS Dept. of Environmental Conservation Hale Creek Field Station 7235 Steele Avenue Extension Gloversville, N.Y. 12078

Larry Skinner

Principal
Fish & Wildlife Ecologist

LCS/lfc
cc: R. Bauer S. Jackling
R. Sloan J. Mckinney/M. Radzevich
W. Stone

TABLE 1.

1989

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
1989
SAMPLE 1
LABORATORY NUMBER

PARAMETER	1	2 (Harbor)	3 (Keystone)	4	5	7 (Corrective Action)	8	MEAN	WARNING LIMIT	ACCEPTANCE LIMIT
Hexachlorobenzene	<0.01	0.01	0.023	0.13	0.06	0.02	<0.002	0.013	0.030-<0.01	0.038-<0.01
Mirex	<0.01	<0.01	<0.018	<0.01	<0.01	<0.01	<0.002			
Endrin	<0.01	<0.01	<0.0071	<0.01	0.95	<0.01	<0.005			
Aldrin	<0.01	<0.01	<0.0024	0.23	0.71	<0.01	<0.005			
cis-Chlordane	0.13	0.04	<0.0024	<0.01	<0.01	0.061	0.063	0.062	0.070-0.054	0.074-.050
trans-Chlordane	0.027	<0.05‡	<0.0024	<0.01	<0.01	0.014	<0.005	0.009	0.017-<0.01	0.031-<0.01
Oxychlordane	——	<0.01	<0.0052	<0.01	<0.01	0.005	0.092			
trans-Nonchlor	——	0.09	<0.0024	<0.01	<0.01	0.131	0.082	0.11	0.170-0.050	0.200-0.020
DDT	0.02	<0.01	<0.01	<0.01	1.5	0.032	0.059	0.044	0.069-0.019	0.082-<0.01
DDE	0.288	0.22	0.5	<0.01	2.9	0.345	0.327	0.344	0.392-0.296	0.405-0.273
	0.084	0.1	<0.0095	<0.01	0.58	0.132	0.124	0.134	0.168-0.100	0.185-0.083
Dieldrin	<0.01	0.02	<0.0039	<0.01	<0.01	0.014	0.03	0.021	0.039-<0.01	0.047-<0.01
Heptachlor	<0.01	<0.01	<0.0024	<0.01	0.15	<0.01	<0.005			
Heptachlor Epoxide	<0.01	<0.01	<0.0039	<0.01	0.52	<0.01	<0.005			
1016	1016	1248	1248	1260	1254	1016	1016		1248 Js 1016	
PCB Aroclor	4.02	2.88	5	3.67	22.9	1.85	4.66			
1254	1254	1254	1254	1232		1254	1254/60			
PCB Aroclor	7.4	4.18	3.1	6.8		4.72	4.86			
1260		1260	1260			1260				
PCB Aroclor		1.94	<0.099			3.97				
Total PCB	11.42	9	8.1	10.47	22.9	10.54	9.52	10.42	12.35-8.49	13.31-7.53
Lead	3.63	<0.05	<0.01	0.102	0.025		<0.08	0.039	0.105-<0.01	0.139-<0.01
Mercury	2.32	0.798	1.1	0.494	0.62		0.772	0.77	1.146-0.394	1.334-0.206
Zinc	16.56	5.06	5.18	5.23	5.17					
% Lipid (as percent)	7.1	9.32	9.37	10.33	27	10.08	9.67	9.91	10.37-9.45	10.61-9.21

‡ Elevated Limit of Detection due to background interference.

317149

TABLE 2.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
1989
SAMPLE 2
LABORATORY NUMBER

