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June 22, 1995

JUN 27 1995

Mr. Charles H. Hinds, P.E.
Civil Engineer
Toxics Cleanup Program
Washington Department of Ecology
P.O. Box 47600, Mail Stop PV-11
Olympia, Washington 98504-7600

Subject: *Drummed wastes at the Maralco Aluminum site.*

Dear Mr. Hinds:

Enviros is pleased to submit this memorandum documenting the characterization of wastes contained in sealed 55-gallon drums at the Maralco Aluminum site located at 7730 South 202nd Street in Kent, Washington. This work consisted of a review of existing documentation and a site investigation to determine appropriate waste designations and waste disposal requirements.

A total of 295 drums stored in the north end of the Maralco building were included in this investigation. As documented in the attached Department of Ecology (Ecology) as-built records, the wastes contained in these drums were generated by Ecology contractors during interim cleanup actions, and stored on-site pending availability of funds for disposal. The wastes include soil and sediments excavated from the former stormwater retention pond, sediments and water recovered during cleaning of stormwater catch basins, soil cuttings from monitoring well installation, and water from developing and purging of monitoring wells.

In general, contaminants of concern in these wastes are related to the 25,000-ton black dross pile at the Maralco site. The black dross was generated as a waste by-product of an aluminum recycling process in the 1980s, and consists primarily of sodium and potassium chlorides and aluminum oxides. Due to impurities in the feedstocks and the production of various alloys, heavy metals such as lead and zinc are also present in the dross. Remedial investigations commissioned by Ecology following the Maralco bankruptcy confirmed that these contaminants had been transported via stormwater runoff to the catch basins and the retention pond in the northwest corner of the site. Interim cleanup actions took place in October and November of 1991.

Enviros visited the site on June 12, 1995 to re-label the drums and collect samples for waste designation analyses. Each drum in the storage area was assigned a number and labeled on the side with red spray paint. The tops of the drums were cleaned to facilitate identification of contents, and any drums which were not clearly labeled were opened and the contents were visually inspected. Several other drums were selected at random and opened to confirm the accuracy of the existing labels. In this manner, the contents of all 295 drums were determined, and grouped into 9 distinct classes, as outlined below:

Collection Pond Soil: Drums 1-216, 219-246, 249, and 274 contain soil that was excavated from the stormwater collection pond at the northwest corner of the Maralco site. Grab samples were collected from ten representative drums, field-composited, and designated Composite #3. This sample was submitted for analysis of TCLP metals (EPA method 1311/7000 series) and Static

Enviros Incorporated 210 Marina Park Building 25 Central Way Kirkland, Washington 98033-6156 Tel 206 / 827-5525 Fax 206 / 827-3299

Acute Fish Toxicity (Ecology 80-12 protocol), and found to be non-hazardous. Analytical reports for these analyses are attached to this letter. Additional analytical data for the stormwater collection pond soil is available from borings HB-7 and MW-4 as detailed in previous Ecology reports, relevant sections of which are also attached.

Parking Lot Soil: Drums 217-218, 248, 250-253, and 271-273 contain dried alum mud that was removed from temporary stockpiles in the Maralco parking lot. Grab samples were collected from three representative drums, field-composited, and designated Composite #2. This sample was submitted for analysis of TCLP metals and Static Acute Fish Toxicity as described above, and found to be non-hazardous. Analytical reports for these analyses are attached to this letter.

Empty Drums: Drums 247, 275-283 and 291-295 are apparently empty. Previous contents of these drums are unknown.

Catch Basin Sediments and Water: Drums 254-270 contain sediments and water which were recovered during cleaning of the stormwater catch basins and associated piping in the Maralco parking lot. Much of the content of these drums (50%-95% of total volume) is water, with the remainder being silty sediments which have settled to the bottoms of the drums. Grab samples of the solid fraction were collected from three representative drums, field-composited, and designated Composite #1. This sample was submitted for analysis of TCLP metals and Static Acute Fish Toxicity as described above, and found to be non-hazardous. Analytical reports for these analyses are attached to this letter.

MW-3 Decontamination/Well Development Water: Drums 284 and 286 contain water purged from monitoring well MW-3, and water used in decontamination of sampling equipment. Analytical data for groundwater in MW-3 is available from previous Ecology reports, relevant sections of which are attached.

MW-3 Soil Cuttings: Drum 285 contains soil cuttings and bentonite (clay) chips generated during the drilling of monitoring well MW-3. Analytical data for soil from boring MW-3 is available from previous Ecology reports, relevant sections of which are attached.

MW-4 Purge Water: Drums 287 and 288 contain water purged from monitoring well MW-4. Analytical data for groundwater in MW-4 is available from previous Ecology reports, relevant sections of which are attached.

MW-4 Soil Cuttings: Drum 289 contains soil cuttings generated during the drilling of monitoring well MW-4. Analytical data for soil from boring MW-4 is available from previous Ecology reports, relevant sections of which are attached.

Unknown Liquid: Drum 290 contains an unknown aqueous fluid. No sample was collected as part of this work due to time and budget limitations.

Preliminary analytical information has been provided to Regional Disposal Company, operators of the Roosevelt Landfill, for approval. If you choose to use this facility, reference job number 95-1337 to expedite the contracting process.

If you have questions regarding the issues discussed above, please feel free to contact us via our direct telephone lines.

Sincerely,

Enviros, Inc.

Trenton G. Smith
Environmental Engineer
(206) 828-2524

Kathleen S. Goodman, R.G.
Principal Geoscientist
(206) 828-2503

enclosures
cc: file

W.O. #3987
TASK 4 - INTERIM REMEDIAL ACTIONS

EXCAVATION OF STORMWATER COLLECTION POND

Excavation activities for the stormwater collection pond (pond) commenced October 15, 1991. Lynn Higgins of MK-Environmental (MK) and Dave Amos, site supervisor for Wilder Construction, met to review MK's work plan (March 14, 1991) for the pond excavation.

It was decided to first excavate around and under the culvert pipe which discharges into the pond. In the event that it rained before pond excavation was complete, the exposed pipe could be plugged to prevent runoff from the parking lot from entering the pond, minimizing the amount of water in the pond. In addition to excavating around the pipe, a five foot section of bent and cracked pipe was removed.

Using a Komatsu PC 120, the excavation started at the north end of the pond and proceeded south toward the culvert pipe. Lynn Higgins was in the pond, inspecting each soil cut for visual contamination. Based upon soil samples previously collected from the pond by MK during the Phase I Remedial Investigation and upon comparison with soils from uncontaminated areas of the site, visually contaminated material was defined by MK to be very fine-grained to clayey material ranging in color from very light to dark grey in relatively well-defined layers.

It was observed during the excavation that the soil from 0 to 6 inches was generally light grey, dry, and very fine-grained, with dense vegetation at the surface. The soil from 6 to 24 inches was a fine-grained to clayey material, dark grey in color with pockets of rust-colored material throughout and ranged from damp to very moist. Material below 24 inches was also fine-grained to clayey, and generally dark brown and very moist. In several areas at this depth, the material was completely saturated and had standing water on it.

As the excavation proceeded south, pockets of white, gooey, odorless material were encountered at varying depths. The material appeared to be distributed randomly throughout the middle of the pond, and it was excavated until visual inspection indicated it had been removed. This material was not found at the north or south ends of the pond.

The toe of the parking lot bed was at approximately a 2 to 1 slope, and it extended out into the pond area 3 or 4'. The bed material consisted of large cobbles and appeared to have little or no visual contamination. Therefore, this material was not excavated.

The excavated material was placed in lined 55-gallon drums and staged on pallets in the parking lot. The 200 drums originally ordered were filled, and an additional 46 were required to complete

June 22, 1995
Lab Traveler #:06-042

Trent Smith
Enviros, Inc.
25 Central Way, Suite 210
Kirkland, WA 98033-6156

Dear Trent:

Enclosed are the results of the analyses of samples submitted on June 13, 1995 from Project E1/941008.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Andy Bay
Project Chemist

Enclosures

Date of Report: June 22, 1995
Samples Submitted: June 13, 1995
Lab Traveler: 06-042
Project: E1/941008

TCLP METALS
EPA 1311/7000 SERIES

Date Extracted: 6-16-95
Date Analyzed: 6-19&20-95

Matrix: TCLP Extract
Units: mg/Kg (ppm)

Lab ID: 06-042-1
Client ID: Composite #1

	Dilution Factor	**Results**	Flags	PQL
Lead	1.1	**ND**		0.55
Arsenic	11	**ND**		0.14
Cadmium	1.1	**ND**		0.055
Chromium	1.1	**ND**		0.55
Mercury	20	**ND**		0.02
Selenium	11	**ND**		0.28
Silver	1.1	**ND**		0.11
Barium	1.1	**ND**		0.55

Date of Report: June 22, 1995
Samples Submitted: June 13, 1995
Lab Traveler: 06-042
Project: E1/941008

TCLP METALS
EPA 1311/7000 SERIES

Date Extracted: 6-16-95
Date Analyzed: 6-19&20-95

Matrix: TCLP Extract
Units: mg/Kg (ppm)

Lab ID: 06-042-2
Client ID: Composite #2

	Dilution Factor	**Results**	Flags	PQL
Lead	1.1	**ND**		0.55
Arsenic	11	**ND**		0.14
Cadmium	1.1	**ND**		0.055
Chromium	1.1	**ND**		0.55
Mercury	20	**ND**		0.02
Selenium	11	**ND**		0.28
Silver	1.1	**ND**		0.11
Barium	1.1	**ND**		0.55

Date of Report: June 22, 1995
Samples Submitted: June 13, 1995
Lab Traveler: 06-042
Project: E1/941008

TCLP METALS
EPA 1311/7000 SERIES

Date Extracted: 6-16-95
Date Analyzed: 6-19&20-95

Matrix: TCLP Extract
Units: mg/Kg (ppm)

Lab ID: 06-042-3
Client ID: Composite #3

	Dilution Factor	**Results**	Flags	PQL
Lead	1.1	**ND**		0.55
Arsenic	11	**ND**		0.14
Cadmium	1.1	**ND**		0.055
Chromium	1.1	**ND**		0.55
Mercury	20	**ND**		0.02
Selenium	11	**ND**		0.28
Silver	1.1	**ND**		0.11
Barium	1.1	**ND**		0.55

Date of Report: June 22, 1995
Samples Submitted: June 13, 1995
Lab Traveler: 06-042
Project: E1/941008

TCLP METALS
EPA 1311/7000 SERIES

METHOD BLANK QUALITY CONTROL

Date Extracted: 6-16-95
Date Analyzed: 6-19&20-95

Matrix: TCLP Extract
Units: mg/Kg (ppm)

Lab ID: MB0619TCLP-1
Client ID: Batch QA

	Dilution Factor	**Results**	Flags	PQL
Lead	1.1	**ND**		0.55
Arsenic	11	**ND**		0.14
Cadmium	1.1	**ND**		0.055
Chromium	1.1	**ND**		0.55
Mercury	20	**ND**		0.02
Selenium	11	**ND**		0.28
Silver	1.1	**ND**		0.11
Barium	1.1	**ND**		0.55

Date of Report: June 22, 1995
Samples Submitted: June 13, 1995
Lab Traveler: 06-042
Project: E1/941008

TCLP METALS
EPA 1311/7000 SERIES

DUPLICATE QUALITY CONTROL

Date Extracted: 6-16-95
Date Analyzed: 6-19&20-95

Matrix: TCLP Extract
Units: mg/Kg (ppm)

Lab ID: 06-042-1
Client ID: Batch QA

	Dilution Factor	Original	Duplicate	RPD	Flags	PQL
Lead	1.1	**ND**	**ND**	NA		0.55
Arsenic	11	**ND**	**ND**	NA		0.14
Cadmium	1.1	**ND**	**ND**	NA		0.055
Chromium	1.1	**ND**	**ND**	NA		0.55
Mercury	20	**ND**	**ND**	NA		0.02
Selenium	11	**ND**	**ND**	NA		0.28
Silver	1.1	**ND**	**ND**	NA		0.11
Barium	1.1	**ND**	**ND**	NA		0.55

