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In Response To The Future

Appendix A

Laboratory Certificates of Analysis

In Response To The Future

September 30, 1993

Mr. Mike Baer
Environmental Science Services
532 Atwells Avenue
Providence, RI 02909

Dear Mike:

Included with this letter is the data report of laboratory test results for the analyses of the samples which were received at ESS on September 16, 1993 as part of your Central Landfill Project. Also included with the data report is the project invoice.

Please note that due to confusion at the time of sample log in, sample -01 was latter identified as sample -03. Consequently, sample -01 does not exist.

This letter authorizes the release of your analytical results and should be considered a part of this report. This report should not be copied except in full without the approval of the laboratory.

If you have any questions please feel free to ask.

Sincerely,

Dave Dickinson
Laboratory Director

Enclosure

Environmental Science Services
532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731
450 Lexington Street, Newton, Massachusetts 02166 (617) 964-1713 Fax. (617) 964-1649
1 Marshall Street, Suite 203, Norwalk, Connecticut 06854 (203) 857-7888 Fax. (203) 857-7886

In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 932121

Client Sample ID: Bass-C1 — ESS Sample ID: 932121-02

Date Sample Received: 8/23/93 — Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	1.0	200.11
Mercury	ND	mg/Kg	0.2	200.11
Zinc	5.6	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a wet tissue weight

Approved by: _____ Date: 29 Sept 93

Environmental Science Services
532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 932121

Client Sample ID: Bass-C2 — ESS Sample ID: 932121-03

Date Sample Received: 8/23/93 — Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	1.0	200.11
Mercury	ND	mg/Kg	0.2	200.11
Zinc	4.3	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a wet tissue weight

Approved by: _____ Date: 29 Sep 93

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In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill

ESS Project ID: 932121

Client Sample ID: Bass-I1

ESS Sample ID: 932121-04

Date Sample Received: 8/23/93

Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	1.0	200.11
Mercury	0.4	mg/Kg	0.2	200.11
Zinc	4.3	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a weight tissue weight

Approved by: _____ Date: 29 Sept 93

Environmental Science Services
532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 932121

Client Sample ID: Pumpkin C-1 — ESS Sample ID: 932121-05

Date Sample Received: 8/23/93 — Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	1.0	200.11
Mercury	ND	mg/Kg	0.2	200.11
Zinc	4.4	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a wet tissue weight

Approved by: _____ Date: 29 Sept 93

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In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill

ESS Project ID: 932121

Client Sample ID: Pumpkin-C2

ESS Sample ID: 932121-06

Date Sample Received: 8/23/93

Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	1.0	200.11
Mercury	ND	mg/Kg	0.2	200.11
Zinc	4.2	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a wet tissue weight

Approved by: _____ Date: 29 Sep 93

Environmental Science Services
532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill

ESS Project ID: 932121

Client Sample ID: Pumpkin-I5

ESS Sample ID: 932121-07

Date Sample Received: 8/23/93

Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	1.0	200.11
Mercury	ND	mg/Kg	0.2	200.11
Zinc	4.5	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a wet tissue weight

Approved by: _____ Date: 29 Sep 93

Environmental Science Services
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QUALITY CONTROL SECTION

In Response To The Future

CERTIFICATE OF ANALYSIS

DUPLICATE ANALYSIS SUMMARY

TOTAL METALS

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 932121

Client Sample ID: Pumpkin-I5 Duplicate — ESS Sample ID: 932121-07D

Date Sample Received: 9/16/93 — Date Reported: 9/29/93

Concentration in: mg/Kg

Parameter	Sample Result	Duplicate Result	RPD	Control Limit
Cadmium	ND	ND	*	± 0.1
Chromium	ND	ND	*	± 0.5
Copper	ND	ND	*	± 0.2
Lead	ND	ND	*	± 1.0
Mercury	ND	ND	*	± 0.2
Zinc	4.5	3.6	22%	30%

RPD = Relative Percent Difference

ND = Not Detected above Method Reporting Limit

* For these analytes the sample concentration was less than five times the MRL. In these cases, the control limit is ± the MRL.

Approved by: _____ Date: 29 Sep 93

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In Response To The Future

CERTIFICATE OF ANALYSIS

SPIKE ANALYSIS SUMMARY

TOTAL METALS

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 932121

Client Sample ID: Pumpkin-I5 Matrix Spike — ESS Sample ID: 932121-07S

Date Sample Received: 8/23/93 — Date Reported: 9/29/93

Concentration in: mg/Kg

Parameter	Sample Result	Predigest Spike Added	Spiked Sample Result	Predigest Spike Recovery	Control Limit	Post Spike Recovery*
Cadmium	ND	0.5	0.43	86%	70 - 130	NR
Chromium	ND	2.0	1.98	99	70 - 130	NR
Copper	ND	2.5	2.6	104	70 - 130	NR
Lead	ND	5.0	4.2	84	70 - 130	NR
Mercury	ND	0.47	0.57	121	70 - 130	NR
Zinc	4.5	5.0	10.4	118	70 - 130	NR

ND = Not Detected above Method Reporting Limit (MRL)

NR = Not Required

* Post Digest Spike added at twice the MRL or twice the indigenous level whichever is greater.

Approved by: _____ Date: 29 Sept 93

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CERTIFIC

[illegible]
Method [illegible]

Client: Environmental Science Services [illegible] Project ID: 932121

Client Project ID: Central Landfill [illegible] ID: 0927MB

Client Sample ID: Method Blank Date Reported: [illegible]/29/93

Target Analyte	Result [illegible]	[illegible] (mg/Kg)
Cadmium	[illegible]	[illegible].1
Chromium	[illegible]	0.5
Copper	[illegible]	0.2
Lead	[illegible]	[illegible].0
Mercury	[illegible]	[illegible].2
Zinc	[illegible]	0.1

ND = Not Detected above MRL

Approved by: [illegible] Date: [illegible]

Environme[illegible]
532 A[illegible]

In Response To The Future

CERTIFICATE OF ANALYSIS

Laboratory Control Sample

Client: Environmental Science Services — ESS Project ID: 932121

Client Project ID: Central Landfill — ESS Sample ID: 0927LCS

Client Sample ID: Laboratory Control Sample — Date Reported: 9/29/93

Target Analyte	% Recovery	Control Limits
Cadmium	92%	70 - 130
Chromium	104	70 - 130
Copper	95	70 - 130
Lead	80	70 - 130
Mercury	90	70 - 130
Zinc	96	70 - 130

Approved by: _____ Date: 29 Sept 93

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952121

ENVIRONMENTAL SCIENCE SERVICES
532 Atwells Avenue
Providence, Rhode Island 02909
(401) 421-0398 Fax (401) 421-5731

CHAIN OF CUSTODY

Page 1 of 1

Company Name	Project No.	Project Name	Turn Around Time Requested	Due Date
ESS	R039	RISWMC	Normal	Aug 6, 1993

Contact Person	Address		
Mike Baer	532 Atwells Ave		

City	State	Zip	Telephone
Providence	RI	02909	421 0398

Laboratory Sample No.	Date	Collection Time	COMP	GRAB	MATRIX	PRES.	Sample Description	No. of Containers	Type of Container	Analysis Required
13 01	7/20/93	5:45am		✓			BASS, No. 1			Metals (Pb, Hg, Cd, Cr, Zn)
02	7/20/93	7:30		✓			" 6			BASS-C1 Composite 6,7,10
02	7/20/93	8:00		✓			" 7			
02		9:20		✓			" 10			
03		19:15		✓			" 13			BASS-C2 Composite 1, 13, 14
03		20:40		✓			" 14			
04		20:40		✓			" 17			BASS-I1
05	7/20/93	5:50		✓			Pumpkinseed No. 2			Composite 2, 15, 16 Pumpkin-C1
06	7/20/93	6:00		✓			3			
06	7/20/93	8:00		✓			4			Composite 3, 4, 8 Pumpkin-C2
04	7/20/93	7:50		✓			5			
06		9:15		✓			8			
05		20:25		✓			15			
05		20:27		✓			16			Pumpkin-I5

Type: P-Poly G-Glass V-VOS Matrix: DW-Drinking Water S-Soil SL-Sludge WW-Wastewater

Sampler Type: Sampler's Signature: Special Conditions:

