

# START

ENCLOSURE 3

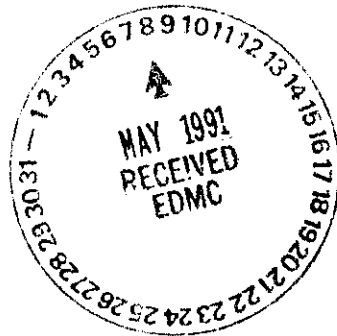
## PACIFIC NORTHWEST ENVIRONMENTAL LABORATORY

RECEIVED

APR 27 1990

REGULATORY COMPLIANCE

### Analytical Report



# PACIFIC NORTHWEST ENVIRONMENTAL LABORATORY

April 26, 1990

Steven Lockhaven  
Advanced Nuclear Fuels Corp.  
2101 Horn Rapids Road  
Richland WA 99352

## **NARRATIVE FOR PNEL 2372** ***Submission from Pacific Northwest Environmental Laboratory***

Enclosed are data summary sheets and supporting documentation for the eighteen samples received on April 11, 1990. The field identification numbers, corresponding lab identification numbers, and dates collected are listed below.

<u>FIELD ID</u>	<u>LAB ID</u>	<u>DATE COLLECTED</u>
1A	2372-01	04-11-90
1B	2372-02	04-11-90
2A	2372-03	04-11-90
2B	2372-04	04-11-90
9A	2372-05	04-11-90
13A	2372-06	04-11-90
14A	2372-07	04-11-90
15A	2372-08	04-11-90
16A	2372-09	04-11-90
9B	2372-10	04-11-90
13B	2372-11	04-11-90
14B	2372-12	04-11-90
15B	2372-13	04-11-90
16B	2372-14	04-11-90
Trip Blank 1	2372-15	04-11-90
15B	2372-16	04-11-90
9B	2372-17	04-11-90
Trip Blank 2	2372-18	04-11-90

Listed below are anomalies and narratives associated with the receipt and/or analysis of these samples.

### ***SAMPLE RECEIVING***

The samples 15B, 9B, and Trip Blank (2372-16, 17, and 18 respectively) were received at 10 degrees C upon sample arrival. Also, the Trip Blank (2372-18) had an airbubble in two of two vial vials. The samples are to be processed as originally requested using the vial with the smallest airbubble for analysis of the Trip Blank.

PACIFIC NORTHWEST ENVIRONMENTAL LABORATORY

Steven Lockhaven  
Advanced Nuclear Fuels Corp.  
April 26, 1990  
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One of two voa vials for sample 9B (2372-10) had a broken lid upon sample receipt. The vial with the lid intact was to be used for analysis.

The samples 1B, 13B, and 14B for volatile analysis (2372-02, 11, 12 respectively) contained an air bubble in one of two voa vials. The vial without the airbubble was to be used for analysis.

Samples 14A and the Trip Blank (2372-07 and 15 respectively) contained an airbubble in two of two voa vials. The samples are to be analyzed as originally requested, using the vial with the smallest airbubble.

The chain of custody forms for these samples were not relinquished by the originator with a signature. The samples were processed as originally requested.

The above anomalies have been verbally reported to Steve Lockhaven upon sample receipt at PNEEL. The corrective actions are as per Steve Lockhaven of Advanced Nuclear Fuels, Inc.

**VOA 601**

No anomalies were detected with this batch.

All samples except 2372-18 and 2372-06 required dilution.

**VOA CLP**

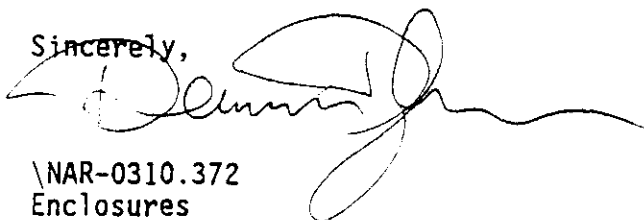
No anomalies were reported for this case.