Date of Report: June 22, 1995
Samples Submitted: June 13, 1995
Lab Traveler: 06-042
Project: E1/941008

TCLP METALS
EPA 1311/7000 SERIES

MS/MSD QUALITY CONTROL

Date Extracted: 6-16-95
Date Analyzed: 6-19&20-95

Matrix: TCLP
Units: mg/Kg (ppm)

Lab ID: 06-042-1
Client ID: Batch QA

	Spiked @	Dilution Factor	Matrix Spike Result	Percent Recovery	Matrix Spike Duplicate	Percent Recovery	RPD	Flags
Lead	5.5	1.1	**5.54**	101%	**5.54**	101%	0.0%	
Arsenic	1.1	11	**1.18**	107%	**1.17**	106%	0.80%	
Cadmium	1.1	1.1	**1.02**	93%	**1.05**	95%	2.9%	
Chromium	2.2	1.1	**2.08**	95%	**2.13**	97%	2.4%	
Mercury	0.100	20	**0.099**	99%	**0.100**	100%	1.0%	
Selenium	1.1	11	**0.96**	87%	**1.03**	94%	7.0%	
Silver	1.1	1.1	**0.87**	79%	**0.92**	84%	5.7%	
Barium	22	1.1	**20.3**	92%	**21.4**	97%	5.3%	

beak consultants incorporated

12931 N.E. 126th Place
Kirkland, WA 98034-7716
(206) 823-6919
FAX: (206) 820-9399

AQUATIC BIOASSAY SERVICES
FACSIMILE REPORT

DATE 6/21/95 PROJECT NUMBER 31300-299/300/301 FAX NUMBER (206) 827-3299

TO: Trent Smith
Enviros Inc.

FROM: Charlie Wisdom

REGARDING:
Reports of the three bioassays

PAGES IN THIS TRANSMITTAL 28

TIME AND DAY SENT 6/21/95

COMMENTS

Trent,
Attached please find the three bioassay reports as you requested. The reference toxicity test will be completed by Friday at which time I will fax you the updated version of page 5 and 6 to be included in each report. If you have any questions please call me at (206)823-6919.

DETERMINATION OF

STATIC ACUTE FISH TOXICITY

OF COMPOSITE SAMPLE #1

FOR ENVIROS INC.

PREPARED BY:

Helle B. Andersen
Bioassay Laboratory Manager

QUALITY ASSURANCE BY:

Charles S. Wisdom, Ph.D.
Bioassay Laboratory Director

Aquatic Bioassay Services
Washington Laboratory Accreditation #C117
BEAK CONSULTANTS INCORPORATED

21 June, 1995

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1.0 ABSTRACT

The Enviros Inc. composite sample #1 was tested to determine the hazardous waste classification status using the static acute fish toxicity test WDOE 80-12 with rainbow trout (*Oncorhynchus mykiss*) as the test organism (Hazardous Waste Section, 1991). The sample was extracted with dilution water using a rotary agitator at the appropriate test concentrations. Fish were exposed to the extract concentrations and control dilution water for 96 hours. The 100% survivorship in the control fish population was within the acceptable range for this test protocol. Survivorship of fish exposed to the 100 mg/L (ppm) and 1000 mg/L (ppm) extracts was high at 100%.

1.1 Summary

The composite sample #1 from Enviros Inc. would be characterized as a non-hazardous material according to the WDOE 80-12 protocol guidelines.

2.0 RANGE FINDING BAR GRAPH

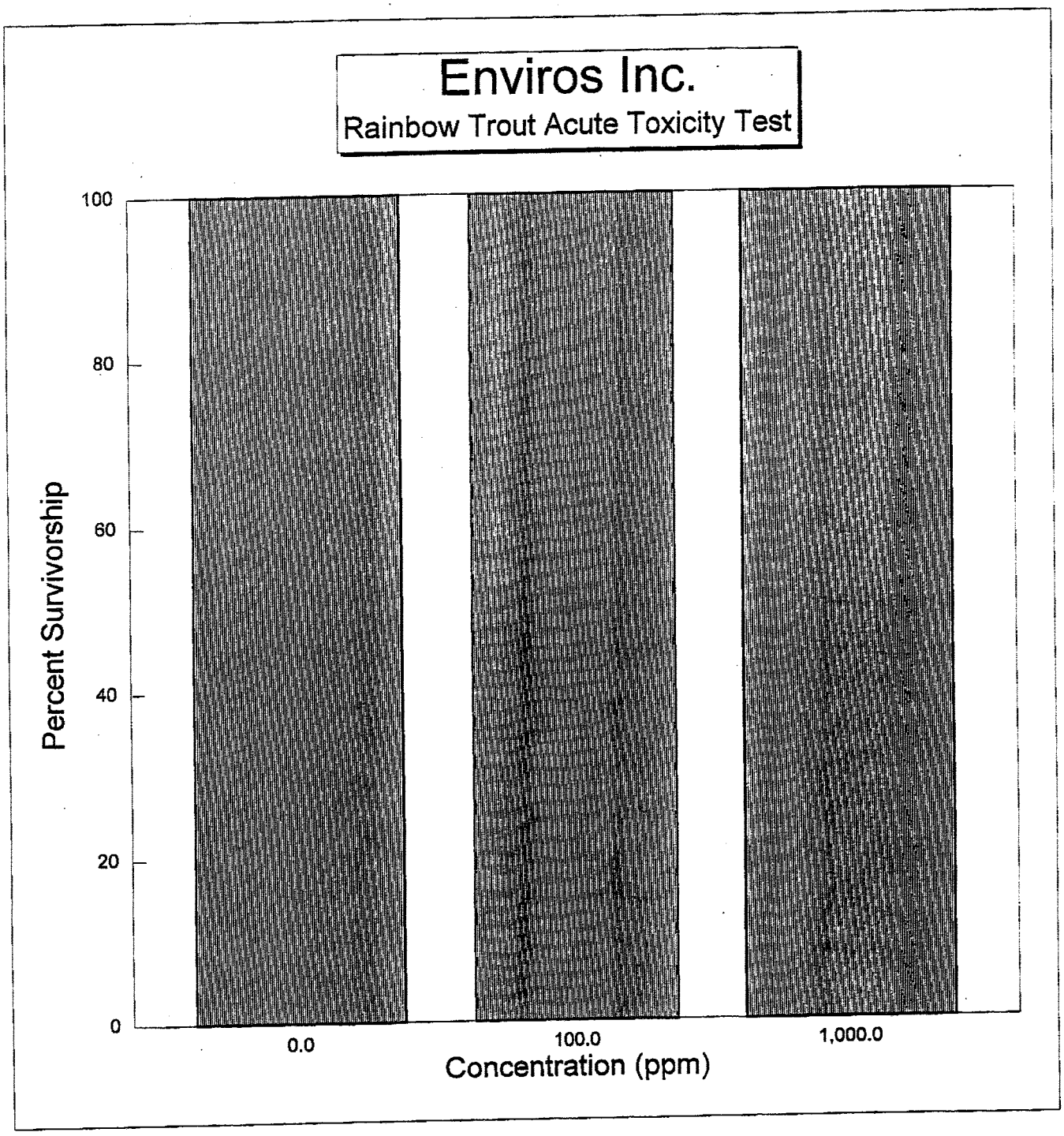


Figure 1: Survivorship of fish at the control and test concentrations for Enviros Inc. composite sample #1.

3.0 ENVIROS INC. COMPOSITE SAMPLE #1 INFORMATION

3.1 Report Overview

The composite sample #1 from Enviros Inc. was received for the purpose of determining the response of rainbow trout fry to 100 ppm and 1,000 ppm extracts. These extract concentrations have been established by the Hazardous Waste Section of the Washington State Department of Ecology for determining if a material is either a dangerous or an extremely hazardous waste. Significant differences in mortality between the control and each extract concentration determines the level of hazard assigned. This report details the conditions under which these materials were tested, indicating the nature of the sample, the test conditions, quality assurance measures and test results.

3.2 Source of Sample

The composite sample #1 from Enviros Inc. was delivered by Enviros personnel to our Kirkland laboratory.

3.2.1 Sample Information

Delivery Date and Time: 13 June 1995 / 11:00 HR	
Storage Conditions:	Materials were stored in a 4°C refrigerator with physical security until the test was initiated.
Matrix : Sand Color : Grey	

3.2.2 Dilution Water Information

Source:	Seattle Water District
Collection Date and Time:	14 June 1995 / 12:00 HR
Pretreatment:	Dechlorination with Granulated Activated Charcoal
Physical and Chemical Parameters When Received:	
Temperature:	16.0 °C
pH:	7.02
Dissolved Oxygen:	11.9 ppm
Conductivity:	40.0 μmhos/cm
Hardness:	20 mg/L $CaCO_3$
Comments: Water was temperature equilibrated to 12.0 °C prior to the initiation of the test.	

4.0 TOXICITY TEST

4.1 Test Parameters

Toxicity Test Methodology:	WDOE 80-12, Static Acute Fish Toxicity Test
Method Modifications (if applicable):	None
Test Started:	14 June 1995 / 15:40 HR
Test Completed:	18 June 1995 / 13:30 HR
Test Concentrations:	0 ppm, 100 ppm, 1,000 ppm
Test Chambers: Plastic Buckets with disposable pail liners, Total Volume 15.1 L Sample Volume/Chamber: 10.2 L/Test Bucket	
Organisms/Chamber: 10 Fish/Test Bucket Replicate Chambers/Treatment: 3 Test Buckets/Concentration	
Test Endpoint: Mortality	Test Acceptability: 90% Control Survivorship
Feeding Frequency/Amount & Type of Food: Organisms were not feed during the test	
Photoperiod: 16:8 L:D	Test Aeration: None
Test temperature: 12 °C ± 1.0 °C	Sample Dechlorination: None
Loading Rates: 0.1791 g/L	

4.2 Test Organisms

Scientific Name: *Oncorhynchus mykiss*, Rainbow Trout		
Life Stage: Juvenile	Age: 41 Days	Acclimation: 41 Days
Largest Length: 4.0 cm	Average Weight: 0.18273 g	
Source and Culture Batch: In House		
Diseases and Treatment (where applicable): None		