Special Remarks/Requests
Note: Pres.- Preservative

Fish Caught from Upper Simmons Reservoir
TOTAL OF 6 SAMPLES: 4 COMPOSITE + 2 INDIVIDUALS

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature]	7/23/93 4:00 p.m.	[signature] 7/23/93			
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)

NOTE: SAMPLE REQUIREMENTS (OVER) 1 (WHITE) - LAB COPY 2 (CANARY) - LAB ARCHIVES 3 (PINK) - CLIENT RECEIPT

In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill

ESS Project ID: 932904

Client Sample ID: Pumpkin-C1

ESS Sample ID: 932904-01

Date Sample Received: 8/13/93

Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	0.10	200.11
Mercury	ND	mg/Kg	0.2	200.11
Zinc	3.9	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a wet tissue weight

Approved by: _____ Date: 29 Sep 93

Environmental Science Services
532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill

ESS Project ID: 932904

Client Sample ID: Pumpkin-C2

ESS Sample ID: 932904-02

Date Sample Received: 8/13/93

Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	1.0	200.11
Mercury	ND	mg/Kg	0.2	200.11
Zinc	4.5	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a weight tissue weight

Approved by: _____ Date: 29 Sep 93

Environmental Science Services
532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

ENVIRONMENTAL SCIENCE SERVICES 932904
532 Atwells Avenue
Providence, Rhode Island 02909
(401) 421-0398 Fax (401) 421-5731

CHAIN OF CUSTODY

Page 1 of 1

Company Name	Project No.	Project Name	Turn Around Time Requested	Due Date
ESS	R039	RISWMC	Normal	Aug 6, 1993

Contact Person	Address
Mike BAER	532 Atwells Ave

City	State	Zip	Telephone
Providence	RI	02909	421-0398

Laboratory Sample No.	Date	Collection Time	COMP.	GRAB	MATRIX	PRES.	Sample Description	No. of Containers	Type of Container	Analysis Required	Pb, Hg, Metals, Cd, Cr, Zn, Cu
-01	8/12/93	6:30		✓			Fish 1 Pumpkin Seed			composite	*
-01	↓	6:38		✓			Fish 2 Pumpkin Seed				
-02	8/12/93	6:48		✓			Fish 3 Pumpkin Seed			composite	*
-02	↓	6:55					Fish 4 Pumpkin Seed				

Type: P-Poly G-Glass V-VOS Matrix: Fish DW-Drinking Water S-Soil SL-Sludge WW-Wastewater

Sampler Type: Sampler's Signature: Matthew Gomez Special Conditions:

Special Remarks/Requests
Note: Pres.- Preservative
Four Pumpkin Heads caught From lower Simmons Reservoir

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Matthew A. Gomez	8/13/93 8:30	Manuel Ferrin 8/13/93			
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)

NOTE: SAMPLE REQUIREMENTS (OVER) 1 (WHITE) - LAB COPY 2 (CANARY) - LAB ARCHIVES 3 (PINK) - CLIENT RECEIPT

In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill

ESS Project ID: 932903

Client Sample ID: Bass-C1

ESS Sample ID: 932903-01

Date Sample Received: 8/26/93

Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	1.0	200.11
Mercury	ND	mg/Kg	0.2	200.11
Zinc	2.1	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a wet tissue weight

Approved by: _____ Date: 29 Sep 93

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In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill

ESS Project ID: 932903

Client Sample ID: Bass-C2

ESS Sample ID: 932903-02

Date Sample Received: 8/26/93

Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	1.0	200.11
Mercury	ND	mg/Kg	0.2	200.11
Zinc	3.9	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a weight tissue weight

Approved by: _____ Date: 29 Sep 93

Environmental Science Services
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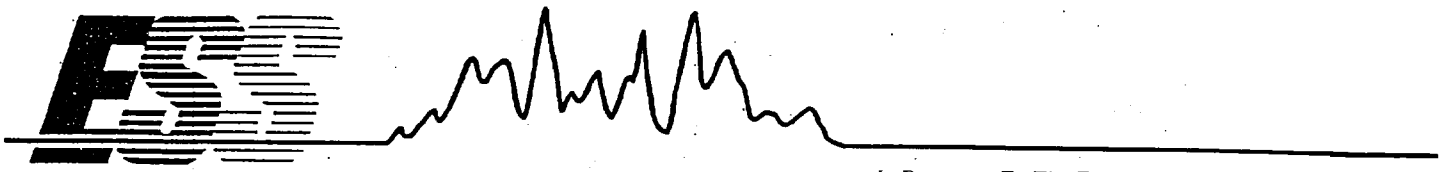

In Response To The Future

CERTIFICATE OF ANALYSIS

Client: Environmental Science Services

Client Project ID: Central Landfill

ESS Project ID: 932903

Client Sample ID: Bass-I1

ESS Sample ID: 932903-03

Date Sample Received: 8/26/93

Date Reported: 9/29/93

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	200.11
Chromium	ND	mg/Kg	0.5	200.11
Copper	ND	mg/Kg	0.2	200.11
Lead	ND	mg/Kg	1.0	200.11
Mercury	ND	mg/Kg	0.2	200.11
Zinc	3.3	mg/Kg	0.1	200.11

ND = Not Detected above Method Reporting Limit (MRL)

Reported on a weight tissue weight

Approved by: _____ Date: 29 Sep 93

Environmental Science Services
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QUALITY CONTROL SECTION

In Response To The Future

CERTIFICATE OF ANALYSIS

TOTAL METALS
Method Blank

Client: Environmental Science Services
Client Project ID: Central Landfill
Client Sample ID: Method Blank

ESS Project ID: 932903
ESS Sample ID: 0927MB
Date Reported: 9/29/93

Target Analyte	Result (mg/Kg)	MRL (mg/Kg)
Cadmium	ND	0.1
Chromium	ND	0.5
Copper	ND	0.2
Lead	ND	1.0
Mercury	ND	0.2
Zinc	ND	0.1

Control Limits are twice Method Reporting Limit (MRL)

ND = Not Detected above MRL

Approved by: _____ Date: 29 Sep 93

Environmental Science Services
Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

In Response To The Future

CERTIFICATE OF ANALYSIS

Laboratory Control Sample

Client: Environmental Science Services — ESS Project ID: 93903

Client Project ID: Central Landfill — ESS Sample ID: 0927LCS

Client Sample ID: Laboratory Control Sample — Date Reported: 9/29/93

Target Analyte	% Recovery	Control Limits
Cadmium	92%	70 - 130
Chromium	104	70 - 130
Copper	95	70 - 130
Lead	80	70 - 130
Mercury	90	70 - 130
Zinc	96	70 - 130

Approved by: _____ Date: 29 Sept 93

Environmental Science Services
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ENVIRONMENTAL SCIENCE SERVICES 732703

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Providence, Rhode Island 02909
(401) 421-0398 Fax (401) 421-5731

CHAIN OF CUSTODY

Page 1 of 1

Company Name	Project No.	Project Name	Turn Around Time Requested	Due Date
ESS	R039-014	RISWMC Fishing	Standard	9/9/93

Contact Person	Address	City	State	Zip	Telephone
Mike Baer	532 Atwells Ave	Prov.	RI	02909	421-0398

Laboratory Sample No.	Date	Collection Time	COMP.	GRAB	MATRIX	PRES.	Sample Description	No. of Containers	Type of Container	Analysis Required	Metals Pb, Hg, Cd, Cr, Cu, Zn
-01	8/26/93	6:45 PM					Bass # 1			Composite	*
-01	8/26/93	6:56					Bass # 2				
-02	8/26/93	7:10					Bass # 3			Composite 3+5	*
-03	↓	7:15					Bass # 4				
-04	↓	7:24					Bass # 5				

analyze seperately.

