

**FISH CONSUMPTION
AND RECREATIONAL USE ASSESSMENTS
OF KENTUCKY LAKES**

**FINAL REPORT
CL004953-91-3**



**Natural Resources and
Environmental Protection Cabinet
Division of Water**

January 1997

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USE ASSESSMENTS OF KENTUCKY LAKES**

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**KENTUCKY NATURAL RESOURCES
AND
ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER**

January, 1997

INTRODUCTION

Section 314(a)(1) of the Clean Water Act requires States to conduct assessments of the water quality of their publicly owned lakes and report on their condition biennially in the 305(b) Report to Congress on Water Quality. Financial assistance is available on a 50% nonfederal match basis to states through Lake Water Quality Assessment grants to aid states in their lake management programs and water quality assessments. Two projects received funding that would help Kentucky assess water quality in various lakes throughout the Commonwealth in 1994. One project involved fish tissue sampling. The other involved monitoring water quality for primary contact recreational uses.

PRIMARY CONTACT USE ASSESSMENT

The Kentucky Division of Water performed bacteriological sampling on two major reservoirs (Herrington and Taylorsville Lakes). These two reservoirs were sampled because of the close proximity to the central microbiological laboratory located in Frankfort, Kentucky. This close proximity allowed the water samples to be analyzed within holding times necessary to provide accurate data. Fecal coliform (FC) sampling was performed to assess use support for primary contact recreation (PCR). This information is useful for public health purposes and can be a significant contribution to use assessments reported in the biennial 305(b) Report to Congress on Water Quality. The primary assessment tool is the concentration of FC collected during the recreation season (May through October).

Methods

Three stations were chosen on each lake for collecting water samples on a weekly basis from May to October (maps 1 and 2). Herrington Lake was sampled at stations (1) Chimney Rock Marina near the dam, (2) Sims Marina at midlake, and (3) at Kings Mill Marina in the headwaters. Taylorsville Lake was sampled at stations (1) at the dam outlet structure, (2) at Settlers Trace marina, and (3) at Van Buren boat ramp.

Water samples were analyzed according to methods outlined in Standard Methods for The Examination of Water and Wastewater, 16th Edition. Analysis was by membrane filter technique (Method 9222D). All samples were collected in sterile sample bottles provided by Ecological Support Section (ESS) Microbiological Laboratory in Frankfort, KY, placed on wet ice, and delivered to the laboratory in six hours or less. Duplicate fecal coliform (FC) samples were also taken randomly throughout the survey to provide quality control and assurance. Results were also provided by the ESS Microbiological Laboratory. All samples were analyzed in eight hours or less from the time of collection. In addition, the staff microbiologist observed field collection techniques on the first sampling trip to make sure samples were collected correctly.

Results

Based on the fecal coliform data taken weekly from May through October (Table 1), both

TABLE 1: BACTERIOLOGICAL RESULTS FROM SAMPLED LAKES						
DATE	Taylorsville Lake	Taylorsville Lake	Taylorsville Lake	Herrington Lake	Herrington Lake	Herrington Lake
	STATION 1	STATION 2	STATION 3	STATION 1	STATION 2	STATION 3
940503	26	32	150	12	6	96
940510	30	64	1000	4	<2/10	26
940517	<2	76	140	<2	4	10
940525	2	2/2	28	2	<2	8
940531	<2	4	16	12	<2	10
940607	<2	360	8	<2	<2	<2/<2
940615	<2	<2	10	<10	16	12
940621	2	<2	6	6	2	46
940628	<2	2/<2	6	34/38	2	10
940705	<2	2/<2	44	2	4	2
940712	4	<2	<2	2	134/82	34
940719	<2	<2/<2	180	30	4	16
940726	<2	8/8	10	8	<2	2
940802	<2	<2	6	2	2	16
940809	<2	<2	6	14	<2/<2	6
940816	2/4	2	2	10	6	2
940823	<2	4	40/30	8	12	12/14
940830	>2	4	4	8	4	<2
940906	2	14/16	<2	18	2	6
940913	14	<2	<2/<2	<2	10	10
940920	4/4	<2	<2	52	6/4	2
940927	2	>2/2	8	32	6	4
941004	<2	<2/<2	2	86/32	8	2
941011	<2	2	<2/4	16	2	12/6
941018	<2	2/<2	<2	18/12	6	4
941025	2/<2	<2	<2	4/6	60	4

Results measured in fecal coliform colonies per 100 milliliters

/ = duplicate sample analyses

lakes had acceptable water quality for primary contact recreational uses (i.e., swimming). Use attainability was assessed by using the criteria in the 305(b) report guidelines. All stations

were grouped for each lake. Primary contact recreation was fully supported if colony counts did not exceed 400/100 ml in 10 percent or less of the measurements, partially supported if 11-25 percent of the measurements exceeded 400 colonies/100 ml, and not supported if the colony counts exceeded 400/100 ml greater than 25 percent of the time. A press release was issued that informed the public of the results (See Appendix B for newspaper article).

Taylorsville Lake

Fecal coliform data from all three stations indicate that one of the 78 (approximately 1.3 percent) values was unacceptable. Based on the FC criterion, the water quality of Taylorsville Lake fully supports use for PCR.

Herrington Lake

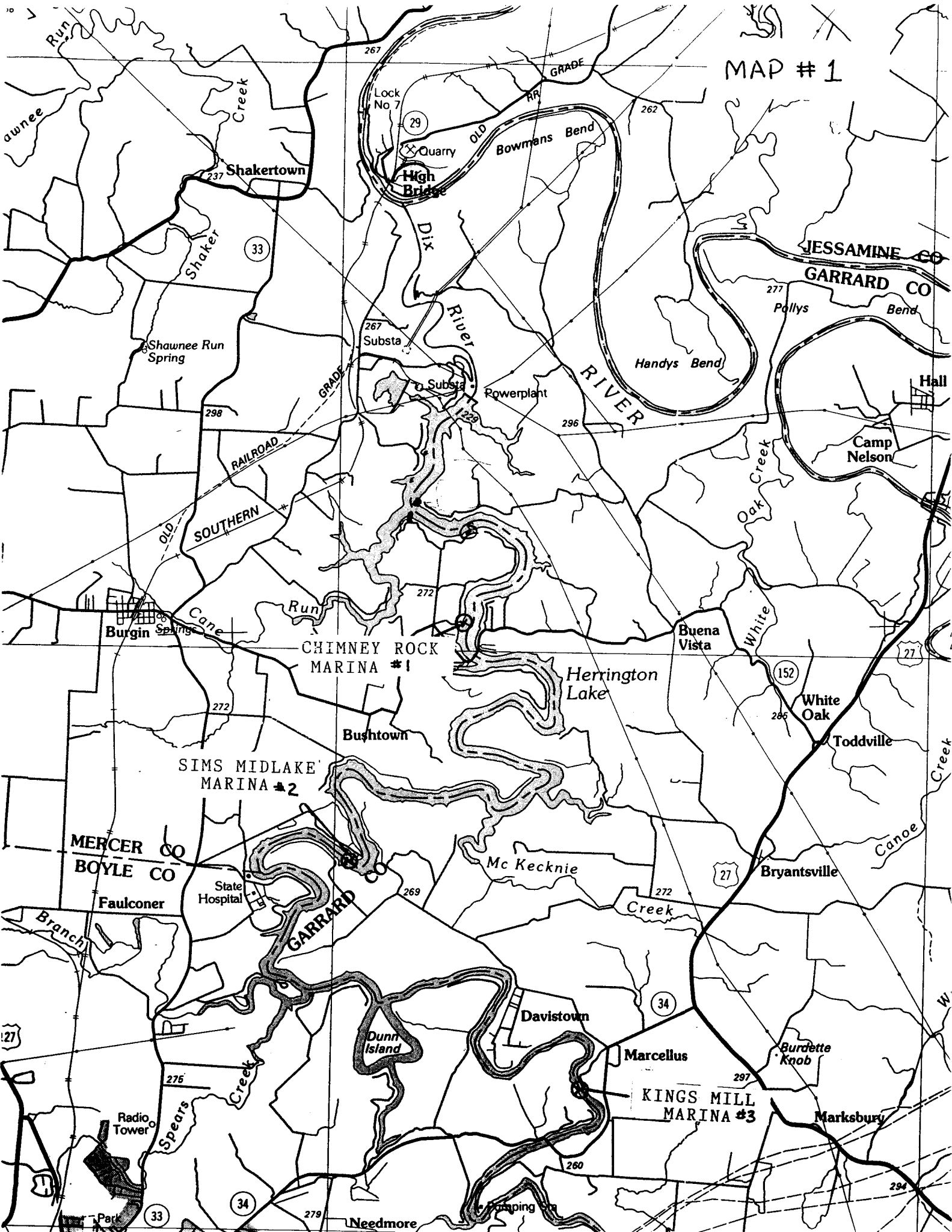
Fecal coliform data from all three stations indicate that none of the 78 values was unacceptable. Based on the FC criterion, the water quality of Herrington Lake fully supports use for PCR.

FISH TISSUE SAMPLING PROJECT

Methods

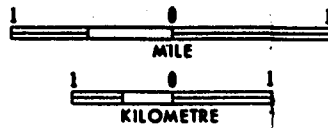
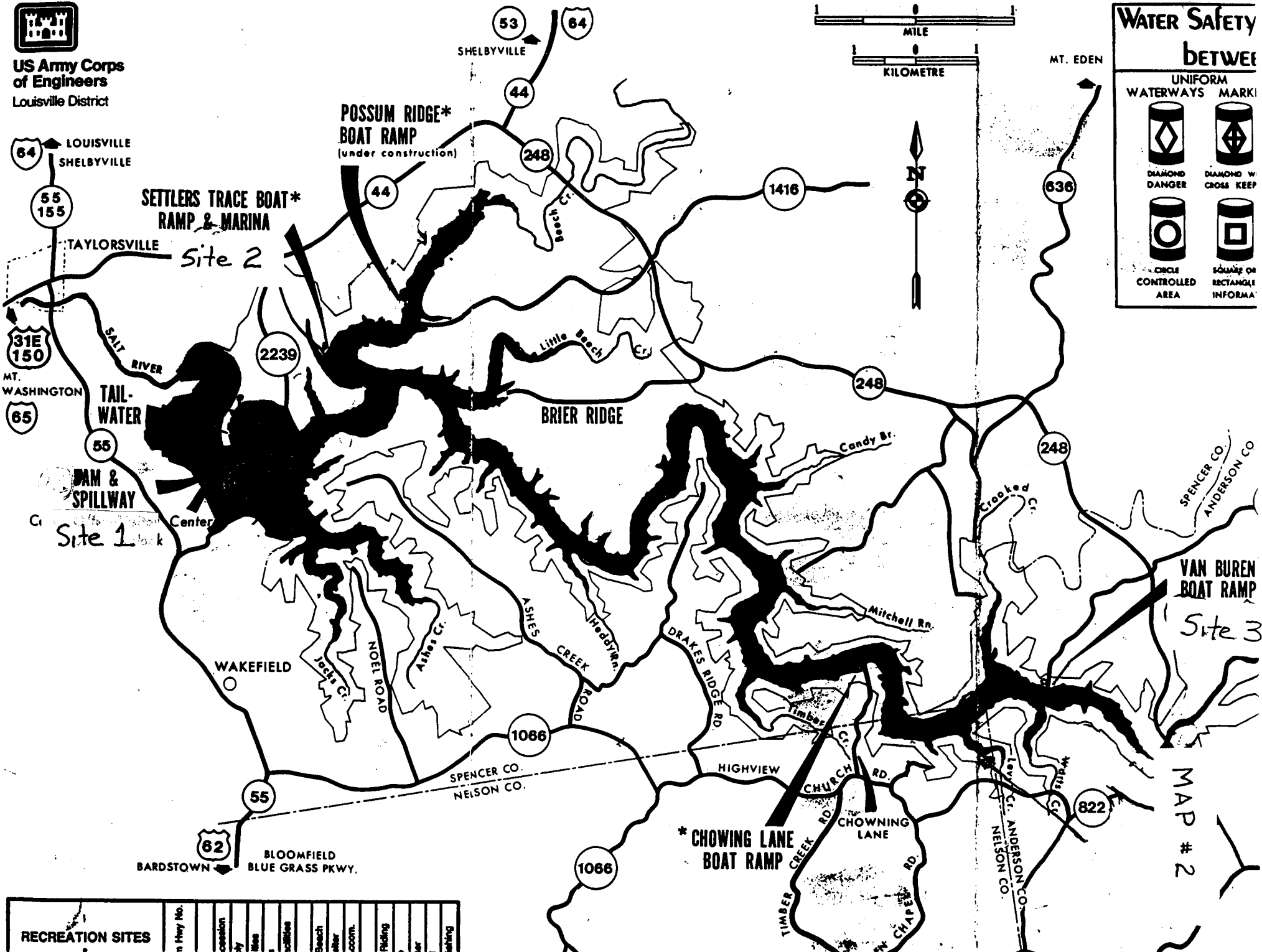
Fish were collected by boat-mounted electrofishing from two sites on McNeely and Guist Creek Lakes with three sites collected on Herrington and Barren River Lakes. The sites represented major spatial areas of the reservoirs or major embayments. The three Herrington Lake sites were collected November 9-11, 1994, in a cooperative effort by biologists of both the Water Quality Branch of the Division of Water and the Central Fisheries District of the

MAP # 1





US Army Corps
of Engineers
Louisville District



WATER SAFETY BETWEEN

UNIFORM WATERWAYS MARKINGS

DIAMOND DANGER	DIAMOND WITH CROSS KEEP
CIRCLE CONTROLLED AREA	SQUARE OR RECTANGLE INFORMATION

RECREATION SITES	Agency No.	Creation	By	Map	Location	Beach	Other	Room	Fishing	Swim	Boating

MAP # 2

Kentucky Department of Fish and Wildlife Resources. The Guist Creek and McNeely Lake sites were collected August 10-11, 1994 and August 17-18, 1994, respectively by the Central Fisheries District of the Kentucky Department of Fish and Wildlife Resources. Barren River Lake was collected on November 1-2, 1994 by the Water Quality Branch of the Division of Water. McNeely Lake was resampled in 1996 for verification of 1994 data by the Central Fisheries District of the Kentucky Department of Fish and Wildlife Resources.