4.3 Quality Assurance

4.3.1 Reference Toxicant Use

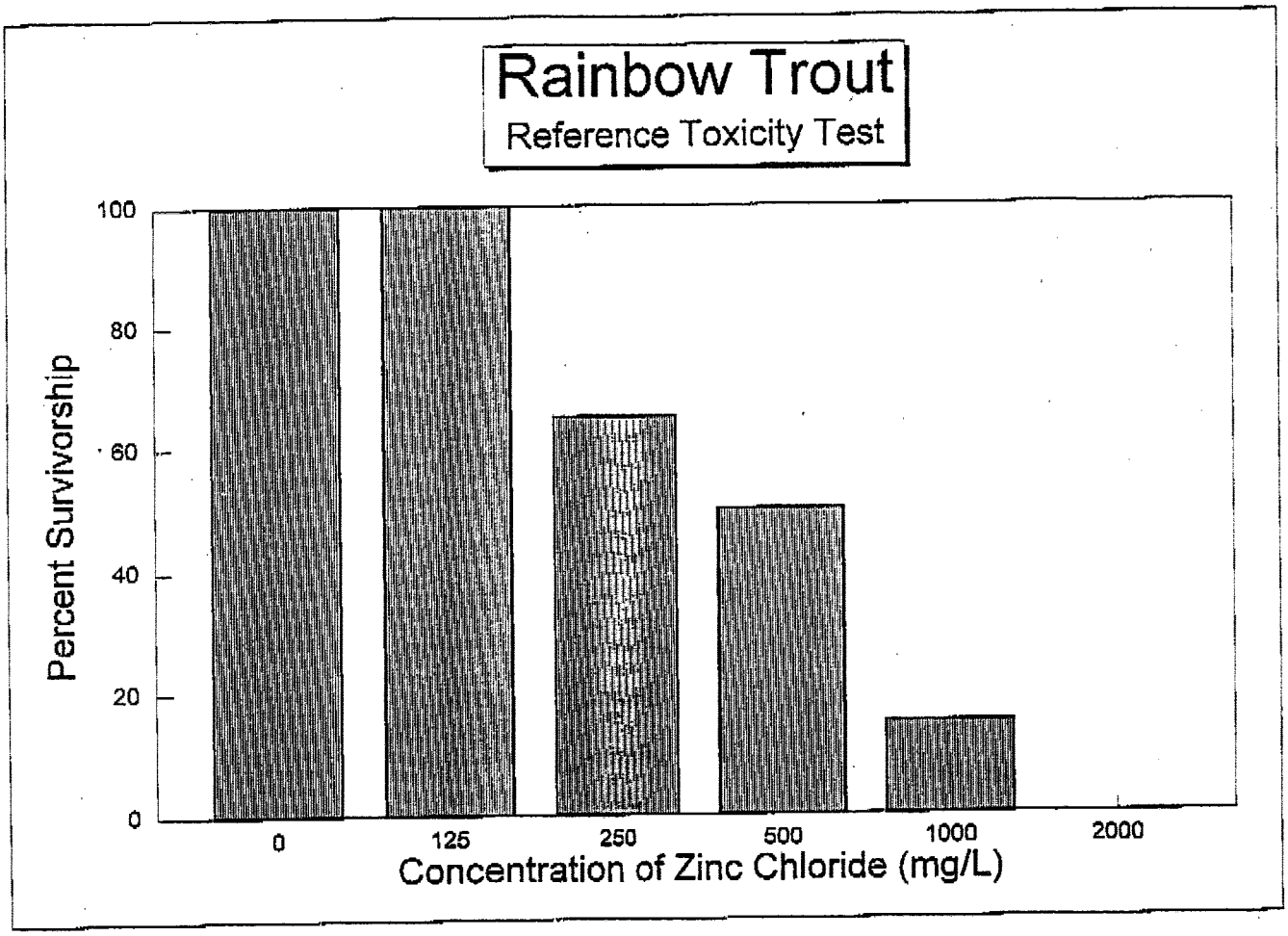
A reference toxicant test ($ZnCl_2$) was performed on June 14, 1995. A 100,000 µg/L stock solution of zinc chloride (Fisher #Z33-100, Lot #914997A) was diluted to 2,000 µg/L as the initial concentration. Material was then diluted 50% for each subsequent concentration to produce the test conditions. Fish of the same size and age as the current test were placed in test buckets. Each concentration received 20 fish. Mortality, pH, and dissolved oxygen were recorded over the 96 hour testing period and an LC_{50} value was calculated by the Trimmed Spearman-Karber statistical method.

4.3.2 Reference Toxicant Test Results

Toxicant Concentration	Organism Mortality	Percent Mortality
0 µg/L	0	0%
125 µg/L	0	0%
250 µg/L	7	35%
500 µg/L	10	50%
1,000 µg/L	17	85%
2,000 µg/L	20	100%

Calculated LC_{50} Value =	434.92 µg/L
Lower 95% Confidence Interval =	339.24 µg/L
Upper 95% Confidence Interval =	554.89 µg/L

4.3.3 Current Reference Toxicant Bar Chart



4.3.4 Physical and Chemical Methods Used

Various water quality parameters were measured during the course of the test. Temperature was determined by mercury thermometer. The pH of each replicate was measured by Hanna Instruments model HI9024, Digital pH meter with Hanna Instruments pH probe model HI1230. The pH meter was calibrated daily against external standards at the test temperature. Dissolved oxygen was determined using a YSI model 51B oxygen meter with an associated YSI model 5739 probe. The dissolved oxygen meter was air calibrated daily. Hardness was measured using the EDTA titrimetric method, #2340 C (APHA 1989). The hardness test was calibrated using a standard reference material purchased from LabChem Inc, Calcium Carbonate Standard (Lot #2181-8). Sample conductivity was measured with a YSI S-C-T Meter and Probe, Model #33.

5.0 RESULTS

5.1 Original Data

The extract concentrations and control buckets each started with 30 fish (10 fish in each of three buckets) on Day 0. The following data represent the number of fish remaining daily in each of the test buckets.

Enviros Composite Sample #1	SURVIVING ORGANISMS				
	DAY 1	DAY 2	DAY 3	DAY 4	% SURVIVORS
Control, 0 ppm	30	30	30	30	100%
100 ppm	30	30	30	30	100%
1,000 ppm	30	30	30	30	100%

5.2 Summary Physical and Chemical Data

Enviros Composite Sample #1	PHYSICAL AND CHEMICAL DATA					
	TEMPERATURE, °C		pH		DISSOLVED OXYGEN, ppm	
	MEAN	STD[2]	MEAN	STD	MEAN	STD
Control, 0 ppm	12.0	0.0	6.82	0.1	10.7	0.7
100 ppm	12.0	0.0	6.79	0.2	10.7	0.8
1,000 ppm	12.0	0.0	6.75	0.2	10.7	0.7

[1]STD = Standard deviation of the data around the mean value

5.3 Numerical and Statistical Analysis

5.3.1 Statistical Methods

The statistical methods used for this test are quite direct. If there is greater than 37% mortality in the combined 1,000 mg/L extract fish population, the test sample is deemed a dangerous waste. If there is greater than 33.3% mortality in the combined 100 mg/L extract fish population, the test sample is deemed an extremely hazardous waste.

5.3.2 Statistical Analysis Summary

Survivorship in the control population was 100% and within the acceptable range of this test protocol. The mortalities in the 100 ppm fish population (0%) were below the decision criterion for an extremely hazardous waste. The mortalities in the 1,000 ppm fish population (0%) were below the decision criterion for the dangerous waste designation. Therefore Enviros composite sample #1 would designate as a non-hazardous material according to the DOE hazardous material classification scheme.

6.0 BIBLIOGRAPHY

Hazardous Waste Section. 1991. Biological Testing Methods. Part A. Static acute fish toxicity test. Washington State Department of Ecology, WDOE 80-12.

American Public Health Association. 1989. Standard methods for the examination of water and wastewater. Seventeenth Edition.

DETERMINATION OF

STATIC ACUTE FISH TOXICITY

OF COMPOSITE SAMPLE #2

FOR ENVIROS INC.

PREPARED BY:

Helle B. Andersen
Bioassay Laboratory Manager

QUALITY ASSURANCE BY:

Charles S. Wisdom, Ph.D.
Bioassay Laboratory Director

Aquatic Bioassay Services
Washington Laboratory Accreditation #C117
BEAK CONSULTANTS INCORPORATED

21 June, 1995

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1.0 ABSTRACT

The Enviros Inc. composite sample #2 was tested to determine the hazardous waste classification status using the static acute fish toxicity test WDOE 80-12 with rainbow trout (*Oncorhynchus mykiss*) as the test organism (Hazardous Waste Section, 1991). The sample was extracted with dilution water using a rotary agitator at the appropriate test concentrations. Fish were exposed to the extract concentrations and control dilution water for 96 hours. The 100% survivorship in the control fish population was within the acceptable range for this test protocol. Survivorship of fish exposed to the 100 mg/L (ppm) and 1000 mg/L (ppm) extracts was high at 100%.

1.1 Summary

The composite sample #2 from Enviros Inc. would be characterized as a non-hazardous material according to the WDOE 80-12 protocol guidelines.

2.0 RANGE FINDING BAR GRAPH

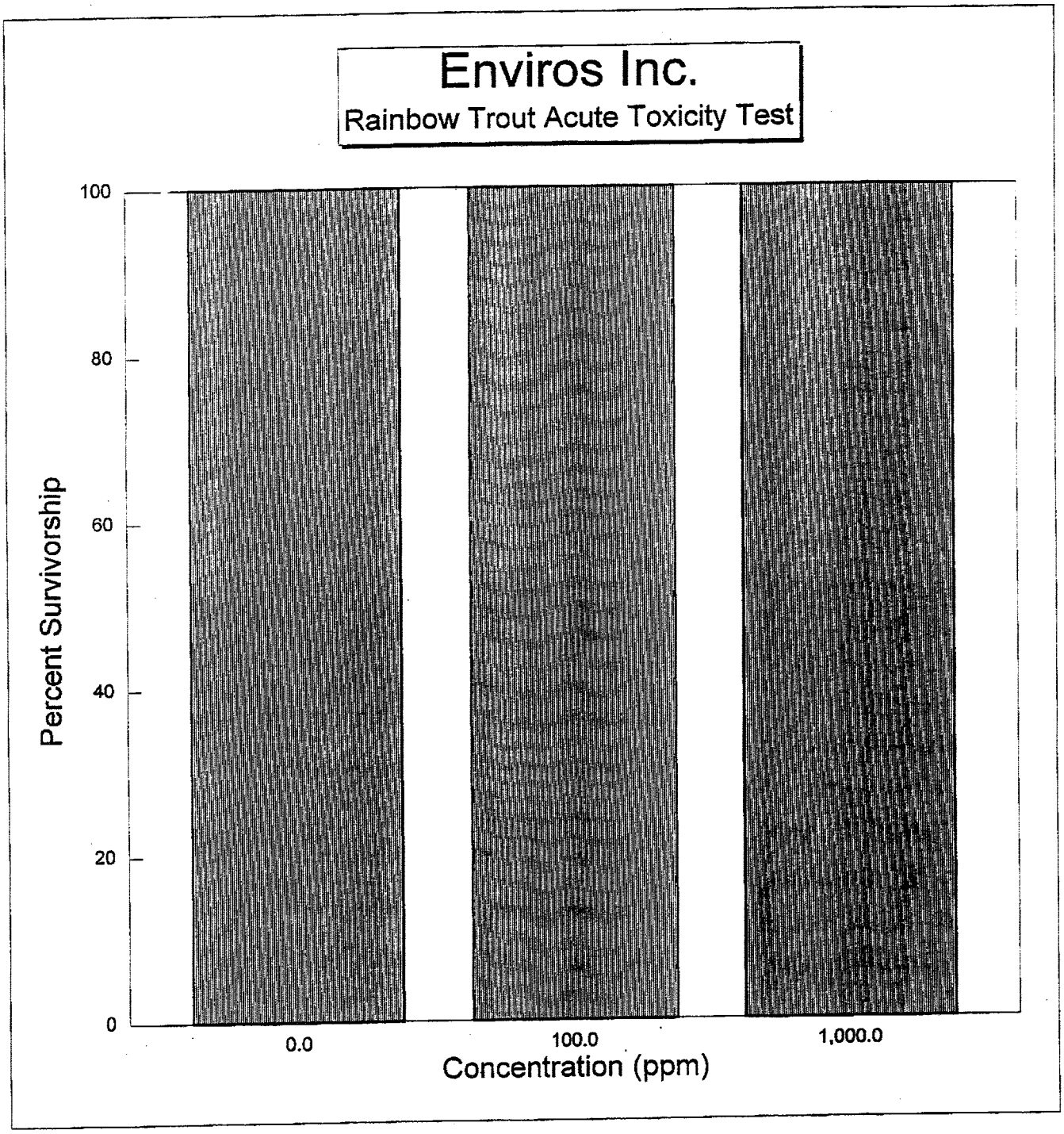


Figure 1: Survivorship of fish at the control and test concentrations for Enviros Inc. composite sample #2.

3.0 ENVIROS INC. COMPOSITE SAMPLE #2 INFORMATION

3.1 Report Overview

The composite sample #2 from Enviros Inc. was received for the purpose of determining the response of rainbow trout fry to 100 ppm and 1,000 ppm extracts. These extract concentrations have been established by the Hazardous Waste Section of the Washington State Department of Ecology for determining if a material is either a dangerous or an extremely hazardous waste. Significant differences in mortality between the control and each extract concentration determines the level of hazard assigned. This report details the conditions under which these materials were tested, indicating the nature of the sample, the test conditions, quality assurance measures and test results.