Type: P-Poly G-Glass V-VOS Matrix: DW-Drinking Water S-Soil SL-Sludge WW-Wastewater

Sampler Type: Sampler's Signature: Joseph A. Vatt Matthew Gomez Special Conditions:

Special Remarks/Requests
Note: Pres.- Preservative Fish caught From Lower Simmons Reservior

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Matthew A. Gomez	8/26/93 8:10	Manuel Ferreira 8/26/93			
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)

NOTE: SAMPLE REQUIREMENTS (OVER) 1 (WHITE) - LAB COPY 2 (CANARY) - LAB ARCHIVES 3 (PINK) - CLIENT RECEIPT

In Response To The Future

CENTRAL LANDFILL FISH SAMPLING AND TISSUE ANALYSIS

Rhode Island Solid Waste Management Corporation
65 Shun Pike
Johnston, Rhode Island

Prepared for:

Rhode Island Solid Waste Management Corp.
65 Shun Pike
Johnston, Rhode Island

Prepared by:

Environmental Science Services
532 Atwells Avenue
Providence, Rhode Island

ESS #(R079-014)

October, 1994

Environmental Science Services
An Equal Opportunity Employer
532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731
450 Lexington Street, Newton, Massachusetts 02166 (617) 964-1713 Fax. (617) 964-1649

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3.00	SAMPLE PREPARATION AND ANALYSIS	2
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5.00	CONCLUSIONS	5
6.00	LIMITATIONS	5

Tables

Table 1 - Summary of Fish Samples Caught from Upper Simmons Reservoir
Table 2 - Summary of Fish Samples Caught from Lower Simmons Reservoir
Table 3 - Surface Water Quality Screening Results
Table 4 - Summary of Analysis

Figures

Figure 1 - Site Location Plan
Figure 2 - Catch Location Plan, Upper Simmons Reservoir
Figure 3 - Catch Location Plan, Lower Simmons Reservoir

Appendices

Appendix A - Laboratory Certificates of Analysis

In Response To The Future

CENTRAL LANDFILL FISH SAMPLING AND TISSUE ANALYSIS

Rhode Island Solid Waste Management Corp.
65 Shun Pike
Johnston, Rhode Island

1.00 INTRODUCTION

Environmental Science Services (ESS) is pleased to submit this report on our Fish Sampling and Tissue Analysis relating to our work completed on the Upper and Lower Simmons Reservoirs located downgradient of the Central Landfill facility in Johnston, Rhode Island. This work was completed in general accordance with the Central Landfill Fish Sampling and Tissue Analysis Program guidance document dated January, 1992, prepared by GZA GeoEnvironmental, Inc. for the Rhode Island Solid Waste Management Corporation (RISWMC). This tissue sampling and analysis program was intended to assess the concentration of selected inorganic trace metals in edible portions of fish obtained from these reservoirs.

2.00 SAMPLE COLLECTION

The fish sampling program was completed on four dates during the months of August and September. Sampling of the Upper Simmons Reservoir was completed during the morning hours of August 2, 1994. Sampling on the Lower Simmons Reservoir was completed during the morning hours of August 26, 1994, September 15, 1994, and the evening hours of September 7, 1994. All sampling was completed by ESS personnel. Figure 1 is a site location plan showing the relative location of the site and two reservoirs. Figures 2 and 3 show the approximate catch locations for the Upper and Lower Simmons Reservoirs, respectively.

All fish were collected by hook and line using normal sport fishing methods. Data on length, weight, location caught and species were recorded. Length was recorded as both total and

standard length. Caught fish were also visually examined for abnormal conformation such as lesions and growths. A total of 20 fish (9 bass and 11 pumpkin seed) were caught from the Upper Simmons and 23 fish (8 bass, 14 pumpkin seed, and 1 yellow perch) were caught from the Lower Simmons. This information is summarized in Tables 1 and 2. All caught fish were submitted to the ESS laboratory under chain of custody for evisceration and analysis.

Field measurements of general water quality were also recorded at major collection locations. Field measurements included pH, temperature, conductivity and turbidity. These measurements are summarized in the attached Table 3.

During the course of this sampling, three species of fish were caught, namely bass, pumpkin seed, and yellow perch. Although brown bullheads and pickerel were reportedly expected to be present in these reservoirs by GZA, none were caught. The presence of other fish species not caught in these reservoirs is unknown. The fish tissue analysis was thus performed on composites and individual bass and pumpkin seed species, and on the individual perch.

3.00 SAMPLE PREPARATION AND ANALYSIS

All caught fish were delivered to ESS laboratory where they were cleaned, cut and frozen. A total of 13 samples were analyzed. Six of these samples were of fish caught from the Upper Simmons and seven were of fish caught from the Lower Simmons. Nine of the 13 samples were composites made up of tissue from two or more like species and four were tissues from individual fish. The sample designation and fish included in each sample is summarized below.

Upper Simmons Reservoir		
Sample ID	**Type**	**Fish Nos.**
Bass - C1	Bass - Composite	1, 2, 3, 5
Bass - C2	Bass - Composite	14, 15, 18
Bass - I1	Bass - Individual	4
Pumpkin Seed - C3	Pumpkin Seed - Composite	8, 9, 11, 12, 13
Pumpkin Seed - C4	Pumpkin Seed - Composite	16, 17, 19, 20
Pumpkin Seed - I2	Pumpkin Seed - Individual	10
Lower Simmons Reservoir		
Sample ID	**Type**	**Fish Nos.**
Pumpkin Seed - C1	Pumpkin Seed - Composite	1, 2, 5, 9
Pumpkin Seed - C2	Pumpkin Seed - Composite	3, 4, 7, 8
Pumpkin Seed - I1	Pumpkin Seed - Individual	12
Bass - C3	Bass - Composite	11, 14, 15
Bass - C4	Bass - Composite	19, 20, 21, 22
Bass - I2	Bass - Individual	17
Yellow Perch - I3	Yellow Perch - Individual	23

See Also Table Nos. 1 and 2 for details on these fish and Figures 2 and 3 for catch locations.

Preparation and analysis of the fish tissues were completed following the procedures described in EPA Methodology 100.11. Each sample was analyzed for the presence of the following metals: cadmium; chromium; copper; lead; mercury; and zinc. Copies of the laboratory Certificates of Analysis are provided in Appendix A.

4.00 RESULTS

The results of analysis are summarized in Table 4. Analysis of the six samples collected from the Upper Simmons revealed zinc concentrations ranging from 4.6 milligrams per kilogram (mg/kg) to 6.0 mg/kg. The individual bass sample was found to contain 5.9 mg/kg of zinc, and the individual sunfish sample contained 5.0 mg/kg of zinc. None of the other metals analyzed for were detected.

Analysis of the seven samples collected from the Lower Simmons revealed zinc concentrations ranging from 3.9 to 8.6 mg/kg. The individual bass sample was found to contain 4.9 mg/kg of zinc, the individual pumpkin seed sample contained 8.6 mg/kg of zinc, and the individual perch sample contained 4.6 mg/kg of zinc. None of the other selected metals were detected.

In comparison to fish tissue samples analyzed in October, 1993, there is a slight increase in the zinc concentration detected in the samples analyzed in 1994. For example, zinc concentrations in bass in the Upper Simmons Reservoir collected during 1993 ranged from 4.3 to 5.6 mg/kg, with an average concentration of 4.73 mg/kg. During 1994, zinc concentrations in bass from this reservoir ranged from 4.6 to 5.9 mg/kg, with an average of 5.47 mg/kg. Similar increases were apparent in other fish species collected during 1994. In addition, in 1993 mercury was detected in an individual bass sample at a concentration of 0.4 mg/kg. No mercury was detected in the fish tissue samples analyzed in 1994.

A previous study completed by ESS of fish caught from freshwaters located across the state of Rhode Island (Trace Metals in Panfish from Rhode Island Freshwaters, May, 1988) indicates that of the six trace metals analyzed, two are biologically required by the fish. The trace metals copper and zinc are required as nutrients by organisms for proper functioning of enzymes. This earlier study included the analysis of 82 fish that were collected by local sports fishermen. The average concentration of trace metals in the fish meat for the entire data set were:

Copper:	1.73 mg/kg
Zinc:	31.2 mg/kg
Cadmium:	0.0083 mg/kg
Mercury:	2.63 mg/kg

The observed concentrations of mercury were reported as elevated and were interestingly found to be elevated in both pristine site areas as well as in urban areas.

In comparing the present results to this previous study, it is evident that the tissue samples collected from the Upper and Lower Simmons Reservoirs have low concentrations of metals analyzed. Also as noted above, zinc was the primary metal found in samples from the current study, and this metal is needed for normal biological growth.