Hazleton Cons. Hazleton

PARAMETER	1	2	3	4	5	7	8	MEAN	WARNING LIMIT	ACCEPTANCE LIMIT
Hexachlorobenzene	0.1	<0.01	0.003	<0.01	<0.01	<0.01	<0.002			
Mirex	<0.01	<0.01	<0.0023	<0.01	<0.01	<0.01	<0.002			
Endrin	<0.01	<0.01	<0.0009	<0.01	<0.01	<0.01	<0.005			
Aldrin	<0.01	<0.01	<0.0003	<0.01	<0.01	<0.01	<0.005			
cis-Chlordane	0.033	<0.01	0.0033	<0.01	<0.01	<0.01	<0.005			
trans-Chlordane	0.01	<0.01	<0.0003	<0.01	<0.01	<0.01	<0.005			
Oxychlordane	——	<0.01	<0.00066	<0.01	<0.01	<0.01	<0.005			
trans-Nonchlor	——	<0.01	<0.0003	<0.01	0.06	<0.01	<0.005			
DDT	0.01	<0.01	<0.0013	<0.01	0.79	<0.01	<0.002			
DDE	0.114	0.02	0.011	<0.01	1.8	0.009	0.016	0.012	0.019-<0.01	0.022-<0.01
DD	0.046	<0.01	0.0085	<0.01	0.14	0.006	0.006	0.006	0.007-0.005	0.007-0.005
Dieldrin	<0.01	<0.01	0.0022	<0.01	<0.01	<0.01	<0.005			
Heptachlor	<0.01	<0.01	<0.0003	<0.01	<0.01	<0.01	<0.005			
Heptachlor Epoxide	0.01	<0.01	<0.0005	<0.01	<0.01	<0.01	<0.005			
PCB Aroclor	1016 0.2	1248 <0.01	1254 0.039	<0.1	<0.1	1016 <0.1	1016 <0.02		1248 vs	1016
PCB Aroclor	1260 0.12	1254 0.23	1260 <0.0125			1254 <0.1	1254/60 0.012			
PCB Aroclor		1260 <0.01	1248 <0.0075			1260 <0.1				
Total PCB	0.32	0.23	0.039	<0.1	<0.1	<0.1	0.012	0.031	0.072-<0.01	0.094-<0.0
Lead	10.13	<0.05	<0.01	0.104	<0.01		<0.08	0.037	0.104-<0.01	0.137-<0.0
Mercury	2.27	0.19	0.43	0.118	0.11		0.206	0.19	0.44-<0.01	0.57-<0.01
Zinc	34.62	9.42	8.84	9.34	8.7					
% Lipid (as percent)	0.8	0.93	0.832	1.27	0.59	0.93	1.06	0.99	1.15-0.83	1.23-0.75

317150

TABLE 3.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
1989
SAMPLE 3
LABORATORY NUMBER

PARAMETER	1	2 (Hazleton)	3	4	5	7 (Cox Hale)	8	MEAN	WARNING LIMIT	ACCEPTANCE LIMIT
Hexachlorobenzene	0.057	0.02	0.032	0.02	<0.01	0.038	0.014	0.026	0.053-<0.01	0.066-<0.01
Mirex	0.312	0.11	0.2	<0.01	<0.01	0.335	0.242	0.288	0.391-0.185	0.443-0.133
Endrin	<0.01	0.02	<0.0088	<0.01	1.4	<0.01	0.017			
Aldrin	<0.01	<0.01	<0.0029	<0.01	<0.01	<0.01	<0.005			
cis-Chlordane	0.122	0.06	<0.0029	<0.01	0.31	0.053	0.044	0.048	0.058-0.038	0.063-0.033
trans-Chlordane	0.033	<0.028	<0.0029	<0.01	<0.01	0.011	<0.005			
Oxychlordane	——	0.01	0.03	<0.01	<0.01	0.119	0.061	0.09	0.154-0.026	0.186-<0.01
trans-Nonchlor	——	0.08	<0.0029	<0.01	<0.01	0.15	0.123	0.136	0.166-0.106	1.81-0.091
DDT	0.073	<0.01	<0.013	<0.01	1.5	0.104	0.128	0.117	0.151-0.083	0.168-0.066
DDE	0.971	0.49	1.2	<0.01	5.6	0.612	0.954	0.783	1.158-0.408	1.346-0.220
DDD	0.107	0.09	<0.012	<0.01	0.54	0.108	0.097	0.103	0.123-0.083	0.133-0.073
Dieldrin	<0.01	0.05	<0.0049	<0.01	<0.01	0.048	0.046	0.047	0.054-0.040	0.057-0.037
Heptachlor	<0.01	<0.01	<0.0029	<0.01	0.04	<0.01	<0.005			
Heptachlor Epoxide	0.01	<0.01	<0.0049	<0.01	0.24	0.006	<0.005			
PCB Aroclor	1254 3.84	1248 0.63	1248 0.8	1254 4.4	<0.1	1016 <0.1	1016 0.378		1248 vs 1016	
PCB Aroclor		1254 2.86	1254 3.8			1254 2.37	1254/60 3.48			
PCB Aroclor		1260 1.35	1260 4.1			1260 2.8				
Total PCB	3.84	4.84	8.7	4.4	<0.1	5.17	3.86	4.51	5.95-3.07	6.67-2.35
Lead	2.53	<0.05	<0.01	0.1	<0.01		<0.08	0.036	0.100-<0.01	0.132-<0.01
Mercury	0.82	0.22	0.43	0.123	0.18		0.186	0.234	0.424-0.044	0.519-<0.01
Zinc	10.29	4.58	3.58	4.71	4.8					
I [illegible] (as percent)	7.5	10.16	11.2	11.48	26	12.02	11.4	11.71	12.51-10.91	12.91-10.51