3.2 Source of Sample

The composite sample #2 from Enviros Inc. was delivered by Enviros personnel to our Kirkland laboratory.

3.2.1 Sample Information

Delivery Date and Time: 13 June 1995 / 11:00 HR	
Storage Conditions:	Materials were stored in a 4°C refrigerator with physical security until the test was initiated.
Matrix : Sand Color : Grey	

3.2.2 Dilution Water Information

Source:	Seattle Water District
Collection Date and Time:	15 June 1995 / 12:00 HR
Pretreatment:	Dechlorination with Granulated Activated Charcoal

Physical and Chemical Parameters When Received:

Temperature:	16.0 °C	pH:	7.02
Dissolved Oxygen:	11.9 ppm	Conductivity:	40.0 μmhos/cm
Hardness:	20 mg/L $CaCO_3$		

Comments: Water was temperature equilibrated to 12.0 °C prior to the initiation of the test.

4.0 TOXICITY TEST

4.1 Test Parameters

Toxicity Test Methodology:	WDOE 80-12, Static Acute Fish Toxicity Test
Method Modifications (if applicable):	None
Test Started:	14 June 1995 / 15:45 HR
Test Completed:	18 June 1995 / 15:45 HR
Test Concentrations:	0 ppm, 100 ppm, 1,000 ppm
Test Chambers:	Plastic Buckets with disposable pail liners, Total Volume 15.1 L
Sample Volume/Chamber:	10.2 L/Test Bucket
Organisms/Chamber:	10 Fish/Test Bucket
Replicate Chambers/Treatment:	3 Test Buckets/Concentration
Test Endpoint:	Mortality
Test Acceptability:	90% Control Survivorship
Feeding Frequency/Amount & Type of Food:	Organisms were not feed during the test
Photoperiod:	16:8 L:D
Test Aeration:	None
Test temperature:	12 °C ± 1.0 °C
Sample Dechlorination:	None
Loading Rates:	0.1791 g/L

4.2 Test Organisms

Scientific Name: *Oncorhynchus mykiss*, Rainbow Trout		
Life Stage: Juvenile	Age: 41 Days	Acclimation: 41 Days
Largest Length: 4.0 cm	Average Weight: 0.18273 g	
Source and Culture Batch: In House		
Diseases and Treatment (where applicable): None		

4.3 Quality Assurance

4.3.1 Reference Toxicant Use

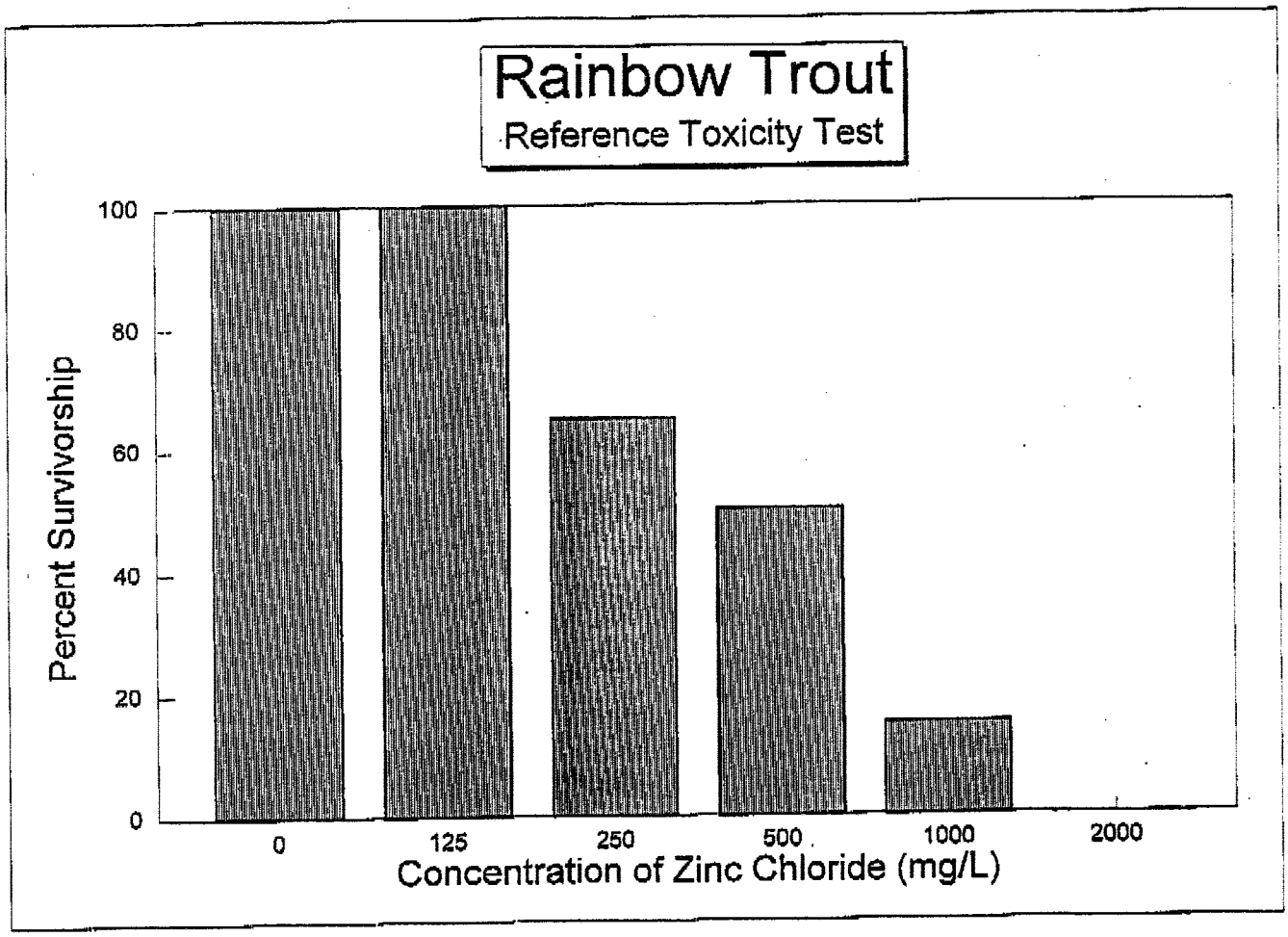
A reference toxicant test ($ZnCl_2$) was performed on June 14, 1995. A 100,000 µg/L stock solution of zinc chloride (Fisher #Z33-100, Lot #914997A) was diluted to 2,000 µg/L as the initial concentration. Material was then diluted 50% for each subsequent concentration to produce the test conditions. Fish of the same size and age as the current test were placed in test buckets. Each concentration received 20 fish. Mortality, pH, and dissolved oxygen were recorded over the 96 hour testing period and an LC_{50} value was calculated by the Trimmed Spearman-Karber statistical method.

4.3.2 Reference Toxicant Test Results

Toxicant Concentration	Organism Mortality	Percent Mortality
0 µg/L	0	0%
125 µg/L	0	0%
250 µg/L	7	35%
500 µg/L	10	50%
1,000 µg/L	17	85%
2,000 µg/L	20	100%

Calculated LC_{50} Value =	434.92 µg/L
Lower 95% Confidence Interval =	339.24 µg/L
Upper 95% Confidence Interval =	554.89 µg/L

4.3.3 Current Reference Toxicant Bar Chart



4.3.4 Physical and Chemical Methods Used

Various water quality parameters were measured during the course of the test. Temperature was determined by mercury thermometer. The pH of each replicate was measured by Hanna Instruments model HI9024, Digital pH meter with Hanna Instruments pH probe model HI1230. The pH meter was calibrated daily against external standards at the test temperature. Dissolved oxygen was determined using a YSI model 51B oxygen meter with an associated YSI model 5739 probe. The dissolved oxygen meter was air calibrated daily. Hardness was measured using the EDTA titrimetric method, #2340 C (APHA 1989). The hardness test was calibrated using a standard reference material purchased from LabChem Inc, Calcium Carbonate Standard (Lot #2181-8). Sample conductivity was measured with a YSI S-C-T Meter and Probe, Model #33.

5.0 RESULTS

5.1 Original Data

The extract concentrations and control buckets each started with 30 fish (10 fish in each of three buckets) on Day 0. The following data represent the number of fish remaining daily in each of the test buckets.

Enviros Composite Sample #2	SURVIVING ORGANISMS				
	DAY 1	DAY 2	DAY 3	DAY 4	% SURVIVORS
Control, 0 ppm	30	30	30	30	100%
100 ppm	30	30	30	30	100%
1,000 ppm	30	30	30	30	100%

5.2 Summary Physical and Chemical Data

Enviros Composite Sample #2	PHYSICAL AND CHEMICAL DATA					
	TEMPERATURE, °C		pH		DISSOLVED OXYGEN, ppm	
	MEAN	STD[2]	MEAN	STD	MEAN	STD
Control, 0 ppm	12.0	0.0	6.69	0.1	10.8	0.7
100 ppm	12.0	0.0	6.74	0.1	10.7	0.7
1,000 ppm	12.0	0.0	6.76	0.1	10.7	0.7

[1]STD = Standard deviation of the data around the mean value

5.3 Numerical and Statistical Analysis

5.3.1 Statistical Methods

The statistical methods used for this test are quite direct. If there is greater than 37% mortality in the combined 1,000 mg/L extract fish population, the test sample is deemed a dangerous waste. If there is greater than 33.3% mortality in the combined 100 mg/L extract fish population, the test sample is deemed an extremely hazardous waste.

5.3.2 Statistical Analysis Summary

Survivorship in the control population was 100% and within the acceptable range of this test protocol. The mortalities in the 100 ppm fish population (0%) were below the decision criterion for an extremely hazardous waste. The mortalities in the 1,000 ppm fish population (0%) were below the decision criterion for the dangerous waste designation. Therefore Enviros composite sample #2 would designate as a non-hazardous material according to the DOE hazardous material classification scheme.

6.0 BIBLIOGRAPHY

Hazardous Waste Section. 1991. Biological Testing Methods. Part A. Static acute fish toxicity test. Washington State Department of Ecology, WDOE 80-12.

American Public Health Association. 1989. Standard methods for the examination of water and wastewater. Seventeenth Edition.

DETERMINATION OF

STATIC ACUTE FISH TOXICITY

OF COMPOSITE SAMPLE #3

FOR ENVIROS INC.

PREPARED BY:

Helle B. Andersen
Bioassay Laboratory Manager

QUALITY ASSURANCE BY:

Charles S. Wisdom, Ph.D.
Bioassay Laboratory Director

Aquatic Bioassay Services
Washington Laboratory Accreditation #C117
BEAK CONSULTANTS INCORPORATED

21 June, 1995

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1.0 ABSTRACT

The Enviros Inc. composite sample #3 was tested to determine the hazardous waste classification status using the static acute fish toxicity test WDOE 80-12 with rainbow trout (*Oncorhynchus mykiss*) as the test organism (Hazardous Waste Section, 1991). The sample was extracted with dilution water using a rotary agitator at the appropriate test concentrations. Fish were exposed to the extract concentrations and control dilution water for 96 hours. The 100% survivorship in the control fish population was within the acceptable range for this test protocol. Survivorship of fish exposed to the 100 mg/L (ppm) and 1000 mg/L (ppm) extracts was high at 96.67% and 93.33%, respectively.

1.1 Summary

The composite sample #3 from Enviros Inc. would be characterized as a non-hazardous material according to the WDOE 80-12 protocol guidelines.