5.00 CONCLUSIONS

Based on the results of this study, there is no evidence that edible fish tissues of fish caught from the Upper and Lower Simmons Reservoirs contain elevated concentrations of selected metal constituents analyzed for in this study. Zinc concentrations ranging from 3.9 to 8.6 ppm were detected in all samples analyzed. Except for zinc, none of the other metals were detected.

6.00 LIMITATIONS

This report has been prepared under contract to, and for the exclusive use of, the Rhode Island Solid Waste Management Corporation (RISWMC). The work conducted by ESS was performed in general accordance with the Central Landfill Fish Sampling and Tissue Analysis Program guidance document dated January 1992 as prepared by GZA GeoEnvironmental, Inc. for the RISWMC.

The information presented in this report is based on our field observations and the results of analysis conducted by ESS. ESS is not responsible for the accuracy or veracity of information provided by outside sources. No representation concerning results other than those described herein is expressed or implied.

Analysis of fish tissue samples obtained from the Upper and Lower Simmons Reservoirs were limited to those parameters specified in this report. The locations of the samples collected may not represent the highest concentrations of contaminants.

Conclusions in this report are based on information obtained from the analysis performed. It should be noted that the fish tissue not sampled by ESS may differ from that which was sampled and analyzed. ESS makes no endorsement for the human consumption of fish from the Upper and Lower Simmons Reservoirs.

Table 1

Summary of Fish Samples Caught
Upper Simmons Reservoir
Johnston, Rhode Island

DATE: August 2, 1994

Sample #	Fish Species	Total Length (in)	Standard Length (in)	Weight(gms)	Time	Abnormal Conformations
1	Bass	11.75	9.25	323	06:20	None
2	Bass	13.50	11.25	559	06:45	None
3	Bass	9.5	7.5	133	07:00	None
4	Bass	14.0	11.5	655	07:20	Cut Lower Abdomen
5	Bass	12.25	10.25	393	07:55	None
6	Pumpkin Seed	7.5	6.0	124	08:05	None
7	Bass	12.5	10.25	390	09:05	None
8	Pumpkin Seed	7.5	5.75	104	09:10	None
9	Pumpkin Seed	7.0	5.75	107	09:25	None
10	Pumpkin Seed	7.5	6.0	119	09:30	None
11	Pumpkin Seed	6.5	5.25	93	09:40	None
12	Pumpkin Seed	6.0	4.75	74	09:40	None
13	Pumpkin Seed	7.0	5.5	103	09:45	None
14	Bass	9.25	7.5	166	10:20	None
15	Bass	12.5	10.5	420	10:45	None
16	Pumpkin Seed	7.5	6.0	128	10:55	None
17	Pumpkin Seed	6.75	5.5	98	10:55	None
18	Bass	9.0	7.5	140	11:00	None
19	Pumpkin Seed	6.0	4.75	73	11:15	None
20	Pumpkin Seed	5.5	4.25	53	11:20	None

NOTE: All fish were caught by angling using live (worms and shiners) and artificial bait.

R039285A.014

Table 2

Summary of Fish Samples Caught
Lower Simmons Reservoir
Johnston, Rhode Island

Date Caught	Sample #	Fish Species	Total Length (in)	Standard Length (in)	Weight(gms)	Time	Abnormalities
8/26/94	1	Pumpkin Seed	5.5	4.5	52	07:08	Normal
8/26/94	2	Pumpkin Seed	6.5	5.5	92	07:15	Normal
8/26/94	3	Pumpkin Seed	6.0	5.0	93	07:19	Normal
8/26/94	4	Pumpkin Seed	5.0	4.0	63	07:25	Normal
8/26/94	5	Pumpkin Seed	7.0	6.0	120	07:35	Normal
8/26/94	6	Pumpkin Seed	7.0	5.5	97	07:38	Normal
8/26/94	7	Pumpkin Seed	7.0	6.0	97	07:40	Normal
8/26/94	8	Pumpkin Seed	5.0	6.0	83	07:45	Normal
8/26/94	9	Pumpkin Seed	7.0	6.0	132	07:50	Normal
8/26/94	10	Pumpkin Seed	7.0	6.0	100	10:00	Normal
8/26/94	11	Bass	6.5	5.5	73	10:44	Normal
9/7/94	12	Pumpkin Seed	6.0	7.75	138	17:34	Normal
9/7/94	13	Pumpkin Seed	5.75	7.5	108	17:57	Normal
9/7/94	14	Bass	8.0	9.75	197	18:24	Normal
9/7/94	15	Bass	7.0	9	156	18:25	Normal
9/15/94	16	Pumpkin Seed	8.0	5.75	134	07:55	Normal
9/15/94	17	Bass	12.5	9	397	08:05	Normal
9/15/94	18	Pumpkin Seed	8.0	5.5	148	08:10	Normal
9/15/94	19	Bass	12.0	9	341	08:15	Normal
9/15/94	20	Bass	8.5	6.5	144	08:25	Normal
9/15/94	21	Bass	9.0	6.5	142	08:34	Normal
9/15/94	22	Bass	10.0	7.0	173	08:40	Normal
9/15/94	23	Yellow Perch	11.75	6.75	205	08:50	Normal

NOTE: All fish were caught by angling using live (worms and shiners) and artificial bait.

Table 3

Surface Water Quality Screening Results

Upper Simmons Reservoir:

Sample Location	Date	Time	pH (standard units)	Specific Conductance (umhos/cm)	Temperature (°C)	Turbidity (NTU)
Eastern Shoreline	8/2/94	06:20	9.7	580	27.5	10.0
Southern Islands	8/2/94	10:20	9.6	450	28.7	12.5
Northern Islands	8/2/94	09:05	9.4	500	28.3	11.5

Lower Simmons Reservoir:

Sample Location	Date	Time	pH (standard units)	Specific Conductance (umhos/cm)	Temperature (°C)	Turbidity (NTU)
Western Shoreline	8/26/94	07:08	8.1	800	20.0	2.7
Eastern Shoreline	9/7/94	18:24	7.5	420	20.0	4.2
Eastern Shoreline	9/15/94	07:55	6.3	410	20.0	2.8
Northern Shoreline	8/26/94	11:55	8.0	560	24.0	1.2

Note: All samples were collected from approximate depths of one-foot below the water surface.