‡ Elevated Limit of Detection due to background interference.

317151

TABLE 4.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
1989
SAMPLE 4
LABORATORY NUMBER

PARAMETER	1	2	3	4	5	7	8	MEAN	WARNING LIMIT	ACCEPTA LIMIT
Hexachlorobenzene	0.055	0.02	0.039	<0.01	0.07	0.022	<0.002	0.013	0.030-<0.01	0.038-<
Mirex	<0.01	0.01	<0.017	<0.01	<0.01	<0.01	<0.002			
Endrin	<0.01	<0.01	<0.0067	<0.01	0.89	<0.01	<0.005			
Aldrin	<0.01	<0.01	<0.0022	0.24	0.67	<0.01	<0.005			
cis-Chlordane	0.208	0.03	<0.0022	<0.01	<0.01	0.058	0.066	0.062	0.070-0.054	0.074-0
trans-Chlordane	0.042	<0.048	<0.0022	<0.01	<0.01	0.012	<0.005	0.009	0.017-<0.01	0.031-<
Oxychlordane	----	<0.01	<0.0049	<0.01	<0.01	0.007	0.096			
trans-Nonchlor	----	0.07	<0.0022	<0.01	<0.01	0.145	0.084	0.11	0.170-0.050	0.200-0
DDT	0.046	<0.01	<0.0096	<0.01	1.5	0.034	0.055	0.044	0.069-0.019	0.082-<
DDE	0.51	0.22	0.9	<0.01	2.6	0.37	0.335	0.334	0.392-0.296	0.405-0.
DDD	0.129	0.09	<0.0089	<0.01	0.54	0.157	0.121	0.134	0.169-0.100	0.185-0.
Dieldrin	<0.01	0.02	<0.0037	<0.01	<0.01	0.016	0.024	0.021	0.039-<0.01	0.047-<0
Heptachlor	<0.01	<0.01	<0.0022	<0.01	0.15	<0.01	<0.005			
Heptachlor Epoxide	0.053	<0.01	<0.0037	<0.01	0.49	<0.01	<0.005			
PCB Aroclor	1016 6.2	1248 3.47	1254 4.2	1260 4.37	1254 21.7	1016 1.91	1016 5.01		1248 vs 1016	
PCB Aroclor	1254 11.8	1254 4.1	1248 9.2	1232 7.41		1254 5.14	1254/60 4.99			
PCB Aroclor		1260 1.92	1260 <0.093			1260 4.55				
Total PCB	18	9.49	13.4	11.78	21.7	11.6	10	10.42	12.35-8.49	13.31-7.5
Lead	1.32	<0.05	<0.01	0.1	<0.01		<0.08	0.039	0.105-<0.01	0.139-<0.
Mercury	3.07	0.784	1.15	0.486	0.61		0.719	0.733	1.148-.318	1.356-0.1
Zinc	12.81	5.06	5.33	5.6	6					
% Lipid (as percent)	6.7	9.22	9.87	10.28	29	10.18	9.73	9.91	10.37-9.45	10.61-9.2

‡ Elevated Limit of Detection due to background interference.