**BNA**

No problems were encountered during the extraction and analysis of these samples and their associated QC.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designee, as verified by the following signature.

Sincerely,

A handwritten signature in black ink, appearing to be "D. L. Lockhaven", written over a horizontal line.

\NAR-0310.372  
Enclosures

**PACIFIC NORTHWEST  
ENVIRONMENTAL  
LABORATORY**

METHOD REFERENCE

Chlorinated Volatiles      Method 8010, Test Methods for Evaluating Solid Waste,  
United States Environmental Protection Agency, SW-846,  
3rd Ed., 1986.

Analytical Methods for      Environmental Protection Agency, Contract Laboratory  
Volatiles                      Program, Organic Statement of Work, Exhibit-D, February  
1988.

Gas Chromatograph/Mass      Method 8270, Test Methods for Evaluating Solid Waste,  
Spectrometry for Semi-      United States Environmental Protection Agency, SW-846,  
Volatile Organics:              3rd Ed., 1986.  
Capillary Column  
Technique

**PACIFIC NORTHWEST  
ENVIRONMENTAL  
LABORATORY**

**DATA REPORTING QUALIFIERS**

Some of these qualifiers may appear in this analytical data report. Soil samples are analyzed and reported on a dry weight basis unless otherwise noted.

**ORGANICS QUALIFIERS**

- A - This flag indicates that a TIC is a suspected aldol-condensation product.
- B - Indicates compound was found in the associated blank as well as in the sample.
- C - This flag applies to pesticide results where the identification has been confirmed by GC/MS.
- D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis.
- J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a target compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.
- M - Indicates value is taken from a medium level analysis.
- ND- Not detected. Detection limit shown in parentheses.
- NQ- Not quantitated as...
- U - Indicates compound was analyzed for but not detected at the given detection limit. The sample quantitation limit was corrected for dilution and for percent moisture, when applicable.
- X - Other specific flags and footnotes may be required to properly define the results. If more than two qualifiers are required for a sample result, the "X" flag combines several flags, as needed. For instance, the "X" flag might combine the "A," "B," and "D" flags for some sample.
- \* - Indicates spiked compounds used for MS/MSD analysis.

**INORGANICS QUALIFIERS**

- NA- Relative percent difference calculation is not applicable to analytes when not detected.
- NC- Not calculated when analyte is not detected.
- NS- Not calculated when sample concentration of analyte exceeds spike level by a factor of four or more.
- U - Indicates that analyte was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

**INORGANICS METHOD QUALIFIERS**

- CV- Manual Cold Vapor AA
- F - FURNACE AA
- P - ICP

**PACIFIC NORTHWEST  
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LABORATORY**

Client Number: 63-900310

VOLATILE ORGANICS ANALYSIS

Client Sample ID.	Blank	1A	1B	2A
PNEL Sample ID.	2372-MB	2372-01	2372-02	2372-03
Matrix	Water	Water	Water	Water
Date Received	NA	04-12-90	04-12-90	04-12-90
Date Analyzed	04-23-90	04-23-90	04-23-90	04-23-90
Units	ug/L	ug/L	ug/L	ug/L

Compound

1,1,1-Trichloroethane	ND(0.5)	7.2	7.6	ND(5.0)
Carbon tetrachloride	ND(0.5)	ND(5.0)	ND(5.0)	ND(5.0)
Trichloroethylene	ND(0.5)	40	40	56

Surrogate

% Bromochloromethane	101	93	94	98
% 4-Bromofluorobenzene	118	113	112	115

**PACIFIC NORTHWEST  
ENVIRONMENTAL  
LABORATORY**

Client Number: 63-900310

VOLATILE ORGANICS ANALYSIS

Client Sample ID.	Blank	2B	9A	13A
PNEL Sample ID.	2372-MB	2372-04	2372-05	2372-06
Matrix	Water	Water	Water	Water
Date Received	NA	04-12-90	04-12-90	04-12-90
Date Analyzed	04-23-90	04-23-90	04-23-90	04-23-90
Units	ug/L	ug/L	ug/L	ug/L