Table 4

Summary of Analysis
Fish Tissue Sampling and Analysis

Location: Upper Simmons Reservoir

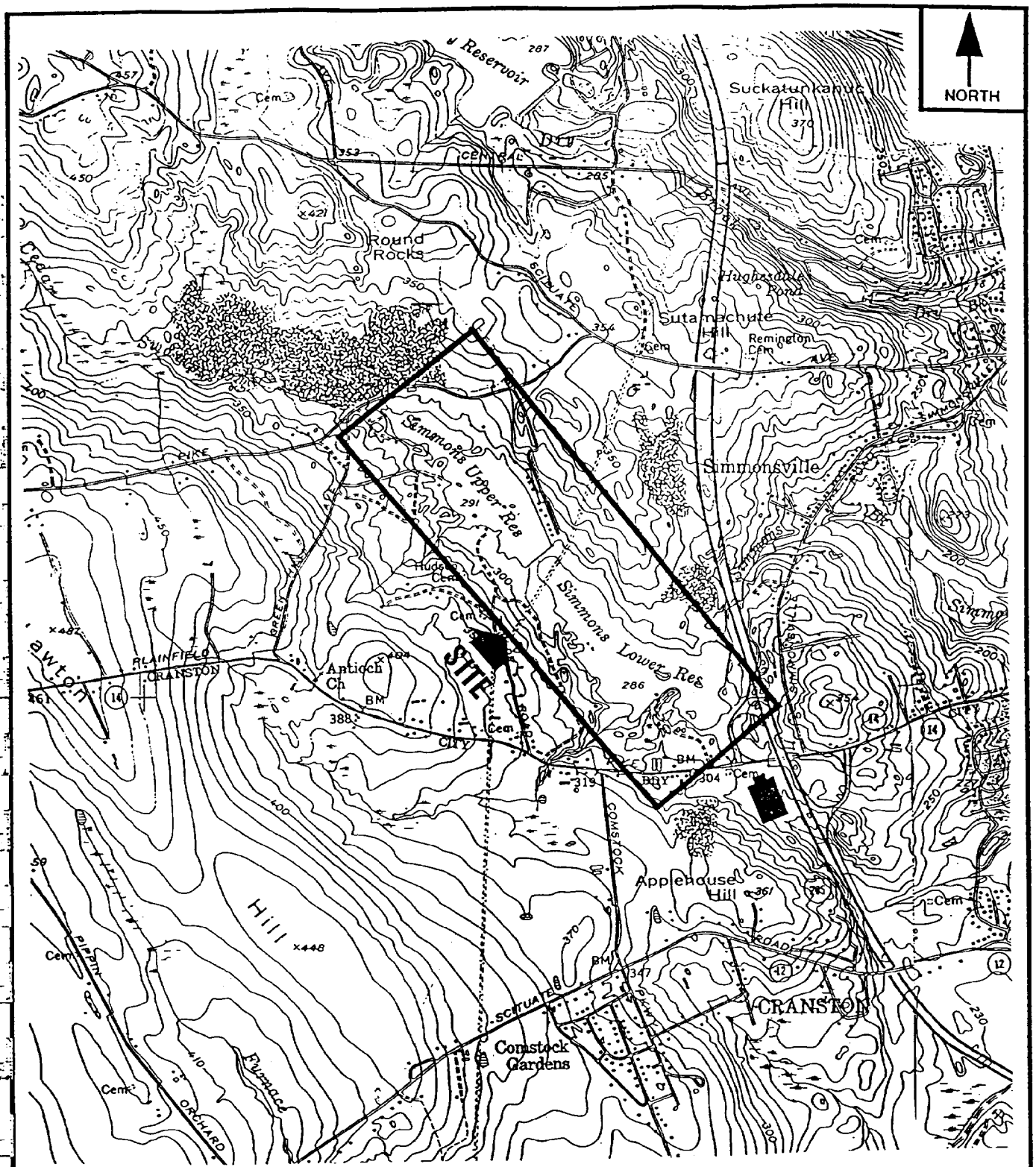
Parameter mg/kg)	Sample ID					
	Bass C-1	Bass C-2	Bass I-1	Pumpkin C-3	Pumpkin C-4	Pumpkin I-1
Cadmium	ND	ND	ND	ND	ND	ND
Chromium	ND	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	ND	ND
Lead	ND	ND	ND	ND	ND	ND
Mercury	ND	ND	ND	ND	ND	ND
Zinc	4.6	5.9	5.9	6.0	5.3	5.0

Notes: Samples Bass C-1 and C-2 each composited from three fish of a like species.
Samples Pumpkin C-3 and C-4 each composited from five fish and four fish of a like species, respectively.
Samples Bass I-1 and Pumpkin I-2 represent individual samples.

Location: Lower Simmons Reservoir

Parameter (mg/kg)	Sample ID						
	Pumpkin C-1	Pumpkin C-2	Pumpkin I-1	Yellow Perch I-3	Bass C-3	Bass C-4	Bass I-1
Cadmium	ND	ND	ND	ND	ND	ND	ND
Chromium	ND	ND	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	ND	ND	ND
Lead	ND	ND	ND	ND	ND	ND	ND
Mercury	ND	ND	ND	ND	ND	ND	ND
Zinc	6.7	7.3	8.6	4.6	5.0	3.9	4.9

Notes: Samples Bass C-3 and C-4 and Pumpkin C-1 and C-2 each composited from four fish of a like species.
Samples Pumpkin I-1, Bass I-2, and Yellow Perch I-3 represent an individual fish sample.



Source: North Scituate and Providence, USGS Quadrangle Maps.

Figure 1:

Site Location Plan
Fish Tissue Analysis
Central Landfill
65 Shun Pike
Johnston, Rhode Island

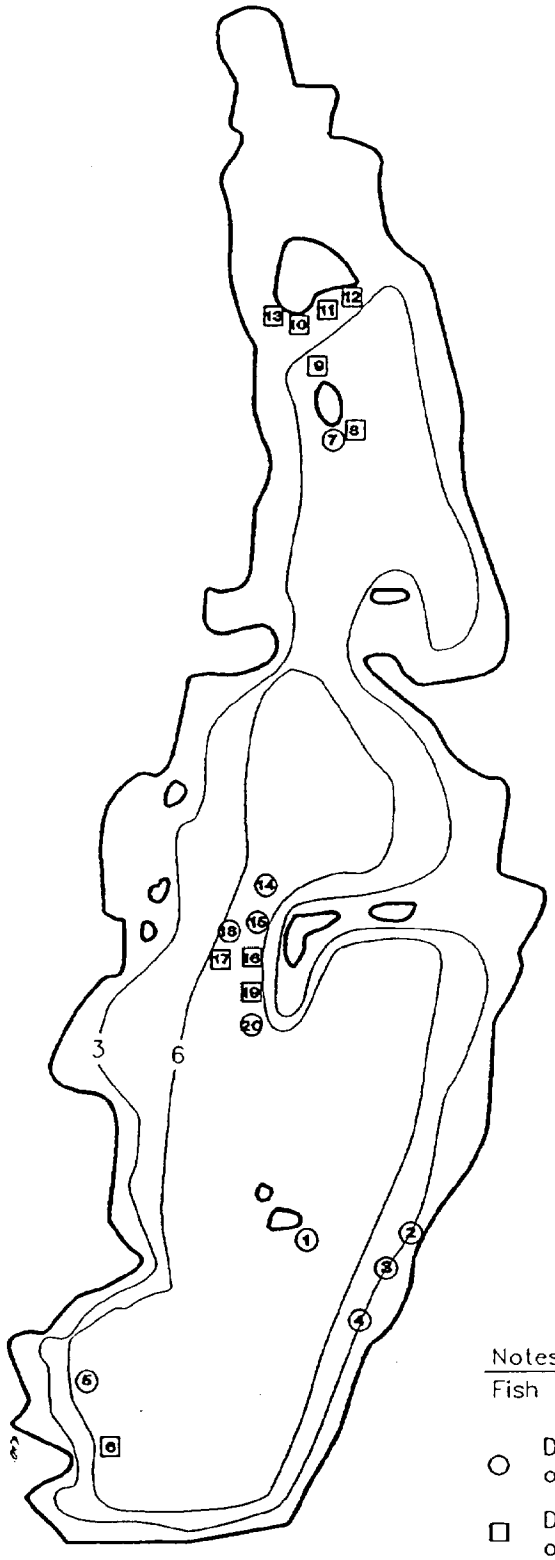
ENVIRONMENTAL SCIENTISTS, ENGINEERS, AND ANALYTICAL LABORATORY

ENVIRONMENTAL SCIENCE SERVICES

PROVIDENCE, RHODE ISLAND 02909 (401) 421-0398

SCALE: 1:24,000 DATE: October, 1994

R079-014



Reference:
Central Landfill Fish Sampling & Tissue Analysis Program Prepared by GZA, January, 1992.

Notes:
Fish were caught on August 2, 1994.

○ Denotes approximate location of bass catch

□ Denotes approximate location of pumpkinseed catch

Figure 2:

Catch Location Plan
Fish Tissue Analysis
Central Landfill
65 Shun Pike
Johnston, Rhode Island

ENVIRONMENTAL SCIENTISTS, ENGINEERS, AND ANALYTICAL LABORATORY
ENVIRONMENTAL SCIENCE SERVICES
PROVIDENCE, RHODE ISLAND 02909 (401) 421-0396