317152

TABLE 5.

Production of acceptable analytical results by potential contract laboratories.

Sample Number	Number of times samples compiled with reference laboratories results					No. of Compounds Evaluated
	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	
1	8	10	8	7	4	12
2	1	5	6	5	3	6
3	6*	9	7	6	4	13
4	4	11	6	8	5	12
Total	19*	35	27	26	16	43
Percent	46*	81	63	60	37	

Hazleton

* Lab 1 did not report results for two compounds, thus total and percent acceptable results are based on 41 comparisons.

1992 Study

Duplicate

Contract Laboratory Lab #	
Lab#	Contract Lab
1.	Hazleton Environmental Services, Inc.
2.	Triangle Laboratories, Inc.
3.	Syracuse Research Corporation
4.	McCoy & McCoy, Inc.
5.	Kanti Technologies, Inc.
6.	Mississippi State Chemical Laboratory
7.	Halo Creek Field Station
8.	Coxsackie Field Station
9.	DOH Laboratories
10.	State of Illinois Dept. of Agriculture
11.	Life Science Laboratory Inc.
12.	H2M Lab Inc.

Sample Identification	
Sample #	Sample Content
1.	Lake Ontario Coho Salmon
2.	Clean Fish Composite (Largemouth Bass)
3.	Lake Ontario Coho Salmon
4.	Hudson River Striped Bass
5.	Great Horn Owl tissue

NEW YORK STATE CONTRACT EVALUATION

Sample #1

LABORATORY NUMBER

NYSDEC CONTROL LABS

PARAMETER	1	2	3	4	5	6	10	11	12	Ave.	2SD	3SD	Standard Deviation	PARAMETER
Hexachlorobenzene	<0.01	ND	<0.01	<0.01	ND	0.010		<0.01	<0.01	0.012	0.018 - 0.006	0.021 - 0.003	0.003	Hexachlorobenzene
Mirex	0.170	0.059	<0.01	0.012	0.020	0.100	0.024	0.110	0.060	0.121	0.135 - 0.106	0.142 - 0.099	0.007	Mirex
Endrin	<0.01	ND	<0.01	<0.01	ND	0.020		<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	Endrin
cis-Chlordane	0.021	ND	<0.01	<0.01	ND	0.030		0.0093J	<0.01	0.018	0.032 - 0.004	0.039 - -0.003	0.007	cis-Chlordane
trans-Chlordane	<0.01	ND	<0.01	<0.01	ND	0.010		<0.01	<0.01	0.019	0.037 - 0.001	0.046 - -0.008	0.009	trans-Chlordane
Oxychlordane	<0.01	ND	NO BID	<0.01	ND	0.010		NO BID	0.030	0.029	0.037 - 0.022	0.041 - 0.018	0.004	Oxychlordane
trans-Nonachlor	0.040	ND	NO BID	0.00567J	0.016	0.060		NO BID	<0.01	0.054	0.063 - 0.044	0.067 - 0.040	0.005	trans-Nonachlor
DDT	0.051	ND	<0.01	0.015	ND	0.040	0.024	<0.01	0.030	0.046	0.076 - 0.017	0.090 - 0.003	0.015	DDT
DDE	0.620	0.252	0.121	0.054	0.125	0.470	0.074	0.300	0.260	0.492	0.626 - 0.359	0.692 - 0.293	0.067	DDE
DDD	0.036	ND	<0.01	0.00823J	ND	0.040	0.027	0.019	0.020	0.024	0.028 - 0.019	0.030 - 0.017	0.002	DDD
Dieldrin	0.013	ND	<0.01	0.008063	ND	0.020	0.011	0.014	<0.01	0.013	0.018 - 0.008	0.020 - 0.006	0.002	Dieldrin
Heptachlor	<0.01	ND	<0.01	<0.01	ND	ND		<0.01	<0.01	0.010	0.010 - 0.010	0.010 - 0.010	0.000	Heptachlor
Heptachlor Epoxide	<0.01	ND	<0.01	<0.01	ND	0.010		<0.01	<0.01	0.010	0.010 - 0.010	0.010 - 0.010	0.000	Heptachlor Epoxide
	1254	1016	1260	1260	1242	1254	1254	1254	1248					
PCB Aroclor	0.920	0.111	0.189	0.200	ND	1.400	0.280	0.700	0.250					PCB Aroclor
	1260	1260			1254	1260	1260	1260	1260					
PCB Aroclor	0.760	0.336			0.400	0.670	0.159	0.520	0.390					PCB Aroclor
					1260									
PCB Aroclor					0.194									PCB Aroclor
Total PCB	1.680	0.447	0.189	0.200	0.594	2.070	0.439	1.220	0.640	1.681	2.149 - 1.214	2.383 - 0.980	0.234	Total PCB
Lead	0.045		0.106	97.200	<0.01		0.060	0.113	0.112	0.100	0.100 - 0.100	0.100 - 0.100	0.000	Lead
Mercury	0.173		0.183	0.270	<0.1		0.120	0.086	0.100	0.141	0.157 - 0.125	0.164 - 0.117	0.008	Mercury
Zinc	4.590		5.000	2900.000	5.670		9.810	5.380	4.360	5.069	5.174 - 4.964	5.227 - 4.912	0.052	Zinc
% Lipid (as percent)	3.570	1.800	0.720	1.920	1.310	3.380	1.210	2.430	0.060	2.714	2.888 - 2.540	2.975 - 2.453	0.087	% Lipid (as percent)