Compound

1,1,1-Trichloroethane	ND(0.5)	ND(5.0)	ND(5.0)	ND(0.5)
Carbon tetrachloride	ND(0.5)	ND(5.0)	ND(5.0)	ND(0.5)
Trichloroethylene	ND(0.5)	59	22	ND(0.5)

Surrogate

% Bromochloromethane	101	90	90	89
% 4-Bromofluorobenzene	118	116	116	98

**PACIFIC NORTHWEST  
ENVIRONMENTAL  
LABORATORY**

Client Number: 63-900310

VOLATILE ORGANICS ANALYSIS

Client Sample ID.	Blank	14A	15A	16A
PNEL Sample ID.	2372-MB	2372-07	2372-08	2372-09
Matrix	Water	Water	Water	Water
Date Received	NA	04-12-90	04-12-90	04-12-90
Date Analyzed	04-23-90	04-23-90	04-23-90	04-23-90
Units	ug/L	ug/L	ug/L	ug/L

Compound

1,1,1-Trichloroethane	ND(0.5)	8.6	6.8	ND(5.0)
Carbon tetrachloride	ND(0.5)	ND(5.0)	ND(5.0)	ND(5.0)
Trichloroethylene	ND(0.5)	33	72	30

Surrogate

% Bromochloromethane	101	91	93	95
% 4-Bromofluorobenzene	118	102	108	103



**PACIFIC NORTHWEST  
ENVIRONMENTAL  
LABORATORY**

Client Number: 63-900310

VOLATILE ORGANICS ANALYSIS

Client Sample ID.	Blank	Trip Blank
PNEL Sample ID.	2372-MB	2372-18
Matrix	Water	Water
Date Received	NA	04-12-90
Date Analyzed	04-23-90	04-23-90
Units	ug/L	ug/L

Compound

1,1,1-Trichloroethane	ND(0.5)	ND(0.5)
Carbon tetrachloride	ND(0.5)	ND(0.5)
Trichloroethylene	ND(0.5)	ND(0.5)

Surrogate

% Bromochloromethane	101	99
% 4-Bromofluorobenzene	118	118

**PACIFIC NORTHWEST  
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LABORATORY**

VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

PNEL Sample ID.:	2379-01	Client No.:	NA
Client Sample ID.:	NA	Sample Matrix:	Water
Date Sample Received:	NA	Date Sample Analyzed:	04-22-90

<u>Compound</u>	<u>SPIKE ADDED (ug/L)</u>	<u>SAMPLE CONC. (ug/L)</u>	<u>MS CONC. (ug/L)</u>	<u>MS % REC*</u>	<u>QC LIMITS REC</u>
1,1-Dichloroethene	20.0	ND	18.8	94	61-145
Trichloroethene	20.0	ND	21.3	106	71-120
Benzene	20.0	ND	18.2	91	76-127
Toluene	20.0	ND	18.7	94	76-125
Chlorobenzene	20.0	ND	25.8	129	75-130

<u>Compound</u>	<u>SPIKE ADDED (ug/L)</u>	<u>MSD CONC. (ug/L)</u>	<u>MSD % REC*</u>	<u>% RPD*</u>	<u>QC LIMITS RPD REC</u>
1,1-Dichloroethene	20.0	18.1	90	4.3	14 61-145
Trichloroethene	20.0	20.7	104	1.9	14 71-120
Benzene	20.0	17.7	88	3.4	11 76-127
Toluene	20.0	17.8	89	5.5	13 76-125
Chlorobenzene	20.0	25.2	126	2.4	13 75-130