Not to Scale

DATE: October, 1994

R079-14B

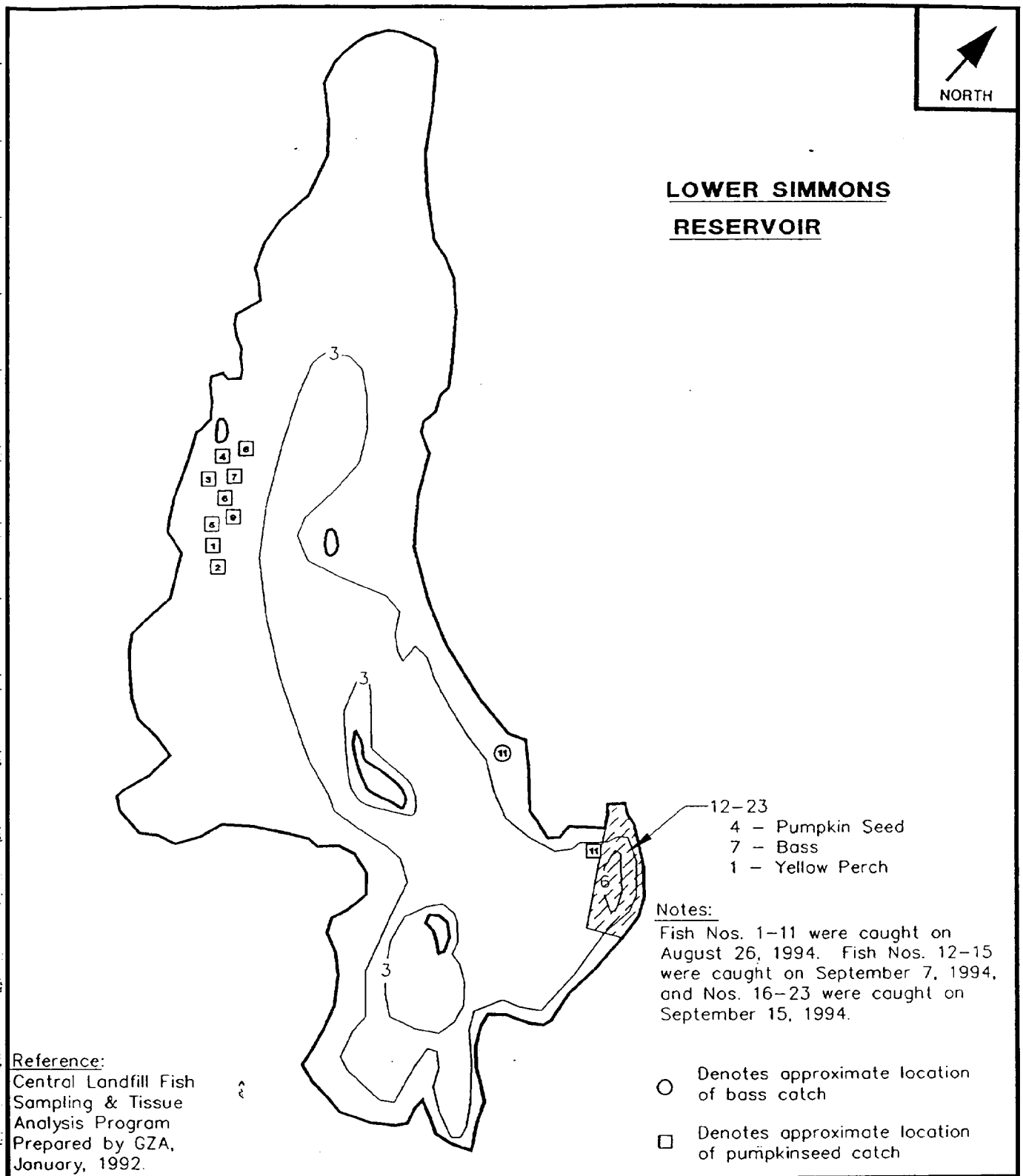


Figure 3:

Catch Location Plan
Fish Tissue Analysis
Central Landfill
65 Shun Pike
Johnston, Rhode Island

ENVIRONMENTAL SCIENTISTS, ENGINEERS, AND ANALYTICAL LABORATORY
ENVIRONMENTAL SCIENCE SERVICES
PROVIDENCE, RHODE ISLAND 02909 (401) 421-0398

SCALE: None DATE: October, 1994

R079-14C

Appendix A

Laboratory Certificates of Analysis

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943005

Client Sample ID: Bass, Comp. #1 — ESS Sample ID: 943005-01

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	6010
Chromium	ND	mg/Kg	0.5	6010
Copper	ND	mg/Kg	0.2	6010
Lead	ND	mg/Kg	1.0	6010
Mercury	ND	mg/Kg	0.5	7471
Zinc	4.6	mg/Kg	0.1	6010

ND = Not Detected above Method Reporting Limit (MRL)

Results reported on an "as is" basis.

Approved by: _____ Date: 10/19/94

Environmental Science Services
532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943005

Client Sample ID: Bass, Comp. #2 — ESS Sample ID: 943005-02

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	6010
Chromium	ND	mg/Kg	0.5	6010
Copper	ND	mg/Kg	0.2	6010
Lead	ND	mg/Kg	1.0	6010
Mercury	ND	mg/Kg	0.5	7471
Zinc	5.9	mg/Kg	0.1	6010

ND = Not Detected above Method Reporting Limit (MRL)

Results reported on an "as is" basis.

Approved by: _____ Date: 10/19/94

Environmental Science Services
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QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943005

Client Sample ID: Sunfish, Comp. #3 — ESS Sample ID: 943005-03

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	6010
Chromium	ND	mg/Kg	0.5	6010
Copper	ND	mg/Kg	0.2	6010
Lead	ND	mg/Kg	1.0	6010
Mercury	ND	mg/Kg	0.5	7471
Zinc	6.0	mg/Kg	0.1	6010

ND = Not Detected above Method Reporting Limit (MRL)

Results reported on an "as is" basis.

Approved by: _____ Date: 10/19/94

Environmental Science Services
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QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943005

Client Sample ID: #10 Sunfish - Individual — ESS Sample ID: 943005-04

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	6010
Chromium	ND	mg/Kg	0.5	6010
Copper	ND	mg/Kg	0.2	6010
Lead	ND	mg/Kg	1.0	6010
Mercury	ND	mg/Kg	0.5	7471
Zinc	5.0	mg/Kg	0.1	6010

ND = Not Detected above Method Reporting Limit (MRL)

Results reported on an "as is" basis.

Approved by: _____ Date: 10/19/94

Environmental Science Services
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QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943005

Client Sample ID: Sunfish, Comp. #4 — ESS Sample ID: 943005-05

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	6010
Chromium	ND	mg/Kg	0.5	6010
Copper	ND	mg/Kg	0.2	6010
Lead	ND	mg/Kg	1.0	6010
Mercury	ND	mg/Kg	0.5	7471
Zinc	5.3	mg/Kg	0.1	6010

ND = Not Detected above Method Reporting Limit (MRL)

Results reported on an "as is" basis.

Approved by: _____ Date: 10/19/94

Environmental Science Services
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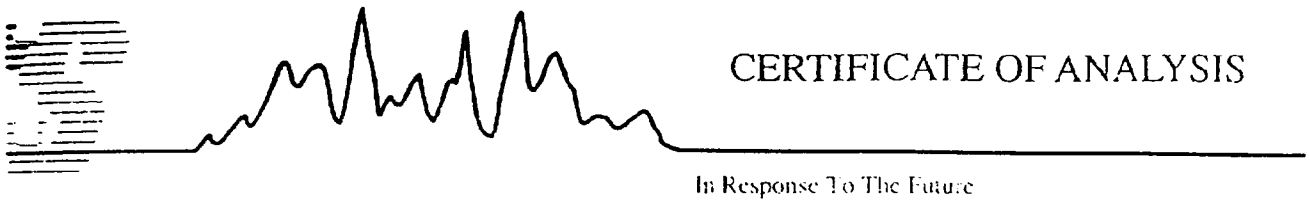
QUALITY SYSTEM REGISTRATION



CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

ıt: Environmental Science Services

ı Project ID: Central Landfill — ESS Project ID: 943005

ı Sample ID: #4 Bass - Individual — ESS Sample ID: 943005-06

Sample Received: 9/19/94 — Date Reported: 10/17/94

neter	Result	Units	MRL	Method
l Metals				
i ium	ND	mg/Kg	0.1	6010
: nium	ND	mg/Kg	0.5	6010
ɔper	ND	mg/Kg	0.2	6010
ıd	ND	mg/Kg	1.0	6010
: ıry	ND	mg/Kg	0.5	7471
ıe	5.9	mg/Kg	0.1	6010

_ɔt Detected above Method Reporting Limit (MRL)

.ts reported on an "as is" basis.