Fish were weighed and measured in the field, and the data recorded on field sheets. Fish were processed by filleting the right side of the body. The fillets were wrapped in aluminum foil, placed in plastic bags with sample identification tags and then placed on wet ice for transportation to Frankfort. The fillet samples were kept frozen in the Water Quality Branch laboratory until shipping. Samples were shipped to the AXYS Analytical Services Ltd. in Sidney, British Columbia for analysis on March 5, 1996 and analyzed through a Memorandum of Agreement (MOA) with Ohio River Valley Water Sanitation Commission (ORSANCO) and the Division of Water.

Results

Tables 2 shows the concentrations of the constituents of concern that were analyzed from fish tissue in Herrington, Barren River, McNeely and Guist Creek Lakes. McNeely Lake was resampled in 1996. Table 3 shows the concentrations of the constituents that were analyzed in 1996. Appendix A contains the parameter analyses including the metals data for the 1996 sample of McNeely Lake. A review of the 1994 data indicated that the fish tissue did contain concentrations of the measured chemicals that would trigger the Division of Water to follow

TABLE 2: Fish Tissue Results for 1994 Lakes Sampling

Lake Name	Location	Site Number	Species Number	Collected Species	Body or Fillet	% Lipid	%Moisture	2378 TCDD ppt	TEQ (NATO) ppt	PCB Total ppb	Chlordane Total ppb	Cadmium ppb	Lead ppb	Mercury ppb
Barren River Reservoir	near Dam	BRR01	73	Lgm Bass	Fillet	2.1	76.6			25.47	4.68	4	10	354
	near Dam	BRR01	1	Carp	Fillet	1.2	78.2			16.54	2.43	9	9	236
	Barren River Arm	BRR02	73	Lgm Bass	Fillet	1.2	77.6			7.68	1.92	4	9	317
	Barren River Arm	BRR02	1	Carp	Fillet	3.72	76.1			15.98	5.98	27	28	201
	Beaver Creek	BRR03	73	Lgm Bass	Fillet	2.1	77			25.47	4.68	18	<5	449
	Beaver Creek	BRR03	1	Carp	Fillet	2.4	78			119.56	9.36	9	28	231
McNeely Lake	Dam	MCN01	73	Lgm Bass	Fillet	0.81	77.8	0.017	0.45	27.9	28.7	4	<5	430
	Dam	MCN01	1	Carp	Fillet	4.3	74.8	1.01	6.8	86.69	109.8	3	9	141
	Upper lake	MCN02	73	Lgm Bass	Fillet	0.49	77.9	0.016	0.4	8.46	13.53	3	<5	437
	Upper lake	MCN02	1	Carp	Fillet	9.3	71	3.75	25.59	198	370	2	9	126
	Upper lake	MCN02	1- DUPE	Carp	Fillet	9.4	70.3	3.82	26.37	217	420	3	18	112
Herrington Lake	near Dam	HERR01	22	Drum	Fillet	5.8	78			209	49	4	9	300
	near Dam	HERR01	73	Lgm Bass	Fillet	0.81	77.6			34	4	4	<5	126
	Midlake	HERR02	73	Lgm Bass	Fillet	0.61	78.3			27.61	3.06	5	9	237
	Midlake	HERR02	75	SM Buffalo	Fillet	12	69.4			558.58	59.7	4	23	113
	Upper lake	HERR03	1	Carp	Fillet	5.8	74.9			209	49	4	10	67
	Upper lake	HERR03	73	Lgm Bass	Fillet	0.81	77			34	4	4	9	177
Guist Creek Lake	near Ramp	GCL01	1	Carp	Fillet	3.8	75.1			15	8.7	5	9	108
	near Ramp	GCL01	73	Lgm Bass	Fillet	1.2	77.7			6.2	6.2	9	<5	325
	near Dam	GCL02	1	Carp	Fillet	4.8	74.6			39	49	4	<5	97
	near Dam	GCL02	73	Lgm Bass	Fillet	1.8	77.9			7.7	6.7	4	<5	333
	near Dam	GCL02	73 - DUPE	Lgm Bass	Fillet	1.7	77.2			6.3	5.7	4	9	315

SM Buffalo = Small Mouth Buffalo

Lgm Bass = Largemouth Bass

TABLE 3: Fish Tissue Results for McNeely Lake in 1996

Lake Name	Location	Site Number	Species Number	Collected Species	Body Or Fillet	% Lipid	DDD, DDE & DDT	2378 TCDD	TEQ (NATO)	PCB Total	Chlordane Total	Cadmium ppb	Lead ppb	Mercury ppb
McNeely Lake	Dam	MCN01	73	Lgm Bass	Fillet	0.18	Nd	0.12	0.529	2.07	4.47	<1	8	265
	Dam	MCN01	1	Carp	Fillet	1.2	3.58	0.39	2.584	13.59	21.3	2	14	71
	Dam	MCN01	4	Ch. Catfish	Fillet	1.6	6.63	0.43	1.373	20.55	40	17	10	271
	Upper Lake	MCN02	73	Lgm Bass	Fillet	0.25	1.64	0.24	0.798	3.6	7.32	2	11	221
	Upper Lake	MCN02	1	Carp	Fillet	2.2	1.73	0.3	1.841	4.47	18.4	<1	10	32
	Upper Lake	MCN02	1-DUPE	Carp	Fillet	2.1	1.42	N/A	N/A	4.51	18.4	N/A	N/A	N/A
	Upper Lake	MCN02	4	Ch. Catfish	Fillet	3.5	43.01	0.61	2.469	24.3	43.4	3	17	149
	Upper Lake	MCN02	4-DUPE	Ch. Catfish	Fillet	3.5	N/A	0.6	2.453	N/A	N/A	N/A	N/A	N/A

Nd = Analyte was nondetectable in tissue sample

N/A = Parameter was not analyzed for this tissue sample

its protocols for issuing a fish consumption advisory for McNeely Lake based on dioxin and chlordane concentrations. The 1996 data for McNeely Lake did not exceed the concentrations that would cause an advisory to be issued. That protocol requires that a second round of fish tissue sampling and analyses be conducted to confirm that an advisory is warranted. The division currently uses concentrations of analytes that exceed the Food and Drug Administration (FDA) Action Levels when issuing advisories. The FDA action levels for commonly found contaminants are: chlordane (0.3 ppm), dioxin (25.0 ppm), mercury (1.0 ppm), DDT (5.0 ppm) and Total PCB (2.0 ppm).

Risk assessment estimates for fish consumption are also being determined from 1994 and 1996 data on these lakes. The Division of Water, the Kentucky Department of Fish and Wildlife Resources and the Department for Health Services are working on a new protocol for fish consumption advisories based on a review of EPA's risk assessment guidance and that developed by the Great Lakes states. When an agreement is reached, it is expected that press releases will be made to inform the public of the new protocols and advisories posted where required based on these protocols.

APPENDIX A
FISH TISSUE RESULTS FOR
McNEELY LAKE
IN 1996

F A X T R A N S M I S S I O N



AXYS

Axys Analytical
Services Ltd

POST OFFICE BOX 2219, 2045 MILLS ROAD,
SIDNEY, BRITISH COLUMBIA, CANADA V8L 3S8

TEL (604) 656-0881
FAX (604) 656-4511

DATE: **20 September 1996** TIME: TOTAL PAGES (INCL THIS PAGE) **19**

CONTACT: **Jerry Schulte** Batch ID: **CL-0851**

ORGANIZATION: **ORSANCO** Our File: **9618**

ADDRESS: Sample: **-01,02,03,04,05,06**

FAX: **1-513-231-7761** PHONE:

FROM: **Dale Hoover**

MESSAGE:

Attached are the PCB/pesticide analysis results for sample batch CL-0851. Should you have any questions, please do not hesitate to contact me.

Best regards,

FAX (604) 656-4511 TEL (604) 656-0881

F A X T R A N S M I S S I O N



AXYS

Axys Analytical
Services Ltd

POST OFFICE BOX 2219, 2045 MILLS ROAD,
SIDNEY, BRITISH COLUMBIA, CANADA V8L 3S8

TEL (604) 656-0881
FAX (604) 656-4511

DATE: 20 September 1996 TIME: TOTAL PAGES (INCL THIS PAGE) 13

CONTACT: Jerry Schulte Batch ID: CL-0851

ORGANIZATION: ORSANCO Our File: 9618

ADDRESS: Sample: -01,02,03,04,05,06

FAX: 1-613-231-7761 PHONE:

FROM: Dale Hoover

MESSAGE:

Attached are the PCB/pesticide analysis results for sample batch CL-0851. Should you have any questions, please do not hesitate to contact me.

Best regards,

FAX (604) 656-4511 TEL (604) 656-0881

BATCH SUMMARY

Batch ID: CL-0851	Date: 20 September 1996
Analysis Type: PCB Congener/Pesticide	Matrix Type: Tissue
BATCH MAKEUP	
Samples: 9618 -01 -02 -03 -04 -05A -06	Blank: CL-T-BLK 851
	Reference or Spike: CL-T-CRM 350 i
	Duplicate: 9605-05B
Comments	

Copyright Axys Analytical Services Ltd.
February 1993

QA /06 Rev. 2. July 18/94

PCB/PESTICIDE ANALYSIS REPORT
Concentrations are not recovery corrected

CLIENT SAMPLE I.D: SRM 1588 N.J.S.T. Certified Cod Liver Oil

AXYS ID: CL-T-CRM 350 I

CLIENT: ORSANGO

DATE: 19/Sept/86

SAMPLE TYPE: Tissue

METHOD NO.: CL-T-03/Ver.2

SAMPLE SIZE: 0.311 g

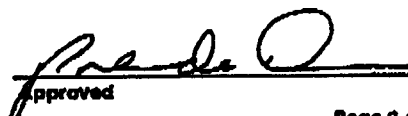
INSTRUMENT: GC-MS/GC-ECD

CONCENTRATION IN: ng/g

Compounds	Determined	Certified
Hexachlorobenzene	140	148 +/- 21
alpha HCH	130	88 +/- 19
gamma-Chlordane	48	50 +/- 13
alpha-Chlordane	170	158 +/- 8
trans-Nonachlor	200	209 +/- 11
p,p'-DDE	580	641 +/- 62
p,p'-DDD	190	277 +/- 16
o,p'-DDT	170	156 +/- 5
p,p'-DDT	440	529 +/- 45
Dieldrin	110	130 +/- 12
90/101	120	129 +/- 5
153	230	276 +/- 40
138/163/164	240	281 +/- 29
150	100	107 +/- 4
170/180	47	45 +/- 5

Surrogate Standards	% Recovery
13C-Hexachlorobenzene	100
13C-gamma HCH	120
13C-p,p'-DDE	110
13C-p,p'-DDT	98
13C-PCB 101	100
13C-PCB 105	88
13C-PCB 118	95
13C-PCB 180	110
13C-PCB 209	120

1. Concentrations are not recovery corrected.


Approved

Page 2 of 2

PCB/PESTICIDE ANALYSIS REPORT
Concentrations are not recovery corrected.

CLIENT SAMPLE I.D: Procedural Blank

AXYS ID: CL-T-BLK 851

CLIENT: ORGANO

DATE: 19/Sept/88

SAMPLE TYPE: Blank

METHOD NO.: CL-T-03/Ver.2

SAMPLE SIZE: 10.0 g

INSTRUMENT: GC-MS/GC-ECD

CONCENTRATION IN: ng/g

Compounds	Concentration	(SDL)
Hexachlorobenzene	ND	0.12
alpha HCH	ND	0.24
beta HCH	ND	0.39
gamma HCH	ND	0.34
delta HCH	ND	0.34
Heptachlor	ND	0.63
Heptachlor Epoxide	ND	0.01
Aldrin	ND	0.22
Oxychlorane	ND	1.2
gamma-Chlordane	ND	0.23
alpha-Chlordane	ND	0.24
trans-Nonachlor	ND	0.18
cis-Nonachlor	ND	0.15
CHLORDANE (Sum)	ND	
o,p'-DDE	ND	0.05
p,p'-DDE	0.08	0.06
o,p'-DDD	ND	0.06
p,p'-DDD	ND	0.08
o,p'-DDT	ND	0.12
p,p'-DDT	ND	0.11
DDD, DDE, DDT (Sum)	0.08	
Dieldrin	ND	0.01
Endrin	ND	0.04

Surrogate Standards	% Recovery
13C-Hexachlorobenzene	120
13C-gamma HCH	110
13C-p,p'-DDE	100
13C-p,p'-DDT	100
13C-PCB 101	110
13C-PCB 105	87
13C-PCB 118	88
13C-PCB 180	92
13C-PCB 209	110

1. SDL = Sample Detection Limit
2. ND = Not Detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are not recovery corrected.

[Signature]
Approved

PCB/PESTICIDE ANALYSIS REPORT (Continued)

Concentrations are not recovery corrected.


