89-e09

Segment No.: 24-54-01

WA-54-1020

RECONNAISSANCE SURVEY OF THE IMPACTS OF NORTHSIDE LANDFILL LEACHATE ON GROUND/SURFACE WATER QUALITY SPOKANE, WASHINGTON

by
Laura Chern

Washington State Department of Ecology
Environmental Investigations and Laboratory Services Program
Toxics Investigations/Ground Water Monitoring Section
Olympia, Washington 98504

May 1989

ACKNOWLEDGMENTS

I would like to thank Barbara Carey of the Surface Water Investigations Section for help with planning and sampling during this study. Also I would like to thank Bill Yake and Denis Erickson for help reviewing this report.

ABSTRACT

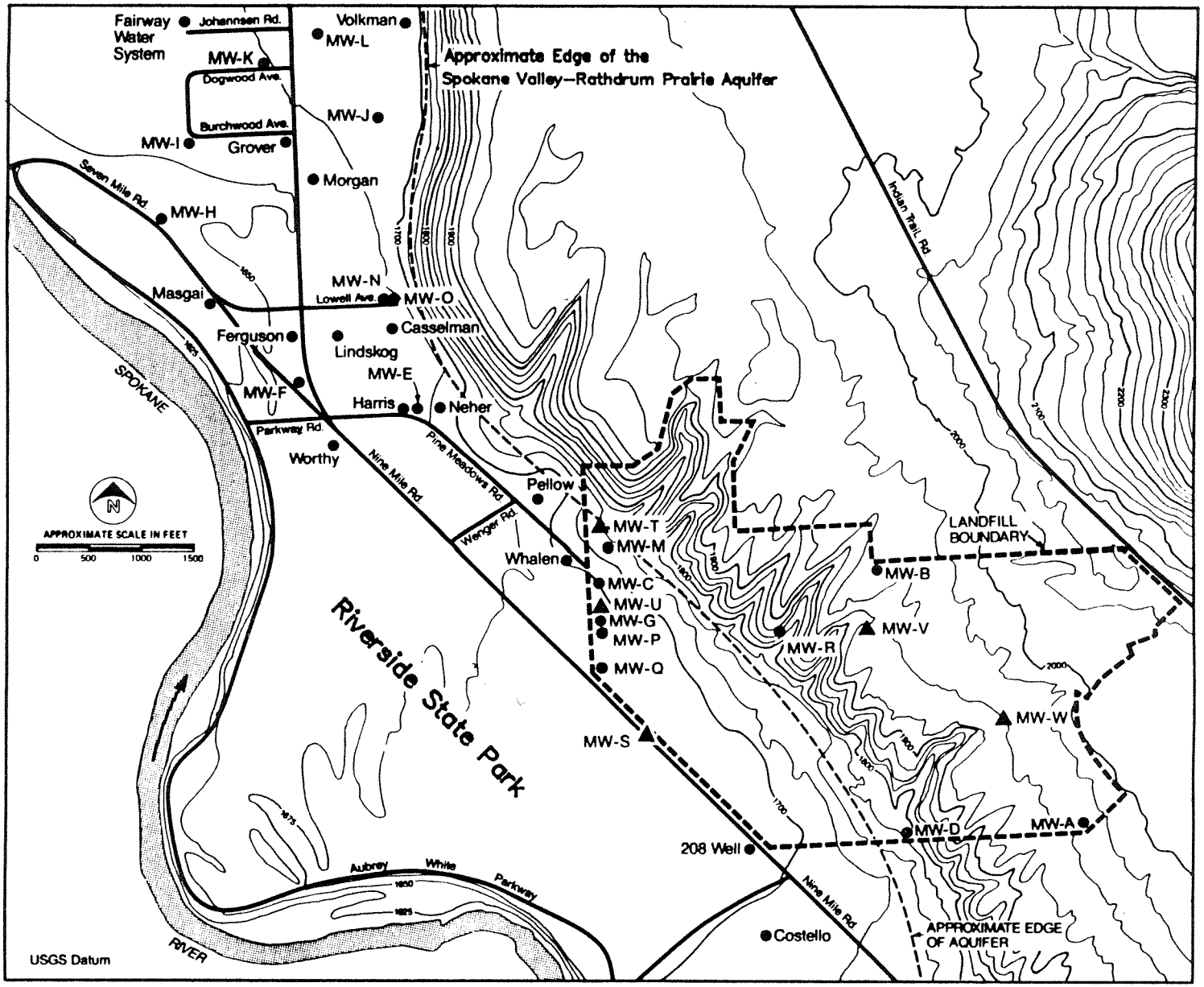
Previous studies of Northside Landfill, located in the City of Spokane, failed to determine conclusively whether landfill leachate was affecting water quality in the Spokane River approximately one-half mile away. The purpose of this study was to do reconnaissance sampling of the river and ground water in the area of concern. Differences in water quality between the Spokane Valley-Rathdrum Prairie Aquifer and the Spokane River were detected. However, data were insufficient to determine whether these differences indicated leachate plume migration west toward the river.

INTRODUCTION

The Northside Landfill (NSL) Superfund Site has been operated by the City of Spokane since the 1930s. It is located approximately 0.5 mile east of the Spokane River on a topographic high underlain by glacio-fluvial sands and gravels, glacio-lacustrine clays, and basalt. The Spokane Valley-Rathdrum Prairie Aquifer (SVRPA) underlies one-third of the site. Since 1982, the city has been monitoring and investigating ground water contamination in the area attributed to landfill leachate. Locations of monitoring wells and domestic wells which have been sampled are shown in Figure 1. The edge of the SVRPA is also shown. Volatile organic compounds (VOCs) were detected in off-site domestic supply wells in 1983. Currently, remedial alternatives for NSL cleanup are being evaluated by the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology). Alternatives are based on the final Remedial Investigation (RI) prepared for the City of Spokane by CH2M Hill (November 1988). Data in the RI have been interpreted to show leachate plume migration north, along the eastern boundary of the SVRPA. Figure 2 from CH2M Hill's report shows tetrachloroethylene (PERC) isoconcentration contours. Organic contaminant concentrations seem to become diluted below detection limits before leachate reaches the Spokane River. Because no samples were collected in the area between the landfill and the river, Ecology determined that additional data were necessary before a final decision was made on cleanup alternatives. Riverside State Park, located west of NSL, is the area of concern.

In August 1988, Hazardous Waste Investigation and Cleanup Program (HWICP) staff conducted a survey along the east bank of the river located closest to the landfill (see Figure 3). Its purpose was to determine gross changes in specific conductance and pH, and to look for indications of leachate from the NSL. No leachate seeps, or extreme changes in pH or specific conductance were observed, although stressed vegetation was documented between stations 5 and 7. The Toxics Investigation/Ground Water Monitoring Section was requested to further investigate possible effects of leachate on Spokane River water quality. This study is the result of that request.

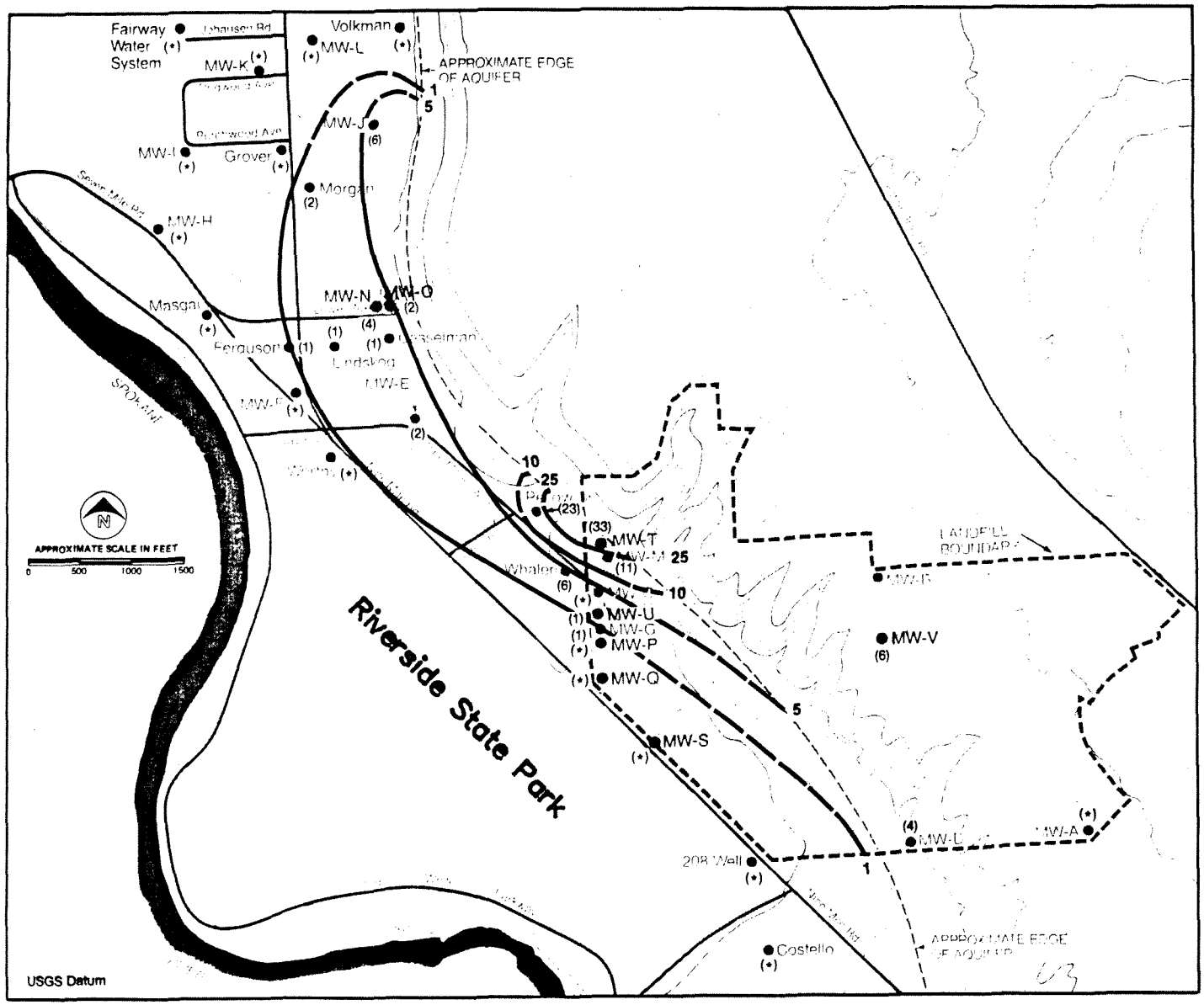
In September of 1988, surface water and ground water samples were obtained in conjunction with a study of the lower Spokane River being conducted by the Surface Water Investigations Section (Carey, in progress). The objective of the sampling was to look for indications that the leachate plume was migrating west toward Riverside State Park and affecting water quality in the Spokane River. The scope of the study was limited to reconnaissance sampling. Sample locations A, B, C, and D are shown in Figure 4. Replicate surface water samples A and B and ground water sample "Well Point" were collected at location A. Surface water samples were collected at locations C and D. Locations A, B, and C were chosen based on slightly elevated specific conductance measurements documented in the August 1988 survey mentioned above. Location D was located close to the area of stressed vegetation. Ground water samples were collected using a three-foot stainless steel well point which was hand-driven approximately 2.5 feet into the river bank. At each location, samples were obtained for metals, VOCs, semi-volatiles, nitrate + nitrite, total phosphorous, chloride, sulfate, and total organic carbon (TOC). Sampling procedures, data analysis results, and recommendations are presented in this report.



● Existing Monitoring and Domestic Wells as of April 1985

▲ Monitoring Wells Added April 1988

Figure 1
MONITORING WELL LOCATIONS



LEGEND

5 ——— PERC ISOCONCENTRATION CONTOUR (µg/l)

— — INFERRED ISOCONCENTRATION CONTOUR

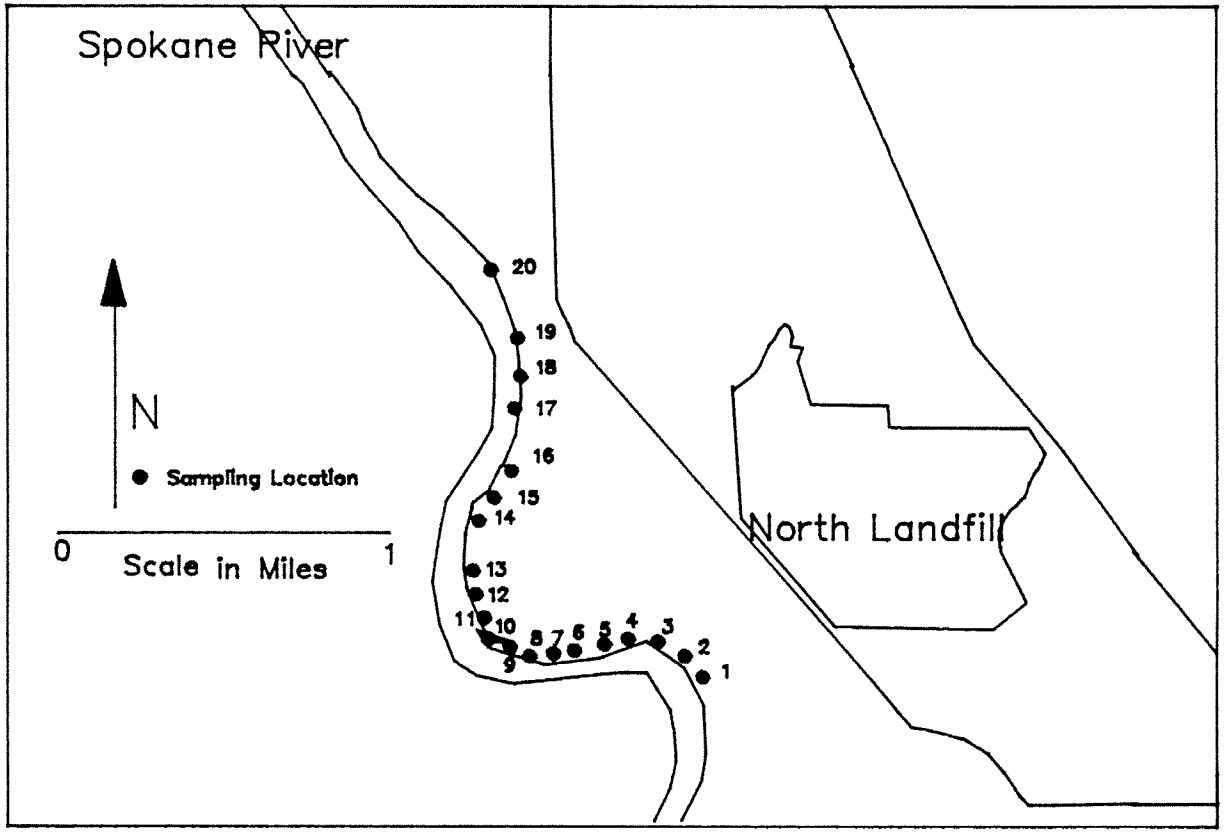
● MONITORING WELL SAMPLED FOR PERC IN JUNE 1988