2.0 RANGE FINDING BAR GRAPH

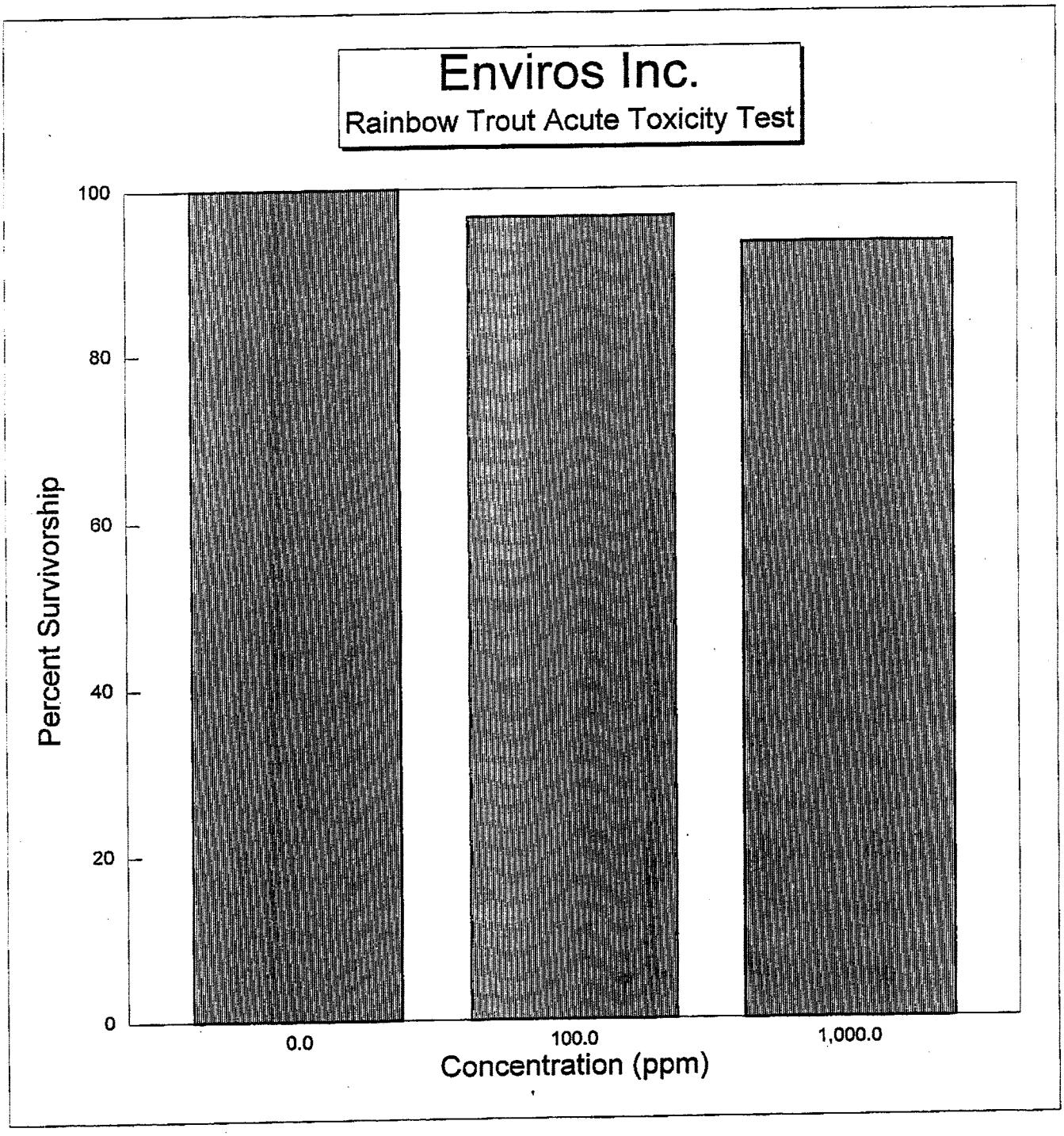


Figure 1: Survivorship of fish at the control and test concentrations for Enviros Inc. composite sample #3.

3.0 ENVIROS INC. COMPOSITE SAMPLE #3 INFORMATION

3.1 Report Overview

The composite sample #3 from Enviros Inc. was received for the purpose of determining the response of rainbow trout fry to 100 ppm and 1,000 ppm extracts. These extract concentrations have been established by the Hazardous Waste Section of the Washington State Department of Ecology for determining if a material is either a dangerous or an extremely hazardous waste. Significant differences in mortality between the control and each extract concentration determines the level of hazard assigned. This report details the conditions under which these materials were tested, indicating the nature of the sample, the test conditions, quality assurance measures and test results.

3.2 Source of Sample

The composite sample #3 from Enviros Inc. was delivered by Enviros personnel to our Kirkland laboratory.

3.2.1 Sample Information

Delivery Date and Time: 13 June 1995 / 11:00 HR	
Storage Conditions:	Materials were stored in a 4°C refrigerator with physical security until the test was initiated.
Matrix : Sand Color : Grey	

3.2.2 Dilution Water Information

Source:	Seattle Water District
Collection Date and Time:	15 June 1995 / 12:00 HR
Pretreatment:	Dechlorination with Granulated Activated Charcoal

Physical and Chemical Parameters When Received:

Temperature:	14.0 °C	pH:	7.07
Dissolved Oxygen:	10.2 ppm	Conductivity:	66.4 μmhos/cm
Hardness:	14.7 mg/L $CaCO_3$		

Comments: Water was temperature equilibrated to 12.0 °C prior to the initiation of the test.

4.0 TOXICITY TEST

4.1 Test Parameters

Toxicity Test Methodology:	WDOE 80-12, Static Acute Fish Toxicity Test
Method Modifications (if applicable):	None
Test Started:	15 June 1995 / 14:45 HR
Test Completed:	19 June 1995 / 12:45 HR
Test Concentrations:	0 ppm, 100 ppm, 1,000 ppm
Test Chambers:	Plastic Buckets with disposable pail liners, Total Volume 15.1 L
Sample Volume/Chamber:	10.2 L/Test Bucket
Organisms/Chamber:	10 Fish/Test Bucket
Replicate Chambers/Treatment:	3 Test Buckets/Concentration
Test Endpoint: Mortality	Test Acceptability: 90% Control Survivorship
Feeding Frequency/Amount & Type of Food:	Organisms were not feed during the test
Photoperiod: 16:8 L:D	Test Aeration: None
Test temperature: 12 °C ± 1.0 °C	Sample Dechlorination: None
Loading Rates:	0.1791 g/L

4.2 Test Organisms

Scientific Name: *Oncorhynchus mykiss*, Rainbow Trout		
Life Stage: Juvenile	Age: 42 Days	Acclimation: 42 Days
Largest Length: 4.0 cm	Average Weight: 0.18273 g	
Source and Culture Batch: In House		
Diseases and Treatment (where applicable): None		

4.3 Quality Assurance

4.3.1 Reference Toxicant Use

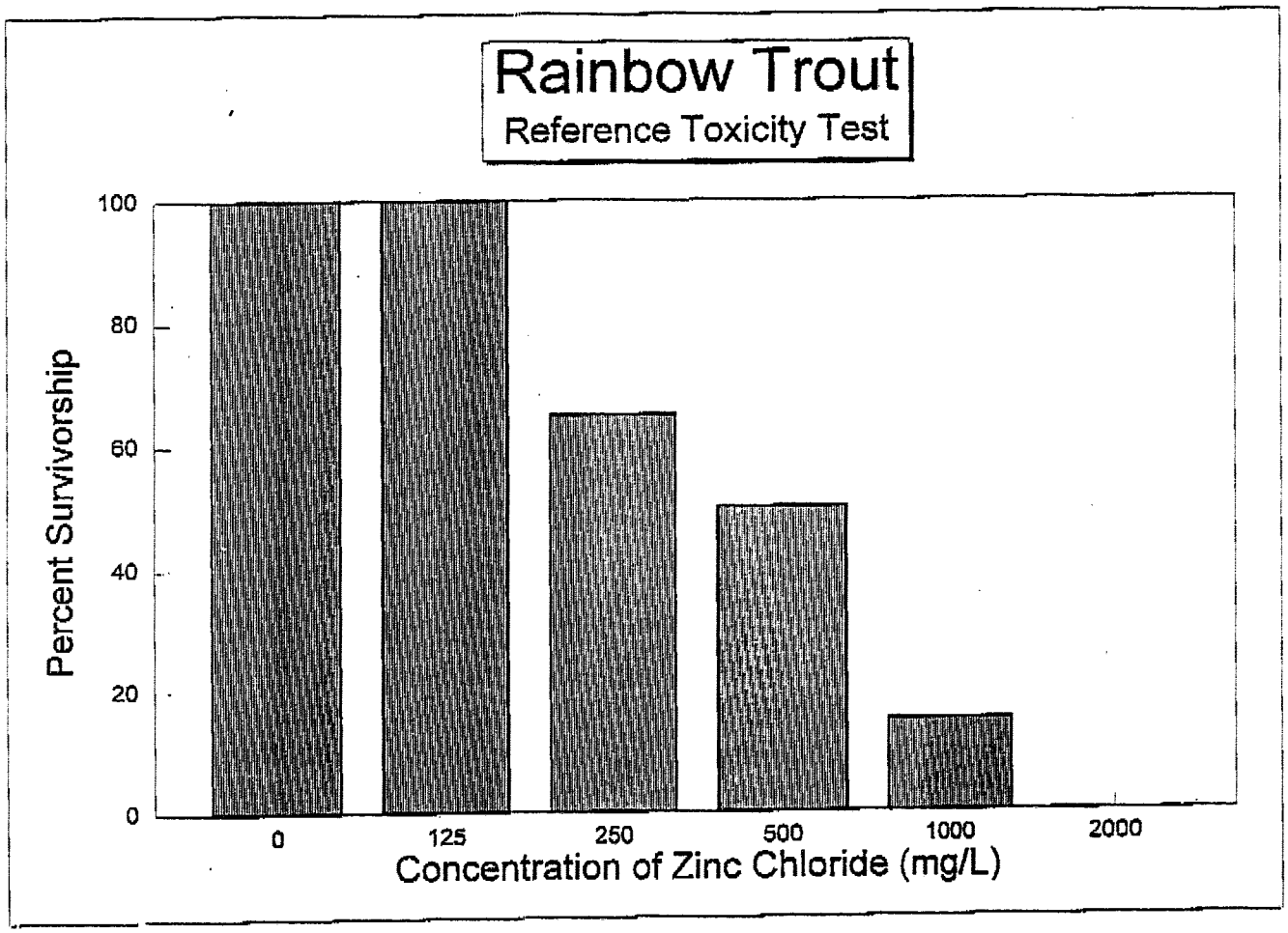
A reference toxicant test ($ZnCl_2$) was performed on June 14, 1995. A 100,000 µg/L stock solution of zinc chloride (Fisher #Z33-100, Lot #914997A) was diluted to 2,000 µg/L as the initial concentration. Material was then diluted 50% for each subsequent concentration to produce the test conditions. Fish of the same size and age as the current test were placed in test buckets. Each concentration received 20 fish. Mortality, pH, and dissolved oxygen were recorded over the 96 hour testing period and an LC_{50} value was calculated by the Trimmed Spearman-Karber statistical method.

4.3.2 Reference Toxicant Test Results

Toxicant Concentration	Organism Mortality	Percent Mortality
0 µg/L	0	0%
125 µg/L	0	0%
250 µg/L	7	35%
500 µg/L	10	50%
1,000 µg/L	17	85%
2,000 µg/L	20	100%

Calculated LC_{50} Value =	434.92 µg/L
Lower 95% Confidence Interval =	339.24 µg/L
Upper 95% Confidence Interval =	554.89 µg/L

4.3.3 Current Reference Toxicant Bar Chart



4.3.4 Physical and Chemical Methods Used

Various water quality parameters were measured during the course of the test. Temperature was determined by mercury thermometer. The pH of each replicate was measured by Hanna Instruments model HI9024, Digital pH meter with Hanna Instruments pH probe model HI1230. The pH meter was calibrated daily against external standards at the test temperature. Dissolved oxygen was determined using a YSI model 51B oxygen meter with an associated YSI model 5739 probe. The dissolved oxygen meter was air calibrated daily. Hardness was measured using the EDTA titrimetric method, #3340 C (APHA 1989). The hardness test was calibrated using a standard reference material purchased from LabChem Inc, Calcium Carbonate Standard (Lot #3181-8). Sample conductivity was measured with a YSI S-C-T Meter and Probe, Model #33.