317155

NEW YORK STATE CONTRACT EVALUATION

Sample #2

LABORATORY NUMBER

NYSDEC CONTROL LABS

PARAMETER	1	2	3	4	5	6	10	11	12	Ave.	2SD	3SD	Standard Deviation	PARAMETER
Hexachlorobenzene	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	Hexachlorobenzene
Mirex	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	Mirex
Endrin	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	Endrin
cis-Chlordane	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	cis-Chlordane
trans-Chlordane	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	trans-Chlordane
Oxychlordane	<0.01	ND	ND BID	<0.01	ND	ND	ND	ND BID	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	Oxychlordane
trans-Nonachlor	<0.01	ND	ND BID	<0.01	ND	ND	ND	ND BID	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	trans-Nonachlor
DDT	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	0.010	0.007	0.014 - -0.000	0.017 - -0.004	0.003	DDT
DDE	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	0.020	0.008	0.013 - 0.003	0.015 - 0.001	0.002	DDE
DDD	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	<0.01	0.007	0.014 - -0.000	0.017 - -0.004	0.003	DDD
Dieldrin	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	Dieldrin
Heptachlor	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	Heptachlor
Heptachlor Epoxide	<0.01	ND	<0.01	<0.01	ND	ND	ND	<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	Heptachlor Epoxide
PCB Aroclor	<0.05	ND	<0.05	<0.05	1242 ND	ND	ND	1254 <0.05	<0.05					PCB Aroclor
PCB Aroclor	<0.05	ND	<0.05	<0.05	1254 0.009	ND	ND	1260 <0.05	<0.05					PCB Aroclor
PCB Aroclor	<0.05	ND	<0.05	<0.05	1260 0.008	ND	ND		<0.05					PCB Aroclor
Total PCB	<0.05	ND	<0.05	<0.05	0.017	ND	ND	<0.05	<0.05	0.028	0.075 - -0.020	0.099 - -0.043	0.024	Total PCB
Lead	0.204		0.292	199.000	<0.01		0.100	0.412	0.260	0.100	0.100 - 0.100	0.100 - 0.100	0.000	Lead
Mercury	0.789		0.735	1.120	<0.01		0.150	0.726	0.760	0.556	0.765 - 0.347	0.870 - 0.242	0.195	Mercury
Zinc	6.090		7.290	6000.000	7.710		12.000	7.610	6.080	6.760	7.211 - 6.309	7.437 - 6.083	0.226	Zinc
% Lipid (as percent)	0.810	0.200	0.300	<0.01	0.236	0.490	1.450	0.047	0.170	0.295	0.437 - 0.153	0.508 - 0.082	0.071	% Lipid (as percent)