CLIENT SAMPLE I.D: Procedural Blank

CONCENTRATION IN: ng/g

AXYS ID: CL-T-BLK 851

Compounds	Concentration	(SDL)	Compounds	Concentration	(SDL)
7	ND	0.07	151	ND	0.11
8/5	ND	0.04	144/135	ND	0.11
15	ND	0.04	149	ND	0.11
19	ND	0.04	134	ND	0.11
18	ND	0.04	131	ND	0.11
17	ND	0.04	146	ND	0.03
24/27	ND	0.04	163	ND	0.08
16/32	ND	0.04	141	ND	0.11
29	ND	0.06	130	ND	0.11
26	ND	0.03	137	ND	0.11
25	ND	0.03	133/163/164	ND	0.11
31/23	ND	0.03	165	ND	0.11
33	ND	0.03	129	ND	0.11
22	ND	0.03	159	ND	0.15
37	ND	0.06	128	ND	0.2
50	ND	0.09	167	ND	0.15
46	ND	0.07	166	ND	0.17
48	ND	0.07	157	ND	0.17
62	ND	0.07	186	ND	0.18
49	ND	0.08	179	ND	0.15
47/48	ND	0.08	176	ND	0.15
44	ND	0.09	178	ND	0.15
42	ND	0.09	175	ND	0.15
41/71/64	ND	0.09	167/162	ND	0.15
40	ND	0.1	163	ND	0.17
74	ND	0.1	165	ND	0.17
70/76	ND	0.1	174	ND	0.17
66	ND	0.06	177	ND	0.17
56/60	ND	0.06	171	ND	0.18
77	ND	0.07	172	ND	0.17
95	ND	0.07	180	ND	0.17
85	ND	0.08	193	ND	0.17
91	ND	0.07	191	ND	0.17
92/89	ND	0.08	170/190	ND	0.24
84	ND	0.07	158	ND	0.24
90/101	ND	0.07	202	ND	0.26
99	ND	0.07	201	ND	0.2
83	ND	0.09	197	ND	0.29
97	ND	0.09	200	ND	0.38
87	ND	0.09	196	ND	0.29
85	ND	0.09	199	ND	0.29
110	ND	0.09	196/203	ND	0.25
82	ND	0.08	195	ND	0.25
108/107	ND	0.07	194	ND	0.51
106/116	ND	0.06	205	ND	0.51
114	ND	0.07	208	ND	0.35
105	ND	0.05	207	ND	0.35
126	ND	0.06	206	ND	0.35
136	ND	0.11	209	ND	0.35
			PCBs (Sum)	ND	

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are not recovery corrected.


 Approved

PCB/PESTICIDE ANALYSIS REPORT
 Concentrations are not recovery corrected.

CLIENT SAMPLE I.D: MCH 017531 (Heavy Dike @ 51m) (Lagoon) (In-lake) (AP-35)

AXYS ID: 9618-01

CLIENT: ORSANCO

DATE: 18/Sept/96

SAMPLE TYPE: Tissue

METHOD NO.: GL-T-03/Ver.2

SAMPLE SIZE: 10.87 g wet

INSTRUMENT: GC-MS/GC-ECD

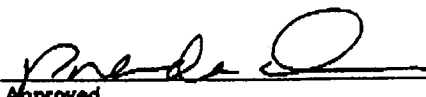
% LIPID: 0.18 0.18

CONCENTRATION IN: [redacted] ppb

Compounds	Concentration	(SDL)
Hexachlorobenzene	0.32	0.08
alpha HCH	ND	0.16
beta HCH	ND	0.27
gamma HCH	ND	0.24
delta HCH	ND	0.24
Heptachlor	ND	0.44
Heptachlor Epoxide	0.37	0.01
Aldrin	ND	0.15
Oxychlorodane	ND	0.83
gamma-Chlordane	0.49	0.19
alpha-Chlordane	1.0	0.19
trans-Nonachlor	2.4	0.13
cis-Nonachlor	0.58	0.11
CHLORDANE (Sum)	4.47	
o,p'-DDE	ND	0.04
p,p'-DDE	0.93	0.04
o,p'-DDD	ND	0.08
p,p'-DDD	ND	0.08
o,p'-DDT	NDR 0.19	0.12
p,p'-DDT	0.45	0.11
DDD, DDE, DDT (Sum)	ND ND	
Dieldrin	0.76	0.01
Endrin	ND	0.04

Surrogate Standards	% Recovery
13C-Hexachlorobenzene	120
13C-gamma HCH	97
13C-p,p'-DDE	98
13C-p,p'-DDT	87
13C-PCB 101	110
13C-PCB 105	88
13C-PCB 118	89
13C-PCB 180	90
13C-PCB 209	100

1. SDL = Sample Detection Limit
2. ND = Not Detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.


 Approved

PCB/PESTICIDE ANALYSIS REPORT (Continued)

Concentrations are not recovery corrected.

CONCENTRATION IN: ng/g

CLIENT SAMPLE I.D: MCN01-73 McNeely Lake @ dam Largemouth bass 7-10-98

AXYS ID: 9618-01

Compounds	Concentration	(SDL)	Compounds	Concentration	(SDL)
7	ND	0.04	151	ND	0.11
8/5	ND	0.03	144/135	ND	0.11
15	ND	0.03	149	0.15	0.11
19	ND	0.04	134	ND	0.11
18	ND	0.04	131	ND	0.11
17	ND	0.04	146	ND	0.03
24/27	ND	0.04	153	0.37	0.08
16/32	ND	0.04	141	ND	0.1
29	ND	0.04	130	ND	0.1
28	ND	0.03	137	ND	0.1
25	ND	0.03	138/163/164	0.35	0.1
31/28	0.08	0.03	158	ND	0.1
33	ND	0.03	129	ND	0.1
22	ND	0.03	159	ND	0.14
37	ND	0.04	128	ND	0.19
50	ND	0.06	167	ND	0.14
45	ND	0.05	156	ND	0.15
48	ND	0.05	157	ND	0.15
52	0.08	0.05	188	ND	0.13
49	ND	0.07	179	ND	0.1
47/48	ND	0.05	176	ND	0.1
44	ND	0.08	178	ND	0.1
42	ND	0.06	175	ND	0.1
41/71/64	ND	0.06	187/182	ND	0.1
40	ND	0.07	183	ND	0.12
74	ND	0.1	185	ND	0.12
70/78	ND	0.08	174	ND	0.12
68	0.08	0.04	177	ND	0.12
56/60	ND	0.04	171	ND	0.12
77	ND	0.04	172	ND	0.12
95	ND	0.05	180	ND	0.14
66	ND	0.06	193	ND	0.12
91	ND	0.05	191	ND	0.12
92/89	ND	0.06	170/190	ND	0.16
84	ND	0.05	189	ND	0.16
90/101	0.24	0.05	202	ND	0.18
99	0.14	0.06	201	ND	0.14
83	ND	0.07	197	ND	0.2
97	ND	0.07	200	ND	0.26
87	ND	0.07	198	ND	0.2
85	ND	0.07	199	ND	0.2
110	0.32	0.07	196/203	ND	0.18
82	ND	0.06	185	ND	0.18
108/107	ND	0.05	194	ND	0.36
106/118	0.21	0.05	205	ND	0.36
114	ND	0.05	208	ND	0.25
105	0.05	0.04	207	ND	0.25
126	ND	0.05	206	ND	0.25
138	ND	0.11	209	ND	0.25
			PCBs (Sum)		

2.07

[Signature]

Approved

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.

PCB/PESTICIDE ANALYSIS REPORT
 Concentrations are not recovery corrected.

CLIENT SAMPLE I.D: MCN01-1 ~~McNeely Lake @ Dam Carleton Place~~

AXYS ID: 9615-02

CLIENT: ORSANCO

DATE: 19/Sept/96

SAMPLE TYPE: Tissue

METHOD NO.: CL-T-03/Ver.2

SAMPLE SIZE: 11.57 g wet

INSTRUMENT: GC-MS/GC-ECD

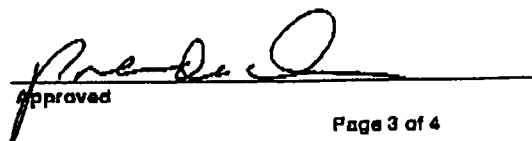
~~LIPID: 12.2~~ 12

CONCENTRATION IN: ~~ug/g~~

Compounds	Concentration	(SDL)
Hexachlorobenzene	1.3	0.09
alpha HCH	ND	0.29
beta HCH	ND	0.49
gamma HCH	ND	0.44
delta HCH	ND	0.44
Heptachlor	ND	0.58
Heptachlor Epoxide	1.6	0.01
Aldrin	ND	0.18
Oxychlorodane	ND	0.97
gamma-Chlordane	4.9	0.18
alpha-Chlordane	7.0	0.19
trans-Nonachlor	7.5	0.15
cis-Nonachlor	1.9	0.13
CHLORDANE (Sum)	21.3 21.3	
o,p'-DDE	0.09	0.04
p,p'-DDE	3.2	0.05
o,p'-DDD	ND	0.10
p,p'-DDD	0.29	0.11
o,p'-DDT	NDR 0.37	0.15
p,p'-DDT	ND	0.14
DDD, DDE, DDT (Sum)	3.58 3.58	
Dieldrin	2.8	0.02
Endrin	ND	0.05

Surrogate Standards	% Recovery
13C-Hexachlorobenzene	91
13C-gamma HCH	84
13C-p,p'-DDE	85
13C-p,p'-DDT	70
13C-PCB 101	90
13C-PCB 105	76
13C-PCB 115	79
13C-PCB 180	86
13C-PCB 209	86

1. SDL = Sample Detection Limit
2. ND = Not Detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.


 approved
 Page 3 of 4

PCB/PESTICIDE ANALYSIS REPORT (Continued)

Concentrations are not recovery corrected.

CONCENTRATION IN: ~~µg/L~~

CLIENT SAMPLE I.D: MCN01-1 McNeely Lake @ dam Carp 7-10-96

AXYS ID: 9618-02

Compounds	Concentration	(SDL)	Compounds	Concentration	(SDL)
7	ND	0.05	151	0.14	0.1
8/5	NDR 0.06	0.04	144/135	ND	0.11
15	ND	0.04	149	0.41	0.11
19	ND	0.05	134	ND	0.11
18	0.14	0.06	131	ND	0.11
17	ND	0.05	146	0.08	0.03
24/27	ND	0.05	153	1.6	0.08
16/32	0.06	0.06	141	0.14	0.1
29	ND	0.06	130	ND	0.1
26	ND	0.05	137	ND	0.1
25	ND	0.05	138/163/164	1.4	0.1
31/28	0.46	0.05	158	0.13	0.11
33	0.05	0.05	129	ND	0.1
22	0.07	0.05	159	0.18	0.14
37	ND	0.06	128	0.22	0.19
50	ND	0.09	167	ND	0.14
45	ND	0.07	156	0.27	0.15
46	ND	0.07	157	ND	0.15
52	0.33	0.08	188	ND	0.23
49	0.29	0.08	179	ND	0.17
47/48	0.2	0.06	176	ND	0.17
44	0.22	0.09	178	ND	0.17
42	ND	0.09	175	ND	0.17
41/71/64	0.27	0.09	187/182	0.49	0.18
40	ND	0.1	183	ND	0.21
74	0.4	0.1	185	ND	0.21
70/76	0.21	0.1	174	ND	0.21
66	0.28	0.06	177	ND	0.21
56/60	0.09	0.06	171	ND	0.21
77	ND	0.06	172	ND	0.21
96	0.18	0.09	180	0.65	0.21
88	ND	0.11	193	ND	0.21
91	ND	0.09	191	ND	0.21
92/89	0.11	0.1	170/190	0.34	0.29
84	ND	0.09	189	ND	0.29
90/101	0.72	0.09	202	ND	0.21
99	0.55	0.09	201	ND	0.15
83	ND	0.12	197	ND	0.22
97	NDR 0.13	0.12	200	ND	0.3
87	0.25	0.12	198	ND	0.22
85	0.17	0.12	199	0.26	0.23
110	0.54	0.12	196/203	0.23	0.2
82	ND	0.11	195	ND	0.2
108/107	ND	0.1	194	ND	0.4
106/118	0.95	0.09	205	ND	0.4
114	ND	0.1	208	ND	0.28
105	0.13	0.07	207	ND	0.28
128	ND	0.08	206	ND	0.28
136	ND	0.11	209	0.36	0.29
			PCBs (Sum)	13.59	0.013 mg/L

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.

Approved

Page 4 of 4

PCB/PESTICIDE ANALYSIS REPORT
 Concentrations are not recovery corrected.

CLIENT SAMPLE I.D. MOND (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)

AXYS ID: 9818-03

CLIENT: ORSANCO

DATE: 19/Sept/98

SAMPLE TYPE: Tissue

METHOD NO.: CL-T-03/Ver.2

SAMPLE SIZE: 10.35 g wet

INSTRUMENT: GC-MS/GC-ECD

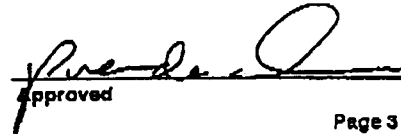
% LIPID: 1.6

CONCENTRATION IN: ng/g

Compounds	Concentration	(SDL)
Hexachlorobenzene	1.6	0.1
alpha HCH	ND	0.36
beta HCH	ND	0.59
gamma HCH	ND	0.52
delta HCH	ND	0.52
Heptachlor	ND	0.57
Heptachlor Epoxide	2.6	0.01
Aldrin	ND	0.19
Oxychlorodane	4.0	1.1
gamma-Chlordane	5.3	0.21
alpha-Chlordane	10	0.22
trans-Nonachlor	17	0.17
cis-Nonachlor	3.7	0.14
CHLORDANE (Sum)	30 40	
o,p'-DDE	0.09	0.05
p,p'-DDE	5.4	0.06
o,p'-DDD	ND	0.08
p,p'-DDD	0.58	0.07
o,p'-DDT	NDR 0.82	0.1
p,p'-DDT	0.58	0.10
DDD, DDE, DDT (Sum)	5.65 6.63	
Dieldrin	4.9	0.01
Endrin	ND	0.04

Surrogate Standards	% Recovery
13C-Hexachlorobenzene	110
13C-gamma HCH	97
13C-p,p'-DDE	100
13C-p,p'-DDT	82
13C-PCB 101	110
13C-PCB 105	90
13C-PCB 118	93
13C-PCB 180	91
13C-PCB 209	88

1. SDL = Sample Detection Limit
2. ND = Not Detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.


 approved
 Page 3 of 4

PCB/PESTICIDE ANALYSIS REPORT (Continued)

Concentrations are not recovery corrected.