5.0 RESULTS

5.1 Original Data

The extract concentrations and control buckets each started with 30 fish (10 fish in each of three buckets) on Day 0. The following data represent the number of fish remaining daily in each of the test buckets.

Enviros Composite Sample #3	SURVIVING ORGANISMS				
	DAY 1	DAY 2	DAY 3	DAY 4	% SURVIVORS
Control, 0 ppm	30	30	30	30	100%
100 ppm	30	30	30	29	96.67%
1,000 ppm	30	30	30	28	93.33%

5.2 Summary Physical and Chemical Data

Enviros Composite Sample #3	PHYSICAL AND CHEMICAL DATA					
	TEMPERATURE, °C		pH		DISSOLVED OXYGEN, ppm	
	MEAN	STD[2]	MEAN	STD	MEAN	STD
Control, 0 ppm	12.0	0.0	7.05	0.3	10.4	0.8
100 ppm	12.0	0.0	6.98	0.2	10.4	0.6
1,000 ppm	12.0	0.0	7.08	0.6	10.0	0.7

[1]STD = Standard deviation of the data around the mean value

5.3 Numerical and Statistical Analysis

5.3.1 Statistical Methods

The statistical methods used for this test are quite direct. If there is greater than 37% mortality in the combined 1,000 mg/L extract fish population, the test sample is deemed a dangerous waste If there is greater than 33.3% mortality in the combined 100 mg/L extract fish population, the test sample is deemed an extremely hazardous waste.

5.3.2 Statistical Analysis Summary

Survivorship in the control population was 100% and within the acceptable range of this test protocol. The mortalities in the 100 ppm fish population (3.33%) were below the decision criterion for an extremely hazardous waste. The mortalities in the 1,000 ppm fish population (6.67%) were below the decision criterion for the dangerous waste designation. Therefore Enviros composite sample #3 would designate as a non-hazardous material according to the DOE hazardous material classification scheme.

6.0 BIBLIOGRAPHY

Hazardous Waste Section. 1991. Biological Testing Methods. Part A. Static acute fish toxicity test. Washington State Department of Ecology, WDOE 80-12.

American Public Health Association. 1989. Standard methods for the examination of water and wastewater. Seventeenth Edition.

Table 5.14
Results of Stage 2 Laboratory Analyses of Black Dross/Baghouse Samples
Selected Parameters
Maralco Site, Kent, Washington

SAMPLE LOCATION	DEPTH INTERVAL (ft., BGS)	SAMPLE ID	DESCRIPTION	SAMPLE DATE	AMMONIA (mg/Kg)	TOTAL KJELDAHL NITROGEN (mg/Kg)	CHLORIDE (mg/Kg)	CYANIDE (mg/Kg)
BH-1	2.3-2.6	368501	black dross	9/6/90	292	884	140,642	0.67
BH-2	2.1-2.7	368502	black dross	9/6/90	188	677	150,755	0.42
BD-5	2.4-2.5	368507	black dross	9/6/90	153	4089	15,752	1.30
BD-6	3.5-4.0	368509	black dross	9/7/90	686	3006	59,427	1.50
BD-8	1.0-1.5	368511	black dross	9/7/90	149	554	131,988	0.66
BD-9	1.5-2.0	368512	black dross	9/7/90	95	664	95,593	0.56
BD-10	3.5-4.0	368513	black dross	9/7/90	26	398	2,025	1.04
BD-11	2.0-2.5	368514	black dross	9/7/90	109	824	41,901	1.07
BD-12	0.0-1.0	368515	black dross	9/7/90	46	684	20,541	1.53
BD-13	1.5-2.5	368516	black dross	9/7/90	101	856	30,614	1.08
BD-113	1.5-2.5	368517	black dross	9/7/90	84	3768	30,265	0.96
BD-14	3.5-4.0	368518	black dross	9/7/90	197	879	5,728	1.51
BD-15	2.5-3.5	368519	black dross	9/7/90	145	777	1,655	0.70
BD-16	3.0-4.0	368522	black dross	9/10/90	61	646	80	0.74
BD-17	2.0-3.0	368525	black dross	9/10/90	109	795	108	1.49
BD-18	3.0-4.0	368527	black dross	9/10/90	64	658	81	1.43
HB-4	0.0-1.0	378552	soil	9/11/90	57	760	4	0.25
HB-4	2.0-3.0	378553	soil	9/11/90	13	102	3	<0.21
HB-5	0.0-0.2	378548	soil	9/11/90	109	1098	17	0.65
HB-5	1.0-2.0	378549	soil	9/11/90	28	331	3	0.29
HB-6	0.0-1.0	378550	soil	9/11/90	108	1110	6	0.22
HB-6	2.0-3.0	378551	soil	9/11/90	13	6	4	<0.22
HB-7	0.5-1.3	378533	soil	9/10/90	347	1479	30	1.32
HB-8	0.0-1.0	378544	soil	9/11/90	341	631	65743	0.33
HB-8	2.5-3.0	378545	soil	9/11/90	222	316	42001	0.29
HB-9	0.0-1.0	378542	soil	9/11/90	53	1754	21092	0.51
HB-9	3.0-4.0	378543	soil	9/11/90	206	690	41498	<0.25
HB-11	0.0-0.75	378529	soil	9/10/90	164	1171	58535	0.55
HB-11	1.5-2.5	378530	soil	9/10/90	97	237	17874	<0.22
HB-11	2.5-4.0	378531	soil	9/10/90	64	173	12726	0.33
HB-12	1.0-1.5	378532	soil	9/10/90	201	2373	45153	0.71
HB-13	1.5-2.5	378528	soil	9/10/90	38	593	4175	1.04
HB-14	0.0-1.0	378555	soil	9/12/90	120	1753	5	0.22
HB-14	2.0-3.3	378556	soil	9/12/90	23	298	2	<0.21
HB-114	2.0-3.3	378557	soil	9/12/90	22	279	3	<0.21
HB-15	0.0-0.5	378546	soil	9/11/90	93	885	6	0.30
HB-15	2.0-3.0	378547	soil	9/11/90	27	255	7	<0.18
HB-16	0.0-1.0	378558	soil	9/12/90	128	1807	10	0.21
HB-16	2.0-3.0	378559	soil	9/12/90	21	241	5	<0.18

SAMPLE LOCATION	DEPTH INTERVAL (ft., BGS)	SAMPLE ID	DESCRIPTION	SAMPLE DATE	AMMONIA (mg/Kg)	TOTAL KJELDAHL NITROGEN (mg/Kg)	CHLORIDE (mg/Kg)	CYANIDE (mg/Kg)
MW-1	3.0-4.0	398576	soil	9/25/90	12	154	3	<0.21
MW-1	6.0-7.5	398577	soil	9/25/90	33	343	4	<0.27
MW-1	12.0-13.5	398578	soil	9/25/90	55	193	3	<0.25
MW-1	15.0-16.5	398579	soil	9/25/90	46	137	<3	<0.25
MW-2	2.0-3.0	398571	soil	9/25/90	15	169	3	<0.21
MW-2	6.0-7.5	398572	soil	9/25/90	7	72	3	<0.22
MW-2	10.5-12.0	398573	soil	9/25/90	10	90	4	<0.25
MW-2	15.5-16.5	398574	soil	9/25/90	148	693	8	<0.25
MW-3	3.0-4.5	398565	soil	9/24/90	10	81	1936	<0.25
MW-3 dup	3.0-4.5	398567	soil	9/24/90	13	154	1932	<0.25
MW-3	6.5-7.5	398568	soil	9/24/90	47	258	3608	<0.24
MW-3	12.5-13.5	398569	soil	9/24/90	62	155	2517	<0.24
MW-3	15.0-16.5	398570	soil	9/24/90	72	281	2860	<0.23
MW-4	1.5-3.0	398561	soil	9/24/90	34	266	120	<0.27
MW-4	4.5-6.0	398562	soil	9/24/90	12	67	83	<0.23
MW-4	9.0-10.5	398563	soil	9/24/90	97	415	3974	0.73
MW-4	12.0-13.5	398564	soil	9/24/90	13	43	765	<0.22

NOTES:

(1) Analyses performed and reviewed by Analytical Resources, Inc. in Seattle, WA and EPA/Ecology Manchester Laboratory, in Port Orchard, WA, respectively. The following USEPA Analytical Methods were employed: Cyanide: 335.2; Ammonia: 350.1; TKN: 351.1; Chloride: 325.3

(2) Dates of analyses are as follows: Ammonia: 10/7 - 10/23/90, Total Kjeldahl Nitrogen: 10/8 - 11/15/90, Chloride: 10/7 - 17/90, Cyanide: 9/27 - 11/2/90.

(3) BD-113 and HB-114 are duplicates of BD-13 and HB-14 (2.0-3.3).

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MKE W.O.No: 2121.03.320
Date Issued: 11/20/90
Revised: 1/09/91

Table 5.15
Results of Stage 2 Laboratory Analyses of Black Dross/Baghouse Samples
Total Metal Analysis (Target Analyte Metals)
Maralco Site, Kent, Washington

SAMPLE LOCATION:	HB-4	HB-4	HB-5	HB-5	HB-6	HB-6	HB-7	HB-8	HB-8	HB-9	HB-9
DEPTH INTERVAL (ft. BGS):	0.0-1.0	2.0-3.0	0.0-0.2	1.0-2.0	0.0-1.0	2.0-3.0	0.5-1.3	0.0-1.0	2.5-3.0	0.0-1.0	3.0-4.0
SAMPLE ID:	378552	378553	378548	378549	378550	378551	378533	378544	378545	378542	378543
DESCRIPTION:	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
SAMPLE DATE:	9/11/90	9/11/90	9/11/90	9/11/90	9/11/90	9/11/90	9/10/90	9/11/90	9/11/90	9/11/90	9/11/90
ANALYSIS DATE:	9/26/90	9/26/90	9/26/90	9/26/90	9/26/90	9/26/90	9/26/90	9/26/90	9/26/90	9/26/90	9/26/90
UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Aluminum	5920	5280	153000	5380	8250	7530	99000	188000	9770	17700	15200
Barium	30.5	26.7	69.5	28.5	42.3	41.9	115	79.9	15.3	50.1	63.7
Calcium	2800	2700	3870	2620	2990	2890	8850	4220	1870	2370	2570
Chromium	62.6 J	90.8 J	72.5 J	68.2 J	41.5 J	17.5 J	111 J	154 J	15.0 J	28.0 J	18.4 J
Copper	14.7 B	14.6 B	708	14.7 B	18.0 B	19.4 B	1220	6050	153	133	38.7
Lead	3.2 J	2.0 U	77.9	2.7 J	9.9 J	2.0 J	275	144	6.8 J	22.6	5.7 J
Magnesium	2000	1870	10800	1860	2250	2390	15800	6240	1790	3030	3750
Manganese	137	91.0	1320	114	175	157	693	1520	101	376	238
Potassium	442	600	975	573	791	752	4330	30500	21000	12400	22100
Sodium	299	338	382	302	277	251	1520	33900	20100	10800	20400
Zinc	23.2	17.4	476	23.9	29.5	20.6	999	3280	78.7	111	36.5

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MKE W.O.No: 2121.03.320
Date Issued: 12/10/90
Revised: 1/09/91

Table 5.16
Results of Stage 2 Laboratory Analyses of Soils
Total Metal Analysis (Target Analyte Metals)
Maralco Site, Kent, Washington