# Column to be used to flag recovery and RPD (Relative % Difference) values with an asterisk.

\* Values outside of QC limits

RPD: 0 out of 5 outside limits  
Spike Recovery: 0 out of 10 outside limits

PACIFIC NORTHWEST ENVIRONMENTAL LABORATORY

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY REPORT

Matrix Spike - LAB Sample No.: 2357-04

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	2500	0	2500	100	61-145
Trichloroethene	2500	620	3100	99	71-120
Benzene	2500	0	2500	100	76-127
Toluene	2500	0	2500	100	76-135
Chlorobenzene	2500	0	2500	100	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	2500	2500	100	0	14 61-145
Trichloroethene	2500	3100	99	0	14 71-120
Benzene	2500	2500	100	0	11 76-127
Toluene	2500	2400	96	4	13 76-135
Chlorobenzene	2500	2500	100	0	13 75-130

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of qc limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

COMMENTS: \_\_\_\_\_

PACIFIC NORTHWEST ENVIRONMENTAL LABORATORY  
 WATER VOLATILE SURROGATE RECOVERY REPORT

	LAB	S1	S2	S3	TOT
	SAMPLE NO.	(TOL)#	(BFB)#	(DCE)#	OUT
01	VELKA1	103	101	96	0
02	2372-10	99	97	91	0
03	2372-11	104	101	97	0
04	2372-12	98	102	96	0
05	2372-13	101	99	99	0
06	2372-14	100	98	98	0
07	2372-10DL	103	97	101	0
08	2372-15	100	98	97	0
09					
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GC LIMITS

S1 (TOL) = Toluene-d8 (88-110)  
 S2 (BFB) = Bromofluorobenzene (86-115)  
 S3 (DCE) = 1,2-Dichloroethane-d4 (75-114)

# Column to be used to flag recovery values

D Surrogates diluted out

Pacific Northwest Environmental Laboratory

VOLATILE ORGANICS ANALYSIS DATA SHEET  
(GC/MS PURGE AND TRAP)

Lab Sample ID: VBLKA1  
 Sample Matrix: WATER  
 Concentration: LOW  
 Sample Volume: 5.0mL  
 Percent Moisture: NA  
 Date Extracted: NA  
 Date Analyzed: 4/12/90  
 Instrument ID: VOA #1

Customer Sample No: NA  
 Sample Description: METHOD BLANK  
 Date Collected: NA  
 Time Collected: NA  
 Date Received: NA  
 Date Release Authorized:

C.A.S. Number	Compound	ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
57-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
133-02-7	Xylene (total)	5	U

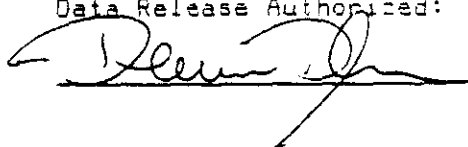
\* See footnote page for data qualifiers (Q)

## Pacific Northwest Environmental Laboratory

VOLATILE ORGANICS ANALYSIS DATA SHEET  
(GC/MS PURGE AND TRAP)

Lab Sample ID: 2372-10  
 Sample Matrix: WATER  
 Concentration: LOW  
 Sample Volume: 5.0mL  
 Percent Moisture: NA  
 Date Extracted: NA  
 Date Analyzed: 4/12/90  
 Instrument ID: VOA #1

Customer Sample No: 9B  
 Sample Description: TEST WELL #9  
 Date Collected: 4/11/90  
 Time Collected: 12:35  
 Date Received: 4/12/90  
 Data Release Authorized:



C.A.S. Number	Compound	ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	300	D
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-83-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
561-79-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
78-34-5	1,1,2,2-Tetrachloroethane	5	U
108-68-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
133-02-7	Xylene (total)	5	U

\* See footnote page for data qualifiers (Q)

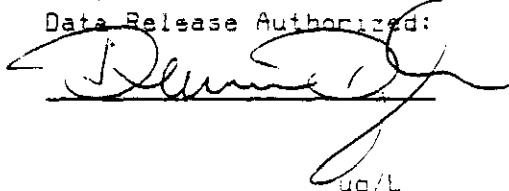
FA4227

## Pacific Northwest Environmental Laboratory

VOLATILE ORGANICS ANALYSIS DATA SHEET  
(GC/MS PURGE AND TRAP)