CONCENTRATION IN: ng/g

CLIENT SAMPLE I.D: MCN01-4 McNeely Lake @ dam Channel Catfish 7-10-96

AXYS ID: 9618-03

Compounds	Concentration	(SDL)	Compounds	Concentration	(SDL)
7	ND	0.05	151	0.23	0.12
8/5	ND	0.04	144/135	NDR 0.14	0.11
15	ND	0.04	149	0.77	0.12
19	ND	0.06	134	ND	0.12
18	0.09	0.08	131	ND	0.12
17	ND	0.06	146	0.15	0.04
24/27	ND	0.06	153	2.4	0.09
16/32	ND	0.06	141	0.24	0.12
29	ND	0.06	130	ND	0.12
28	ND	0.05	137	ND	0.12
25	ND	0.05	138/163/164	2.3	0.12
31/28	0.51	0.05	158	0.22	0.12
33	ND	0.05	129	ND	0.12
22	0.05	0.05	159	0.16	0.16
37	ND	0.05	128	0.51	0.22
50	ND	0.11	187	ND	0.16
45	ND	0.09	156	0.32	0.17
46	ND	0.09	157	ND	0.17
52	0.47	0.09	188	ND	0.16
49	0.38	0.1	179	ND	0.12
47/48	0.33	0.09	178	ND	0.12
44	0.19	0.11	178	ND	0.12
42	ND	0.11	175	ND	0.12
41/71/64	0.36	0.11	187/182	0.63	0.12
40	ND	0.12	183	0.2	0.14
74	0.74	0.12	185	ND	0.14
70/76	0.15	0.12	174	ND	0.15
66	0.52	0.07	177	ND	0.15
56/60	0.11	0.07	171	ND	0.15
77	ND	0.08	172	ND	0.14
95	0.25	0.07	180	0.89	0.14
88	ND	0.09	193	ND	0.14
91	ND	0.08	191	ND	0.14
92/89	0.26	0.09	170/190	0.48	0.2
84	ND	0.08	189	ND	0.2
90/101	1.2	0.07	202	ND	0.23
99	0.92	0.07	201	ND	0.17
83	ND	0.1	197	ND	0.26
87	0.22	0.1	200	ND	0.33
87	0.54	0.1	198	ND	0.26
85	0.35	0.1	198	0.34	0.25
110	1.1	0.09	196/203	ND	0.22
82	ND	0.09	195	ND	0.22
108/107	0.12	0.08	194	ND	0.45
108/118	1.5	0.07	205	ND	0.45
114	ND	0.08	208	ND	0.32
105	0.35	0.08	207	ND	0.32
126	ND	0.08	206	ND	0.32
136	ND	0.12	209	ND	0.32
			PCBs (Sum)	20.55	

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.

[Signature]
 approved
 Page 4 of 4

PCB/PESTICIDE ANALYSIS REPORT
Concentrations are not recovery corrected.

CLIENT SAMPLE I.D: MCN02-7-~~(b) (6)~~ ~~(b) (7)(C)~~ ~~(b) (7)(D)~~ ~~(b) (7)(E)~~ ~~(b) (7)(F)~~ ~~(b) (7)(G)~~ ~~(b) (7)(H)~~ ~~(b) (7)(I)~~ ~~(b) (7)(J)~~ ~~(b) (7)(K)~~ ~~(b) (7)(L)~~ ~~(b) (7)(M)~~ ~~(b) (7)(N)~~ ~~(b) (7)(O)~~ ~~(b) (7)(P)~~ ~~(b) (7)(Q)~~ ~~(b) (7)(R)~~ ~~(b) (7)(S)~~ ~~(b) (7)(T)~~ ~~(b) (7)(U)~~ ~~(b) (7)(V)~~ ~~(b) (7)(W)~~ ~~(b) (7)(X)~~ ~~(b) (7)(Y)~~ ~~(b) (7)(Z)~~

AXYS ID: 9618-04

CLIENT: ORSANCO

DATE: 19/Sep/96

SAMPLE TYPE: Tissue

METHOD NO.: CL-T-03/Ver.2

SAMPLE SIZE: 10.13 g wet

INSTRUMENT: GC-MS/GC-ECD

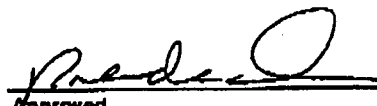
% LIPID: 0.25

CONCENTRATION IN: ~~98/g~~

Compounds	Concentration	(SDL)
Hexachlorobenzene	0.52	0.09
alpha HCH	ND	0.18
beta HCH	ND	0.29
gamma HCH	ND	0.26
delta HCH	ND	0.26
Heptachlor	ND	0.47
Heptachlor Epoxide	0.64	0.01
Aldrin	ND	0.16
Oxychlorodane	ND	0.89
gamma-Chlordane	0.91	0.17
alpha-Chlordane	2.0	0.18
trans-Nonachlor	3.7	0.14
cis-Nonachlor	0.71	0.12
CHLORDANE (Sum)	7.32	
o,p'-DDE	ND	0.05
p,p'-DDE	1.5	0.05
o,p'-DDD	ND	0.08
p,p'-DDD	0.14	0.07
o,p'-DDT	NDR 0.21	0.09
p,p'-DDT	ND	0.08
DDD, DDE, DDT (Sum)	1.64	
Dieldrin	1.2	0.01
Endrin	ND	0.04

Surrogate Standards	% Recovery
13C-Hexachlorobenzene	120
13C-gamma HCH	110
13C-p,p'-DDE	110
13C-p,p'-DDT	81
13C-PCB 101	120
13C-PCB 105	84
13C-PCB 118	98
13C-PCB 180	97
13C-PCB 209	93

1. SDL = Sample Detection Limit
2. ND = Not Detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.


Approved

PCB/PESTICIDE ANALYSIS REPORT (Continued)

Concentrations are not recovery corrected.

CONCENTRATION IN: ng/g

CLIENT SAMPLE I.D: MGN02-73 McNeely Lake/Upper Lake Largemouth bass 7-10-96

AXYS ID: 8618-04

Compounds	Concentration	(SDL)	Compounds	Concentration	(SDL)
7	ND	0.05	151	ND	0.11
8/5	ND	0.04	144/135	ND	0.11
15	ND	0.04	148	0.19	0.11
19	ND	0.05	134	ND	0.11
18	ND	0.05	131	ND	0.11
17	ND	0.05	146	ND	0.04
24/27	ND	0.05	153	0.55	0.08
16/32	ND	0.05	141	ND	0.11
29	ND	0.05	130	ND	0.11
26	ND	0.04	137	ND	0.11
25	ND	0.04	138/163/164	0.5	0.1
31/28	0.19	0.04	158	ND	0.11
33	ND	0.04	129	ND	0.11
22	ND	0.04	159	ND	0.14
37	ND	0.05	128	ND	0.19
60	ND	0.07	167	ND	0.14
45	ND	0.07	156	ND	0.16
48	ND	0.07	167	ND	0.16
52	0.16	0.07	188	ND	0.16
49	0.13	0.07	179	ND	0.12
47/48	0.11	0.07	176	ND	0.12
44	ND	0.08	178	ND	0.12
42	ND	0.08	175	ND	0.12
41/71/84	ND	0.08	187/182	ND	0.15
40	ND	0.08	183	ND	0.14
74	0.18	0.09	166	ND	0.14
70/76	ND	0.11	174	ND	0.14
66	0.12	0.05	177	ND	0.14
68/60	ND	0.05	171	ND	0.14
77	ND	0.06	172	ND	0.14
85	0.08	0.06	180	0.18	0.13
88	ND	0.07	193	ND	0.14
91	ND	0.07	191	ND	0.14
92/89	ND	0.07	170/190	ND	0.19
84	ND	0.07	189	ND	0.19
90/101	0.32	0.07	202	ND	0.19
99	0.21	0.08	201	ND	0.16
83	ND	0.09	197	ND	0.21
97	ND	0.09	200	ND	0.28
87	ND	0.09	198	ND	0.21
85	ND	0.09	199	ND	0.21
110	0.25	0.09	196/203	ND	0.18
82	ND	0.09	195	ND	0.18
108/107	ND	0.07	194	ND	0.39
106/118	0.34	0.08	205	ND	0.39
114	ND	0.07	208	ND	0.26
105	0.08	0.05	207	ND	0.26
126	ND	0.06	206	ND	0.26
136	ND	0.11	209	ND	0.27

PCBs (Sum)

3.60

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.

[Signature]
Approved

PCB/PESTICIDE ANALYSIS REPORT
 Concentrations are not recovery corrected.

CLIENT SAMPLE I.D: MCN02-1 McNeely Lake/Upper Lake Camp/NO-PS

AXYS ID: 9616-05A

CLIENT: ORSANCO

DATE: 19/Sept/96

SAMPLE TYPE: Tissue

METHOD NO.: GL-T-03/Ver.2

SAMPLE SIZE: 10.15 g wet

INSTRUMENT: GC-M8/GC-ECD

LAB ID: 2.2

CONCENTRATION IN: ng/g

Compounds	Concentration	(SDL)
Hexachlorobenzene	1.9	0.1
alpha HCH	ND	0.22
beta HCH	ND	0.36
gamma HCH	ND	0.32
delta HCH	ND	0.32
Heptachlor	ND	0.59
Heptachlor Epoxide	2.8	0.02
Aldrin	ND	0.23
Oxychlorane	ND	1.1
gamma-Chlordane	5.4	0.22
alpha-Chlordane	7.2	0.22
trans-Nonachlor	4.7	0.18
cis-Nonachlor	1.1	0.14
CHLORDANE (Sum)	18.4	
o,p'-DDE	ND	0.05
p,p'-DDE	1.5	0.07
o,p'-DDD	ND	0.09
p,p'-DDD	0.23	0.1
o,p'-DDT	NDR 0.23	0.14
p,p'-DDT	ND	0.13
DDD, DDE, DDT (Sum)	1.73	
Dieldrin	4.6	0.02
Endrin	ND	0.06

Surrogate Standards	% Recovery
13C-Hexachlorobenzene	110
13C-gamma HCH	87
13C-p,p'-DDE	100
13C-p,p'-DDT	81
13C-PCB 101	110
13C-PCB 105	93
13C-PCB 118	95
13C-PCB 180	99
13C-PCB 209	97

1. SDL = Sample Detection Limit
2. ND = Not Detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.

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PCB/PESTICIDE ANALYSIS REPORT (Continued)

Concentrations are not recovery corrected.

CLIENT SAMPLE I.D.: MCN02-1 McNeely Lake/Upper CONCENTRATION IN: ng/g

AXYS ID: 9618-05A

Compounds	Concentration	(SDL)	Compounds	Concentration	(SDL)
7	ND	0.07	151	ND	0.13
8/5	0.08	0.05	144/135	ND	0.13
16	ND	0.04	149	0.19	0.13
19	ND	0.07	134	ND	0.13
18	0.11	0.06	131	ND	0.13
17	ND	0.07	146	ND	0.04
24/27	ND	0.07	153	0.41	0.1
16/32	ND	0.07	141	ND	0.13
29	ND	0.07	130	ND	0.13
26	ND	0.05	137	ND	0.13
25	ND	0.05	138/163/164	0.43	0.13
31/28	0.41	0.05	158	ND	0.13
33	ND	0.05	129	ND	0.13
22	0.09	0.05	159	ND	0.17
37	ND	0.07	128	ND	0.24
50	ND	0.1	187	ND	0.17
45	ND	0.09	156	ND	0.19
48	ND	0.09	157	ND	0.19
52	0.22	0.08	188	ND	0.19
49	0.17	0.09	179	ND	0.15
47/48	0.15	0.09	176	ND	0.15
44	0.17	0.1	178	ND	0.15
42	ND	0.11	175	ND	0.15
41/71/64	0.19	0.1	187/182	ND	0.15
40	ND	0.11	183	ND	0.18
74	0.19	0.11	185	ND	0.18
70/76	0.17	0.11	174	ND	0.18
66	0.15	0.06	177	ND	0.18
58/80	0.07	0.06	171	ND	0.18
77	ND	0.08	172	ND	0.17
95	0.13	0.07	180	ND	0.17
88	ND	0.09	183	ND	0.17
91	ND	0.08	191	ND	0.17
92/89	ND	0.09	170/190	ND	0.25
84	ND	0.08	189	ND	0.25
90/101	0.28	0.08	202	ND	0.25
98	0.19	0.08	201	ND	0.19
83	ND	0.11	197	ND	0.27
97	ND	0.11	200	ND	0.36
87	ND	0.11	198	ND	0.27
85	ND	0.11	199	ND	0.27
110	0.37	0.1	196/203	ND	0.24
82	ND	0.1	196	ND	0.24
108/107	ND	0.09	194	ND	0.48
106/118	0.31	0.07	205	ND	0.48
114	ND	0.09	208	ND	0.33
105	ND	0.07	207	ND	0.33
126	ND	0.07	206	ND	0.33
136	ND	0.13	209	ND	0.33
			PCBs (Sum)	4.47	

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.

[Signature]
 Approved

PCB/PESTICIDE ANALYSIS REPORT
 Concentrations are not recovery corrected.