317156

NEW YORK STATE CONTRACT EVALUATION

Sample #3

LABORATORY NUMBER

PARAMETER	1	2	3	4	5	6	10	11	12	NYSDEC CONTROL LABS Ave.	2SD	3SD	Standard Deviation	PARAMETER
Hexachlorobenzene	<0.01	0.004	<0.01	<0.01	ND	0.010		<0.01	<0.01	0.013	0.018 - 0.007	0.021 - 0.004	0.003	Hexachlorobenzene
Mirex	0.160	0.072	<0.01	0.021	0.018	0.100	0.059	0.098	0.090	0.115	0.139 - 0.091	0.151 - 0.079	0.012	Mirex
Endrin	<0.01	ND	<0.01	<0.01	ND	0.020		<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	Endrin
cis-Chlordane	0.020	0.019	<0.01	<0.01	ND	0.030		0.0090J	0.010	0.018	0.032 - 0.003	0.039 - -0.004	0.007	cis-Chlordane
trans-Chlordane	<0.01	0.016	<0.01	<0.01	ND	0.010		<0.01	0.010	0.019	0.038 - 0.001	0.047 - -0.009	0.009	trans-Chlordane
Oxychlordane	<0.01	ND	NO BID	<0.01	ND	0.010		NO BID	0.040	0.029	0.038 - 0.020	0.043 - 0.015	0.005	Oxychlordane
trans-Nonachlor	0.038	ND	NO BID	<0.01	0.020	0.060		NO BID	<0.01	0.050	0.060 - 0.040	0.065 - 0.034	0.005	trans-Nonachlor
DDT	0.053	ND	<0.01	0.00928J	ND	0.040		<0.01	0.040	0.045	0.081 - 0.009	0.099 - -0.008	0.018	DDT
DDE	0.590	0.294	0.123	0.087	0.170	0.470	0.174	0.270	0.350	0.464	0.604 - 0.324	0.674 - 0.254	0.070	DDE
DDD	0.043	ND	<0.01	0.010	ND	0.040	0.057	0.021	0.030	0.029	0.037 - 0.020	0.042 - 0.015	0.004	DDD
Dieldrin	0.013	0.013	<0.01	0.009	ND	0.020		0.011	<0.01	0.014	0.025 - 0.003	0.031 - -0.003	0.006	Dieldrin
Heptachlor	<0.01	ND	<0.01	<0.01	ND	ND		<0.01	<0.01	0.010	0.010 - 0.010	0.010 - 0.010	0.000	Heptachlor
Heptachlor Epoxide	<0.01	ND	<0.01	<0.01	ND	0.010		<0.01	<0.01	0.010	0.010 - 0.010	0.010 - 0.010	0.000	Heptachlor Epoxide
PCB Aroclor	1254 0.910	1254 0.398	1260 0.186	1260 0.310	1242 0.580	1254 1.600	1254 0.451	1254 0.680	1248 0.300					PCB Aroclor
PCB Aroclor	1260 0.740				1254 0.580	1260 0.670	1260 0.400	1260 0.450	1260 0.500					PCB Aroclor
PCB Aroclor					1260 0.270									PCB Aroclor
Total PCB	1.650	0.398	0.186	0.310	1.430	2.270	0.850	1.130	0.800	1.616	2.020 - 1.213	2.222 - 1.011	0.202	Total PCB
Lead	0.046		0.044	<0.01	<0.01		0.040	0.116	0.144	0.100	0.100 - 0.100	0.100 - 0.100	0.000	Lead
Mercury	0.176		0.187	0.240	<0.01		0.110	0.071	0.110	0.137	0.187 - 0.087	0.213 - 0.062	0.025	Mercury
Zinc	4.990		5.360	2000.000	5.970		10.000	5.830	4.460	4.837	4.889 - 4.784	4.915 - 4.758	0.026	Zinc
% Lipid (as percent)	3.630	2.200	0.420	3.330	1.180	3.450	4.520	2.430	0.080	2.721	3.102 - 2.340	3.293 - 2.150	0.190	% Lipid (as percent)