( ) JUNE 1988 PERC CONCENTRATION (µg/l)

* NOT DETECTED

Figure 2
DISTRIBUTION OF PERC
JUNE 1988

Figure 3
Spokane River Survey Sampling Locations
August, 1988



After Eric Fairchild and Dan Wrye

Data

Station	pH	Conductivity	Temperature
1	7.93	285	15.8
2	8.08	282	15.7
3	7.93	280	15.8
4	8.05	279	16.2
5	8.07	277	16.3
6	8.03	282	16.3
7	8.08	283	16.3
8	8.17	279	16.3
9	8.11	279	16.0
10	8.15	281	15.5
11	8.21	280	16.1
12	8.23	279	16.2
13	8.14	283	16.2
14	8.18	278	16.4
15	8.18	287	16.3
16	8.29	284	18.0
17	8.2	300	19.4
18	8.28	285	18.3
19	8.26	284	18.6
20	8.24	279	18.0

SAMPLING PROCEDURES

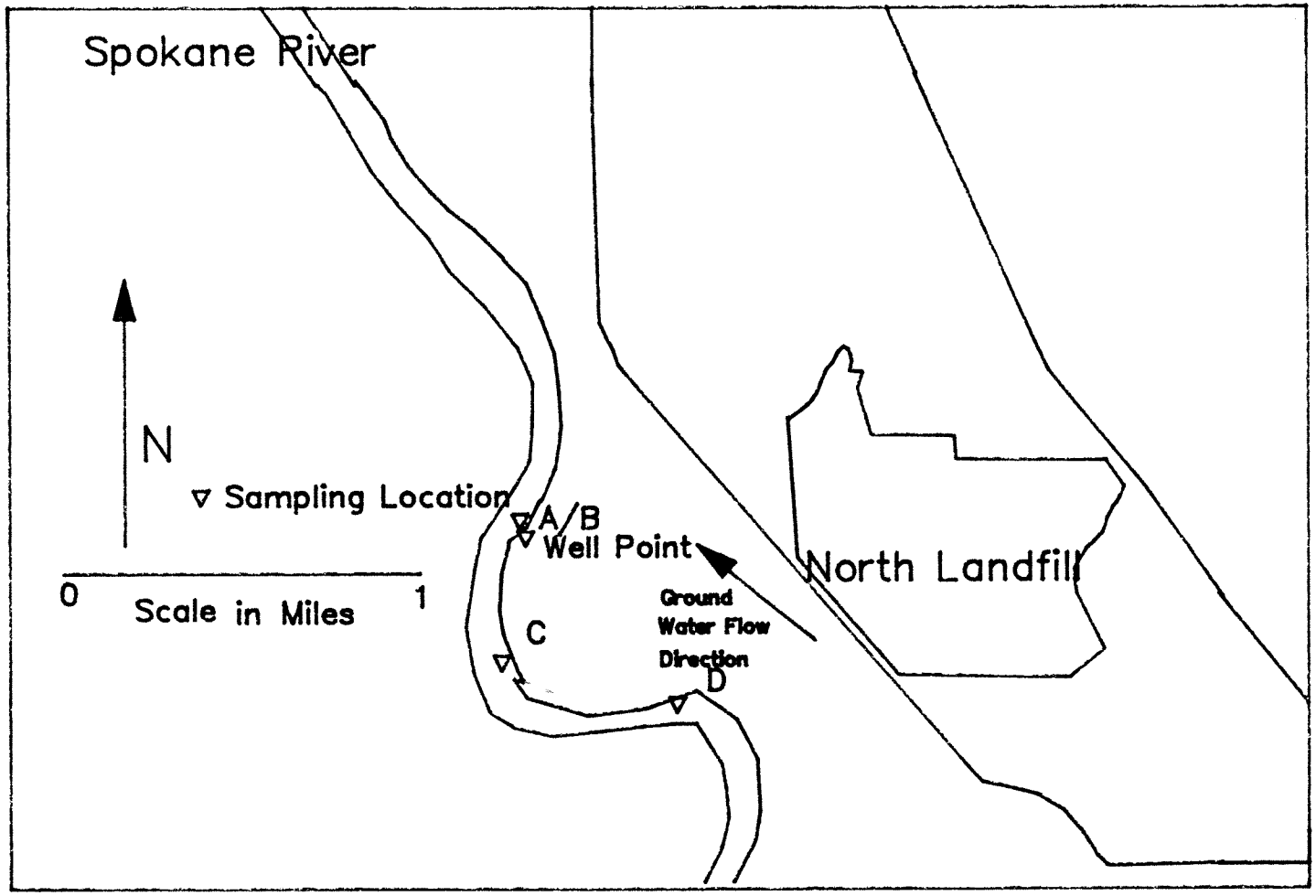
Surface Water Sampling Procedures

Initially, field specific conductance and pH measurements were obtained using a YSI model 33 pH/conductivity meter. Measurements were obtained at various locations along the river to help define sample locations. Specific conductance ranged from 148 at D to 162 at location A. pH values decreased downstream from 8.0 at D and 7.9 at C to 7.5 at location A. No significant variations were found. Consequently, sample locations A and C were based on slightly elevated specific conductance measurements recorded during the August 1988 survey (see Figure 3). Location D was in the area of stressed vegetation found during the August 1988 survey; however, no stressed vegetation was observed at the time of this study. Samples were collected directly into sample bottles about 0.5 feet below the surface in non-turbulent water less than five feet from the bank. Transfer and method blanks were analyzed for VOCs, semi-volatiles, and metals. No transport blanks were submitted.

Ground Water Sampling Procedures

In order to determine ground water quality entering the Spokane River, a three-foot stainless steel well point was hand-driven into the east river bank at location A (see Figure 4). The soil was composed of permeable, well sorted, well-rounded, fine sand. The well point was pumped for 30 minutes using a peristaltic pump. After ten minutes of pumping, water from the well looked clear and sediment-free. The well was allowed to recover for 20 minutes, after which several more well volumes were removed prior to sampling. All samples were collected using a peristaltic pump and 0.125 inch I.D. teflon tubing. A metals sample collected from the well point was subsequently lost. Transfer and method blanks were analyzed for metals, VOCs, and semi-volatiles. The transfer blank was pumped though the peristaltic pump to test for contamination of collection equipment. Results of the transfer blank are presented in Appendix A as Leach 0. No transport blanks were analyzed.

Figure 4
North Landfill Sampling Locations: Present Study
September, 1988



ANALYTICAL RESULTS

Surface Water Sample Results

No significant levels of contamination were detected in surface water sample analyses. Appendix A lists analytical results and detection limits on all parameters sampled. Metals samples were analyzed for total metals. Trace amounts of arsenic, iron, manganese, silver, and zinc were detected at concentrations well below drinking water and surface water quality criteria standards. Silver was detected at a concentration of 0.00081 mg/L in method blanks. Methylene chloride, a VOC, and bis(2-ethylhexyl)phthalate, a semi-volatile compound, were detected; both compounds were also detected in method blanks at concentrations of 1.4 ug/L and 2.7 ug/L, respectively, indicating probable laboratory contamination. TOC samples were collected but are not reported because it was later discovered that results were influenced by a defect in bottle design. Indicator parameters and nutrient analyses are presented in Table 1 along with ground water sample data. There is no indication from this data that leachate is affecting the river.

Ground Water Sample Results

Well point samples showed no significant contamination by VOCs or semi-volatile compounds. Appendix A lists the sample analyses results and detection limits. Transfer and method blanks showed probable laboratory contamination by methylene chloride and bis(2-ethylhexyl)phthalate. Because ground water was sampled at only one location and the metals sample was lost, no general conclusions about the NSL leachate plume in the study area can be made. Indicator parameters, as presented in Table 1, show that water in the well point is higher in sulfate and hardness as $CaCO_3$, and lower in carbon oxygen demand (COD), ammonia, nitrate + nitrite, and total phosphorous levels than surface water samples. It is important to note that the quality of SVRPA water and Spokane River water vary markedly, explaining the results of this study. The observed differences in concentrations of these parameters are within expected ranges for local ground water and the Spokane River but do not indicate that the ground water sampled was contaminated by the leachate plume. The expected ranges of concentrations shown in Table 1 are based on sample analyses from local monitoring wells.

Table 1. Surface Water and Well Point Data*

Analysis	Upstream D	Upstream C	Downstream B	Downstream A	Well Point	Reported concentration ranges from local SVRPA#
Chloride	3.4	3.6	4.2	3.8	3.6	4.1-29
Sulfate	12	11	13	13	22	16.8-37
COD	8	10	9	9	4	<0.4-8
Hardness	94	94	94	94	187	Not tested
Ammonia	.040	.038	.028	.028	<.010	<0.10
Nitrate/Nitrite	.627	.714	.757	.734	.557	<0.10
Total Phosphorous	.049	.046	.041	.045	.015	Not tested

* All data presented in units of mg/L.

Obtained from the Remedial Investigation by CH2M Hill

CONCLUSIONS AND RECOMMENDATIONS

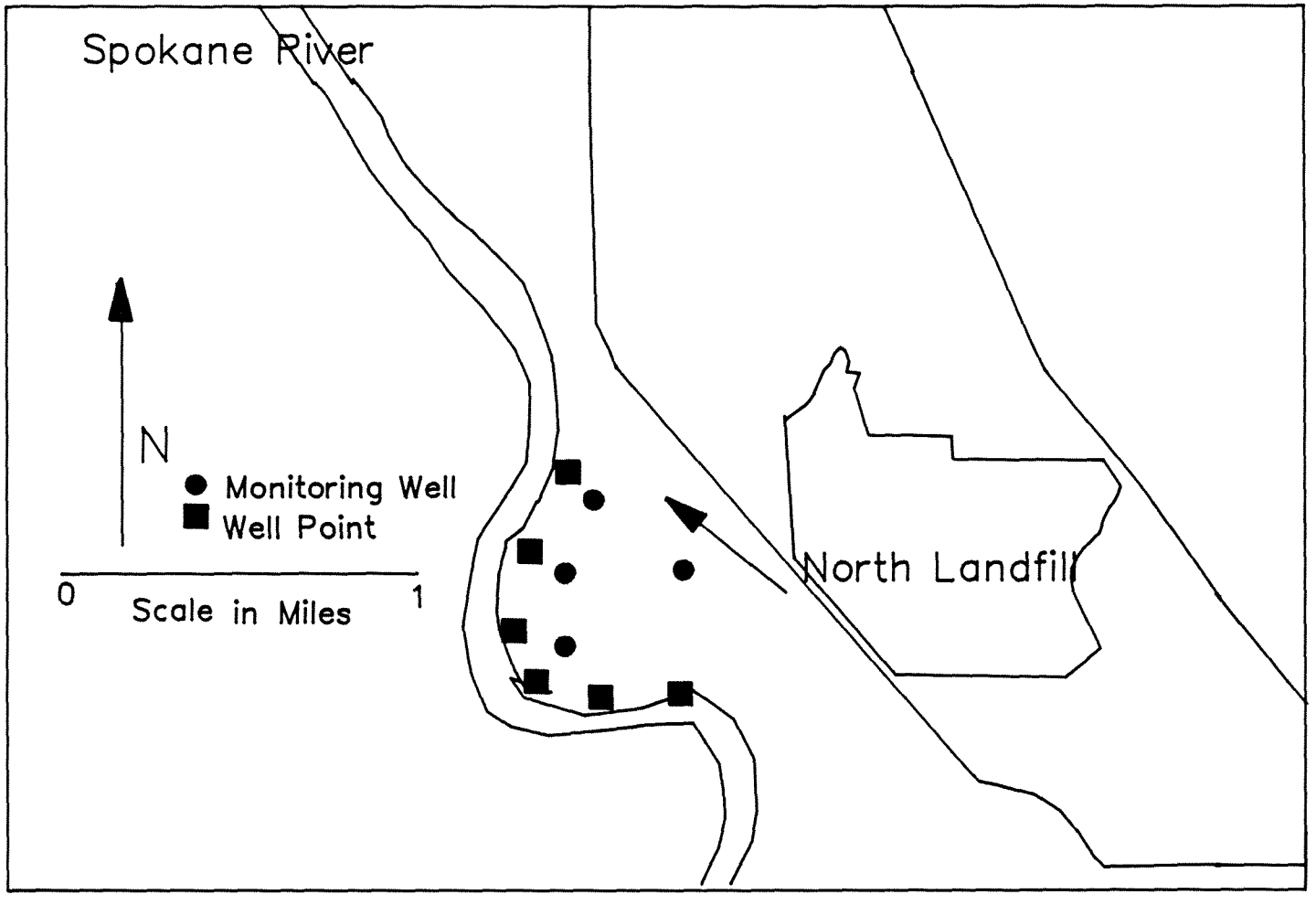
The reconnaissance sampling along the Spokane River east of the NSL Superfund site showed no indication that leachate was entering the river at the locations sampled. The possibility that leachate has contaminated ground water west of the NSL has not been addressed in this study. A determination of ground water quality beneath Riverside State Park would have required an investigation beyond the scope of this study. If a concern remains regarding ground water contamination west of the landfill, installation and sampling of additional monitoring devices is recommended. This is based on the understanding that no wells exist at the park. Two conceptual alternatives are:

1. Installation of three to five additional monitoring wells in Riverside State Park. Approximate well locations are shown in Figure 6. At least one of these locations should consist of a nested well with the deeper well screened just above the tertiary basalt layer. All wells should be screened in the SVRPA. This alternative would provide additional ground water flow, soils, and plume migration information. It is the more costly of the two proposals.

2. Alternatively, five to six well points could be installed along the Spokane River. Locations are indicated in Figure 6. This alternative would provide data on ground water entering the Spokane River west of the landfill, but no additional data on ground water flow or possible deeper contamination.

Either monitoring wells or well points would be sampled for VOCs, semi-volatiles, metals, TOC, and total phosphorous. The phosphorus would be used as a tracer for contamination by wastewater treatment plant sewage sludges disposed of in the landfill at various locations since 1977. Well 208 or the Costello well would be designated as a background well.

Figure 5
North Side Landfill
Proposed Sampling Locations



REFERENCE

CH2M Hill, November 1988, Final Report: Remedial Investigation, North Landfill.

Appendix A

27-SEP-88 EPA Region X Lab Management System Page 1

*** Lab Analysis Report ***

Partial

Transaction #: 09270843 Seq #: 01 (18) Demand - Specified

(WE) DOE, Manchester

Prj: SPOKANE RIVER (DOE-014C) 27A02 BMC

Par: T-Org-C Total mg/l (Par# 680 S)

Instrument: TOC-DOE Total Carbon (DOE) #XXXXXX

Method: EP1-415.1 Organic Carbon, Total, Combustion or Oxidation

Chemist: (PXC) Crawford, Pat DOE Hours Worked:

Lab Prep:( ) Unspecifed Date Preprd: Date Anlyzd: 880922

Matrix: (10) Water-Total Units: (10) mg/l

Line	Sample #	Result	Sample Location/Description	#Days to Anl
1	88 398050	4.7	LEACH-A	880920 (2)
2	88 398051	6.3	LEACH-B	880920 (2)
3	88 398052	5.9	LEACH-C	880920 (2)
4	88 398053	5.7	LEACH-D	880920 (2)

Record Type: TRNIN2 Date Verified: [illegible] By: [illegible]

Transaction Status: New Transaction...First Printing...Unverified.