CLIENT SAMPLE I.D.: MCN02-1 McNeely Lake/Upper D [REDACTED]

AXYS ID: 9618-05B
 DUPLICATE
 DATE: 19/Sept/96

CLIENT: ORSANCO

METHOD NO.: CL-T-03/Ver.2

SAMPLE TYPE: Tissue

INSTRUMENT: GC-MS/GC-ECD

SAMPLE SIZE: 9.91 g wet


[REDACTED] 2.1

CONCENTRATION IN: [REDACTED] g

Compound	Concentration	(SDL)
Hexachlorobenzene	1.8	0.09
alpha HCH	ND	0.19
beta HCH	ND	0.32
gamma HCH	ND	0.28
delta HCH	ND	0.28
Heptachlor	ND	0.51
Heptachlor Epoxide	2.1	0.02
Aldrin	ND	0.17
Oxychlorane	ND	0.96
gamma-Chlordane	5.5	0.19
alpha-Chlordane	7.2	0.2
trans-Nonachlor	4.7	0.15
cis-Nonachlor	1.0	0.12
CHLORDANE (Sum)	18.4 18.4	
o,p'-DDE	ND	0.06
p,p'-DDE	1.2	0.05
o,p'-DDD	ND	0.08
p,p'-DDD	0.22	0.09
o,p'-DDT	NDR 0.21	0.13
p,p'-DDT	ND	0.12
DDD, DDE, DDT (Sum)	1.42 1.42	
Dieldrin	3.8	0.02
Endrin	ND	0.04

Surrogate Standards	% Recovery
13C-Hexachlorobenzene	110
13C-gamma HCH	88
13C-p,p'-DDE	100
13C-p,p'-DDT	80
13C-PCB 101	100
13C-PCB 105	89
13C-PCB 118	91
13C-PCB 180	96
13C-PCB 209	97

1. SDL = Sample Detection Limit
2. ND = Not Detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.


 Approved _____
 Page 3 of 4

PCB/PESTICIDE ANALYSIS REPORT (Continued)

Concentrations are not recovery corrected.

CONCENTRATION IN: ng/g

AXYS ID: 9618-05B DUPLICATE

CLIENT SAMPLE I.D.: MCN02-1 McNeely Lake/Upper Lake Carp 7-10-96

Compounds	Concentration	(SDL)	Compounds	Concentration	(SDL)
7	ND	0.05	151	ND	0.11
8/5	0.08	0.04	144/135	ND	0.11
15	ND	0.04	148	0.19	0.11
19	ND	0.06	134	ND	0.11
18	0.12	0.08	131	ND	0.11
17	ND	0.06	146	ND	0.03
24/27	ND	0.06	153	0.39	0.08
16/32	0.07	0.06	141	ND	0.11
29	ND	0.06	130	ND	0.11
26	ND	0.05	137	ND	0.11
25	ND	0.05	138/183/164	0.49	0.11
31/28	0.44	0.05	158	ND	0.11
33	0.05	0.05	129	ND	0.11
22	0.06	0.05	159	ND	0.14
37	ND	0.06	128	ND	0.2
50	ND	0.06	167	ND	0.14
45	ND	0.07	156	ND	0.16
46	ND	0.07	157	ND	0.16
52	0.23	0.07	188	ND	0.19
49	0.15	0.08	179	ND	0.12
47/48	0.11	0.08	176	ND	0.12
44	0.11	0.09	178	ND	0.12
42	ND	0.09	175	ND	0.12
41/71/84	0.18	0.1	187/182	ND	0.12
40	ND	0.1	183	ND	0.14
74	0.21	0.1	185	ND	0.14
70/76	0.19	0.1	174	ND	0.14
86	0.14	0.06	177	ND	0.14
56/60	ND	0.06	171	ND	0.14
77	ND	0.06	172	ND	0.14
85	0.13	0.07	180	ND	0.14
88	ND	0.08	193	ND	0.14
91	ND	0.07	191	ND	0.14
92/89	ND	0.08	170/190	ND	0.2
84	ND	0.07	189	ND	0.2
90/101	0.26	0.07	202	ND	0.21
99	0.19	0.07	201	ND	0.16
83	ND	0.09	197	ND	0.23
97	ND	0.09	200	ND	0.31
87	ND	0.09	198	ND	0.23
85	ND	0.09	199	ND	0.23
110	0.35	0.1	198/203	ND	0.2
82	ND	0.08	195	ND	0.2
108/107	ND	0.07	194	ND	0.41
106/118	0.28	0.07	205	ND	0.41
114	ND	0.07	208	ND	0.28
105	0.08	0.05	207	ND	0.28
128	ND	0.06	206	ND	0.28
136	ND	0.11	209	ND	0.29
			PCBs (Sum)	4.51	

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.

[Signature]
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PCB/PESTICIDE ANALYSIS REPORT

Concentrations are not recovery corrected.

CLIENT SAMPLE I.D: MCN02-4 McNeely Lake/Upper Lake Ontario Catfish Tissue

AXYS ID: 9618-06

CLIENT: ORSANCO

DATE: 19/Sept/96

SAMPLE TYPE: Tissue

METHOD NO.: CL-T-03/Ver.2

SAMPLE SIZE: 10.81 g wet

INSTRUMENT: GC-MS/GC-ECD

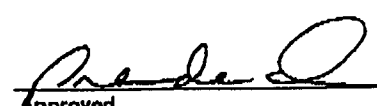
% LIPID: ~~0.5~~ 3.5

CONCENTRATION IN: ng/g

Compounds	Concentration	(SDL)
Hexachlorobenzene	2.3	0.09
alpha HCH	ND	0.18
beta HCH	ND	0.3
gamma HCH	ND	0.28
delta HCH	ND	0.26
Heptachlor	ND	0.48
Heptachlor Epoxide	4.4	0.02
Aldrin	ND	0.16
Oxychlorodane	4.0	0.9
gamma-Chlordane	8.0	0.18
alpha-Chlordane	13	0.19
trans-Nonachlor	15	0.14
cis-Nonachlor	3.4	0.12
CHLORDANE (Sum)	34 43.4	
o,p'-DDE	0.24	0.04
p,p'-DDE	33	0.05
o,p'-DDD	0.9	0.08
p,p'-DDD	8.5	0.08
o,p'-DDT	NDR 0.9	0.09
p,p'-DDT	0.37	0.08
DDD, DDE, DDT (Sum)	3.01 43.01	
Dieldrin	9.2	0.03
Endrin	0.1	0.07

Surrogate Standards	% Recovery
13C-Hexachlorobenzene	110
13C-gamma HCH	93
13C-p,p'-DDE	120
13C-p,p'-DDT	82
13C-PCB 101	110
13C-PCB 105	91
13C-PCB 118	97
13C-PCB 180	100
13C-PCB 209	99

1. SDL = Sample Detection Limit
2. ND = Not Detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.


 Approved _____
 Page 3 of 4

PCB/PESTICIDE ANALYSIS REPORT (Continued)

Concentrations are not recovery corrected.

CONCENTRATION IN: ng/g

AXYS ID: 9618-06

CLIENT SAMPLE I.D.: MCN02-4 McNeely Lake/Upper Lake Channel Catfish 7-10-88

Compounds	Concentration	(SDL)	Compounds	Concentration	(SDL)
7	ND	0.05	151	0.22	0.11
8/8	0.04	0.04	144/135	NDR 0.11	0.11
15	ND	0.03	149	0.47	0.11
19	ND	0.07	134	ND	0.11
18	ND	0.07	131	ND	0.11
17	ND	0.07	146	0.22	0.03
24/27	ND	0.07	153	3.3	0.08
16/32	ND	0.07	141	0.34	0.11
29	ND	0.07	130	ND	0.1
28	ND	0.04	137	0.14	0.11
25	ND	0.04	138/163/164	3.1	0.11
31/28	0.6	0.05	158	0.38	0.11
33	ND	0.04	129	ND	0.1
22	ND	0.04	159	0.22	0.14
37	ND	0.07	128	0.68	0.2
50	ND	0.09	167	0.21	0.14
45	ND	0.08	156	0.38	0.16
48	ND	0.12	157	ND	0.16
52	0.38	0.08	188	ND	0.18
49	0.38	0.09	179	ND	0.13
47/48	0.31	0.08	176	ND	0.13
44	ND	0.1	178	ND	0.13
42	ND	0.1	175	ND	0.13
41/71/84	0.25	0.1	187/182	0.9	0.14
40	ND	0.11	183	0.38	0.16
74	0.72	0.1	185	ND	0.18
70/78	0.13	0.11	174	ND	0.16
68	0.47	0.06	177	ND	0.16
56/60	0.13	0.06	171	ND	0.16
77	ND	0.07	172	ND	0.16
95	0.07	0.06	160	1.4	0.16
88	ND	0.08	193	ND	0.18
91	0.07	0.06	191	ND	0.16
92/89	0.27	0.08	170/190	0.66	0.23
84	ND	0.07	189	ND	0.23
90/101	1.3	0.07	202	ND	0.22
99	1.3	0.07	201	ND	0.16
83	ND	0.09	197	ND	0.24
97	0.15	0.09	200	ND	0.31
87	0.27	0.09	198	ND	0.24
85	0.41	0.09	199	0.41	0.24
110	0.47	0.09	196/203	0.42	0.21
82	ND	0.09	195	ND	0.21
108/107	0.15	0.07	194	ND	0.48
106/116	2.0	0.06	205	ND	0.42
114	0.11	0.07	208	ND	0.27
105	0.5	0.05	207	ND	0.27
126	ND	0.07	206	ND	0.27
136	ND	0.11	209	ND	0.28
			PCBs (Sum)	24.3	

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected.
5. Concentrations are not recovery corrected.

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 Page 4 of 4

F A X T R A N S M I S S I O N



AXYS

Axys Analytical Services Ltd

POST OFFICE BOX 2219, 2045 MILLS ROAD, SIDNEY, BRITISH COLUMBIA, CANADA V8L 3S8

TEL (604) 656-0881 FAX (604) 656-4511

DATE: August 14/96 TIME: TOTAL PAGES (INCL. THIS PAGE)

CONTACT: Terry Schulte 9618

ORGANIZATION: ORSANCO 1-6

ADDRESS: SX 1460

FAX: 1-573-231-7761 PHONE:

FROM: Katharine Kaye

MESSAGE: Here are results from the dioxin/furan analysis of your six fish tissues. The data package is currently being compiled and will be sent shortly. If you have any questions, please do not hesitate to call. Regards, Kky

Jerry Schulte
ORSANGO
5735 Kellogg Avenue
Cincinnati, Ohio 45228

COVER PAGE - PCDD/PCDF ANALYSES DATA PACKAGE

Lab Name: **Axys Analytical Services Ltd.** Contract No.: **9618**

Episode No.: **N/A** EPA Method No.: **1631B** Method Issue/
 Rev. Date: **Oct 1994**

Industrial Category: _____ Program: _____

EPA Sample No.	Lab Sample ID
LAB BLANK	DXT-BLK 1460
OPR	DXT-SPM 701E
MCN01-73 <i>LMB at dam</i>	9618-01
MCN01-1 <i>Carp at Dam</i>	9618-02
MCN01-4 <i>Catfish at Dam</i>	9618-03
MCN02-73 <i>LMB upper lake</i>	9618-04
MCN02-1 <i>Carp upper lake</i>	9618-05
MCN02-4 <i>Catfish upper lake</i>	9618-06A
MCN02-4 (DUPLICATE) <i>" "</i>	9618-06B (DUPLICATE)
CAL/VER	DX03B-WIN
WIN/RES	DX010C-CAL
CS1-5	DX010A-E-CAL

Comments: Narrative Report is attached. (yes)

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the Narrative Report. Release of the data contained in this hardcopy data package (and in the data submitted on magnetic media, if data are submitted on magnetic media), has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: *Katharine Kaye* Name: **Katharine Kaye, MSc**
 Date: **August 12, 1996** Title: **QA Chemist**

USEPA - ITD

FORM 8A
PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

Lab Name: AXYS ANALYTICAL SERVICES

Episode No.: N/A

Contract No.: 9618

SAS No.:

Matrix (aqueous/solid/leachate): TISSUE OPR Data Filename: DX63_0198 S:13

Ext. Date: 31-JUL-96 Shift: 0700 Analysis Date: 9-AUG-96 Time: 05:25:13

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT.

	ION ABUND. RATIO (2)	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS (1) (ng/mL)
NATIVE ANALYTES				
2,3,7,8-TCDD	0.79	10	10.412	6.7 - 15.8
1,2,3,7,8-PeCDD	0.62	50	47.538	35 - 71
1,2,3,4,7,8-HxCDD	1.25	50	55.822	35 - 82
1,2,3,6,7,8-HxCDD	1.24	50	49.087	38 - 67
1,2,3,7,8,9-HxCDD	1.23	50	50.138	32 - 81
1,2,3,4,6,7,8-HpCDD	1.05	50	50.680	35 - 70
OCDD	0.89	100	103.334	78 - 144
2,3,7,8-TCDF	0.79	10	11.664	7.5 - 15.8
1,2,3,7,8-PeCDF	1.54	50	54.027	40 - 67
2,3,4,7,8-PeCDF	1.54	50	52.780	34 - 80
1,2,3,4,7,8-HxCDF	1.23	50	49.828	36 - 67
1,2,3,6,7,8-HxCDF	1.23	50	50.451	42 - 65
1,2,3,7,8,9-HxCDF	1.23	50	49.160	39 - 65
2,3,4,6,7,8-HxCDF	1.22	50	48.015	35 - 78
1,2,3,4,6,7,8-HpCDF	1.03	50	54.115	41 - 61
1,2,3,4,7,8,9-HpCDF	1.04	50	52.152	39 - 69
OCDF	0.90	100	100.735	63 - 170

- (1) Contract-required concentration limits for OPR as specified in Table 6, Method 1613.
 (2) Contract-required Ion Abundance Ratios are specified in Table 9, Method 1613.

3/96

USEPA - ITD

FORM 88
PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

Lab Name: AXYS ANALYTICAL SERVICES

Episode No.: N/A

Contract No.: 9618

SAS No.:

Matrix (aqueous/solid/leachate): TISSUE OPR Data Filename: DX63_0198 S:13

Ext. Date: 31-JUL-96 Shift: 0700 Analysis Date: 9-AUG-96 Time: 05:25:13

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT.