SAMPLE LOCATION:	MW-2	MW-3	MW-3 dup	MW-3	MW-3	MW-3	MW-4	MW-4	MW-4	MW-4
DEPTH INTERVAL (ft., BGS):	15.5-16.5	3.0-4.5	3.0-4.5	6.5-7.5	12.5-13.5	15.0-16.5	1.5-3.0	4.5-6.0	9.0-10.5	12.0-13.5
SAMPLE ID:	398574	398565	398567	398568	398569	398570	398561	398562	398563	398564
DESCRIPTION:	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
SAMPLE DATE:	9/25/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90
ANALYSIS DATE:	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90
UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Aluminum	22900	13500	13400	31800	17100	15300	17100	18200	21800	9770
Barium	88.2 N	45.7 N	51.9 N	124 N	65.3 N	70.2 N	40.7 N	62.7 N	86.1 N	25.8 N
Calcium	7810	5530	5490	7690	6370	5850	5250	5680	7190	5230
Chromium	24.3 N	38.4 N	27.7 N	29.4 N	30.0 N	24.3 N	26.6 N	27.9 N	34.3 N	55.5 N
Copper	54.1 N	18.3 N	21.4 N	38.6 N	20.3 N	25.0 N	22.6 N	20.6 N	34.5 N	10.7 N
Lead	4.26	2.03	2.29	5.88	2.47	3.09	2.67	2.48	3.92	1.23
Magnesium	5180	2070	2060	5950	3110	3530	2870	3010	5430	1590
Manganese	396 N	148 N	172 N	222 N	177 N	204 N	122 N	131 N	250 N	106 N
Potassium	924	2870	2840	5750	1110	857	3380	3910	3820	800
Sodium	1790	2340	2420	3690	2380	2280	1480	1630	3610	1630
Zinc	38.5 N	22.9 N	25.4 N	53.8 N	31.4 N	34.3 N	29.3 N	32.6 N	40.7 N	22.4 N

NOTES:

(1) Analyses performed and reviewed by Weyerhauser Laboratories and EPA/Ecology Manchester Laboratory, respectively. USEPA analytical method 6010 (200.7) was used for ICP determinations. Lead was analyzed by method 7421, 239.2.

(2) Data qualifiers:
N = not within control limits

Table 5.17
Results of Stage 2 Laboratory Analyses of Soil Samples
Volatile Organic Analysis (VOA)
Maralco Site, Kent, Washington

SAMPLE LOCATION:	MW-3	MW-3 dup	MW-3	MW-3	MW-3	MW-4	MW-4	MW-4	MW-4
DEPTH INTERVAL (ft. BGS):	3.0-4.5	3.0-4.5	6.5-7.5	12.5-13.5	15.0-16.5	1.5-3.0	4.5-6.0	9.0-10.5	12.0-13.5
SAMPLE ID:	398565	398567	398568	398569	398570	398561	398562	398563	398564
DESCRIPTION:	soil	soil	soil	soil	soil	soil	soil	soil	soil
SAMPLE DATE:	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90
ANALYSIS DATE:	10/3/90	10/3/90	10/3/90	10/3/90	10/4/90	10/3/90	10/3/90	10/3/90	10/3/90
UNITS:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Chloromethane	14 U	14 U	14 U	14 U	14 U	13 U	15 U	14 U	13 U
Bromomethane	14 U	14 U	14 U	14 U	14 U	13 U	15 U	14 U	13 U
Vinyl Chloride	14 U	14 U	14 U	14 U	14 U	13 U	15 U	14 U	13 U
Chloroethane	14 U	14 U	14 U	14 U	14 U	13 U	15 U	14 U	13 U
Methylene Chloride	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Acetone*	17 UJ	14 U	85 B	80 J	110 J	20 UJ	64 B	190	61 B
Carbon Disulfide	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
1,1-Dichloroethene	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
1,1-Dichloroethane	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
1,2-Dichloroethene (total)	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Chloroform	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
1,2-Dichloroethane	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
2-Butanone	14 U	14 U	10 J	6 J	16 J	13 U	15 U	23	13 U
1,1,1-Trichloroethane	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Carbon Tetrachloride	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Vinyl Acetate	14 U	14 U	14 U	14 U	14 U	13 U	15 U	14 U	13 U
Bromodichloromethane	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
1,2-Dichloropropane	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
cis-1,3-Dichloropropene	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Trichloroethene	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Dibromochloromethane	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
1,1,2-Trichloroethane	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Benzene	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Trans-1,3-Dichloropropene	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Bromoform	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
4-Methyl-2-Pentanone	14 U	14 U	14 U	14 U	14 U	13 U	15 U	14 U	13 U
2-Hexanone	14 U	14 U	14 U	14 U	14 U	13 U	15 U	14 U	13 U
Tetrachloroethene	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
1,1,2,2-Tetrachloroethane	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Toluene	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Chlorobenzene	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Ethylbenzene	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Styrene	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U
Xylene (total)	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	6 U

NOTES:

(1) Analyses performed and reviewed by Pacific Northwest Environmental Laboratory in Redmond, WA and EPA/Ecology Manchester Laboratory in Port Orchard, WA, respectively. USEPA Analytical Method 8270 was used.

(2) Data qualifiers:

U = not detected above these levels
J = estimated value
B = compound detected in blank
* = suspected laboratory contaminant

C:\WDOE\SMI-VOA2.WK1

MKE W.O.No: 2121.03.320
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Table 5.18
Results of Stage 2 Laboratory Analyses of Soil Samples
Semivolatile Organic Analysis: Polynuclear Aromatic Hydrocarbons
Maraico Site, Kent, Washington

SAMPLE LOCATION:	MW-1	MW-1	MW-1	MW-1	MW-2	MW-2	MW-2	MW-2	MW-3	MW-3 dup
DEPTH INTERVAL (ft. BGS):	3.0-4.0	6.0-7.5	12.0-13.5	15.0-16.5	2.0-3.0	6.0-7.5	10.5-12.0	15.5-16.5	3.0-4.5	3.0-4.5
SAMPLE ID:	398576	398577	398578	398579	398571	398572	398573	398574	398565	398567
DESCRIPTION:	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
SAMPLE DATE:	9/25/90	9/25/90	9/25/90	9/25/90	9/25/90	9/25/90	9/25/90	9/25/90	9/24/90	9/24/90
EXTRACTION DATE:	10/2/90	10/2/90	10/2/90	10/2/90	10/2/90	10/2/90	10/2/90	10/2/90	10/1/90	10/1/90
ANALYSIS DATE:	10/5/90	10/5/90	10/5/90	10/5/90	10/5/90	10/5/90	10/5/90	10/5/90	10/4/90	10/4/90
UNITS:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
2-Methylnapthalene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Acenaphthylene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Acenaphthene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Fluorene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Phenanthrene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Anthracene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Fluoranthene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Pyrene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Benzo(a)anthracene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Chrysene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Benzo(b)fluoranthene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Benzo(k)fluoranthene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Benzo(a)pyrene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Indeno(1,2,3-cd)pyrene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Dibenz(a,h)anthracene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Benzo(g,h,i)perylene	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Dibenzofuran	840 U	920 U	940 U	860 U	740 U	850 U	930 U	990 U	890 U	890 U
Perylene*		950 J	340 J			130 J	170 J	330 J		

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Table 5.18
Results of Stage 2 Laboratory Analyses of Soil Samples
Semivolatile Organic Analysis: Polynuclear Aromatic Hydrocarbons
Maralco Site, Kent, Washington

SAMPLE LOCATION:	MW-3	MW-3	MW-3	MW-4	MW-4	MW-4	MW-4
DEPTH INTERVAL (ft. B	6.5-7.5	12.5-13.5	15.0-16.5	1.5-3.0	4.5-6.0	9.0-10.5	12.0-13.5
SAMPLE ID:	398568	398569	398570	398561	398562	398563	398564
DESCRIPTION:	soil	soil	soil	soil	soil	soil	soil
SAMPLE DATE:	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90	9/24/90
EXTRACTION DATE:	10/1/90	10/1/90	10/1/90	10/1/90	10/1/90	10/1/90	10/1/90
ANALYSIS DATE:	10/4/90	10/4/90	10/4/90	10/4/90	10/4/90	10/4/90	10/4/90
UNITS:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
2-Methylnapthalene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Acenaphthylene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Acenaphthene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Fluorene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Phenanthrene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Anthracene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Fluoranthene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Pyrene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Benzo(a)anthracene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Chrysene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Benzo(b)fluoranthene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Benzo(k)fluoranthene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Benzo(a)pyrene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Indeno(1,2,3-cd)pyrene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Dibenz(a,h)anthracene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Benzo(g,h,i)perylene	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Dibenzofuran	960 U	890 U	890 U	880 U	970 U	960 U	860 U
Perylene*	680 J	170 J	230 J	180 J	350 J	400 J	

NOTES:

(1) Analyses performed and reviewed by Pacific Northwest Environmental Laboratory in Redmond, WA and EPA/Ecology Manchester Laboratory in Port Orchard, WA, respectively. USEPA Analytical Method 8270 was used.

(2) Data qualifiers:

U = not detected above these levels

J = estimated value between the detection limit and the reporting limit

(3) * = Tentatively Identified Compound

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Revised: 1/09/91
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Table 5.19
Results of Stage 2 Laboratory Analyses of Groundwater Samples
Total Metal Analysis (Target Analyte Metals)
Maralco Site, Kent, Washington

SAMPLE LOCATION:	MW-1	MW-2	MW-3	MW-330	MW-4	MW-Eq. Blank
SAMPLE ID:	408586	408584	408589	408583	408588	408585
DESCRIPTION:	groundwater	groundwater	groundwater	groundwater	groundwater	groundwater
SAMPLE DATE:	10/2/90	10/1/90	10/1/90	10/1/90	10/1/90	10/1/90
ANALYSIS DATE:	10/2/90	10/1/90	10/1/90	10/1/90	10/1/90	10/1/90
UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Aluminum	17800	2350	3850 E	6070 E	27500	33 JB
Antimony	30 U	30 U	30 U	30 U	30 U	30 U
Arsenic	7.96	5.30	5.38	5.12	17.1	1.5 U
Barium	109	33.3	3530	3470	605	1.1 J
Berylium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	2.0 U	2.0 U	2.0 UJ	2.0 UJ	2.0 U	2.0 U
Calcium*	16.8	21.4	700 E	694 E	69.0	0.391
Chromium	16	5.0 U	5.0 U	5.0 U	25	5.0 U
Cobalt	15 J	5.0 U	61.3	60.0	14 J	5.0 U
Copper	33.5	11.9	17.6	23.1	79.9	29.7
Iron	32500	44400	1140000	1140000	65800	13 J
Lead	5.32	2.0 J	1.0 J	1.0 J	9.51	1.0 U
Manganese	974	2150	39100 E	38000 E	2760	1.2 J
Magnesium*	7.82	6.17	195	193	18.3	0.01752
Mercury	0.12 JH	0.04 UH	0.11 JH	0.058 JH	0.077 JH	0.048 JH
Nickel	15 J	10 U	10 U	10 U	28 J	10 U
Potassium*	2.13	1.58	583	659	532	0.3 U
Selenium	2.0 UJ	2.0 UJ	4.0 UJ	4.0 UJ	2.0 UJ	2.0 UJ
Silver	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Sodium*	7.77	9.87	2005	2130	666	0.081 B
Thallium	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Vanadium	49.7	12.1	7.3 J	14.1	90.9	2.0 U
Zinc	543	26.0	33.0	52.1	92.2	8.0 JB

NOTES:

(1) Analyses performed by EPA/Ecology Mancester Laboratory in Port Orchard, WA. The following USEPA analytical methods were employed: Arsenic: 760; Lead: 7421, 239.2; Mercury: 7471; Selenium: 7740; Thallium: 7841, all other metals: 6010, 200.7.

(2) * = units in mg/L

(3) Data qualifiers:

U = not detected above these levels
J = estimated value
H = exceeded holding time
REJ = data unusable
B = compound detected in blank (sample value is less than 10 times that value)
E = suspected physical/character interference.