Processed: 27-SEP-88 09:09:51 Status: N Batch: (In CUR DB)

*** Lab Analysis Report ***

Transaction #: 10041444 Seq #: 01 (80) Ion Chromatography
(WE) Ecology, Manchester Lab
Prj: SPOKANE RIVER (DOE-014C) 27A02 BMC
Par: Chloride mg/l (Par# 940 S)

Instrument: IC-2020I Dionex #IC-2020 Ion Chromatograph
Method: EP1-325.4 Chloride, Ion Chromatograph
Chemist: (DTS) Strong, Despina DOE Hours Worked:
Lab Prep:( ) Unspecifed Date Preprd: Date Anlyzd: 880926

Matrix: (10) Water-Total Units: (10) mg/l

Line	Sample #	Result	Sample Location/Description	#Days to Anl
1	88 398050	3.8	LEACH-A	880920 (6)
2	88 398051	4.2	LEACH-B	880920 (6)
3	88 398052	3.6	LEACH-C	880920 (6)
4	88 398053	3.4	LEACH-D	880920 (6)

Record Type: TRNIN2 Date Verified: 88 8/10 By:
Transaction Status: New Transaction...First Printing...Unverified.
Processed: 4-OCT-88 14:53:20 Status: N Batch: (In CUR DB)

4-OCT-88 Washington State Department of Ecology Page 1

*** Lab Analysis Report ***

Transaction #: 10041445 Seq #: 01 (80) Ion Chromatography

(WE) Ecology, Manchester Lab

Prj: SPOKANE RIVER (DOE-014C) 27A02 BMC

Par: Sulfate Total mg/l (Par# 945 S)

Instrument: IC-2020I Dionex #IC-2020 Ion Chromatograph

Method: EP1-375.5 Sulfate, Ion Chromatograph

Chemist: (DTS) Strong, Despina DOE Hours Worked:

Lab Prep:( ) Unspecifed Date Preprd: Date Anlyzd: 880926

Matrix: (10) Water-Total Units: (10) mg/l

Line	Sample #	Result	Sample Location/Description	#Days to Anl
1	88 398050	13	LEACH-A	880920 (6)
2	88 398051	13	LEACH-B	880920 (6)
3	88 398052	11	LEACH-C	880920 (6)
4	88 398053	12	LEACH-D	880920 (6)

Record Type: TRNIN2 Date Verified: _____ By: _____

Transaction Status: New Transaction...First Printing...Unverified.

Processed: 4-OCT-88 14:53:20 Status: N Batch: (In CUR DB)

*** Lab Analysis Report ***

Transaction #: 10041450 Seq #: 01 (18) Demand - Specified
(WE) Ecology, Manchester Lab
Prj: SPOKANE RIVER (DOE-014C) 27A02 BMC
Par: COD Hi Level mg/l (Par# 340 S)

Instrument: TITRIT Titrimetric Measurement
Method: EP1-410.1 Chemical Oxygen Demand, Titrimetric, Mid-Level
Chemist: (PXC) Crawford, Pat DOE Hours Worked:
Lab Prep:( ) Unspecifed Date Preprd: Date Anlyzd: 880928

Matrix: (10) Water-Total Units: (10) mg/l

Line	Sample #	Result	Sample Location/Description	#Days to Anl
1	88 398050	9	LEACH-A	880920 (8)
2	88 398051	9	LEACH-B	880920 (8)
3	88 398052	10	LEACH-C	880920 (8)
4	88 398053	8	LEACH-D	880920 (8)

Record Type: TRNIN2 Date Verified: 88 [illegible] By: [illegible]
Transaction Status: New Transaction...First Printing...Unverified.
Processed: 4-OCT-88 14:53:20 Status: N Batch: (In CUR DB)

4-OCT-88 Washington State Department of Ecology Page 1

*** Lab Analysis Report ***

Transaction #: 10041455 Seq #: 01 (10) Gen Inorg/Phys-Specified

(WE) Ecology, Manchester Lab

Prj: SPOKANE RIVER (DOE-014C) 27A02 BMC

Par: Hard-Tot CaCO3 mg/l (Par# 900 S)

Instrument: TITRIT Titrimetric Measurement

Method: EP1-130.2 Hardness, Total (mg/l as CaCO3), Titrimetric, EDTA

Chemist: (DCZ) Zink, David DOE Hours Worked:

Lab Prep:( ) Unspecifed Date Preprd: Date Anlyzd: 880926

Matrix: (10) Water-Total Units: (10) mg/l

Line	Sample #	Result	Sample Location/Description	#Days to Anl
1	88 398050	94	LEACH-A	880920 (6)
2	88 398051	94	LEACH-B	880920 (6)
3	88 398052	94	LEACH-C	880920 (6)
4	88 398053	94	LEACH-D	880920 (6)

Record Type: TRNIN2 Date Verified: _____ By: _____

Transaction Status: New Transaction...First Printing...Unverified.

Processed: 4-OCT-88 14:56:11 Status: N Batch: (In CUR DB)

*** Lab Analysis Report ***

Partial

Transaction #: 10041449 Seq #: 01 (10) Gen Inorg/Phys-Specified
(WE) Ecology, Manchester Lab
Prj: SPOKANE RIVER (DOE-014C) 27A02 BMC
Par: Hard-Tot CaCO3 mg/l (Par# 900 S)

Instrument: TITRIT Titrimetric Measurement
Method: EP1-130.2 Hardness, Total (mg/l as CaCO3), Titrimetric, EDTA
Chemist: (DCZ) Zink, David DOE Hours Worked:
Lab Prep:( ) Unspecifed Date Preprd: Date Anlyzd: 880923

Matrix: (10) Water-Total Units: (10) mg/l

Line	Sample #	Result	Sample Location/Description	#Days to Anl
1	88 398054	187	WELLPOIN	880922 (1)
2	88 398055	1	LEACH-0	880922 (1)

Record Type: TRNIN2 Date Verified: 88/10/7 By: N Jensen
Transaction Status: New Transaction...First Printing...Unverified.
Processed: 4-OCT-88 14:53:20 Status: N Batch: (In CUR DB)

4-OCT-88 Washington State Department of Ecology Page 1

*** Lab Analysis Report ***

Transaction #: 10041447 Seq #: 01 (80) Ion Chromatography
(WE) Ecology, Manchester Lab
Prj: SPOKANE RIVER (DOE-014C) 27A02 BMC
Par: Sulfate Total mg/l (Par# 945 S)

Instrument: IC-2020I Dionex #IC-2020 Ion Chromatograph
Method: EP1-375.5 Sulfate, Ion Chromatograph
Chemist: (DTS) Strong, Despina DOE Hours Worked:
Lab Prep:( ) Unspecifed Date Preprd: Date Anlyzd: 880926

Matrix: (10) Water-Total Units: (10) mg/l

Line	Sample #	Result	Sample Location/Description	#Days to Anl
1	88 398054	22	WELLPOIN	880922 (4)
2	88 398055	1.7	LEACH-0	880922 (4)

Record Type: TRNIN2 Date Verified: 88/10/7 By: [illegible]
Transaction Status: New Transaction...First Printing...Unverified.
Processed: 4-OCT-88 14:53:20 Status: N Batch: (In CUR DB)

4-OCT-88 Washington State Department of Ecology Page 1

*** Lab Analysis Report ***

Transaction #: 10041446 Seq #: 01 (80) Ion Chromatography
(WE) Ecology, Manchester Lab
Prj: SPOKANE RIVER (DOE-014C) 27A02 BMC
Par: Chloride mg/l (Par# 940 S)

Instrument: IC-2020I Dionex #IC-2020 Ion Chromatograph
Method: EP1-325.4 Chloride, Ion Chromatograph
Chemist: (DTS) Strong, Despina DOE Hours Worked:
Lab Prep:( ) Unspecifed Date Preprd: Date Anlyzd: 880926

Matrix: (10) Water-Total Units: (10) mg/l

Line	Sample #	Result	Sample Location/Description	#Days to Anl
1	88 398054	3.6	WELLPOIN	880922 (4)
2	88 398055	0.05U	LEACH-0	880922 (4)

Record Type: TRNIN2 Date Verified: 88/10/7 By: N. Lenton
Transaction Status: New Transaction...First Printing...Unverified.
Processed: 4-OCT-88 14:53:20 Status: N Batch: (In CUR DB)

10-OCT-88 Washington State Department of Ecology Page 1

*** Lab Analysis Report ***

Transaction #: 10041448 Seq #: 01 (18) Demand - Specified

(WE) Ecology, Manchester Lab

Prj: SPOKANE RIVER (DOE-014C) 27A02 BMC

Par: T-Org-C Total mg/l (Par# 680 S)

Instrument: TOC-DOE Total Carbon (DOE) #XXXXXX

Method: EP1-415.1 Organic Carbon, Total, Combustion or Oxidation

Chemist: (PXC) Crawford, Pat DOE Hours Worked: _____

Lab Prep:( ) Unspecifed Date Preprd:_____ Date Anlyzd: 880927

Matrix: (10) Water-Total Units: (10) mg/l

Line	Sample #	Result	Sample Location/Description	#Days to Anl
1	88 398054	24	WELLPOIN	880922 (5)
2	88 398055	1.8	LEACH-0	880922 (5)

Record Type: TRNIN2 Date Verified: 88/10/07 By: Jensen, Nancy DOE

Transaction Status: Verified Transaction...Ready to release.

Processed: 10-OCT-88 08:29:26 Status: V Batch: (In CUR DB)

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North

(206)621-6490

25 October 1988

Roy Araki
Washington Dept. of Ecology
Manchester Laboratory
7411 Beach Drive East
Port Orchard, WA 98366

RE: ARI Project Nos. 02068 & 02069.

Dear Roy:

Please find enclosed the results of Total Metals analyses of the samples from Greenacres and Spokane River projects.

If you need additional information or have further questions, please feel free to call any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Norman Rocky Wells

Norman Rocky Wells
Inorganics Lab Manager

NRW/ml

enclosures

cc: file#02068
02069

Rec'd 10-27-88
Raja

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North

(206)621-6490

Project Narrative

Client: Washington DOE
Contact: Roy Araki
Project: Spokane River
ARI Job Number: 2069

Receipt and Storage of Samples

The samples were received October 7, 1988 at the laboratories of Analytical Resources, Inc. Samples in their original containers were stored in the Inorganic Preparation Laboratory sample storage closet. Samples that were prepared for analysis were stored in new, acid-rinsed containers and were placed in the Inorganic Instrument Laboratory sample storage closet.

Preservation of Samples

The pH of the aqueous samples was checked and found to be below 2.0. No further steps were taken to preserve the samples.

Preparation Methods

The samples were prepared by digesting them in accordance with preparation techniques outlined in the document: "Methods for Chemical Analysis of Water and Wastes", USEPA document EPA-600/4-79-020, revised March 1983.

Most of the metals were determined in the total fraction resulting from the nitric acid version of the preparation procedure given in paragraph 4.1.3 on page METALS-6.

Antimony was determined in the total fraction obtained by using the hydrochloric acid version of the preparation procedure in paragraph 4.1.3 on page METALS-6.

Iron and manganese were analyzed in the recoverable fraction resulting from the preparation procedure in paragraph 4.1.4 on page METALS-6.

Arsenic and selenium were determined in the fraction obtained by using the preparation procedure found in Method 206.2.

Analytical Methods

The samples were analyzed by either ICP emission spectrometry or graphite furnace AAS methods. The specific details of the methods are consistent with the analytical methods found in the document: "Methods for Chemical Analysis of Water and Wastes", USEPA document EPA-600/4-79-020, revised March 1983.

Calibration and Verification

In the case of ICP emission analyses, each of the analytical channels was standardized with a two-point calibration, and all measurements were limited to the linear range of the instrument. The calibration of the instrument was verified by analyzing reference sample 1643b obtained from the National Bureau of Standards.

The graphite furnace AAS measurements were made with either a four-point calibration curve or by the method of standard additions. Calibration was verified by analyzing the aqueous reference sample 1643b obtained from the National Bureau of Standards.

Results of Preparation Blanks

There were no detectable amounts of metals found in the preparation blank with the exception of silver, which was found at the level of 0.8 ppb. Caution must be used when utilizing the analytical results for silver, in view of the silver contamination found in the blank.

Results of Laboratory Duplicates

A laboratory duplicate was analyzed for every parameter requested in this project. All laboratory duplicate results were within the control limits of ± 20% relative percent difference (or ± 1 detection limit for samples less than 5 times the detection limit) with the exception of iron. The percent difference for the iron laboratory duplicate was 31%.

Results of Laboratory Spikes

A matrix spike was analyzed for every metal requested in this project. All matrix spike recoveries were within the control limits of ± 25%.

Results of Laboratory Reference Samples

The aqueous laboratory reference sample number 1643b (from the National Bureau of Standards) was analyzed for every metal requested in this project with the exception of antimony. All the results of the aqueous laboratory reference sample were within the control limit of ± 20% of the true value.

. . . . . .

Any questions regarding the analyses performed on these samples should be directed to the Inorganic Laboratory Manager.

Norman Rocky Wells

Norman Rocky Wells
Inorganic Laboratory Manager

25-Oct-88

Date

ANALYTICAL RESOURCES INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North

(206)621-6490

EXPLANATIONS OF INORGANIC DATA REPORT CODES

THE COLUMNS LABELED 'PREP', 'C', AND 'M' CONTAIN IMPORTANT INFORMATION ABOUT YOUR ANALYSES. THE CODES ARE DEFINED BELOW.

PREP CODES

THE 3-LETTER CODES IN THIS COLUMN ARE USED TO DESCRIBE THE METHOD USED TO PREPARE THE SAMPLE FOR ANALYSIS.

THE FIRST LETTER OF THE CODE STANDS FOR THE MATRIX TYPE OR THE FRACTION OF THE SAMPLE THAT IS BEING ANALYZED:

D = THE DISSOLVED FRACTION OF A SAMPLE (FILTERED THROUGH A 0.45 μ MEMBRANE FILTER.)
E = THE EP TOXICITY FRACTION OF A SAMPLE.
F = A PROCEDURE FOR DIGESTING FISH, OR OTHER TISSUE.
O = A DIGESTION OF AN OIL, GREASE, OR TAR.
R = A WATER SAMPLE PREPARED BY A 'TOTAL RECOVERABLE' DIGESTION.
S = A DIGESTION OF A SOIL OR SEDIMENT SAMPLE.
T = A WATER SAMPLE PREPARED BY A 'TOTAL' DIGESTION.
W = A SAMPLE ANALYZED WITHOUT ANY PREPARATION.

THE MIDDLE LETTER OF THE CODE RELATES TO THE SOURCE OF THE PROCEDURE.