	ION ABUND. RATIO (2)	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS (1) (ng/mL)
LABELED COMPOUNDS				
13C-2,3,7,8-TCDD	0.78	100	67.132	20 - 175
13C-1,2,3,7,8-PeCDD	0.64	100	78.538	21 - 227
13C-1,2,3,4,7,8-HxCDD	1.27	100	73.961	21 - 193
13C-1,2,3,6,7,8-HxCDD	1.24	100	83.095	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	1.03	100	85.163	26 - 166
13C-OCDD	0.89	200	162.405	26 - 397
13C-2,3,7,8-TCDF	0.80	100	88.476	22 - 152
13C-1,2,3,7,8-PeCDF	1.61	100	80.553	21 - 192
13C-2,3,4,7,8-PeCDF	1.59	100	81.296	13 - 328
13C-1,2,3,4,7,8-HxCDF	0.52	100	77.889	19 - 202
13C-1,2,3,6,7,8-HxCDF	0.52	100	78.236	21 - 159
13C-1,2,3,7,8,9-HxCDF	0.52	100	74.506	17 - 205
13C-2,3,4,6,7,8-HxCDF	0.52	100	76.689	22 - 176
13C-1,2,3,4,6,7,8-HpCDF	0.46	100	75.682	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	0.46	100	81.747	20 - 186
CLEANUP STANDARD				
37C1-2,3,7,8-TCDD		10	7.845	3.1 - 19.1

- (1) Contract-required concentration limits for OPR as specified in Table 6, Method 1613. Labelled compound concentration limits are based on required percent recovery (Section 15.5, Method 1613).
- (2) Contract-required Ion Abundance Ratios are specified in Table 9, Method 1613.

3/96

USEPA - ITD

Form 1A
PCDD/PCDF ANALYSIS DATA SHEET
Use for Sample and Blank Results

EPA SAMPLE NO.
LAB BLANK

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
Contract No.: 9618 SAS No.: Lab Sample ID: TBLK-1460
Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.0 g
Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
Analysis Date: 9-AUG-96 Time: 09:09:52 GC Column ID: DB5-5871423
Extract Volume (uL): 20.0 Sample Datafile: DX63_0198 S:17
Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

ANALYTE	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO (1)	RRT (1)
2,3,7,8-TCDD		0.1		
1,2,3,7,8-PeCDD		0.2		
1,2,3,4,7,8-HxCDD		0.4		
1,2,3,6,7,8-HxCDD		0.4		
1,2,3,7,8,9-HxCDD		0.4		
1,2,3,4,6,7,8-HpCDD		0.4		
OCDD		0.7		
2,3,7,8-TCDF		0.1		
1,2,3,7,8-PeCDF		0.2		
2,3,4,7,8-PeCDF		0.2		
1,2,3,4,7,8-HxCDF		0.4		
1,2,3,6,7,8-HxCDF		0.4		
1,2,3,7,8,9-HxCDF		0.4		
2,3,4,6,7,8-HxCDF		0.4		
1,2,3,4,6,7,8-HpCDF		0.4		
1,2,3,4,7,8,9-HpCDF		0.4		
OCDF		0.7		
Total Tetra-Furans		0.1		
Total Penta-Furans		0.2		
Total Hexa-Furans		0.4		
Total Hepta-Furans		0.4		
Total Tetra-Dioxins		0.1		
Total Penta-Dioxins		0.2		
Total Hexa-Dioxins		0.4		
Total Hepta-Dioxins		0.4		

(1) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

3/96

USEPA - ITD

FORM 2
PCDD/PCDF LABELED COMPOUND AND
CLEANUP STANDARD RECOVERIESEPA SAMPLE NO.
LAB BLANK

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: TBLK-1460
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.0 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 09:09:52 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Data Filename: DX63_0198 S:17
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R (%) (1)	ION ABUND. RATIO (2)	RRT (2)
13C-2,3,7,8-TCDD	2000	1170.80	59	0.80	1.013
13C-1,2,3,7,8-PeCDD	2000	1339.32	67	0.65	1.383
13C-1,2,3,4,7,8-HxCDD	2000	1372.16	69	1.25	0.986
13C-1,2,3,6,7,8-HxCDD	2000	1473.69	74	1.25	0.990
13C-1,2,3,4,6,7,8-HpCDD	2000	1565.65	78	1.02	1.097
13C-0CDD	4000	2940.85	74	0.89	1.183
13C-2,3,7,8-TCDF	2000	1421.02	71	0.78	0.967
13C-1,2,3,7,8-PeCDF	2000	1567.61	78	1.56	1.283
13C-2,3,4,7,8-PeCDF	2000	1327.08	66	1.59	1.351
13C-1,2,3,4,7,8-HxCDF	2000	1185.45	59	0.53	0.953
13C-1,2,3,6,7,8-HxCDF	2000	1358.23	68	0.52	0.957
13C-1,2,3,7,8,9-HxCDF	2000	1108.05	55	0.52	1.006
13C-2,3,4,6,7,8-HxCDF	2000	1207.95	60	0.52	0.979
13C-1,2,3,4,6,7,8-HpCDF	2000	1165.53	58	0.46	1.064
13C-1,2,3,4,7,8,9-HpCDF	2000	1397.85	70	0.46	1.107
CLEANUP STANDARD					
37C1-2,3,7,8-TCDD	200	139.64	70		1.014

(1) Contract-required limits for percent recovery (R) are specified in Section 9.3.3, Method 1613.

(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613. NOTE: There is no ion abundance ratio for 37C14-2378-TCDD (cleanup standard).

3/96

*Largemouth Bass
At Dam*

USEPA - ITD

Form 1A
PCDD/PCDF ANALYSIS DATA SHEET
Use for sample and Blank Results

EPA SAMPLE NO. XXXXXXXXXX

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-01
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.3 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 10:06:01 GC Column ID: DB5-5871429
 Extract Volume (uL): 20.0 Sample Datafile: DX63_0198 S:18
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

ANALYTE	CONCENTRATION FOUND	TEF	DETECTION LIMIT	ION ABUND. RATIO (1)	RRT (1)
2,3,7,8-TCDD	0.12	1.0	0.1	0.72	1.002
1,2,3,7,8-PeCDD	0.21	0.5	0.2	0.57	1.001
1,2,3,4,7,8-HxCDD		0.1	0.4		
1,2,3,6,7,8-HxCDD		0.1	0.4		
1,2,3,7,8,9-HxCDD		0.1	0.4		
1,2,3,4,6,7,8-HpCDD		0.01	0.4		
OCDD		0.001	0.7		
2,3,7,8-TCDF	0.23	0.1	0.1	0.80	1.001
1,2,3,7,8-PeCDF	0.20	0.5	0.2	1.46	1.001
2,3,4,7,8-PeCDF	0.20	0.05	0.2	1.53	1.001
1,2,3,4,7,8-HxCDF		0.1	0.4		
1,2,3,6,7,8-HxCDF		0.1	0.4		
1,2,3,7,8,9-HxCDF	0.44	0.1	0.4	1.30	1.001
2,3,4,6,7,8-HxCDF		0.1	0.4		
1,2,3,4,6,7,8-HpCDF		0.01	0.4		
1,2,3,4,7,8,9-HpCDF		0.001	0.7		
OCDF	0.78	0.001	0.7	0.86	1.002
Total Tetra-Furans	0.35		0.1		
Total Penta-Furans	1.07		0.2		
Total Hexa-Furans	0.44		0.4		
Total Hepta-Furans	0.54		0.4		
Total Tetra-Dioxins	0.12		0.1		
Total Penta-Dioxins	0.21		0.2		
Total Hexa-Dioxins			0.4		
Total Hepta-Dioxins			0.4		

(1) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1618.

TEQ = 0.52913

3/96

USEPA - ITD

FORM 2
PCDD/PCDF LABELED COMPOUND AND
CLEANUP STANDARD RECOVERIES

EPA SAMPLE NO. XXXXXXXXXX

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-01
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.3 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 10:06:01 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Data Filename: DX63_0198 S:18
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

LABELLED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R (%) (1)	ION ABUND. RATIO (2)	RRT (2)
13C-2,3,7,8-TCDD	2000	1387.59	69	0.80	1.013
13C-1,2,3,7,8-PeCDD	2000	1426.36	71	0.64	1.382
13C-1,2,3,4,7,8-HxCDD	2000	1424.03	71	1.26	0.986
13C-1,2,3,6,7,8-HxCDD	2000	1583.81	79	1.24	0.989
13C-1,2,3,4,6,7,8-HpCDD	2000	1665.32	83	1.03	1.097
13C-OCDD	4000	3110.57	78	0.90	1.183
13C-2,3,7,8-TCDF	2000	1671.39	84	0.78	0.967
13C-1,2,3,7,8-PeCDF	2000	1760.08	88	1.55	1.282
13C-2,3,4,7,8-PeCDF	2000	1541.58	77	1.57	1.350
13C-1,2,3,4,7,8-HxCDF	2000	1512.18	76	0.53	0.953
13C-1,2,3,6,7,8-HxCDF	2000	1613.20	81	0.52	0.957
13C-1,2,3,7,8,9-HxCDF	2000	1282.24	64	0.53	1.005
13C-2,3,4,6,7,8-HxCDF	2000	1494.37	75	0.52	0.980
13C-1,2,3,4,6,7,8-HpCDF	2000	1427.54	71	0.44	1.064
13C-1,2,3,4,7,8,9-HpCDF	2000	1332.46	67	0.44	1.107
CLEANUP STANDARD					
37C1-2,3,7,8-TCDD	200	165.52	83		1.014

- (1) Contract-required limits for percent recovery (R) are specified in Section 9.3.3, Method 1613.
- (2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613. NOTE: There is no ion abundance ratio for 37C14-2378-TCDD (cleanup standard).

Carp at Dam

USEPA - ITD

Form 1A
PCDD/PCDF ANALYSIS DATA SHEET
Use for sample and Blank Results

EPA SAMPLE NO.

~~111001.1~~

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-02
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.1 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 11:02:09 GC Column ID: DB5-6871423
 Extract Volume (uL): 20.0 Sample Datafile: DX63_0198 S:19
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

ANALYTE	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO (1)	RRT (1)
2,3,7,8-TCDD	0.39	0.1	0.79	1.001
1,2,3,7,8-PeCDD	0.52	0.2	0.68	1.001
1,2,3,4,7,8-HxCDD	0.43	0.4	1.19	1.000
1,2,3,6,7,8-HxCDD	0.61	0.4	1.28	1.001
1,2,3,7,8,9-HxCDD		0.4		
1,2,3,4,6,7,8-HpCDD	1.19	0.4	0.97	1.000
OCDD	2.03	0.7	0.87	1.000
2,3,7,8-TCDF	0.62	0.1	0.76	1.001
1,2,3,7,8-PeCDF	1.29	0.2	1.56	1.000
2,3,4,7,8-PeCDF	3.22	0.2	1.51	1.000
1,2,3,4,7,8-HxCDF	3.49	0.4	1.21	1.000
1,2,3,6,7,8-HxCDF	1.38	0.4	1.23	1.000
1,2,3,7,8,9-HxCDF		0.4		
2,3,4,6,7,8-HxCDF		0.4		
1,2,3,4,6,7,8-HpCDF	1.20	0.4	1.08	1.000
1,2,3,4,7,8,9-HpCDF		0.4		
OCDF		0.7		
Total Tetra-Furans	1.09	0.1		
Total Penta-Furans	6.44	0.2		
Total Hexa-Furans	5.46	0.4		
Total Hepta-Furans	1.20	0.4		
Total Tetra-Dioxins	0.39	0.1		
Total Penta-Dioxins	0.52	0.2		
Total Hexa-Dioxins	1.04	0.4		
Total Hepta-Dioxins	1.19	0.4		

(1) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

TEQ = 2.58435 mg/Kg
3/96

USEPA - ITD

FORM 2
PCDD/PCDF LABELED COMPOUND AND
CLEANUP STANDARD RECOVERIES

EPA SAMPLE NO. XXXXXXXXXX

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-02
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.1 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 11:02:09 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Data Filename: DX63_0198 S:19
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R (%) (1)	ION ABUND. RATIO (2)	RRT (2)
13C-2,3,7,8-TCDD	2000	1334.06	67	0.78	1.013
13C-1,2,3,7,8-PeCDD	2000	1270.60	64	0.63	1.382
13C-1,2,3,4,7,8-HxCDD	2000	1341.56	67	1.26	0.987
13C-1,2,3,6,7,8-HxCDD	2000	1418.05	71	1.26	0.990
13C-1,2,3,4,6,7,8-HpCDD	2000	1594.74	80	1.02	1.098
13C-OCDD	4000	3050.26	76	0.90	1.183
13C-2,3,7,8-TCDF	2000	1597.53	80	0.78	0.966
13C-1,2,3,7,8-PeCDF	2000	1404.84	70	1.60	1.282
13C-2,3,4,7,8-PeCDF	2000	1436.70	72	1.57	1.350
13C-1,2,3,4,7,8-HxCDF	2000	1392.94	70	0.51	0.953
13C-1,2,3,6,7,8-HxCDF	2000	1348.94	67	0.51	0.957
13C-1,2,3,7,8,9-HxCDF	2000	1375.73	69	0.52	1.005
13C-2,3,4,6,7,8-HxCDF	2000	1369.64	68	0.52	0.980
13C-1,2,3,4,6,7,8-HpCDF	2000	1372.24	69	0.45	1.064
13C-1,2,3,4,7,8,9-HpCDF	2000	1525.58	76	0.45	1.107
CLEANUP STANDARD					
37C1-2,3,7,8-TCDD	200	170.39	85		1.014

- (1) Contract-required limits for percent recovery (R) are specified in Section 9.3.3, Method 1613.
- (2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613. NOTE: There is no ion abundance ratio for 37C14-2978-TCDD (cleanup standard).

Catfish at Dam

USEPA - ITD

Form 1A
PCDD/PCDF ANALYSIS DATA SHEET
Use for sample and Blank Results

EPA SAMPLE NO. 