ɔved by: _____ Date: 10/19/94

l Science Services

venue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

QUALITY SYSTEM REGISTRATION

QUALITY CONTROL SECTION

CERTIFICATE OF ANALYSIS

In Response To The Future

Laboratory Control Sample

Client: Environmental Science Services — ESS Project ID: 943005

Client Project ID: Central Landfill — ESS Sample ID: 0922LCSS

Client Sample ID: Laboratory Control Sample — Date Reported: 10/17/94

Date Sample Received: 9/19/94

Target Analyte	% Recovery	Control Limits
Cadmium	101	70 - 130%
Chromium	91	70 - 130
Copper	106	70 - 130
Lead	94	70 - 130
Mercury	98	70 - 130
Zinc	89	70 - 130

Approved by: _____ Date: 10/19/94

Environmental Science Services
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QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
Method Blank

Client: Environmental Science Services
Client Project ID: Central Landfill
Client Sample ID: Method Blank
Date Sample Received: 9/19/94

ESS Project ID: 943005
ESS Sample ID: 0922PBS
Date Reported: 10/17/94

Target Analyte	Result (mg/Kg)	MRL (mg/Kg)
Cadmium	ND	0.1
Chromium	ND	0.5
Copper	ND	0.2
Lead	ND	1.0
Mercury	ND	0.5
Zinc	ND	0.1

ND = Not Detected above MRL

Approved by: _____ Date: 10/19/94

Environmental Science Services
532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

QUALITY SYSTEM REGISTRATION

ENVIRONMENTAL SCIENCE SERVICES
532 Atwells Avenue
Providence, Rhode Island 02909
(401) 421-0398 Fax (401) 421-5731

CHAIN OF CUSTODY

TURN TIME: ☒ Standard (2 wks.) ☐ Other _____

ESS-LAB PROJECT ID: 943005

Company Name	Project No.	Project Name
Above	R079-14	RISWMC

Contact Person	Address
Mike Bass	Above

City	State	Zip	Telephone
Above			Above

Purchase Order Number	FAX Number

ESS-LAB Sample No.	Date	Collection Time	COMP.	GRAB	MATRIX	Sample Identification – Upper	# of Cont	Type	Preserv.	Analysis Request: Lead	Mercury	Cadmium	Chromium	Copper	Zinc
01	8/2/94	6:20				#1 - Bass } #1 Comp	Bag	Plastic	—	1					
01		6:45				#2 - Bass } #1 Comp									
01		7:00				#3 - Bass } #1 Comp									
~~02~~		7:20				#4 - Bass – Individual									
01		7:55				#5 - Bass #1 Comp									
		8:05				#6 - Sunfish (Hold)									
		9:05				#7 - Bass (Hold)									
03		9:10				#8 Sunfish } # 3 Comp									
03		9:25				#9 - Sunfish } # 3 Comp									
04		9:30				#10 - Sunfish – Individual									
03		9:40				#11 - Sunfish } # 3 Comp									
03		9:40				#12 - Sunfish } # 3 Comp									
03		9:45				#13 - Sunfish } # 3 Comps									
02	↓	10:20				#14 - Bass # 2 Comp									

Container Type: P-Poly G-Glass S-Sterile V-VOA

Matrix: DW-Drinking Water S-Solid GW-Ground Water WW-Wastewater

Seals Intact: ☐ YES ☐ NO

Cooler Temp: _____

Comments: Wraps up the Upper Simmons fish study. Two individual and four composite samples = total of 6 samples

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Peter S Hanley	8/2/94 1:45	Mary Fenn	8/2/94				
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

ENVIRONMENTAL SCIENCE SERVICES
532 Atwells Avenue
Providence, Rhode Island 02909
(401) 421-0398 Fax (401) 421-5731

CHAIN OF CUSTODY

TURN TIME: ☒ Standard (2 wks.) ☐ Other _____

ESS-LAB PROJECT ID: 943005

Company Name	Project No.	Project Name
Above	R079-~~#~~ 11	RISWMC

Contact Person	Address
Above	Above

City	State	Zip	Telephone
Above			Above

Purchase Order Number	FAX Number

# of Cont	Bag
Type	Plastic
Preserv.	

Analysis Request: Lead, Mercury, Cadmium, Chromium, Copper, Zinc

ESS-LAB Sample No.	Date	Collection Time	COMP.	GRAB	MATRIX	Sample Identification — Upper
02	8/2/94	10:45				#15 - Bass #2 Comp
05		10:55				#16 - Sunfish } #4 Comp
05		10:55				#17 - Sunfish } #4 Comp
02		11:00				#18 - Bass #2 Comp
05		11:15				#19 - Sunfish } #4 Comp
05		11:20				#20 - Sunfish } #4 Comp

Container Type: (P-Poly) G-Glass S-Sterile V-VOA

Matrix: DW-Drinking Water S-Solid GW-Ground Water WW-Wastewater

Seals Intact: ☐ YES ☐ NO

Cooler Temp: _____

Comments:

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Peter E Haley	8/2/94 1:45	Marvel Fein	8/2/94				
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943482

Client Sample ID: #1 Comp. - Pumpkin Seed — ESS Sample ID: 943482-01

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	6010
Chromium	ND	mg/Kg	0.5	6010
Copper	ND	mg/Kg	0.2	6010
Lead	ND	mg/Kg	1.0	6010
Mercury	ND	mg/Kg	0.5	7471
Zinc	6.7	mg/Kg	0.1	6010

ND = Not Detected above Method Reporting Limit (MRL)

Results reported on an "as is" basis.

Approved by: _____ Date: 10/19/94

Environmental Science Services
532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

REGISTERED QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943482

Client Sample ID: #2 Comp. - Pumpkin Seed — ESS Sample ID: 943482-02

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	6010
Chromium	ND	mg/Kg	0.5	6010
Copper	ND	mg/Kg	0.2	6010
Lead	ND	mg/Kg	1.0	6010
Mercury	ND	mg/Kg	0.5	7471
Zinc	7.3	mg/Kg	0.1	6010

ND = Not Detected above Method Reporting Limit (MRL)

Results reported on an "as is" basis.

Approved by: _____ Date: 10/19/94

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QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943482

Client Sample ID: #3 Comp. - Bass — ESS Sample ID: 943482-03

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	6010
Chromium	ND	mg/Kg	0.5	6010
Copper	ND	mg/Kg	0.2	6010
Lead	ND	mg/Kg	1.0	6010
Mercury	ND	mg/Kg	0.5	7471
Zinc	5.0	mg/Kg	0.1	6010

ND = Not Detected above Method Reporting Limit (MRL)

Results reported on an "as is" basis.

Approved by: _____ Date: 10/19/94

nvironmental Science Services
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REGISTERED QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943482

Client Sample ID: #12 Pumpkin - Individual — ESS Sample ID: 943482-04

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	6010
Chromium	ND	mg/Kg	0.5	6010
Copper	ND	mg/Kg	0.2	6010
Lead	ND	mg/Kg	1.0	6010
Mercury	ND	mg/Kg	0.5	7471
Zinc	8.6	mg/Kg	0.1	6010

ND = Not Detected above Method Reporting Limit (MRL)

Results reported on an "as is" basis.

Approved by: _____ Date: 10/19/94

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REGISTERED QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943482

Client Sample ID: #17 Bass - Individual — ESS Sample ID: 943482-05

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Parameter	Result	Units	MRL	Method
Total Metals				
Cadmium	ND	mg/Kg	0.1	6010
Chromium	ND	mg/Kg	0.5	6010
Copper	ND	mg/Kg	0.2	6010
Lead	ND	mg/Kg	1.0	6010
Mercury	ND	mg/Kg	0.5	7471
Zinc	4.9	mg/Kg	0.1	6010

ND = Not Detected above Method Reporting Limit (MRL)

Results reported on an "as is" basis.