A = A METHOD DEVELOPED BY ARI.
C = THE USEPA CLP PROGRAM STATEMENT OF WORK.
E = THE USEPA 1979 WATER AND WASTEWATER MANUAL.
M = A COMMON PROCEDURE FOUND IN A MANY SOURCES.
P = THE PUGET SOUND ESTUARY PROTOCOLS.
S = STANDARD METHODS.
W = THE USEPA SW-846 SOLID WASTE MANUAL.

THE LAST LETTER OF THE PREPARATION CODE REFERS EITHER TO THE FINAL MATRIX OF THE PREPARED SAMPLE OR TO A SPECIALIZED USE OF THE PROCEDURE.

A = A PROCEDURE FOR ARSENIC AND SELENIUM ANALYSIS ONLY.
C = A HYDROCHLORIC ACID MATRIX.
F = A HYDROFLUORIC ACID DIGESTION.
M = A PROCEDURE FOR MERCURY ANALYSIS ONLY.
N = A NITRIC ACID MATRIX.
P = A PERCHLORIC ACID DIGESTION.
R = A SPECIAL 'SOFT' DIGESTION OF A SOLID.

C CODES

THESE CODES ARE USED TO QUALIFY THE REPORTED CONCENTRATIONS. A CODE OF 'L' MEANS NO ANALYTE WAS DETECTED AT THE REPORTED CONCENTRATION LEVEL.

M CODES

THESE CODES SIGNIFY THE TYPE OF INSTRUMENTAL TECHNIQUE USED WHEN ANALYZING THE SAMPLES. THE CODES ARE DEFINED BELOW:

CVA = COLD VAPOR AAS
FLA = FLAME AAS
GFA = GRAPHITE FURNACE AAS
ICP = ICP-AES

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
10/25/88
09:29:52

Client: WDOE
Contact: ROY ARAKI
Project: SPOKANE RIVER
ID number: 398050 LEACH-A
Description:
Sampled: / /
Matrix: WATER

ARI job number: 2069
ARI sample number: A

Released by: MRW

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	Prep	M
7440-36-0	Antimony	0.0010 mg/L	L	TEC	GFA
7440-38-2	Arsenic	0.0015 mg/L		RMA	GFA
7440-41-7	Beryllium	0.001 mg/L	L	TEN	ICP
7440-43-9	Cadmium	0.002 mg/L	L	TEN	ICP
7440-47-3	Chromium	0.005 mg/L	L	TEN	ICP
7440-50-8	Copper	0.002 mg/L	L	TEN	ICP
7439-89-6	Iron	0.067 mg/L		REI	ICP
7439-92-1	Lead	0.02 mg/L	L	TEN	ICP
7439-96-5	Manganese	0.007 mg/L		REI	ICP
7440-02-0	Nickel	0.01 mg/L	L	TEN	ICP
7782-49-2	Selenium	0.0020 mg/L	L	RMA	GFA
7440-22-4	Silver	0.00062 mg/L		TEN	GFA
7440-28-0	Thallium	0.0020 mg/L	L	TEN	GFA
7440-66-6	Zinc	0.025 mg/L		TEN	ICP

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
10/25/88
09:30:08

Client: WDOE
Contact: ROY ARAKI
Project: SPOKANE RIVER
ID number:
Description: DUPLICATE OF 2069 A LEACH-A
Sampled: / /
Matrix: WATER

ARI job number: 2069
ARI sample number: ADUP

Released by: NRW

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	Prep	M
7440-36-0	Antimony	0.0010 mg/L	L	TEC	GFA
7440-38-2	Arsenic	0.0017 mg/L		RMA	GFA
7440-41-7	Beryllium	0.001 mg/L	L	TEN	ICP
7440-43-9	Cadmium	0.002 mg/L	L	TEN	ICP
7440-47-3	Chromium	0.005 mg/L	L	TEN	ICP
7440-50-8	Copper	0.002 mg/L	L	TEN	ICP
7439-89-6	Iron	0.049 mg/L		REI	ICP
7439-92-1	Lead	0.02 mg/L	L	TEN	ICP
7439-96-5	Manganese	0.007 mg/L		REI	ICP
7440-02-0	Nickel	0.01 mg/L	L	TEN	ICP
7782-49-2	Selenium	0.0020 mg/L	L	RMA	GFA
7440-22-4	Silver	0.00045 mg/L		TEN	GFA
7440-28-0	Thallium	0.0020 mg/L	L	TEN	GFA
7440-66-6	Zinc	0.024 mg/L		TEN	ICP

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
10/25/88
09:30:23

Client: WDOE
Contact: ROY ARAKI
Project: SPOKANE RIVER
ID number: 398051 LEACH-B
Description:
Sampled: / /
Matrix: WATER

ARI job number: 2069
ARI sample number: B

Released by: MRW

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	Prep	M
7440-36-0	Antimony	0.0010 mg/L	L	TEC	GFA
7440-38-2	Arsenic	0.0021 mg/L		RMA	GFA
7440-41-7	Beryllium	0.001 mg/L	L	TEN	ICP
7440-43-9	Cadmium	0.002 mg/L	L	TEN	ICP
7440-47-3	Chromium	0.005 mg/L	L	TEN	ICP
7440-50-8	Copper	0.002 mg/L	L	TEN	ICP
7439-89-6	Iron	0.062 mg/L		REI	ICP
7439-92-1	Lead	0.02 mg/L	L	TEN	ICP
7439-96-5	Manganese	0.007 mg/L		REI	ICP
7440-02-0	Nickel	0.01 mg/L	L	TEN	ICP
7782-49-2	Selenium	0.0020 mg/L	L	RMA	GFA
7440-22-4	Silver	0.00070 mg/L		TEN	GFA
7440-28-0	Thallium	0.0020 mg/L	L	TEN	GFA
7440-66-6	Zinc	0.026 mg/L		TEN	ICP

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
10/25/88
09:30:39

Client: WDOE
Contact: ROY ARAKI
Project: SPOKANE RIVER
ID number:
Description: SPIKED 2069 B LEACH-B
Sampled: / /
Matrix: WATER

ARI job number: 2069
ARI sample number: BSPK

Released by: MRW

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	Prep	M
7440-36-0	Antimony	0.102 mg/L		TEC	GFA
7440-38-2	Arsenic	0.0445 mg/L		RMA	GFA
7440-41-7	Beryllium	0.047 mg/L		TEN	ICP
7440-43-9	Cadmium	0.050 mg/L		TEN	ICP
7440-47-3	Chromium	0.208 mg/L		TEN	ICP
7440-50-8	Copper	0.249 mg/L		TEN	ICP
7439-89-6	Iron	1.05 mg/L		REI	ICP
7439-92-1	Lead	0.52 mg/L		TEN	ICP
7439-96-5	Manganese	0.524 mg/L		REI	ICP
7440-02-0	Nickel	0.50 mg/L		TEN	ICP
7782-49-2	Selenium	0.0094 mg/L		RMA	GFA
7440-22-4	Silver	0.00665 mg/L		TEN	GFA
7440-28-0	Thallium	0.0540 mg/L		TEN	GFA
7440-66-6	Zinc	0.537 mg/L		TEN	ICP

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
10/25/88
09:30:54

Client: WDOE
Contact: ROY ARAKI
Project: SPOKANE RIVER
ID number: 398052 LEACH-C
Description:
Sampled: / /
Matrix: WATER

ARI job number: 2069
ARI sample number: C

Released by: MRW

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	Prep	M
7440-36-0	Antimony	0.0010 mg/L	L	TEC	GFA
7440-38-2	Arsenic	0.0020 mg/L		RMA	GFA
7440-41-7	Beryllium	0.001 mg/L	L	TEN	ICP
7440-43-9	Cadmium	0.002 mg/L	L	TEN	ICP
7440-47-3	Chromium	0.005 mg/L	L	TEN	ICP
7440-50-8	Copper	0.002 mg/L	L	TEN	ICP
7439-89-6	Iron	0.061 mg/L		REI	ICP
7439-92-1	Lead	0.02 mg/L	L	TEN	ICP
7439-96-5	Manganese	0.007 mg/L		REI	ICP
7440-02-0	Nickel	0.01 mg/L	L	TEN	ICP
7782-49-2	Selenium	0.0020 mg/L	L	RMA	GFA
7440-22-4	Silver	0.00096 mg/L		TEN	GFA
7440-28-0	Thallium	0.0020 mg/L	L	TEN	GFA
7440-66-6	Zinc	0.027 mg/L		TEN	ICP

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
10/25/88
09:31:10

Client: WDOE
Contact: ROY ARAKI
Project: SPOKANE RIVER
ID number: 398053 LEACHED
Description:
Sampled: / /
Matrix: WATER

ARI job number: 2069
ARI sample number: D

Released by: MRW

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	Prep	M
7440-36-0	Antimony	0.0010 mg/L	L	TEC	GFA
7440-38-2	Arsenic	0.0018 mg/L		RMA	GFA
7440-41-7	Beryllium	0.001 mg/L	L	TEN	ICP
7440-43-9	Cadmium	0.002 mg/L	L	TEN	ICP
7440-47-3	Chromium	0.005 mg/L	L	TEN	ICP
7440-50-8	Copper	0.002 mg/L	L	TEN	ICP
7439-89-6	Iron	0.053 mg/L		REI	ICP
7439-92-1	Lead	0.02 mg/L	L	TEN	ICP
7439-96-5	Manganese	0.007 mg/L		REI	ICP
7440-02-0	Nickel	0.01 mg/L	L	TEN	ICP
7782-49-2	Selenium	0.0020 mg/L	L	RMA	GFA
7440-22-4	Silver	0.00053 mg/L		TEN	GFA
7440-28-0	Thallium	0.0020 mg/L	L	TEN	GFA
7440-66-6	Zinc	0.025 mg/L		TEN	ICP

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
10/25/88
09:31:25

Client: WDOE
Contact: ROY ARAKI
Project: SPOKANE RIVER
ID number: 398056 MATRIX SPIKE
Description:
Sampled: / /
Matrix: WATER

ARI job number: 2069
ARI sample number: E

Released by: MRW

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	Prep	M
7440-36-0	Antimony	0.0010 mg/L	L	TEC	GFA
7440-38-2	Arsenic	0.0024 mg/L		RMA	GFA
7440-41-7	Beryllium	0.001 mg/L	L	TEN	ICP
7440-43-9	Cadmium	0.001 mg/L	L	TEN	ICP
7440-47-3	Chromium	0.005 mg/L	L	TEN	ICP
7440-50-8	Copper	0.002 mg/L	L	TEN	ICP
7439-89-6	Iron	0.053 mg/L		REI	ICP
7439-92-1	Lead	0.02 mg/L	L	TEN	ICP
7439-96-5	Manganese	0.007 mg/L		REI	ICP
7440-02-0	Nickel	0.01 mg/L	L	TEN	ICP
7782-49-2	Selenium	0.0020 mg/L	L	RMA	GFA
7440-22-4	Silver	0.00066 mg/L		TEN	GFA
7440-28-0	Thallium	0.0020 mg/L	L	TEN	GFA
7440-66-6	Zinc	0.027 mg/L		TEN	ICP

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
10/25/88
09:31:44

Client: WDOE
Contact: ROY ARAKI
Project: SPOKANE RIVER
ID number:
Description: METHOD BLANK
Sampled: / /
Matrix: WATER

ARI job number: 2069
ARI sample number: MB

Released by: NRW

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	Prep	M
7440-36-0	Antimony	0.0010 mg/L	L	TEC	GFA
7440-38-2	Arsenic	0.0010 mg/L	L	RMA	GFA
7440-41-7	Beryllium	0.001 mg/L	L	TEN	ICP
7440-43-9	Cadmium	0.002 mg/L	L	TEN	ICP
7440-47-3	Chromium	0.005 mg/L	L	TEN	ICP
7440-50-8	Copper	0.002 mg/L	L	TEN	ICP
7439-89-6	Iron	0.005 mg/L	L	REI	ICP
7439-92-1	Lead	0.02 mg/L	L	TEN	ICP
7439-96-5	Manganese	0.001 mg/L	L	REI	ICP
7440-02-0	Nickel	0.01 mg/L	L	TEN	ICP
7782-49-2	Selenium	0.0020 mg/L	L	RMA	GFA
7440-22-4	Silver	0.00081 mg/L		TEN	GFA
7440-28-0	Thallium	0.0020 mg/L	L	TEN	GFA
7440-66-6	Zinc	0.004 mg/L	L	TEN	ICP

ANALYTICAL RESOURCES, INC.
Inorganic Laboratory Data Report
10/25/88
09:31:59

Client: WDOE
Contact: ROY ARAKI
Project: SPOKANE RIVER
ID number: NBS 1643B
Description: TRACE ELEMENTS/WATER
Sampled: / /
Matrix: WATER

ARI job number: 2069
ARI sample number: REF

Released by: MRW

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	Prep	M
7440-36-0	Antimony	NOT ANALYZED		WMN	GFA
7440-38-2	Arsenic	0.0560 mg/L		WMN	GFA
7440-41-7	Beryllium	0.017 mg/L		WMN	ICP
7440-43-9	Cadmium	0.020 mg/L		WMN	ICP
7440-47-3	Chromium	0.018 mg/L		WMN	ICP
7440-50-8	Copper	0.022 mg/L		WMN	ICP
7439-89-6	Iron	0.101 mg/L		WMN	ICP
7439-92-1	Lead	0.02 mg/L		WMN	ICP
7439-96-5	Manganese	0.031 mg/L		WMN	ICP
7440-02-0	Nickel	0.05 mg/L		WMN	ICP
7782-49-2	Selenium	0.0113 mg/L		WMN	GFA
7440-22-4	Silver	0.0113 mg/L		WMN	GFA
7440-28-0	Thallium	0.0077 mg/L		WMN	GFA
7440-66-6	Zinc	0.065 mg/L		WMN	ICP

ANALYTICAL RESOURCES, INC.

Results of Quality Control Duplicate Analysis

Client: WDOE

ARI Sample number: 2069 A

Units: mg/L

ANALYTE	SAMPLE	C	DUPLICATE	C	RPD
Antimony	0.001	L	0.001	L	
Arsenic	0.0015		0.0017		12.50
Beryllium	0.001	L	0.001	L	
Cadmium	0.002	L	0.002	L	
Chromium	0.005	L	0.005	L	
Copper	0.002	L	0.002	L	
Iron	0.067		0.049		31.03
Lead	0.02	L	0.02	L	
Manganese	0.007		0.007		0.00
Nickel	0.01	L	0.01	L	
Selenium	0.002	L	0.002	L	
Silver	0.00062		0.00045		31.78
Thallium	0.002	L	0.002	L	
Zinc	0.025		0.024		4.08

RPD = Relative Percent Difference

ANALYTICAL RESOURCES, INC.