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-03
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.4 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 11:58:21 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Datafile: DX63_0198 S:20
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

ANALYTE	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO (1)	RRT (1)
2,3,7,8-TCDD	0.43	0.1	0.74	1.001
1,2,3,7,8-PeCDD	0.53	0.2	0.61	1.001
1,2,3,4,7,8-HxCDD		0.4		
1,2,3,6,7,8-HxCDD	0.53	0.4	1.14	1.000
1,2,3,7,8,9-HxCDD		0.4		
1,2,3,4,6,7,8-HpCDD	0.71	0.4	1.04	1.000
OCDD	1.36	0.7	0.86	1.000
2,3,7,8-TCDF	0.20	0.1	0.75	1.001
1,2,3,7,8-PeCDF	0.64	0.2	1.57	1.001
2,3,4,7,8-PeCDF	1.34	0.2	1.58	1.000
1,2,3,4,7,8-HxCDF	0.77	0.4	1.27	1.000
1,2,3,6,7,8-HxCDF	0.45	0.4	1.12	1.001
1,2,3,7,8,9-HxCDF		0.4		
2,3,4,6,7,8-HxCDF		0.4		
1,2,3,4,6,7,8-HpCDF	0.40	0.4	*0.64	1.001
1,2,3,4,7,8,9-HpCDF		0.4		
OCDF		0.7		
Total Tetra-Furans	0.20	0.1		
Total Penta-Furans	1.66	0.2		
Total Hexa-Furans	1.22	0.4		
Total Hepta-Furans	0.40	0.4		
Total Tetra-Dioxins	0.43	0.1		
Total Penta-Dioxins	0.53	0.2		
Total Hexa-Dioxins	0.63	0.4		
Total Hepta-Dioxins	0.71	0.4		

(1) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

*Alternate ions used for quantitation and confirmation.

TEQ = 1.37281 mg/kg ^{8/96}

USEPA - ITD

FORM 2
PCDD/PCDF LABELED COMPOUND AND
CLEANUP STANDARD RECOVERIES

EPA SAMPLE NO.
~~MG0101~~

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-03
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.4 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 11:58:21 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Data Filename: DX63_0198 S:20
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R (%) (1)	ION ABUND. RATIO (2)	RRT (2)
13C-2,3,7,8-TCDD	2000	1271.95	64	0.80	1.013
13C-1,2,3,7,8-PeCDD	2000	1328.05	66	0.64	1.382
13C-1,2,3,4,7,8-HxCDD	2000	1297.62	65	1.25	0.986
13C-1,2,3,6,7,8-HxCDD	2000	1395.39	70	1.25	0.989
13C-1,2,3,4,6,7,8-HpCDD	2000	1510.26	76	1.04	1.097
13C-OCDD	4000	2866.58	72	0.90	1.182
13C-2,3,7,8-TCDF	2000	1558.98	78	0.82	0.966
13C-1,2,3,7,8-PeCDF	2000	1460.75	73	1.55	1.282
13C-2,3,4,7,8-PeCDF	2000	1448.60	72	1.55	1.350
13C-1,2,3,4,7,8-HxCDF	2000	1332.74	67	0.52	0.953
13C-1,2,3,6,7,8-HxCDF	2000	1317.07	66	0.51	0.957
13C-1,2,3,7,8,9-HxCDF	2000	1360.28	68	0.53	1.005
13C-2,3,4,6,7,8-HxCDF	2000	1327.35	66	0.52	0.979
13C-1,2,3,4,6,7,8-HpCDF	2000	1296.23	65	0.45	1.064
13C-1,2,3,4,7,8,9-HpCDF	2000	1420.23	71	0.46	1.107
CLEANUP STANDARD					
37C1-2,3,7,8-TCDD	200	160.91	80		1.014

- (1) Contract-required limits for percent recovery (R) are specified in Section 9.3.3, Method 1613.
- (2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613. NOTE: There is no ion abundance ratio for 37C14-2378-TCDD (cleanup standard).

Largemouth Bass Upper lake

USEPA - ITD

Form 1A
PCDD/PCDF ANALYSIS DATA SHEET
Use for sample and Blank Results

EPA SAMPLE NO.
MCN02-73

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-04
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.1 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 12:54:35 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Datafile: DX63_0198 S:21
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

ANALYTE	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO (1)	RRT (1)
2,3,7,8-TCDD	0.24	0.1	0.68	1.001
1,2,3,7,8-PeCDD	0.29	0.2	0.63	1.001
1,2,3,4,7,8-HxCDD		0.4		
1,2,3,6,7,8-HxCDD		0.4		
1,2,3,7,8,9-HxCDD		0.4		
1,2,3,4,6,7,8-HpCDD		0.4		
OCDD		0.7		
2,3,7,8-TCDF	0.37	0.1	0.80	1.001
1,2,3,7,8-PeCDF	0.40	0.2	1.42	1.001
2,3,4,7,8-PeCDF	0.57	0.2	1.56	1.000
1,2,3,4,7,8-HxCDF	0.45	0.4	1.21	1.000
1,2,3,6,7,8-HxCDF		0.4		
1,2,3,7,8,9-HxCDF		0.4		
2,3,4,6,7,8-HxCDF		0.4		
1,2,3,4,6,7,8-HpCDF		0.4		
1,2,3,4,7,8,9-HpCDF		0.4		
OCDF		0.7		
Total Tetra-Furans	0.55	0.1		
Total Penta-Furans	1.33	0.2		
Total Hexa-Furans	0.45	0.4		
Total Hepta-Furans		0.4		
Total Tetra-Dioxins	0.24	0.1		
Total Penta-Dioxins	0.29	0.2		
Total Hexa-Dioxins		0.4		
Total Hepta-Dioxins		0.4		

(1) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

TEQ = 0.7977 3/96

USEPA - ITD

FORM 2
PCDD/PCDF LABELED COMPOUND AND
CLEANUP STANDARD RECOVERIESEPA SAMPLE NO.
MCN02-73

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-04
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.1 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 12:54:35 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Data Filename: DX63_0198 S:21
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R (%) (1)	ION ABUND. RATIO (2)	RRT (2)
13C-2,3,7,8-TCDD	2000	978.93	48	0.81	1.013
13C-1,2,3,7,8-PeCDD	2000	1184.57	59	0.64	1.382
13C-1,2,3,4,7,8-HxCDD	2000	1254.83	63	1.27	0.986
13C-1,2,3,6,7,8-HxCDD	2000	1360.23	68	1.24	0.990
13C-1,2,3,4,6,7,8-HpCDD	2000	1306.39	65	1.03	1.097
13C-0CDD	4000	2177.99	54	0.90	1.183
13C-2,3,7,8-TCDF	2000	1317.07	66	0.78	0.966
13C-1,2,3,7,8-PeCDF	2000	1250.81	63	1.55	1.282
13C-2,3,4,7,8-PeCDF	2000	1311.29	66	1.57	1.351
13C-1,2,3,4,7,8-HxCDF	2000	1323.50	66	0.52	0.953
13C-1,2,3,6,7,8-HxCDF	2000	1292.42	65	0.51	0.957
13C-1,2,3,7,8,9-HxCDF	2000	1143.08	57	0.51	1.005
13C-2,3,4,6,7,8-HxCDF	2000	1227.16	61	0.52	0.979
13C-1,2,3,4,6,7,8-HpCDF	2000	1154.80	58	0.45	1.064
13C-1,2,3,4,7,8,9-HpCDF	2000	1278.31	64	0.45	1.107
CLEANUP STANDARD					
37Cl-2,3,7,8-TCDD	200	126.17	63		1.014

(1) Contract-required limits for percent recovery (R) are specified in Section 9.3.3, Method 1613.

(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613. NOTE: There is no ion abundance ratio for 37Cl4-2378-TCDD (cleanup standard).

3/96

USEPA - ITD

FORM 2
PCDD/PCDF LABELED COMPOUND AND
CLEANUP STANDARD RECOVERIESEPA SAMPLE NO.
MCN02-1

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-05
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.4 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 13:50:50 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Data Filename: DX63_0198 S:22
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R (%) (1)	ION ABUND. RATIO (2)	RRT (2)
13C-2,3,7,8-TCDD	2000	1014.31	51	0.80	1.012
13C-1,2,3,7,8-PeCDD	2000	1310.56	66	0.65	1.382
13C-1,2,3,4,7,8-HxCDD	2000	1320.99	66	1.26	0.986
13C-1,2,3,6,7,8-HxCDD	2000	1495.89	75	1.24	0.990
13C-1,2,3,4,6,7,8-HpCDD	2000	1538.13	77	1.02	1.098
13C-OCDD	4000	2693.23	67	0.89	1.183
13C-2,3,7,8-TCDF	2000	1344.60	67	0.80	0.965
13C-1,2,3,7,8-PeCDF	2000	1399.33	70	1.58	1.281
13C-2,3,4,7,8-PeCDF	2000	1423.42	71	1.57	1.349
13C-1,2,3,4,7,8-HxCDF	2000	1405.60	70	0.52	0.953
13C-1,2,3,6,7,8-HxCDF	2000	1367.67	68	0.51	0.957
13C-1,2,3,7,8,9-HxCDF	2000	1250.34	63	0.52	1.005
13C-2,3,4,6,7,8-HxCDF	2000	1376.62	69	0.52	0.980
13C-1,2,3,4,6,7,8-HpCDF	2000	1367.37	68	0.46	1.064
13C-1,2,3,4,7,8,9-HpCDF	2000	1464.48	73	0.46	1.107
CLEANUP STANDARD					
37C1-2,3,7,8-TCDD	200	127.14	64		1.013

(1) Contract-required limits for percent recovery (R) are specified in Section 9.3.3, Method 1613.

(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613. NOTE: There is no ion abundance ratio for 37C14-2378-TCDD (cleanup standard).

3/96

Catfish Upper Lake

USEPA - ITD

Form 1A
PCDD/PCDF ANALYSIS DATA SHEET
Use for sample and Blank Results

EPA SAMPLE NO.
MCN02-4

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-06A
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.4 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 14:47:08 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Datafile: DX63_0198 S:23
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

ANALYTE	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO (1)	RRT (1)
2,3,7,8-TCDD	0.61	0.1	0.73	1.001
1,2,3,7,8-PeCDD	1.08	0.2	0.60	1.001
1,2,3,4,7,8-HxCDD	0.98	0.4	1.26	1.001
1,2,3,6,7,8-HxCDD	1.42	0.4	1.16	1.000
1,2,3,7,8,9-HxCDD	0.94	0.4	1.32	1.000
1,2,3,4,6,7,8-HpCDD	6.56	0.4	1.03	1.000
OCDD	41.18	0.7	0.90	1.000
2,3,7,8-TCDF	0.31	0.1	0.77	1.001
1,2,3,7,8-PeCDF	0.84	0.2	1.51	1.000
2,3,4,7,8-PeCDF	2.38	0.2	1.50	1.001
1,2,3,4,7,8-HxCDF	1.81	0.4	1.20	1.001
1,2,3,6,7,8-HxCDF	0.76	0.4	1.17	1.000
1,2,3,7,8,9-HxCDF		0.4		
2,3,4,6,7,8-HxCDF		0.4		
1,2,3,4,6,7,8-HpCDF	0.90	0.4	*0.56	1.001
1,2,3,4,7,8,9-HpCDF		0.4		
OCDF		0.7		
Total Tetra-Furans	0.59	0.1		
Total Penta-Furans	4.04	0.2		
Total Hexa-Furans	3.28	0.4		
Total Hepta-Furans	0.90	0.4		
Total Tetra-Dioxins	0.61	0.1		
Total Penta-Dioxins	1.08	0.2		
Total Hexa-Dioxins	3.34	0.4		
Total Hepta-Dioxins	7.33	0.4		

(1) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

*Alternate ions used for quantitation and confirmation.

TEQ 2.46913
8/96

USEPA - ITD

FORM 2
PCDD/PCDF LABELED COMPOUND AND
CLEANUP STANDARD RECOVERIES

EPA SAMPLE NO.
MCN02-4

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-06A
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.4 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 14:47:08 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Data Filename: DX63_0198 S:23
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R (%) (1)	ION ABUND. RATIO (2)	RRT (2)
13C-2,3,7,8-TCDD	2000	1275.93	64	0.78	1.012
13C-1,2,3,7,8-PeCDD	2000	1310.08	66	0.65	1.382
13C-1,2,3,4,7,8-HxCDD	2000	1375.60	69	1.33	0.986
13C-1,2,3,6,7,8-HxCDD	2000	1518.25	76	1.21	0.989
13C-1,2,3,4,6,7,8-HpCDD	2000	1657.47	83	1.03	1.097
13C-OCDD	4000	3193.30	80	0.90	1.182
13C-2,3,7,8-TCDF	2000	1556.47	78	0.81	0.966
13C-1,2,3,7,8-PeCDF	2000	1453.23	73	1.56	1.281
13C-2,3,4,7,8-PeCDF	2000	1444.42	72	1.55	1.349
13C-1,2,3,4,7,8-HxCDF	2000	1422.14	71	0.62	0.952
13C-1,2,3,6,7,8-HxCDF	2000	1411.58	71	0.52	0.957
13C-1,2,3,7,8,9-HxCDF	2000	1481.22	74	0.52	1.005
13C-2,3,4,6,7,8-HxCDF	2000	1420.09	71	0.52	0.979
13C-1,2,3,4,6,7,8-HpCDF	2000	1429.38	71	0.45	1.064
13C-1,2,3,4,7,8,9-HpCDF	2000	1584.82	79	0.46	1.107
CLEANUP STANDARD					
37Cl-2,3,7,8-TCDD	200	163.84	82		1.013

(1) Contract-required limits for percent recovery (R) are specified in Section 9.3.3, Method 1613.

(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613. NOTE: There is no ion abundance ratio for 37Cl4-2378-TCDD (cleanup standard).