Approved by: _____ Date: 10/19/94

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QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

t: Environmental Science Services

t Project ID: Central Landfill — ESS Project ID: 943482

t Sample ID: #4 Comp. - Bass — ESS Sample ID: 943482-06

Sample Received: 9/19/94 — Date Reported: 10/17/94

eter	Result	Units	MRL	Method
Metals				
π um	ND	mg/Kg	0.1	6010
c_ium	ND	mg/Kg	0.5	6010
per	ND	mg/Kg	0.2	6010
d	ND	mg/Kg	1.0	6010
c ry	ND	mg/Kg	0.5	7471
c	3.9	mg/Kg	0.1	6010

N_t Detected above Method Reporting Limit (MRL)

t reported on an "as is" basis.

ved by: _____ Date: 10/19/94

l cience Services

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QUALITY SYSTEM REGISTRATION

nvironn

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CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
EPA Method 200.11

ent: Environmental Science Services

nt Project ID: Central Landfill ESS Project ID: 943482

nt Sample ID: #23 Yellow Perch - Individual ESS Sample ID: 943482-07

e Sample Received: 9/19/94 Date Reported: 10/17/94

meter	Result	Units	MRL	Method
l Metals				
dmium	ND	mg/Kg	0.1	6010
hromium	ND	mg/Kg	0.5	6010
opper	ND	mg/Kg	0.2	6010
ad	ND	mg/Kg	1.0	6010
ercury	ND	mg/Kg	0.5	7471
inc	4.6	mg/Kg	0.1	6010

= Not Detected above Method Reporting Limit (MRL)

lts reported on an "as is" basis.

oved by: _____ Date: 10/17/94

l Science Services

Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax. (401) 421-5731

QUALITY SYSTEM REGISTRATION

QUALITY CONTROL SECTION

CERTIFICATE OF ANALYSIS

In Response To The Future

DUPLICATE ANALYSIS SUMMARY

TOTAL METALS

Client: Environmental Science Services

Client Project ID: Central Landfill

ESS Project ID: 943482

Client Sample ID: #23 Yellow Perch

ESS Sample ID: 943482-07D

Date Sample Received: 9/19/94

Date Reported: 10/17/94

Concentration in: mg/Kg

Parameter	Sample Result	Duplicate Result	RPD	Control Limit
Cadmium	ND	ND	*	± 0.1
Chromium	ND	ND	*	± 0.5
Copper	ND	ND	*	± 0.2
Lead	ND	ND	*	± 1.0
Mercury	ND	ND	*	± 0.5
Zinc	4.6	6.5	34%	30%

RPD = Relative Percent Difference

ND = Not Detected above Method Reporting Limit

* For these analytes the sample concentration was less than five times the MRL. In these cases, the control limit is ± the MRL.

Approved by: _____ Date: 10/19/94

nvironmental Science Services
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QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

MATRIX SPIKE ANALYSIS SUMMARY

TOTAL METALS

Client: Environmental Science Services

Client Project ID: Central Landfill — ESS Project ID: 943482

Client Sample ID: #23 Yellow Perch — ESS Sample ID: 943482-07MS

Date Sample Received: 9/19/94 — Date Reported: 10/17/94

Concentration in: mg/Kg

Parameter	Sample Result	Predigest Spike Added	Spiked Sample Result	Predigest Spike Recovery
Cadmium	ND	6.13	6.37	104%
Chromium	ND	24.5	25.9	106
Copper	ND	30.7	32.1	105
Lead	ND	61.3	58.5	95
Mercury	ND	0.909	0.868	96
Zinc	4.56	61.3	63.4	96

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: _____ Date: 10/19/94

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REGISTERED QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

TOTAL METALS
Method Blank

Client: Environmental Science Services
ESS Project ID: 943482

Client Project ID: Central Landfill
ESS Sample ID: LCB0922

Client Sample ID: Method Blank
Date Reported: 10/17/94

Date Sample Received: N/A

Target Analyte	Result (mg/Kg)	MRL (mg/Kg)
Cadmium	ND	0.1
Chromium	ND	0.5
Copper	ND	0.2
Lead	ND	1.0
Mercury	ND	0.5
Zinc	ND	0.1

ND = Not Detected above MRL

Approved by: _____ Date: 10/19/94

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QUALITY SYSTEM REGISTRATION

CERTIFICATE OF ANALYSIS

In Response To The Future

Laboratory Control Sample

Client: Environmental Science Services — ESS Project ID: 943482

Client Project ID: Central Landfill — ESS Sample ID: LCS0922

Client Sample ID: Laboratory Control Sample — Date Reported: 10/17/94

Date Sample Received: N/A

Target Analyte	% Recovery	Control Limits
Cadmium	101	70 - 130%
Chromium	91	70 - 130
Copper	106	70 - 130
Lead	94	70 - 130
Mercury	98	70 - 130
Zinc	89	70 - 130

N/A = Not Applicable

Approved by: _____ Date: 10/19/94

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QUALITY SYSTEM REGISTRATION

ENVIRONMENTAL SCIENCE SERVICES
532 Atwells Avenue
Providence, Rhode Island 02909
(401) 421-0398 Fax (401) 421-5731

CHAIN OF CUSTODY

Company Name	Project No.	Project Name	Turn Around Time Requested	Due Date
ESS	R079-014	RISWMC	NORMAL	

Contact Person	Address	City	State	Zip	Telephone
MIKE BAER					

Laboratory Sample No.	Date	Collection Time	COMP.	GRAB	MATRIX	PRES.	Sample Description	No. of Containers	Type of Container	Analysis Required: Lead	Mercury	Cadmium	Chromium	Copper	Zinc
01	8/26/94	7:08					#1 PUMPKIN SEED			#1 Comp					
01	8/26/94	7:15					#2			#1 Comp					
02		7:19					#3			#2 Comp					
02		7:25					#4			#2 Comp					
01		7:35					#5			#1 Comp					
		7:38					#6			(Hold)					
02		7:40					#7			#2 Comp					
02		7:~~45~~					#8			#2 Comp					
01		~~7:50~~					#9			#1 Comp					
		10:00					#10			(Hold)					
03		10:44					#11 BASS			#3 Comp					
04	9/7/94	17:34					#12 PUMPKIN SEED - INDIVIDUAL								
		17:57					#13 PUMPKIN SEED (HOLD)								
03		18:24					#14 BASS			#3 Comp					

Type: P-Poly G-Glass V-VOS

Matrix: DW-Drinking Water S-Soil SL-Sludge WW-Wastewater

Sampler Type: Sampler's Signature: Special Conditions:

Special Remarks/Requests
Note: Pres.- Preservative

COMPLETES LOWER SIMMONS FISH TISSUE - SAMPLES INCLUDE 3 INDIVIDUAL SAMPLES (1 BASS, 1 PUMPKIN SEED, 1 YELLOW PERCH) AND 4 COMPOSITE SAMPLES = 7 total.

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Michael O Baer	9/19/94 10:30				
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)

NOTE: SAMPLE REQUIREMENTS (OVER)

1 (WHITE) - LAB COPY 2 (CANARY) - LAB ARCHIVES 3 (PINK) - CLIENT RECEIPT

ENVIRONMENTAL SCIENCE SERVICES
532 Atwells Avenue
Providence, Rhode Island 02909
(401) 421-0398 Fax (401) 421-5731

CHAIN OF CUSTODY

TURN TIME: ☒ Standard (2 wks.) ☐ Other _____

ESS-LAB PROJECT ID: 943482

Company Name	Project No.	Project Name
ESS	R077-014	RISWMC

Contact Person	Address
MIKE BAER	

City	State	Zip	Telephone

Purchase Order Number	FAX Number

ESS-LAB Sample No.	Date	Collection Time	COMP.	GRAB	MATRIX	Sample Identification	# of Cont	Type	Preserv.	Analysis Request: LEAD	Mercury	Cadmium	Chromium	Copper	Zinc
03	9/7/94	18:25				#15 BASS #3 COMPOSITE									
	9/15/94	7:55				#16 PUMPKIN SEED (HOLD)									
05	↓	8:05				#17 BASS - INDIVIDUAL									
		9:10				#18 PUMPKIN SEED (HOLD)									
06		8:15				#19 BASS → #4 COMP									
06		8:25				#20 BASS → #4 COMP									
06		8:34				#21 BASS → #4 COMP									
06		8:40				#22 BASS → #4 COMP									
07	↓	8:50				#23 YELLOW PERCH - INDIVIDUAL									

Container Type: P-Poly G-Glass S-Sterile V-VOA

Matrix: DW-Drinking Water S-Solid GW-Ground Water WW-Wastewater

Seals Intact: ☐ YES ☐ NO

Cooler Temp: _____

Comments:

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Michael D Baer	9/19/94 1033						
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time