Results of NBS 1643B Trace Elements Analysis

Client: WDOE

ARI Sample number: 2069 REF

Units: mg/L

ANALYTE	FOUND	CERTIFIED VALUE	RECOVERY
Arsenic	0.056	0.049 (EST)	114.29
Beryllium	0.017	0.019 ± 0.002	89.47
Cadmium	0.02	0.02 ± 0.001	100.00
Chromium	0.018	0.0186 ± .0004	96.77
Copper	0.022	0.0219 ± .0004	100.46
Iron	0.101	0.099 ± 0.008	102.02
Lead	0.02	0.0237 ± .0007	84.39
Manganese	0.031	0.028 ± 0.002	110.71
Nickel	0.05	0.049 ± 0.003	102.04
Selenium	0.011	0.0097 ± .0005	113.40
Silver	0.011	0.0098 ± .0008	112.24
Thallium	0.0077	0.008 ± .0002	96.25
Zinc	0.065	0.066 ± 0.002	98.48

RECOVERY = Percent Recovery

ANALYTICAL RESOURCES, INC.

Results of Quality Control Spike Analysis

Client: WDOE

ARI Sample number: 2069 B

Units: mg/L

ANALYTE	SPIKE	C	SAMPLE	C	ADDED	C	RECOVERY
Antimony	0.102		0		0.1		102.00
Arsenic	0.0445		0.0021		0.04		106.00
Beryllium	0.047		0		0.05		94.00
Cadmium	0.05		0		0.05		100.00
Chromium	0.208		0		0.2		104.00
Copper	0.249		0		0.25		99.60
Iron	1.05		0.062		1		98.80
Lead	0.52		0		0.5		104.00
Manganese	0.524		0.007		0.5		103.40
Nickel	0.5		0		0.5		100.00
Selenium	0.0094		0		0.01		94.00
Silver	0.00665		0.0007		0.005		119.00
Thallium	0.054		0		0.05		108.00
Zinc	0.537		0.026		0.5		102.20

RECOVERY = Percent Recovery of Added Spike

DATA REVIEW
November 9, 1988

Project: Spokane River

Sample No.: 398050 - 398055

Laboratory: Aquatic Research
Seattle, Washington

By: Craig Smith, Chemist

Through: Roy Araki

Parameters: Ammonia, Nitrate/Nitrite, Total Phosphorous

HOLDING TIME: Time summary for this analysis:

Sample #	Collected	To Manche	To Contr	Data Received	Digested/Analyzed NH3	NO3	TP	Since Collected		
398050 through	9/20	9/21	9/23	11/2	10/5	10/5	9/30	15	15	10
398053	9/20	9/21	9/23	11/2	10/5	10/5	9/30	15	15	10
398054	9/22	9/23	9/23	11/2	10/5	10/5	9/30	13	13	8
398055	9/22	9/23	9/23	11/2	10/5	10/5	9/30	13	13	8

These times are within the U.S. EPA limits of 28 days for analysis from the date of collection.

The samples did not require any dilutions.

SPIKES: Recovery for Total Phosphorous was 95%, NH3 was 115%, and NO2/NO3 was recovered at 58%. (This value is low). A single low value is not significant with respect to the bulk of the QC data for this run. The acceptable range is 70 - 130%.

DUPLICATES: The sample duplicates for NO2/NO3 gave an average percent deviation of 3.03%. TP was -0.001. NH3 gave a difference of 0.00. The acceptable limits are (+/- 5%), or <0.01.

CHECK STANDARDS: The values for this set gave an average error of 0.08 for TP, -1.4 for NO2/NO3, and 1.4 for NH3. These are within the acceptable range of -2 to +2.

SAMPLE DATA: The data is considered acceptable for use without additional qualifications.

AQUATIC RESEARCH LABORATORY

WSDOE		MG/L		
SAMPLE ID		NH3-N	NO3+NO2-N	TP
LEACH-A	398050	0.028	0.734	0.045
LEACH-B	398051	0.028	0.757	0.041
LEACH-C	398052	0.038	0.714	0.046
LEACH-D	398053	0.040	0.627	0.049
WELL POINT	398054	<0.010	0.557	0.015
LEACH-Ø	398055	0.030	<0.010	<0.002

CHRISTINE GREGOIRE
XXXXXXXXXXXXXXXXX
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Post Office Box 346 • Manchester, Washington 98353-0346 • (206) 895-4740

Data Review
October 13, 1988

Project: Spokane River

Sample No: 398050 thru 398056

Laboratory: Analytical Resources Inc

By: Roy Araki, Chemist

VOA

Holding Time. The following is a time summary for this analysis.

Sam. #	Collect	To Manche	To Contr	VOA	VOA Frm Rcpt	VOA Frm Coll
39 8050	9/20	9/21	9/26	9/30	4 days	10 days
39 8051	9/20	9/21	9/26	9/30	4 days	10 days
39 8052	9/20	9/21	9/26	9/30	4 days	10 days
39 8053	9/20	9/21	9/26	9/30	4 days	10 days
39 8054	9/22	9/23	9/26	9/30	4 days	8 days
39 8055	9/22	9/23	9/26	9/30	4 days	8 days
39 8056	9/20	9/21	9/26	9/30	4 days	10 days

These times are within the U.S. EPA CLP limits of ten (10) days for analysis from the time of sample receipt and fourteen (14) days for analysis from the time of sample collection.

Surrogates. Recoveries are acceptable and within the CLP limits

Matrix Spike & Matrix Spike Duplicate: Toluene was recovered from the matrix spike duplicate (126%) at slightly above the CLP limit of 125%. No other limits were exceeded and this recovery can be considered an anomaly. No action is needed.

All other recoveries and precision data are acceptable and within the CLP limits.

Sample Data: The data is considered acceptable for use without additional qualification

BNA

Holding Time: The following is a time summary for this analysis:

Sam. #	Collect	To Manche	To Contr	Ext BNA	Analysis BNA	Ext BNA Frm Rcpt	Ext BNA Frm Coll	BNA anal Frm Ext
39 8050	9/20	9/21	9/26	9/27	9/29	1 days	7 days	2 days
39 8051	9/20	9/21	9/26	9/27	9/29	1 days	7 days	2 days
39 8052	9/20	9/21	9/26	9/27	9/29	1 days	7 days	2 days
39 8053	9/20	9/21	9/26	9/27	9/29	1 days	7 days	2 days
39 8054	9/22	9/23	9/26	9/27	9/29	1 days	5 days	2 days
39 8055	9/22	9/23	9/26	9/27	9/29	1 days	5 days	2 days
39 8056	9/20	9/21	9/26	9/27	9/29	1 days	7 days	2 days

These times are within the U.S. EPA CLP limits of five (5) days for extraction from the date of sample receipt and seven (7) days for extraction from the date of sample collection. The limit for sample analysis is forty (40) days from the date of sample extraction.

Surrogates: Recoveries are acceptable and within the CLP limits.

Matrix Spike & Matrix Spike Duplicate: 4-Chloro-3-methylphenol was recovered from both the matrix spike and the matrix spike duplicate (102% and 102%) at higher than the CLP limit of 97%. Other acid type compounds were recovered within their limits. All associated acid type surrogates for all samples were recovered adequately. The data does not appear to be affected and no action is required.

All other recoveries and precision data are acceptable and within the CLP limits.

Sample Data: The data is considered acceptable for use without additional qualification.

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206)621-6490

10 October 1988

Roy Araki
Washington Dept. of Ecology
Manchester Laboratory
7411 Beach Drive East
Port Orchard, WA 98366

RE: WDOE Project Reference: Spokane; ARI Project #02017.

Dear Roy:

Please find enclosed the results of VOA and ABN analyses of seven water samples from the above referenced project.

The ABN extracts were concentrated to 0.5 ml final volume to obtain lower than normal detection limits.

If you have further questions or require additional information, please feel free to call me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

David R. Mitchell

David R. Mitchell
Project Manager

DRM/ml

enclosures

cc: file #02017

	cell	man	cont	VOA	ext BNA	BNA
398050	9/20	9/21	9/26	9/30	9/27	9/29
398051	↓	↓	↓	↓	↓	↓
398052	↓	↓	↓	↓	↓	↓
398053	↓	↓	↓	↓	↓	↓
398054	9/22	9/23	↓	↓	↓	↓
398055	9/22	9/23	↓	↓	↓	↓
398056	9/20	9/21	↓	↓	↓	↓

Rec'd 10-12-88
RJA

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: Method Blank

Lab Sample ID: MB930
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Data Release Authorized: _____

Instrument: FINN III
Date Analyzed: 09/30/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**1.4**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	0.9 U
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-02-6	Trans-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-01-5	cis-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

Surrogate Recoveries

d8-Toluene	105%
Bromofluorobenzene	103%
d4-1,2-Dichloroethane	89.0%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 10/05/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
J	Indicates an estimated value when result is less than specified detection limit.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 398050
LEACH A

Lab Sample ID: 2017A
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Data Release Authorized: [signature]

Instrument: FINN III
Date Analyzed: 09/30/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**1.0 JB**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	0.9 U
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-02-6	Trans-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-01-5	cis-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

Surrogate Recoveries

d8-Toluene	102%
Bromofluorobenzene	99.5%
d4-1,2-Dichloroethane	87.6%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 10/05/88 - MAC:B

Data Reporting Qualifiers

Value — If the result is a value greater than or equal to the detection limit, report the value.

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates an estimated value when result is less than specified detection limit.

B — This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K — This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M — Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 398051
LEACH - B

Lab Sample ID: 2017B
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Data Release Authorized: _____

Instrument: FINN III
Date Analyzed: 09/30/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**2.0 B**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	0.9 U
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-02-6	Trans-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-01-5	cis-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

Surrogate Recoveries

d8-Toluene	103%
Bromofluorobenzene	102%
d4-1,2-Dichloroethane	84.5%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 10/05/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
J	Indicates an estimated value when result is less than specified detection limit.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 398052
LEACH-C

Lab Sample ID: 2017C
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Data Release Authorized: _____

Instrument: FINN III
Date Analyzed: 09/30/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**3.4 B**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	0.9 U
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-02-6	Trans-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-01-5	cis-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

Surrogate Recoveries

d8-Toluene	98.4%
Bromofluorobenzene	97.9%
d4-1,2-Dichloroethane	86.7%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 10/05/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
J	Indicates an estimated value when result is less than specified detection limit.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 398053
LEACH - D

Lab Sample ID: 2017D
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Data Release Authorized: [signature]

Instrument: FINN III
Date Analyzed: 09/30/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**0.9 JB**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	0.9 U
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-02-6	Trans-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-01-5	cis-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

Surrogate Recoveries

d8-Toluene	103%
Bromofluorobenzene	95.4%
d4-1,2-Dichloroethane	92.8%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 10/05/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
J	Indicates an estimated value when result is less than specified detection limit.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL RESOURCES INCORPORATED
Analytical Chemists & Consultants
333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

WATER MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

ARI Job No.: 2017 Client: WDOE Project: Spokane

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/L)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO. **398053**	1,1-Dichloroethene	50.0	0.0	59.5	119	57.2	114	3.9	14	61 - 145
	Trichloroethene	50.0	0.0	54.2	108	56.1	112	-3.4	14	71 - 120
	Chlorobenzene	50.0	0.0	53.7	107	50.1	100	6.9	13	75 - 130
	Toluene	50.0	0.0	61.8	124	63.0	*126	-1.9	13	76 - 125
	Benzene	50.0	0.0	60.7	121	63.3	127	-4.1	11	76 - 127
B/N SMO SAMPLE NO. **398056**	1.2.4-Trichlorobenzene	25	0.0	15.9	63.4	17.0	67.9	-6.7	28	39 - 98
	Acenaphthene	25	0.0	22.2	88.8	21.2	84.8	4.6	31	46 - 118
	2,4-Dinitrotoluene	25	0.0	20.6	82.4	20.6	82.5	-0.2	38	24 - 96
	Pyrene	25	0.0	21.9	87.6	20.4	81.4	7.3	31	26 - 127
	N-Nitroso-Di-n-Propylamine	25	0.0	21.0	83.9	20.0	80.0	4.7	38	41 - 116
	1,4-Dichlorobenzene	25	0.0	13.2	52.8	16.6	66.4	-22.8	28	36 - 97
	Pentachlorophenol	50	0.0	23.5	47.0	28.4	56.8	-19.0	50	9 - 103
	Phenol	50	0.0	20.9	41.8	22.4	44.8	-7.1	42	12 - 89
	2-Chlorophenol	50	0.0	44.0	88.1	49.7	99.4	-12.1	40	27 - 123
	4-Chloro-3-Methylphenol	50	0.0	50.9	*102	51.2	*102	-0.6	42	23 - 97
	4-Nitrophenol	50	0.0	22.8	45.5	23.8	47.7	-4.7	50	10 - 80
PEST SMO SAMPLE NO.	Lindane								15	56 - 123
	Heptachlor								20	40 - 131
	Aldrin								22	40 - 120
	Dieldrin								18	52 - 126
	Endrin								21	56 - 121
	4,4'-DDT								27	38 - 127

* ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD:
VOA 0 out of 5; outside QC limits
B/N 0 out of 6; outside QC limits
ACID 0 out of 5; outside QC limits
PEST NA

RECOVERY:
VOA 1 out of 10; outside QC limits
B/N 0 out of 12; outside QC limits
ACID 2 out of 10; outside QC limits
PEST NA

Comments:

FORM III

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 398053 Matrix Spike
LEACH - D

Lab Sample ID: 2017DMS
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Data Release Authorized: _____

Instrument: FINN III
Date Analyzed: 09/30/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**3.5 B**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	-
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	0.9 U
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-02-6	Trans-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	-
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	-
10061-01-5	cis-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	-
108-90-7	Chlorobenzene	-
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

Surrogate Recoveries

d8-Toluene	98.5%
Bromofluorobenzene	98.1%
d4-1,2-Dichloroethane	89.5%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 10/05/88 - MAC:B

Data Reporting Qualifiers

Value — If the result is a value greater than or equal to the detection limit, report the value.

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates an estimated value when result is less than specified detection limit.

B — This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K — This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M — Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-5490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 398055
LEACH - Ø
ICC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Lab Sample ID: 2017F
Sample Matrix: Waters

Data Release Authorized: [signature]

Instrument: FINN III
Date Analyzed: 09/30/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**4.8 B**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	0.9 U
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-02-6	Trans-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-01-5	cis-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

Surrogate Recoveries

d8-Toluene	103%
Bromofluorobenzene	101%
d4-1,2-Dichloroethane	90.5%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 10/05/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
J	Indicates an estimated value when result is less than specified detection limit.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 398056
MATRIX SPIKE (D)

Lab Sample ID: 20176
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Data Release Authorized: _____

Instrument: FINN III
Date Analyzed: 09/30/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**0.8 JB**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	0.9 U
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-02-6	Trans-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-01-5	cis-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

Surrogate Recoveries

d8-Toluene	104%
Bromofluorobenzene	104%
d4-1,2-Dichloroethane	88.3%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 10/05/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
J	Indicates an estimated value when result is less than specified detection limit.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 398053
MEACH - D

Lab Sample ID: 2017D
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Data Release Authorized: _____

Instrument: FINN III
Date Analyzed: 09/30/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**0.9 JB**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	0.9 U
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-02-6	Trans-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-01-5	cis-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

Surrogate Recoveries

d8-Toluene	103%
Bromofluorobenzene	95.4%
d4-1,2-Dichloroethane	92.8%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 10/05/88 - MAC:B

Data Reporting Qualifiers

Value — If the result is a value greater than or equal to the detection limit, report the value.