USEPA - ITD

Form 1A
PCDD/PCDF ANALYSIS DATA SHEET
Use for sample and Blank Results

EPA SAMPLE NO.
MCN02-4

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-06B DUPLICATE
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.3 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 15:43:22 GC Column ID: DB5-5871423
 Extract Volume (uL): 20.0 Sample Datafile: DX63_0198 S:24
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

ANALYTE	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO (1)	RRT (1)
2,3,7,8-TCDD	0.60	0.1	0.74	1.001
1,2,3,7,8-PeCDD	1.08	0.2	0.62	1.001
1,2,3,4,7,8-HxCDD	1.07	0.4	1.22	1.000
1,2,3,6,7,8-HxCDD	1.52	0.4	1.27	1.000
1,2,3,7,8,9-HxCDD	0.92	0.4	1.27	1.000
1,2,3,4,6,7,8-HpCDD	7.21	0.4	1.04	1.000
OCDD	44.29	0.7	0.89	1.000
2,3,7,8-TCDF	0.31	0.1	0.77	1.001
1,2,3,7,8-PeCDF	0.79	0.2	1.48	1.000
2,3,4,7,8-PeCDF	2.38	0.2	1.52	1.000
1,2,3,4,7,8-HxCDF	1.74	0.4	1.20	1.000
1,2,3,6,7,8-HxCDF	0.75	0.4	1.19	1.000
1,2,3,7,8,9-HxCDF		0.4		
2,3,4,6,7,8-HxCDF		0.4		
1,2,3,4,6,7,8-HpCDF	0.89	0.4	*0.62	1.001
1,2,3,4,7,8,9-HpCDF		0.4		
OCDF		0.7		
Total Tetra-Furans	0.61	0.1		
Total Penta-Furans	4.07	0.2		
Total Hexa-Furans	3.21	0.4		
Total Hepta-Furans	0.89	0.4		
Total Tetra-Dioxins	0.60	0.1		
Total Penta-Dioxins	1.08	0.2		
Total Hexa-Dioxins	3.51	0.4		
Total Hepta-Dioxins	8.05	0.4		

(1) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

*Alternate ions used for quantitation and confirmation.

TEQ = 2.45264 mg/l
3/96

USEPA - ITD

FORM 2
PCDD/PCDF LABELED COMPOUND AND
CLEANUP STANDARD RECOVERIES

EPA SAMPLE NO.
MCN02-4

Lab Name: AXYS ANALYTICAL SERVICES Episode No.: N/A
 Contract No.: 9618 SAS No.: Lab Sample ID: 9618-06B DUPLICATE
 Matrix (aqueous/solid/leachate): TISSUE Sample Wt/Vol: 15.3 g
 Sample Receipt Date: 18-JUL-96 Initial Calibration Date: 08-AUG-96
 Ext. Date: 31-JUL-96 Shift: 0700 Instrument ID: AutoSpec-Ultima
 Analysis Date: 9-AUG-96 Time: 15:43:22 GC Column ID: DB5-6871423
 Extract Volume (uL): 20.0 Sample Data Filename: DX63_0198 S:24
 Injection Volume (uL): 1.0 Blank Data Filename: DX63_0198 S:17
 Dilution Factor: Cal. Ver. Data Filename: DX63_0198 S:14
 Concentration Units (pg/L or ng/kg dry weight): ng/kg % Solids:

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R (%) (1)	ION ABUND. RATIO (2)	RRT (2)
13C-2,3,7,8-TCDD	2000	1138.45	57	0.79	1.013
13C-1,2,3,7,8-PeCDD	2000	1187.83	59	0.64	1.382
13C-1,2,3,4,7,8-HxCDD	2000	1144.92	57	1.27	0.987
13C-1,2,3,6,7,8-HxCDD	2000	1265.72	63	1.23	0.990
13C-1,2,3,4,6,7,8-HpCDD	2000	1241.18	62	1.04	1.098
13C-OCDD	4000	1900.63	48	0.90	1.183
13C-2,3,7,8-TCDF	2000	1388.18	69	0.79	0.966
13C-1,2,3,7,8-PeCDF	2000	1281.28	64	1.58	1.282
13C-2,3,4,7,8-PeCDF	2000	1300.30	65	1.57	1.350
13C-1,2,3,4,7,8-HxCDF	2000	1234.48	62	0.51	0.953
13C-1,2,3,6,7,8-HxCDF	2000	1219.99	61	0.52	0.957
13C-1,2,3,7,8,9-HxCDF	2000	1102.97	55	0.52	1.005
13C-2,3,4,6,7,8-HxCDF	2000	1156.62	58	0.52	0.980
13C-1,2,3,4,6,7,8-HpCDF	2000	1159.27	58	0.45	1.064
13C-1,2,3,4,7,8,9-HpCDF	2000	1178.14	59	0.46	1.107
CLEANUP STANDARD					
37C1-2,3,7,8-TCDD	200	146.40	73		1.014

(1) Contract-required limits for percent recovery (R) are specified in Section 9.3.3, Method 1613.

(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613. NOTE: There is no ion abundance ratio for 37C14-2378-TCDD (cleanup standard).

Lavage Mouth Bass Upperlake MCN02-73

Analyte	TEF	TEQ mg/kg
2,3,7,8 - TCDD	1.0	0.24
1,2,3,7,8 - PeCDD	0.5	0.145
1,2,3,4,7,8 HxCDD	0.1	0.020
1,2,3,6,8,9 HxCDD	0.1	0.020
1,2,3,7,8,9 HxCDD	0.1	0.020
1,2,3,4,6,7,8 - H ₇ CDD	0.01	0.002
OCDD	0.001	0.00035
2,3,7,8 - TCDF	0.1	0.037
1,2,3,7,8 - PeCDF	0.5	0.200
3,3,4,7,8 - PeCDF	0.05	0.029
1,2,3,4,7,8 - HxCDF	0.1	0.020
1,2,3,6,7,8 - HxCDF	0.1	0.020
1,2,3,7,8,9 - HxCDF	0.1	0.020
2,3,4,6,7,8 - HxCDF	0.1	0.020
1,2,3,4,6,7,8 - HpCDF	0.01	0.002
1,2,3,4,7,8,9 - HpCDF	0.01	0.002
OCDF	0.001	0.00035

Concentration Total dioxins = ~~0.9157~~
 As 2,3,7,8 - TCDD 0.7977

Carp

Upper Lake

MCN02-1

<u>Analyte</u>	<u>TEF</u>	<u>TEQ</u> ng/kg
2,3,7,8 - TCDD	1.0	0.30
1,2,3,7,8 - PeCDD	0.5	0.225
1,2,3,4,7,8 - HxCDD	0.1	0.020
1,2,3,6,7,8 - HxCDD	0.1	0.047
1,2,3,7,8,9 - HxCDD	0.1	0.020
1,2,3,4,6,7,8 - HpCDD	0.01	0.0115
OCDD	0.001	0.00223
2,3,7,8 - TCDF	0.1	0.112
1,2,3,7,8 - PeCDF	0.5	0.565
2,3,4,7,8 - PeCDF	0.05	0.103
1,2,3,4,7,8 - HxCDF	0.1	0.268
1,2,3,6,7,8 - HxCDF	0.1	0.096
1,2,3,7,8,9 - HxCDF	0.1	0.020
2,3,4,6,7,8 - HxCDF	0.1	0.020
1,2,3,4,6,7,8 - HpCDF	0.01	0.020
1,2,3,4,7,8,9 - HpCDF	0.01	0.0105
OCDF	0.001	0.00035

Concentration Total dioxins = 1.84058
 As 2,3,7,8 - TCDD

Catfish Upper Lake MC NO2-4

Analyte

<u>TEF</u>	<u>TEQ</u>	<u>MCNO2-4 (duplicate)</u>
1.0	0.61	0.60
0.5	0.54	0.54
0.1	0.098	0.107
0.1	0.142	0.152
0.1	0.094	0.092
0.01	0.0656	0.072
0.001	0.04118	0.0442
0.1	0.031	0.031
0.5	0.420	0.395
0.05	0.119	0.119
0.1	0.181	0.174
0.1	0.076	0.075
0.1	0.020	0.020
0.1	0.020	0.020
0.01	0.009	0.008
0.01	0.002	0.002
0.001	0.00035	0.0003
	<u>2.46913</u>	<u>2.4526</u>

Large mouth Bass at Dam

MCN01-73

Analyte	TEF	TEQ	Mg/Kg
2,3,7,8 TCDD	1.0	0.12	
1,2,3,7,8 PCDD	0.5	0.105	
1,2,3,4,7,8 HxCDD	0.1	0.020	
1,2,3,6,7,8 HxCDD	0.1	0.020	
1,2,3,7,8,9 HxCDD	0.1	0.020	
1,2,3,4,6,7,8 HpCDD	0.01	0.002	
OCDD	0.001	0.00035	
2,3,7,8 - TCDF	0.1	0.023	
1,2,3,7,8 PeCDF	0.5	0.100	
2,3,4,7,8 - PeCDF	0.05	0.010	
1,2,3,4,7,8 HxCDF	0.1	0.020	
1,2,3,6,7,8 HxCDF	0.1	0.044	
1,2,3,7,8,9 HxCDF	0.1	0.020	
2,3,4,7,8,9 HxCDF	0.1	0.020	
1,2,3,4,6,7,8 - HpCDF	0.01	0.002	
1,2,3,4,7,8,9 - HpCDF	0.01	0.002	
OCDF	0.001	0.00078	

Concentration Total dioxins = 0.50913
 AS 2,3,7,8 TCDD

Carp at Dam

MCN01-#

Analyte	TEF	TEQ mg/kg
2,3,7,8 - TCDD	1.0	0.39
1,2,3,7,8 PeCDD	0.5	0.26
1,2,3,4,7,8 HxCDD	0.1	0.43
1,2,3,6,7,8 HxCDD	0.1	0.061
1,2,3,7,8,9 HxCDD	0.1	0.020
1,2,3,4,6,7,8 - HpCDD	0.01	0.012
OCDD	0.001	0.002
2,3,7,8 - TCDF	0.1	0.062
1,2,3,7,8 - PeCDF	0.5	0.645
2,3,4,7,8 - PeCDF	0.05	0.161
1,2,3,4,7,8 - HxCDF	0.1	0.349
1,2,3,6,7,8 - HxCDF	0.1	0.138
1,2,3,7,8,9 - HxCDF	0.1	0.020
2,3,4,7,8,9 - HxCDF	0.1	0.020
1,2,3,4,6,7,8 - HpCDF	0.01	0.002
1,2,3,4,7,8,9. HpCDF	0.01	0.002
OCDF	0.001	0.00035

concentration Total dioxins = 2.58435

As 2,3,7,8-TCDD

Catfish at Dam

MCN01-4

<u>Analyte</u>	<u>TEF</u>	<u>TEQ ng/kg</u>
2,3,7,8-TCDD	1.0	0.43
1,2,3,7,8-PeCDD	0.5	0.265
1,2,3,4,7,8 HxCDD	0.1	0.020
1,2,3,6,7,8 HxCDD	0.1	0.053
1,2,3,7,8,9 HxCDD	0.1	0.020
1,2,3,4,6,7,8-HpCDD	0.01	0.0071
OCDD	0.001	0.00136
2,3,7,8-TCDF	0.1	0.020
1,2,3,7,8-PeCDF	0.5	0.321
2,3,4,7,8-PeCDF	0.05	0.067
1,2,3,4,7,8-HxCDF	0.1	0.077
1,2,3,6,7,8-HxCDF	0.1	0.045
1,2,3,7,8,9-HxCDF	0.1	0.020
2,3,4,6,7,8-HxCDF	0.1	0.020
1,2,3,4,6,7,8-HpCDF	0.01	0.004
1,2,3,4,7,8,9-HpCDF	0.01	0.002
OCDF	0.001	<u>0.00035</u>

Concentration Total dioxins = 1.37281

As 2,3,7,8-TCDD

Risks of Consuming Fish From McNoely Lake - Dioxin

Lake location	Species	TEQ Dioxin Concentration ppt (ug/Kg) in Fillet
A)		

APPENDIX B
PRESS RELEASE ON
BACTERIOLOGICAL RESULTS FOR 1994

State Government News

Commonwealth of Kentucky

Brereton C. Jones, Governor

Capitol Building
Frankfort, Ky. 40601
502-564-2611
News Line: 1-800-633-1019
(In Kentucky)

CONTACT: Maleva Chamberlain
(502) 564-3410

KY. DIVISION OF WATER SHARES GOOD NEWS ABOUT WATER AND FISH

FRANKFORT, KY. (Sept. 2, 1994) -- Results of analyses of fish caught in Taylorsville and Barkley lakes are good news for fishermen. And results of water quality analyses of Taylorsville and Herrington lakes are good news for swimmers.

Largemouth bass (representing predatory fish) and carp (representing bottom-feeding fish) were collected in late summer 1993 at several locations in both lakes. Analyses of the fish tissue for pesticides and PCBs indicate that the levels of these substances in the fish were well below FDA guidelines, indicating that they present no hazards.

The Division of Water will be conducting similar studies of fish from Herrington, Guist Creek, Barren River, and McNeely lakes later this summer and will report on results as they become available.

Both Taylorsville Lake and Herrington Lake have been monitored since the first of May at three locations each to determine if water quality meets the fecal coliform standard for primary contact recreational uses, such as swimming. Monitoring takes place weekly and will continue through the end of October.

At Taylorsville Lake, one monitoring station is in the headwaters at Van Buren, one is at Settlers Trace Marina, and the third is located at the dam. Through the middle of August, all but one of 44 samples have been within the primary contact recreational use standard. The one sample that showed high fecal coliform levels was taken at Van Buren on May 10. Otherwise, all samples have indicated that the water is safe for swimming.

Monitoring stations on Herrington Lake are at Kings Mill Boat Dock, Sim's Midlake Boat Dock, and Chimney Rock Boat Dock. So far, all samples have shown very low fecal coliform levels, indicating that the water is safe for swimming.