(4) MW-330 is a duplicate of MW-3

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MK W.O.NO.: 2121.03.320
Date Issued: 11/20/90
Revised: 1/09/91
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Table 5.20
Results of Stage 2 Field and Laboratory Analyses of Groundwater
Selected Parameters
Maralco Site, Kent, Washington

SAMPLE LOCATION	SAMPLE ID	DESCRIPTION	SAMPLE DATE	TEMP (degree C)	pH	SPECIFIC CONDUCTIVITY (umhos)	ALKALINITY (mg/L)	TDS (mg/L)	AMMONIA-N (mgN/L)	TOTAL CYANIDE (mg/L)
MW-1	408586	water	10/2/90	12.0	6.24	165	49.4	103	0.175	<0.004
MW-2	408584	water	10/1/90	12.3	6.51	297	121.7	154	0.124	<0.004
MW-3	408582	water	10/1/90	16.8	5.58	949	<1	14356	14.638	<0.004
MW-330	408583	water	10/1/90	—	—	—	<1	15284	24.024	<0.004
MW-4	408581	water	10/1/90	16.2	6.92	1440	215.4	3729	6.683	<0.004

NOTES:

(1) Analyses performed by MK field personnel include temperature, pH, and specific conductivity. All analyses performed following well development.

(2) Fixed laboratory analyses performed and reviewed by Analytical Resources, Inc. in Seattle, WA and EPA/Ecology Manchester Laboratory in Port Orchard, WA, respectively.
Dates of analyses are as follows: Ammonia: 10/7/90, Total Kjeldahl Nitrogen: 10/8/90, Chloride: 10/7/90, Cyanide: 9/27 – 10/16/90.

(3) MW-330 is a duplicate of MW-3

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Table 5.21
Results of Stage 2 Laboratory Analyses of Groundwater Samples
Priority Pollutant Volatile Organics
Maralco Site, Kent, Washington

MKE W.O.No: 2121.03.320
Date Issued: 12/12/90
Revised: 1/09/91

SAMPLE LOCATION:	MW-1	MW-2	MW-3	MW-330	MW-4	MW-Eq. Blank	Trip Blank
SAMPLE ID:	408586	408584	408589	408583	408588	408585	408587
DESCRIPTION:	groundwater	groundwater	groundwater	groundwater	groundwater	water	water
SAMPLE DATE:	10/2/90	10/1/90	10/1/90	10/1/90	10/1/90	10/1/90	10/2/90
ANALYSIS DATE:	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90
UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Carbon Tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	6 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U	1 U	2	1 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	0.5 J	1 U
Bromomethane	1 U	REJ	REJ	REJ	REJ	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methane, Dichlorodiflu+	REJ	REJ	REJ	REJ	REJ	REJ	REJ
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHANE, 1,1,2,2-TETRAC+	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Hexachlorobutadiene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Total Xylenes	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Chlorotoluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
DBCP	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tert-Butylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene (Cume+	1 U	1 U	1 U	1 U	1 U	1 U	1 U
p-Isopropyltoluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BENZENE, ETHYL-	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BENZENE, ETHENYL-(STYR+	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BENZENE, PROPYL-	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Butylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Chlorotoluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane (EDB)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Acetate	NAR	NAR	NAR	NAR	NAR	NAR	NAR

Table 5.21
Results of Stage 2 Laboratory Analyses of Groundwater Samp..
Priority Pollutant Volatile Organics
Maralco Site, Kent, Washington

SAMPLE LOCATION:	MW-1	MW-2	MW-3	MW-330	MW-4	MW-Eq. Blank	Trip Blank
SAMPLE ID:	408586	408584	408589	408583	408588	408585	408587
DESCRIPTION:	groundwater	groundwater	groundwater	groundwater	groundwater	water	water
SAMPLE DATE:	10/2/90	10/1/90	10/1/90	10/1/90	10/1/90	10/1/90	10/2/90
ANALYSIS DATE:	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90
UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
4-Methyl-2-Pentanone	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sec-Butylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethe+	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethane, 1,1,1,2-Tetrac+	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloroprop+	1 U	1 U	1 U	1 U	1 U	1 U	1 U

NOTES:

(1) Analyses performed by EPA/Ecology Manchester Laboratory in Port Orchard, WA. USEPA analytical method 8240 was used.

(2) Data qualifiers:
U = not detected above these levels
J = estimated value
REJ = data unusable
NAR = no analytical results

(3) MW-330 is a duplicate of MW-3

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Table 5.22
Results of Stage 2 Laboratory Analyses of Groundwater Samples
Priority Pollutant Semivolatiles
Maralco Site, Kent, Washington

MKE W.O.No: 2121.03.320
Date Issued: 12/12/90
Revised: 1/09/91

SAMPLE LOCATION:	MW-1	MW-2	MW-3	MW-330	MW-4	MW-Eq. Blank
SAMPLE ID:	408586	408584	408589	408583	408588	408585
DESCRIPTION:	groundwater	groundwater	groundwater	groundwater	groundwater	water
SAMPLE DATE:	10/2/90	10/1/90	10/1/90	10/1/90	10/1/90	10/1/90
ANALYSIS DATE:	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90
UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Benzo (a)pyrene	2 U	2 U	2 U	2 U	2 U	2 U
2,4-Dinitrophenol	9 U	11 U	9 U	9 U	9 U	9 U
Dibenzo (a,h)anthracene	2 U	2 U	2 U	2 U	2 U	2 U
Benzo (a)anthracene	2 U	2 U	2 U	2 U	2 U	2 U
4-Chloro-3-Methylphenol	2 U	2 U	2 U	2 U	2 U	2 U
Benzoic acid	REJ U	REJ	REJ	REJ	REJ	REJ
Hexachloroethane	2 U	2 U	2 U	2 U	2 U	2 U
Hexachlorocyclopentadi+	4 U	5 U	4 U	3 U	3 U	4 U
Isophorone	2 U	2 U	2 U	2 U	2 U	2 U
Acenaphthene	2 U	2 U	2 U	2 U	2 U	2 U
Diethylphthalate	0.5 J	2 U	0.3 J	0.2 J	2 U	2 U
Di-n-Butylphthalate	2 U	2 U	2 U	2 U	2 U	2 U
Phenanthrene	2 U	2 U	2 U	2 U	2 U	2 U
Butylbenzylphthalate	2 U	2 U	2 U	2 U	2 U	2 U
N-Nitrosodiphenylamine	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
Fluorene	2 U	2 U	2 U	2 U	2 U	2 U
Carbazole	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
Hexachlorobutadiene	2 U	2 U	2 U	2 U	2 U	2 U
Pentachlorophenol	9 U	11 U	9 U	9 U	9 U	9 U
2,4,6-Trichlorophenol	2 U	2 U	2 U	2 U	2 U	2 U
2-Nitroaniline	9 U	11 U	9 U	9 U	9 U	9 U
2-Nitrophenol	2 U	2 U	2 U	2 U	2 U	2 U
Napthalene, 1-Methyl-	2 U	2 U	2 U	2 U	2 U	2 U
Naphthalene	2 U	2 U	2 U	2 U	2 U	2 U
2-Methylnaphthalene	2 U	2 U	2 U	2 U	2 U	2 U
2-Chloronaphthalene	2 U	2 U	2 U	2 U	2 U	2 U
3,3'-Dichlorobenzidine	2 U	2 U	2 U	2 U	2 U	2 U
2-Methylphenol	2 U	2 U	2 U	2 U	2 U	2 U
1,2-Dichlorobenzene	2 U	2 U	2 U	2 U	2 U	2 U
o-Chlorophenol	2 U	2 U	2 U	2 U	2 U	2 U
2,4,5-Trichlorophenol	9 U	11 U	9 U	9 U	9 U	9 U
Nitrobenzene	2 U	2 U	2 U	2 U	2 U	2 U
3-Nitroaniline	9 U	11 U	9 U	9 U	9 U	9 U
4-Nitroaniline	9 UJ	11 UJ	9 UJ	9 UJ	9 UJ	9 UJ
4-Nitrophenol	9 U	11 UJ	9 U	9 UJ	9 U	9 U
Benzyl Alcohol	2 U	2 U	2 U	2 U	2 U	2 U
4-Bromophenyl-phenylet+	2 U	2 U	2 U	2 U	2 U	2 U
2,4-Dimethylphenol	2 U	2 U	2 U	2 U	2 U	2 U
4-Methylphenol	0.5 J	0.3 J	2 U	2 U	2 U	2 U
1,4-Dichlorobenzene	2 U	2 U	2 U	2 U	2 U	2 U
4-Chloroaniline	REJ U	REJ	REJ	REJ	REJ	REJ
Phenol	2 U	2 U	2 U	2 U	2 U	2 U
bis(2-Chloroethyl)Ether	2 U	2 U	2 U	2 U	2 U	2 U
bis(2-Chloroethoxy)Met+	2 U	2 U	2 U	2 U	2 U	2 U
BIS(2-ETHYLHEXYL) PHTH+	2 U	2 U	2 U	2 U	4 U	2 U

Table 5.22
Results of Stage 2 Laboratory Analyses of Groundwater Samples
Priority Pollutant Semivolatiles
Maralco Site, Kent, Washington

SAMPLE LOCATION:	MW-1	MW-2	MW-3	MW-330	MW-4	MW-Eq. Blank
SAMPLE ID:	408586	408584	408589	408583	408588	408585
DESCRIPTION:	groundwater	groundwater	groundwater	groundwater	groundwater	water
SAMPLE DATE:	10/2/90	10/1/90	10/1/90	10/1/90	10/1/90	10/1/90
ANALYSIS DATE:	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90	10/23/90
UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Di-n-Octyl Phthalate	2 U	2 U	2 U	2 U	2 U	2 U
Hexachlorobenzene	2 U	2 U	2 U	2 U	2 U	2 U
Anthracene	2 U	2 U	2 U	2 U	2 U	2 U
1,2,4-Trichlorobenzene	2 U	2 U	2 U	2 U	2 U	2 U
2,4-Dichlorophenol	2 U	2 U	2 U	2 U	2 U	2 U
2,4-Dinitrotoluene	2 U	2 U	2 U	2 U	2 U	2 U
Pyrene	2 U	2 U	2 U	2 U	2 U	2 U
Dimethylphthalate	0.3 J	2 U	0.1 J	0.1 J	2 U	2 U
Dibenzofuran	2 U	2 U	2 U	2 U	2 U	2 U
Benzo(ghi)perylene	2 U	2 U	2 U	2 U	2 U	2 U
Indeno (1,2,3-od)pyrene	2 U	2 U	2 U	2 U	2 U	2 U
Benzo (b)fluoranthene	2 U	2 U	2 U	2 U	2 U	2 U
Fluoranthene	2 U	2 U	2 U	2 U	2 U	2 U
Benzo (k)fluoranthene	2 U	2 U	2 U	2 U	2 U	2 U
Acenaphthylene	2 U	2 U	2 U	2 U	2 U	2 U
Chrysene	2 U	2 U	2 U	2 U	2 U	2 U
Retene	2 U	2 U	2 U	2 U	2 U	2 U
4,6-Dinitro-2-methylph+	9 U	11 U	9 U	9 U	9 U	9 U
1,3-Dichlorobenzene	2 U	2 U	2 U	2 U	2 U	2 U
2,6-Dinitrotoluene	2 U	2 U	2 U	2 U	2 U	2 U
N-Nitroso-di-n-Propyla+	2 U	2 U	2 U	2 U	2 U	2 U
4-Chlorophenyl-phenyle+	2 U	2 U	2 U	2 U	2 U	2 U
bis(2-Chloroisopropyl)+	2 U	2 U	2 U	2 U	2 U	2 U

NOTES:

(1) Analyses performed by EPA/Ecology Manchester Laboratory in Port Orchard, WA. USEPA method 8270 was used.

(2) Data qualifiers:
U = not detected above these levels
J = estimated value
R = data unusable; resampling and reanalysis necessary for verification.
E = suspected physical/character interference

(3) MW-330 is a duplicate of MW-3/c