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates an estimated value when result is less than specified detection limit.

B — This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.

K — This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.

M — Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 398054
WELL POINT

Lab Sample ID: 2017E
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Data Release Authorized: _____

Instrument: FINN III
Date Analyzed: 09/30/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**1.1 B**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	Chloroform	0.9 U
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-02-6	Trans-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-01-5	cis-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

Surrogate Recoveries

d8-Toluene	103%
Bromofluorobenzene	96.3%
d4-1,2-Dichloroethane	89.4%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 10/05/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
J	Indicates an estimated value when result is less than specified detection limit.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: Method Blank

Lab Sample ID: 2017MB
Sample Matrix: Water

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Date Release Authorized: Brian N. Baker

Date extracted: 09/27/88
Date Analyzed: 09/29/88

Sample Volume: 1000 mls
Final extract Volume: 0.5 mls
Conc/Dilution: 1 to 1

CAS Number		µg/L
108-95-2	Phenol	0.5 U
111-44-4	bis(2-Chloroethyl)Ether	0.5 U
95-57-8	2-Chlorophenol	0.5 U
541-73-1	1,3-Dichlorobenzene	0.5 U
106-46-7	1,4-Dichlorobenzene	0.5 U
100-51-6	Benzyl Alcohol	2.5 U
95-50-1	1,2-Dichlorobenzene	0.5 U
95-48-7	2-Methylphenol	0.5 U
39638-32-9	bis(2-chloroisopropyl)Ether	0.5 U
106-44-5	4-Methylphenol	0.5 U
621-64-7	N-Nitroso-Di-n-Propylamine	0.5 U
67-72-1	Hexachloroethane	1.0 U
98-95-3	Nitrobenzene	0.5 U
78-59-1	Isophorone	0.5 U
88-75-5	2-Nitrophenol	2.5 U
105-67-9	2,4-Dimethylphenol	1.0 U
65-85-0	Benzoic Acid	5.0 U
111-91-1	bis(2-Chloroethoxy)Methane	0.5 U
120-83-2	2,4-Dichlorophenol	1.5 U
120-82-1	1,2,4-Trichlorobenzene	0.5 U
91-20-3	Naphthalene	0.5 U
106-47-8	4-Chloroaniline	1.5 U
87-68-3	Hexachlorobutadiene	1.0 U
59-50-7	4-Chloro-3-Methylphenol	1.0 U
91-57-6	2-Methylnaphthalene	0.5 U
77-47-4	Hexachlorocyclopentadiene	2.5 U
88-06-2	2,4,6-Trichlorophenol	2.5 U
95-95-4	2,4,5-Trichlorophenol	2.5 U
91-58-7	2-Chloronaphthalene	0.5 U
88-74-4	2-Nitroaniline	2.5 U
131-11-3	Dimethyl Phthalate	0.5 U
208-96-8	Acenaphthylene	0.5 U
99-09-2	3-Nitroaniline	2.5 U

CAS Number		µg/L
83-32-9	Acenaphthene	0.5 U
51-28-5	2,4-Dinitrophenol	5.0 U
100-02-7	4-Nitrophenol	2.5 U
132-64-9	Dibenzofuran	0.5 U
121-14-2	2,4-Dinitrotoluene	2.5 U
606-20-2	2,6-Dinitrotoluene	2.5 U
84-66-2	Diethylphthalate	0.5 U
7005-72-3	4-Chlorophenyl-phenylether	0.5 U
86-73-7	Fluorene	0.5 U
100-01-6	4-Nitroaniline	2.5 U
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U
86-30-6	N-Nitrosodiphenylamine(1)	0.5 U
101-55-3	4-Bromophenyl-phenylether	0.5 U
118-74-1	Hexachlorobenzene	0.5 U
87-86-5	Pentachlorophenol	2.5 U
85-01-8	Phenanthrene	0.5 U
120-12-7	Anthracene	0.5 U
84-74-2	Di-n-Butylphthalate	0.5 U
206-44-0	Fluoranthene	0.5 U
129-00-0	Pyrene	0.5 U
85-68-7	Butylbenzylphthalate	0.5 U
91-94-1	3,3'-Dichlorobenzidine	2.5 U
56-55-3	Benzo(a)Anthracene	0.5 U
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**2.7**
218-01-9	Chrysene	0.5 U
117-84-0	Di-n-Octyl Phthalate	0.5 U
205-99-2	Benzo(b)Fluoranthene	0.5 U
207-08-9	Benzo(k)Fluoranthene	0.5 U
50-32-8	Benzo(a)Pyrene	0.5 U
193-39-5	Indeno(1,2,3-cd)Pyrene	0.5 U
53-70-3	Dibenz(a,h)Anthracene	0.5 U
191-24-2	Benzo(ghi)Perylene	0.5 U

(1) Cannot be separated from diphenylamine

Report prepared 10/03/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	65.8%
2-Fluorobiphenyl	63.2%
d14-p-Terphenyl	84.0%

***Acid surrogate recoveries**

d5-Phenol	31.7%
2-Fluorophenol	46.4%
2,4,6-Tribromophenol	79.7%

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 398050
LEACH - A

Lab Sample ID: 2017A
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Date Release Authorized: _____

Date extracted: 09/27/88
Date Analyzed: 09/29/88

Sample Volume: 1000 mls
Final extract Volume: 0.5 mls
Conc/Dilution: 1 to 1

CAS Number		µg/L
108-95-2	Phenol	0.5 U
111-44-4	bis(2-Chloroethyl)Ether	0.5 U
95-57-8	2-Chlorophenol	0.5 U
541-73-1	1,3-Dichlorobenzene	0.5 U
106-46-7	1,4-Dichlorobenzene	0.5 U
100-51-6	Benzyl Alcohol	2.5 U
95-50-1	1,2-Dichlorobenzene	0.5 U
95-48-7	2-Methylphenol	0.5 U
39638-32-9	bis(2-chloroisopropyl)Ether	0.5 U
106-44-5	4-Methylphenol	0.5 U
621-64-7	N-Nitroso-Di-n-Propylamine	0.5 U
67-72-1	Hexachloroethane	1.0 U
98-95-3	Nitrobenzene	0.5 U
78-59-1	Isophorone	0.5 U
88-75-5	2-Nitrophenol	2.5 U
105-67-9	2,4-Dimethylphenol	1.0 U
65-85-0	Benzoic Acid	5.0 U
111-91-1	bis(2-Chloroethoxy)Methane	0.5 U
120-83-2	2,4-Dichlorophenol	1.5 U
120-82-1	1,2,4-Trichlorobenzene	0.5 U
91-20-3	Naphthalene	0.5 U
106-47-8	4-Chloroaniline	1.5 U
87-68-3	Hexachlorobutadiene	1.0 U
59-50-7	4-Chloro-3-Methylphenol	1.0 U
91-57-6	2-Methylnaphthalene	0.5 U
77-47-4	Hexachlorocyclopentadiene	2.5 U
88-06-2	2,4,6-Trichlorophenol	2.5 U
95-95-4	2,4,5-Trichlorophenol	2.5 U
91-58-7	2-Chloronaphthalene	0.5 U
88-74-4	2-Nitroaniline	2.5 U
131-11-3	Dimethyl Phthalate	0.5 U
208-96-8	Acenaphthylene	0.5 U
99-09-2	3-Nitroaniline	2.5 U

CAS Number		µg/L
83-32-9	Acenaphthene	0.5 U
51-28-5	2,4-Dinitrophenol	5.0 U
100-02-7	4-Nitrophenol	2.5 U
132-64-9	Dibenzofuran	0.5 U
121-14-2	2,4-Dinitrotoluene	2.5 U
606-20-2	2,6-Dinitrotoluene	2.5 U
84-66-2	Diethylphthalate	0.5 U
7005-72-3	4-Chlorophenyl-phenylether	0.5 U
86-73-7	Fluorene	0.5 U
100-01-6	4-Nitroaniline	2.5 U
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U
86-30-6	N-Nitrosodiphenylamine(1)	0.5 U
101-55-3	4-Bromophenyl-phenylether	0.5 U
118-74-1	Hexachlorobenzene	0.5 U
87-86-5	Pentachlorophenol	2.5 U
85-01-8	Phenanthrene	0.5 U
120-12-7	Anthracene	0.5 U
84-74-2	Di-n-Butylphthalate	0.5 U
206-44-0	Fluoranthene	0.5 U
129-00-0	Pyrene	0.5 U
85-68-7	Butylbenzylphthalate	0.5 U
91-94-1	3,3'-Dichlorobenzidine	2.5 U
56-55-3	Benzo(a)Anthracene	0.5 U
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**1.0 B**
218-01-9	Chrysene	0.5 U
117-84-0	Di-n-Octyl Phthalate	0.5 U
205-99-2	Benzo(b)Fluoranthene	0.5 U
207-08-9	Benzo(k)Fluoranthene	0.5 U
50-32-8	Benzo(a)Pyrene	0.5 U
193-39-5	Indeno(1,2,3-cd)Pyrene	0.5 U
53-70-3	Dibenz(a,h)Anthracene	0.5 U
191-24-2	Benzo(ghi)Perylene	0.5 U

(1) Cannot be separated from diphenylamine

Report prepared 10/03/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	83.3%
2-Fluorobiphenyl	75.2%
d14-p-Terphenyl	80.1%

***Acid surrogate recoveries**

d5-Phenol	39.7%
2-Fluorophenol	57.1%
2,4,6-Tribromophenol	97.4%

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 398051
LEACH - R

Lab Sample ID: 20173
Sample Matrix: Waters

QC Report No. 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Date Release Authorized

Date extracted: 09/27/88
Date Analyzed: 09/29/88

Sample Volume: 1000 mls
Final extract Volume: 0.5 mls
Conc/Dilution: 1 to 1

CAS Number		µg/L
108-95-2	Phenol	0.5 U
111-44-4	bis(2-Chloroethyl)Ether	0.5 U
95-57-8	2-Chlorophenol	0.5 U
541-73-1	1,3-Dichlorobenzene	0.5 U
106-46-7	1,4-Dichlorobenzene	0.5 U
100-51-6	Benzyl Alcohol	2.5 U
95-50-1	1,2-Dichlorobenzene	0.5 U
95-48-7	2-Methylphenol	0.5 U
39638-32-9	bis(2-chloroisopropyl)Ether	0.5 U
106-44-5	4-Methylphenol	0.5 U
621-64-7	N-Nitroso-Di-n-Propylamine	0.5 U
67-72-1	Hexachloroethane	1.0 U
98-95-3	Nitrobenzene	0.5 U
78-59-1	Isophorone	0.5 U
88-75-5	2-Nitrophenol	2.5 U
105-67-9	2,4-Dimethylphenol	1.0 U
65-85-0	Benzoic Acid	5.0 U
111-91-1	bis(2-Chloroethoxy)Methane	0.5 U
120-83-2	2,4-Dichlorophenol	1.5 U
120-82-1	1,2,4-Trichlorobenzene	0.5 U
91-20-3	Naphthalene	0.5 U
106-47-8	4-Chloroaniline	1.5 U
87-68-3	Hexachlorobutadiene	1.0 U
59-50-7	4-Chloro-3-Methylphenol	1.0 U
91-57-6	2-Methylnaphthalene	0.5 U
77-47-4	Hexachlorocyclopentadiene	2.5 U
88-06-2	2,4,6-Trichlorophenol	2.5 U
95-95-4	2,4,5-Trichlorophenol	2.5 U
91-58-7	2-Chloronaphthalene	0.5 U
88-74-4	2-Nitroaniline	2.5 U
131-11-3	Dimethyl Phthalate	0.5 U
208-96-8	Acenaphthylene	0.5 U
99-09-2	3-Nitroaniline	2.5 U

CAS Number		µg/L
83-32-9	Acenaphthene	0.5 U
51-28-5	2,4-Dinitrophenol	5.0 U
100-02-7	4-Nitrophenol	2.5 U
132-64-9	Dibenzofuran	0.5 U
121-14-2	2,4-Dinitrotoluene	2.5 U
606-20-2	2,6-Dinitrotoluene	2.5 U
84-66-2	Diethylphthalate	0.5 U
7005-72-3	4-Chlorophenyl-phenylether	0.5 U
86-73-7	Fluorene	0.5 U
100-01-6	4-Nitroaniline	2.5 U
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U
86-30-6	N-Nitrosodiphenylamine(1)	0.5 U
101-55-3	4-Bromophenyl-phenylether	0.5 U
118-74-1	Hexachlorobenzene	0.5 U
87-86-5	Pentachlorophenol	2.5 U
85-01-8	Phenanthrene	0.5 U
120-12-7	Anthracene	0.5 U
84-74-2	Di-n-Butylphthalate	0.5 U
206-44-0	Fluoranthene	0.5 U
129-00-0	Pyrene	0.5 U
85-68-7	Butylbenzylphthalate	0.5 U
91-94-1	3,3'-Dichlorobenzidine	2.5 U
56-55-3	Benzo(a)Anthracene	0.5 U
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**1.5 B**
218-01-9	Chrysene	0.5 U
117-84-0	Di-n-Octyl Phthalate	0.5 U
205-99-2	Benzo(b)Fluoranthene	0.5 U
207-08-9	Benzo(k)Fluoranthene	0.5 U
50-32-8	Benzo(a)Pyrene	0.5 U
193-39-5	Indeno(1,2,3-cd)Pyrene	0.5 U
53-70-3	Dibenz(a,h)Anthracene	0.5 U
191-24-2	Benzo(ghi)Perylene	0.5 U

(1) Cannot be separated from diphenylamine

Report prepared 10/03/88 MAC/B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	85.4%
2-Fluorobiphenyl	79.3%
d14-p-Terphenyl	73.6%

***Acid surrogate recoveries**

d5-Phenol	40.8%
2-Fluorophenol	60.4%
2,4,6-Tribromophenol	94.6%

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 398052
LEACH - C

Lab Sample ID: 2017C
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Date Release Authorized: Brian N. Beber