NEW YORK STATE CONTRACT EVALUATION

Sample #4 Hudson SCB

LABORATORY NUMBER

NYSDEC CONTROL LABS

PARAMETER	1	2	3	4	5	6	10	11	12	Ave.	2SD	3SD	Standard Deviation	PARAMETER
Hexachlorobenzene	<0.01	0.005	<0.01	<0.01	ND	0.010		<0.01	0.010	0.014	0.022 - 0.006	0.026 - 0.002	0.004	Hexachlorobenzene
Mirex	<0.01	ND	<0.01	<0.01	ND	ND		0.026	0.020	0.006	0.014 - -0.002	0.018 - -0.006	0.004	Mirex
Endrin	<0.01	0.024	<0.01	<0.01	ND	0.020		<0.01	<0.01	0.008	0.012 - 0.003	0.015 - 0.000	0.002	Endrin
cis-Chlordane	0.033	ND	0.016	0.017	0.030	0.040	0.048	0.020	<0.01	0.028	0.033 - 0.022	0.036 - 0.019	0.003	cis-Chlordane
trans-Chlordane	<0.01	ND	<0.01	<0.01	ND	0.010		<0.01	<0.01	0.014	0.031 - -0.003	0.040 - -0.011	0.009	trans-Chlordane
Oxychlordane	<0.01	ND	NO BID	0.008263	ND	0.020		NO BID	0.010	0.028	0.075 - -0.019	0.098 - -0.042	0.023	Oxychlordane
trans-Nonachlor	0.037	0.055	NO BID	0.021	0.060	0.070		NO BID	<0.01	0.057	0.076 - 0.038	0.086 - 0.029	0.010	trans-Nonachlor
DDT	0.032	ND	<0.01	0.030	ND	0.020		<0.01	0.030	0.034	0.059 - 0.009	0.070 - -0.003	0.012	DDT
DDE	0.200	0.147	0.029	0.069	0.150	0.170	0.140	0.099	0.160	0.162	0.257 - 0.067	0.304 - 0.020	0.047	DDE
DDD	0.099	ND	0.031	0.036	ND	0.080	0.124	0.044	0.060	0.055	0.060 - 0.049	0.063 - 0.046	0.003	DDD
Dieldrin	0.010	0.009	<0.01	0.013	ND	0.030	0.041	0.023	<0.01	0.012	0.019 - 0.005	0.023 - 0.001	0.004	Dieldrin
Heptachlor	<0.01	ND	<0.01	<0.01	ND	ND		<0.01	<0.01	0.010	0.010 - 0.010	0.010 - 0.010	0.000	Heptachlor
Heptachlor Epoxide	<0.01	ND	<0.01	<0.01	ND	ND	0.018	<0.01	<0.01	0.010	0.010 - 0.010	0.010 - 0.010	0.000	Heptachlor Epoxide
PCB Aroclor	1242 0.930	1016 0.962	1248 1.650		1242 1.760	1248 0.850	1248 1.620	1248 0.710	1248 2.100	1.504	2.881 - 0.126	3.570 - -0.563	0.689	PCB Aroclor
PCB Aroclor	1254 1.600			1254 0.083	1254 1.470	1254 2.180	1254 1.235	1254 0.940	1254 1.700	1.424	1.976 - 0.871	2.252 - 0.595	0.276	PCB Aroclor
PCB Aroclor	1260 0.680	1260 0.477	1260 1.010		1260 0.546	1260 0.580	1260 0.601		1260 0.440	0.776	0.917 - 0.636	0.987 - 0.566	0.070	PCB Aroclor
Total PCB	3.210	1.439	2.660	0.830	3.776	3.610	3.456	1.650	4.240	3.704	4.744 - 2.664	5.264 - 2.143	0.520	Total PCB
Lead	0.121		0.059	99.700	<0.01		0.030	0.148	0.117	0.100	0.100 - 0.100	0.100 - 0.100	0.000	Lead
Mercury	0.349		0.462	0.460	0.053		0.210	0.166	0.350	0.351	0.440 - 0.263	0.484 - 0.219	0.044	Mercury
Zinc	5.100		5.530	2000.000	5.530		10.300	6.530	4.430	5.287	5.532 - 5.042	5.654 - 4.919	0.123	Zinc
% Lipid (as percent)	8.730	8.500	7.400	35.420	5.830	8.340	9.040	6.330	0.890	7.888	8.350 - 7.425	8.582 - 7.193	0.231	% Lipid (as percent)

317158