Date extracted: 09/27/88
Date Analyzed: 09/29/88

Sample Volume: 1000 mls
Final extract Volume: 0.5 mls
Conc/Dilution: 1 to 1

CAS Number		µg/L
108-95-2	Phenol	0.5 U
111-44-4	bis(2-Chloroethyl)Ether	0.5 U
95-57-8	2-Chlorophenol	0.5 U
541-73-1	1,3-Dichlorobenzene	0.5 U
106-46-7	1,4-Dichlorobenzene	0.5 U
100-51-6	Benzyl Alcohol	2.5 U
95-50-1	1,2-Dichlorobenzene	0.5 U
95-48-7	2-Methylphenol	0.5 U
39638-32-9	bis(2-chloroisopropyl)Ether	0.5 U
106-44-5	4-Methylphenol	0.5 U
621-64-7	N-Nitroso-Di-n-Propylamine	0.5 U
67-72-1	Hexachloroethane	1.0 U
98-95-3	Nitrobenzene	0.5 U
78-59-1	Isophorone	0.5 U
88-75-5	2-Nitrophenol	2.5 U
105-67-9	2,4-Dimethylphenol	1.0 U
65-85-0	Benzoic Acid	5.0 U
111-91-1	bis(2-Chloroethoxy)Methane	0.5 U
120-83-2	2,4-Dichlorophenol	1.5 U
120-82-1	1,2,4-Trichlorobenzene	0.5 U
91-20-3	Naphthalene	0.5 U
106-47-8	4-Chloroaniline	1.5 U
87-68-3	Hexachlorobutadiene	1.0 U
59-50-7	4-Chloro-3-Methylphenol	1.0 U
91-57-6	2-Methylnaphthalene	0.5 U
77-47-4	Hexachlorocyclopentadiene	2.5 U
88-06-2	2,4,6-Trichlorophenol	2.5 U
95-95-4	2,4,5-Trichlorophenol	2.5 U
91-58-7	2-Chloronaphthalene	0.5 U
88-74-4	2-Nitroaniline	2.5 U
131-11-3	Dimethyl Phthalate	0.5 U
208-96-8	Acenaphthylene	0.5 U
99-09-2	3-Nitroaniline	2.5 U

CAS Number		µg/L
83-32-9	Acenaphthene	0.5 U
51-28-5	2,4-Dinitrophenol	5.0 U
100-02-7	4-Nitrophenol	2.5 U
132-64-9	Dibenzofuran	0.5 U
121-14-2	2,4-Dinitrotoluene	2.5 U
606-20-2	2,6-Dinitrotoluene	2.5 U
84-66-2	Diethylphthalate	0.5 U
7005-72-3	4-Chlorophenyl-phenylether	0.5 U
86-73-7	Fluorene	0.5 U
100-01-6	4-Nitroaniline	2.5 U
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U
86-30-6	N-Nitrosodiphenylamine(1)	0.5 U
101-55-3	4-Bromophenyl-phenylether	0.5 U
118-74-1	Hexachlorobenzene	0.5 U
87-86-5	Pentachlorophenol	2.5 U
85-01-8	Phenanthrene	0.5 U
120-12-7	Anthracene	0.5 U
84-74-2	Di-n-Butylphthalate	0.5 U
206-44-0	Fluoranthene	0.5 U
129-00-0	Pyrene	0.5 U
85-68-7	Butylbenzylphthalate	0.5 U
91-94-1	3,3'-Dichlorobenzidine	2.5 U
56-55-3	Benzo(a)Anthracene	0.5 U
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**0.8 B**
218-01-9	Chrysene	0.5 U
117-84-0	Di-n-Octyl Phthalate	0.5 U
205-99-2	Benzo(b)Fluoranthene	0.5 U
207-08-9	Benzo(k)Fluoranthene	0.5 U
50-32-8	Benzo(a)Pyrene	0.5 U
193-39-5	Indeno(1,2,3-cd)Pyrene	0.5 U
53-70-3	Dibenz(a,h)Anthracene	0.5 U
191-24-2	Benzo(ghi)Perylene	0.5 U

(1) Cannot be separated from diphenylamine

Report prepared 10/03/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	93.8%
2-Fluorobiphenyl	80.3%
d14-p-Terphenyl	65.4%

***Acid surrogate recoveries**

d5-Phenol	45.4%
2-Fluorophenol	66.2%
2,4,6-Tribromophenol	92.9%

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 398053
LEACH - D

Lab Sample ID: 2017D
Sample Matrix: Waters
QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Date Release Authorized: [signature]

Date extracted: 09/27/88
Date Analyzed: 09/29/88

Sample Volume: 1000 mls
Final extract Volume: 0.5 mls
Conc/Dilution: 1 to 1

CAS Number		µg/L
108-95-2	Phenol	0.5 U
111-44-4	bis(2-Chloroethyl)Ether	0.5 U
95-57-8	2-Chlorophenol	0.5 U
541-73-1	1,3-Dichlorobenzene	0.5 U
106-46-7	1,4-Dichlorobenzene	0.5 U
100-51-6	Benzyl Alcohol	2.5 U
95-50-1	1,2-Dichlorobenzene	0.5 U
95-48-7	2-Methylphenol	0.5 U
39638-32-9	bis(2-chloroisopropyl)Ether	0.5 U
106-44-5	4-Methylphenol	0.5 U
621-64-7	N-Nitroso-Di-n-Propylamine	0.5 U
67-72-1	Hexachloroethane	1.0 U
98-95-3	Nitrobenzene	0.5 U
78-59-1	Isophorone	0.5 U
88-75-5	2-Nitrophenol	2.5 U
105-67-9	2,4-Dimethylphenol	1.0 U
65-85-0	Benzoic Acid	5.0 U
111-91-1	bis(2-Chloroethoxy)Methane	0.5 U
120-83-2	2,4-Dichlorophenol	1.5 U
120-82-1	1,2,4-Trichlorobenzene	0.5 U
91-20-3	Naphthalene	0.5 U
106-47-8	4-Chloroaniline	1.5 U
87-68-3	Hexachlorobutadiene	1.0 U
59-50-7	4-Chloro-3-Methylphenol	1.0 U
91-57-6	2-Methylnapnthalene	0.5 U
77-47-4	Hexachlorocyclopentadiene	2.5 U
88-06-2	2,4,6-Trichlorophenol	2.5 U
95-95-4	2,4,5-Trichlorophenol	2.5 U
91-58-7	2-Chloronaphthalene	0.5 U
88-74-4	2-Nitroaniline	2.5 U
131-11-3	Dimethyl Phthalate	0.5 U
208-96-8	Acenaphthylene	0.5 U
99-09-2	3-Nitroaniline	2.5 U

CAS Number		µg/L
83-32-9	Acenaphthene	0.5 U
51-28-5	2,4-Dinitrophenol	5.0 U
100-02-7	4-Nitrophenol	2.5 U
132-64-9	Dibenzofuran	0.5 U
121-14-2	2,4-Dinitrotoluene	2.5 U
606-20-2	2,6-Dinitrotoluene	2.5 U
84-66-2	Diethylphthalate	0.5 U
7005-72-3	4-Chlorophenyl-phenylether	0.5 U
86-73-7	Fluorene	0.5 U
100-01-6	4-Nitroaniline	2.5 U
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U
86-30-6	N-Nitrosodiphenylamine(1)	0.5 U
101-55-3	4-Bromophenyl-phenylether	0.5 U
118-74-1	Hexachlorobenzene	0.5 U
87-86-5	Pentachlorophenol	2.5 U
85-01-8	Phenanthrene	0.5 U
120-12-7	Anthracene	0.5 U
84-74-2	Di-n-Butylphthalate	0.5 U
206-44-0	Fluoranthene	0.5 U
129-00-0	Pyrene	0.5 U
85-68-7	Butylbenzylphthalate	0.5 U
91-94-1	3,3'-Dichlorobenzidine	2.5 U
56-55-3	Benzo(a)Anthracene	0.5 U
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**12 B**
218-01-9	Chrysene	0.5 U
117-84-0	Di-n-Octyl Phthalate	0.5 U
205-99-2	Benzo(b)Fluoranthene	0.5 U
207-08-9	Benzo(k)Fluoranthene	0.5 U
50-32-8	Benzo(a)Pyrene	0.5 U
193-39-5	Indeno(1,2,3-cd)Pyrene	0.5 U
53-70-3	Dibenz(a,h)Anthracene	0.5 U
191-24-2	Benzo(ghi)Perylene	0.5 U

(1) Cannot be separated from diphenylamine

Report prepared 10/03/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	79.8%
2-Fluorobiphenyl	72.6%
d14-p-Terphenyl	68.2%

***Acid surrogate recoveries**

d5-Phenol	38.7%
2-Fluorophenol	57.7%
2,4,6-Tribromophenol	87.7%

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 398056
MATRIX SPIKE(D)

Lab Sample ID: 2017G
Sample Matrix: Waters

QC Report No: 2017-WD0E
Project No: Spokane
Date Received: 09/26/88

Date Release Authorized: [signature]

Date extracted: 09/27/88
Date Analyzed: 09/29/88

Sample Volume: 1000 mls
Final extract Volume: 0.5 mls
Conc/Dilution: 1 to 1

CAS Number		µg/L
108-95-2	Phenol	0.5 U
111-44-4	bis(2-Chloroethyl)Ether	0.5 U
95-57-8	2-Chlorophenol	0.5 U
541-73-1	1,3-Dichlorobenzene	0.5 U
106-46-7	1,4-Dichlorobenzene	0.5 U
100-51-6	Benzyl Alcohol	2.5 U
95-50-1	1,2-Dichlorobenzene	0.5 U
95-48-7	2-Methylphenol	0.5 U
39638-32-9	bis(2-chloroisopropyl)Ether	0.5 U
106-44-5	4-Methylphenol	0.5 U
621-64-7	N-Nitroso-Di-n-Propylamine	0.5 U
67-72-1	Hexachloroethane	1.0 U
98-95-3	Nitrobenzene	0.5 U
78-59-1	Isophorone	0.5 U
88-75-5	2-Nitrophenol	2.5 U
105-67-9	2,4-Dimethylphenol	1.0 U
65-85-0	Benzoic Acid	5.0 U
111-91-1	bis(2-Chloroethoxy)Methane	0.5 U
120-83-2	2,4-Dichlorophenol	1.5 U
120-82-1	1,2,4-Trichlorobenzene	0.5 U
91-20-3	Naphthalene	0.5 U
106-47-8	4-Chloroaniline	1.5 U
87-68-3	Hexachlorobutadiene	1.0 U
59-50-7	4-Chloro-3-Methylphenol	1.0 U
91-57-6	2-Methylnaphthalene	0.5 U
77-47-4	Hexachlorocyclopentadiene	2.5 U
88-06-2	2,4,6-Trichlorophenol	2.5 U
95-95-4	2,4,5-Trichlorophenol	2.5 U
91-58-7	2-Chloronaphthalene	0.5 U
88-74-4	2-Nitroaniline	2.5 U
131-11-3	Dimethyl Phthalate	0.5 U
208-96-8	Acenaphthylene	0.5 U
99-09-2	3-Nitroaniline	2.5 U

CAS Number		µg/L
83-32-9	Acenaphthene	0.5 U
51-28-5	2,4-Dinitrophenol	5.0 U
100-02-7	4-Nitrophenol	2.5 U
132-64-9	Dibenzofuran	0.5 U
121-14-2	2,4-Dinitrotoluene	2.5 U
606-20-2	2,6-Dinitrotoluene	2.5 U
84-66-2	Diethylphthalate	0.5 U
7005-72-3	4-Chlorophenyl-phenylether	0.5 U
86-73-7	Fluorene	0.5 U
100-01-6	4-Nitroaniline	2.5 U
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U
86-30-6	N-Nitrosodiphenylamine(1)	0.5 U
101-55-3	4-Bromophenyl-phenylether	0.5 U
118-74-1	Hexachlorobenzene	0.5 U
87-86-5	Pentachlorophenol	2.5 U
85-01-8	Phenanthrene	0.5 U
120-12-7	Anthracene	0.5 U
84-74-2	Di-n-Butylphthalate	0.5 U
206-44-0	Fluoranthene	0.5 U
129-00-0	Pyrene	0.5 U
85-68-7	Butylbenzylphthalate	0.5 U
91-94-1	3,3'-Dichlorobenzidine	2.5 U
56-55-3	Benzo(a)Anthracene	0.5 U
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**0.6 B**
218-01-9	Chrysene	0.5 U
117-84-0	Di-n-Octyl Phthalate	0.5 U
205-99-2	Benzo(b)Fluoranthene	0.5 U
207-08-9	Benzo(k)Fluoranthene	0.5 U
50-32-8	Benzo(a)Pyrene	0.5 U
193-39-5	Indeno(1,2,3-cd)Pyrene	0.5 U
53-70-3	Dibenz(a,h)Anthracene	0.5 U
191-24-2	Benzo(ghi)Perylene	0.5 U

(1) Cannot be separated from diphenylamine

Report prepared 10/03/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	71.6%
2-Fluorobiphenyl	73.5%
d14-p-Terphenyl	77.2%

***Acid surrogate recoveries**

d5-Phenol	35.2%
2-Fluorophenol	52.5%
2,4,6-Tribromophenol	93.4%

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 398055
LEACH - Ø

Lab Sample ID: 2017F
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Date Release Authorized: [signature]

Date extracted: 09/27/88
Date Analyzed: 09/29/88

Sample Volume: 1000 mls
Final extract Volume: 0.5 mls
Conc/Dilution: 1 to 1

CAS Number		µg/L
108-95-2	Phenol	0.5 U
111-44-4	bis(2-Chloroethyl)Ether	0.5 U
95-57-8	2-Chlorophenol	0.5 U
541-73-1	1,3-Dichlorobenzene	0.5 U
106-46-7	1,4-Dichlorobenzene	0.5 U
100-51-6	Benzyl Alcohol	2.5 U
95-50-1	1,2-Dichlorobenzene	0.5 U
95-48-7	2-Methylphenol	0.5 U
39638-32-9	bis(2-chloroisopropyl)Ether	0.5 U
106-44-5	4-Methylphenol	0.5 U
621-64-7	N-Nitroso-Di-n-Propylamine	0.5 U
67-72-1	Hexachloroethane	1.0 U
98-95-3	Nitrobenzene	0.5 U
78-59-1	Isophorone	0.5 U
88-75-5	2-Nitrophenol	2.5 U
105-67-9	2,4-Dimethylphenol	1.0 U
65-85-0	Benzoic Acid	5.0 U
111-91-1	bis(2-Chloroethoxy)Methane	0.5 U
120-83-2	2,4-Dichlorophenol	1.5 U
120-82-1	1,2,4-Trichlorobenzene	0.5 U
91-20-3	Naphthalene	0.5 U
106-47-8	4-Chloroaniline	1.5 U
87-68-3	Hexachlorobutadiene	1.0 U
59-50-7	4-Chloro-3-Methylphenol	1.0 U
91-57-6	2-Methylnaphthalene	0.5 U
77-47-4	Hexachlorocyclopentadiene	2.5 U
88-06-2	2,4,6-Trichlorophenol	2.5 U
95-95-4	2,4,5-Trichlorophenol	2.5 U
91-58-7	2-Chloronaphthalene	0.5 U
88-74-4	2-Nitroaniline	2.5 U
131-11-3	Dimethyl Phthalate	0.5 U
208-96-8	Acenaphthylene	0.5 U
99-09-2	3-Nitroaniline	2.5 U

CAS Number		µg/L
83-32-9	Acenaphthene	0.5 U
51-28-5	2,4-Dinitrophenol	5.0 U
100-02-7	4-Nitrophenol	2.5 U
132-64-9	Dibenzofuran	0.5 U
121-14-2	2,4-Dinitrotoluene	2.5 U
606-20-2	2,6-Dinitrotoluene	2.5 U
84-66-2	Diethylphthalate	0.5 U
7005-72-3	4-Chlorophenyl-phenylether	0.5 U
86-73-7	Fluorene	0.5 U
100-01-6	4-Nitroaniline	2.5 U
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U
86-30-6	N-Nitrosodiphenylamine(1)	0.5 U
101-55-3	4-Bromophenyl-phenylether	0.5 U
118-74-1	Hexachlorobenzene	0.5 U
87-86-5	Pentachlorophenol	2.5 U
85-01-8	Phenanthrene	0.5 U
120-12-7	Anthracene	0.5 U
84-74-2	Di-n-Butylphthalate	0.5 U
206-44-0	Fluoranthene	0.5 U
129-00-0	Pyrene	0.5 U
85-68-7	Butylbenzylphthalate	0.5 U
91-94-1	3,3'-Dichlorobenzidine	2.5 U
56-55-3	Benzo(a)Anthracene	0.5 U
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**0.9 B**
218-01-9	Chrysene	0.5 U
117-84-0	Di-n-Octyl Phthalate	0.5 U
205-99-2	Benzo(b)Fluoranthene	0.5 U
207-08-9	Benzo(k)Fluoranthene	0.5 U
50-32-8	Benzo(a)Pyrene	0.5 U
193-39-5	Indeno(1,2,3-cd)Pyrene	0.5 U
53-70-3	Dibenz(a,h)Anthracene	0.5 U
191-24-2	Benzo(ghi)Perylene	0.5 U

(1) Cannot be separated from diphenylamine

Report prepared 10/03/88 MAC:E

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	79.3%
2-Fluorobiphenyl	76.4%
d14-p-Terphenyl	70.7%

***Acid surrogate recoveries**

d5-Phenol	37.5%
2-Fluorophenol	56.9%
2,4,6-Tribromophenol	54.7%

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 398054

WELL POINT

Lab Sample ID: 2017E
Sample Matrix: Waters

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Date Release Authorized: Brian N. Beba

Date extracted: 09/27/88
Date Analyzed: 09/29/88

Sample Volume: 1000 mls
Final extract Volume: 0.5 mls
Conc/Dilution: 1 to 1

CAS Number		µg/L
108-95-2	Phenol	0.5 U
111-44-4	bis(2-Chloroethyl)Ether	0.5 U
95-57-8	2-Chlorophenol	0.5 U
541-73-1	1,3-Dichlorobenzene	0.5 U
106-46-7	1,4-Dichlorobenzene	0.5 U
100-51-6	Benzyl Alcohol	2.5 U
95-50-1	1,2-Dichlorobenzene	0.5 U
95-48-7	2-Methylphenol	0.5 U
39638-32-9	bis(2-chloroisopropyl)Ether	0.5 U
106-44-5	4-Methylphenol	0.5 U
621-64-7	N-Nitroso-Di-n-Propylamine	0.5 U
67-72-1	Hexachloroethane	1.0 U
98-95-3	Nitrobenzene	0.5 U
78-59-1	Isophorone	0.5 U
88-75-5	2-Nitrophenol	2.5 U
105-67-9	2,4-Dimethylphenol	1.0 U
65-85-0	Benzoic Acid	5.0 U
111-91-1	bis(2-Chloroethoxy)Methane	0.5 U
120-83-2	2,4-Dichlorophenol	1.5 U
120-82-1	1,2,4-Trichlorobenzene	0.5 U
91-20-3	Naphthalene	0.5 U
106-47-8	4-Chloroaniline	1.5 U
87-68-3	Hexachlorobutadiene	1.0 U
59-50-7	4-Chloro-3-Methylphenol	1.0 U
91-57-6	2-Methylnaphthalene	0.5 U
77-47-4	Hexachlorocyclopentadiene	2.5 U
88-06-2	2,4,6-Trichlorophenol	2.5 U
95-95-4	2,4,5-Trichlorophenol	2.5 U
91-58-7	2-Chloronaphthalene	0.5 U
88-74-4	2-Nitroaniline	2.5 U
131-11-3	Dimethyl Phthalate	0.5 U
208-96-8	Acenaphthylene	0.5 U
99-09-2	3-Nitroaniline	2.5 U

CAS Number		µg/L
83-32-9	Acenaphthene	0.5 U
51-28-5	2,4-Dinitrophenol	5.0 U
100-02-7	4-Nitrophenol	2.5 U
132-64-9	Dibenzofuran	0.5 U
121-14-2	2,4-Dinitrotoluene	2.5 U
606-20-2	2,6-Dinitrotoluene	2.5 U
84-66-2	Diethylphthalate	0.5 U
7005-72-3	4-Chlorophenyl-phenylether	0.5 U
86-73-7	Fluorene	0.5 U
100-01-6	4-Nitroaniline	2.5 U
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U
86-30-6	N-Nitrosodiphenylamine(1)	0.5 U
101-55-3	4-Bromophenyl-phenylether	0.5 U
118-74-1	Hexachlorobenzene	0.5 U
87-86-5	Pentachlorophenol	2.5 U
85-01-8	Phenanthrene	0.5 U
120-12-7	Anthracene	0.5 U
84-74-2	Di-n-Butylphthalate	0.5 U
206-44-0	Fluoranthene	0.5 U
129-00-0	Pyrene	0.5 U
85-68-7	Butylbenzylphthalate	0.5 U
91-94-1	3,3'-Dichlorobenzidine	2.5 U
56-55-3	Benzo(a)Anthracene	0.5 U
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**0.6 B**
218-01-9	Chrysene	0.5 U
117-84-0	Di-n-Octyl Phthalate	0.5 U
205-99-2	Benzo(b)Fluoranthene	0.5 U
207-08-9	Benzo(k)Fluoranthene	0.5 U
50-32-8	Benzo(a)Pyrene	0.5 U
193-39-5	Indeno(1,2,3-cd)Pyrene	0.5 U
53-70-3	Dibenz(a,h)Anthracene	0.5 U
191-24-2	Benzo(ghi)Perylene	0.5 U

(1) Cannot be separated from diphenylamine

Report prepared 10/03/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	84.3%
2-Fluorobiphenyl	76.6%
d14-p-Terphenyl	78.8%

***Acid surrogate recoveries**

d5-Phenol	41.9%
2-Fluorophenol	58.3%
2,4,6-Tribromophenol	88.0%

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 398056 Matrix Spike

Lab Sample ID: 2017GMS
Sample Matrix: Waters

Date Release Authorized: [signature]

Date extracted: 09/27/88
Date Analyzed: 09/29/88

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Sample Volume: 1000 mls
Final extract Volume: 0.5 mls
Conc/Dilution: 1 to 1

CAS Number		µg/L
108-95-2	Phenol	-
111-44-4	bis(2-Chloroethyl)Ether	0.5 U
95-57-8	2-Chlorophenol	-
541-73-1	1,3-Dichlorobenzene	0.5 U
106-46-7	1,4-Dichlorobenzene	-
100-51-6	Benzyl Alcohol	2.5 U
95-50-1	1,2-Dichlorobenzene	0.5 U
95-48-7	2-Methylphenol	0.5 U
39638-32-9	bis(2-chloroisopropyl)Ether	0.5 U
106-44-5	4-Methylphenol	0.5 U
621-64-7	N-Nitroso-Di-n-Propylamine	-
67-72-1	Hexachloroethane	1.0 U
98-95-3	Nitrobenzene	0.5 U
78-59-1	Isophorone	0.5 U
88-75-5	2-Nitrophenol	2.5 U
105-67-9	2,4-Dimethylphenol	1.0 U
65-85-0	Benzoic Acid	5.0 U
111-91-1	bis(2-Chloroethoxy)Methane	0.5 U
120-83-2	2,4-Dichlorophenol	1.5 U
120-82-1	1,2,4-Trichlorobenzene	-
91-20-3	Naphthalene	0.5 U
106-47-8	4-Chloroaniline	1.5 U
87-68-3	Hexachlorobutadiene	1.0 U
59-50-7	4-Chloro-3-Methylphenol	-
91-57-6	2-Methylnaphthalene	0.5 U
77-47-4	Hexachlorocyclopentadiene	2.5 U
88-06-2	2,4,6-Trichlorophenol	2.5 U
95-95-4	2,4,5-Trichlorophenol	2.5 U
91-58-7	2-Chloronaphthalene	0.5 U
88-74-4	2-Nitroaniline	2.5 U
131-11-3	Dimethyl Phthalate	0.5 U
208-96-8	Acenaphthylene	0.5 U
99-09-2	3-Nitroaniline	2.5 U

CAS Number		µg/L
83-32-9	Acenaphthene	-
51-28-5	2,4-Dinitrophenol	5.0 U
100-02-7	4-Nitrophenol	-
132-64-9	Dibenzofuran	0.5 U
121-14-2	2,4-Dinitrotoluene	-
606-20-2	2,6-Dinitrotoluene	2.5 U
84-66-2	Diethylphthalate	0.5 U
7005-72-3	4-Chlorophenyl-phenylether	0.5 U
86-73-7	Fluorene	0.5 U
100-01-6	4-Nitroaniline	2.5 U
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U
86-30-6	N-Nitrosodiphenylamine(1)	0.5 U
101-55-3	4-Bromophenyl-phenylether	0.5 U
118-74-1	Hexachlorobenzene	0.5 U
87-86-5	Pentachlorophenol	-
85-01-8	Phenanthrene	0.5 U
120-12-7	Anthracene	0.5 U
84-74-2	Di-n-Butylphthalate	0.5 U
206-44-0	Fluoranthene	0.5 U
129-00-0	Pyrene	-
85-68-7	Butylbenzylphthalate	0.5 U
91-94-1	3,3'-Dichlorobenzidine	2.5 U
56-55-3	Benzo(a)Anthracene	0.5 U
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**0.8 B**
218-01-9	Chrysene	0.5 U
117-84-0	Di-n-Octyl Phthalate	0.5 U
205-99-2	Benzo(b)Fluoranthene	0.5 U
207-08-9	Benzo(k)Fluoranthene	0.5 U
50-32-8	Benzo(a)Pyrene	0.5 U
193-39-5	Indeno(1,2,3-cd)Pyrene	0.5 U
53-70-3	Dibenz(a,h)Anthracene	0.5 U
191-24-2	Benzo(ghi)Perylene	0.5 U

(1) Cannot be separated from diphenylamine

Report prepared 10/03/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	76.5%
2-Fluorobiphenyl	78.0%
d14-p-Terphenyl	87.5%

***Acid surrogate recoveries**

d5-Phenol	39.4%
2-Fluorophenol	47.6%
2,4,6-Tribromophenol	92.4%

ANALYTICAL
RESOURCES
INCORPORATED
Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 398056 Spike Duplicate

Lab Sample ID: 2017GMSD
Sample Matrix: Waters

Date Release Authorized: [signature]

Date extracted: 09/27/88
Date Analyzed: 09/29/88

QC Report No: 2017-WDOE
Project No: Spokane
Date Received: 09/26/88

Sample Volume: 1000 mls
Final extract Volume: 0.5 mls
Conc/Dilution: 1 to 1

CAS Number		µg/L
108-95-2	Phenol	-
111-44-4	bis(2-Chloroethyl)Ether	0.5 U
95-57-8	2-Chlorophenol	-
541-73-1	1,3-Dichlorobenzene	0.5 U
106-46-7	1,4-Dichlorobenzene	-
100-51-6	Benzyl Alcohol	2.5 U
95-50-1	1,2-Dichlorobenzene	0.5 U
95-48-7	2-Methylphenol	0.5 U
39638-32-9	bis(2-chloroisopropyl)Ether	0.5 U
106-44-5	4-Methylphenol	0.5 U
621-64-7	N-Nitroso-Di-n-Propylamine	-
67-72-1	Hexachloroethane	1.0 U
98-95-3	Nitrobenzene	0.5 U
78-59-1	Isophorone	0.5 U
88-75-5	2-Nitrophenol	2.5 U
105-67-9	2,4-Dimethylphenol	1.0 U
65-85-0	Benzoic Acid	5.0 U
111-91-1	bis(2-Chloroethoxy)Methane	0.5 U
120-83-2	2,4-Dichlorophenol	1.5 U
120-82-1	1,2,4-Trichlorobenzene	-
91-20-3	Naphthalene	0.5 U
106-47-8	4-Chloroaniline	1.5 U
87-68-3	Hexachlorobutadiene	1.0 U
59-50-7	4-Chloro-3-Methylphenol	-
91-57-6	2-Methylnaphthalene	0.5 U
77-47-4	Hexachlorocyclopentadiene	2.5 U
88-06-2	2,4,6-Trichlorophenol	2.5 U
95-95-4	2,4,5-Trichlorophenol	2.5 U
91-58-7	2-Chloronaphthalene	0.5 U
88-74-4	2-Nitroaniline	2.5 U
131-11-3	Dimethyl Phthalate	0.5 U
208-96-8	Acenaphthylene	0.5 U
99-09-2	3-Nitroaniline	2.5 U

CAS Number		µg/L
83-32-9	Acenaphthene	-
51-28-5	2,4-Dinitrophenol	5.0 U
100-02-7	4-Nitrophenol	-
132-64-9	Dibenzofuran	0.5 U
121-14-2	2,4-Dinitrotoluene	-
606-20-2	2,6-Dinitrotoluene	2.5 U
84-66-2	Diethylphthalate	0.5 U
7005-72-3	4-Chlorophenyl-phenylether	0.5 U
86-73-7	Fluorene	0.5 U
100-01-6	4-Nitroaniline	2.5 U
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U
86-30-6	N-Nitrosodiphenylamine(1)	0.5 U
101-55-3	4-Bromophenyl-phenylether	0.5 U
118-74-1	Hexachlorobenzene	0.5 U
87-86-5	Pentachlorophenol	-
85-01-8	Phenanthrene	0.5 U
120-12-7	Anthracene	0.5 U
84-74-2	Di-n-Butylphthalate	0.5 U
206-44-0	Fluoranthene	0.5 U
129-00-0	Pyrene	-
85-68-7	Butylbenzylphthalate	0.5 U
91-94-1	3,3'-Dichlorobenzidine	2.5 U
56-55-3	Benzo(a)Anthracene	0.5 U
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**1.6 B**
218-01-9	Chrysene	0.5 U
117-84-0	Di-n-Octyl Phthalate	0.5 U
205-99-2	Benzo(b)Fluoranthene	0.5 U
207-08-9	Benzo(k)Fluoranthene	0.5 U
50-32-8	Benzo(a)Pyrene	0.5 U
193-39-5	Indeno(1,2,3-cd)Pyrene	0.5 U
53-70-3	Dibenz(a,h)Anthracene	0.5 U
191-24-2	Benzo(ghi)Perylene	0.5 U

(1) Cannot be separated from diphenylamine

Report prepared 10/03/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	82.7%
2-Fluorobiphenyl	76.1%
d14-p-Terphenyl	84.8%

***Acid surrogate recoveries**

d5-Phenol	42.4%
2-Fluorophenol	57.0%
2,4,6-Tribromophenol	92.6%