Lab Sample ID: 2372-11  
 Sample Matrix: WATER  
 Concentration: LOW  
 Sample Volume: 5.0mL  
 Percent Moisture: NA  
 Date Extracted: NA  
 Date Analyzed: 4/12/90  
 Instrument ID: VOA #1

Customer Sample No: 138  
 Sample Description: TEST WELL #13  
 Date Collected: 4/11/90  
 Time Collected: 13:52  
 Date Received: 4/12/90  
 Data Release Authorized:



C.A.S. Number	Compound	ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethane (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-83-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-73-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
103-02-7	Xylene (total)	5	U

\* See footnote page for data qualifiers (Q)

(FA4226)

## Pacific Northwest Environmental Laboratory

VOLATILE ORGANICS ANALYSIS DATA SHEET  
(GC/MS PURGE AND TRAP)

Lab Sample ID: 2372-12  
 Sample Matrix: WATER  
 Concentration: LOW  
 Sample Volume: 5.0mL  
 Percent Moisture: NA  
 Date Extracted: NA  
 Date Analyzed: 4/12/90  
 Instrument ID: VOA #1

Customer Sample No: 148  
 Sample Description: TEST WELL #14  
 Date Collected: 4/11/90  
 Time Collected: 11:55  
 Date Received: 4/12/90  
 Data Release Authorized:

C.A.S. Number	Compound	ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	7	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
76-87-5	1,2-Dichloropropane	5	U
10051-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	39	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10051-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
531-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
133-02-7	Xylene (total)	5	U

\* See footnote page for data qualifiers (Q)

FA4029



## Pacific Northwest Environmental Laboratory

VOLATILE ORGANICS ANALYSIS DATA SHEET  
(GC/MS PURGE AND TRAP)

Lab Sample ID: 2372-13  
 Sample Matrix: WATER  
 Concentration: LOW  
 Sample Volume: 5.0mL  
 Percent Moisture: NA  
 Date Extracted: NA  
 Date Analyzed: 4/12/90  
 Instrument ID: VOA #1

Customer Sample No: 15B  
 Sample Description: TEST WELL #15  
 Date Collected: 4/11/90  
 Time Collected: 12:15  
 Date Received: 4/12/90  
 Data Release Authorized:

C.A.S. Number	Compound	ug/L	Q
74-87-3	Chloromethane	10	J
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	75	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	J
108-90-7	Chlorobenzene	5	J
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	J
133-02-7	Xylene (total)	5	J

\* See footnote page for data qualifiers (Q)

EA4230

Pacific Northwest Environmental Laboratory

VOLATILE ORGANICS ANALYSIS DATA SHEET  
(GC/MS PURGE AND TRAP)

Lab Sample ID: 2372-14  
 Sample Matrix: WATER  
 Concentration: LOW  
 Sample Volume: 5.0mL  
 Percent Moisture: NA  
 Date Extracted: NA  
 Date Analyzed: 4/12/90  
 Instrument ID: VOA #1

Customer Sample No: 168  
 Sample Description: TEST WELL #16  
 Date Collected: 4/11/90  
 Time Collected: 12:23  
 Date Received: 4/12/90  
 Data Release Authorized:

C.A.S. Number	Compound	ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethane	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethane (total)	5	U
57-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
76-93-3	2-Butanone	10	U
71-55-8	1,1,1-Trichloroethane	1	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	75	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-5	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-5	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
133-02-7	Xylene (total)	5	U

\* See footnote page for data qualifiers (Q)

## Pacific Northwest Environmental Laboratory

VOLATILE ORGANICS ANALYSIS DATA SHEET  
(GC/MS PURGE AND TRAP)

Lab Sample ID: 2372-15  
 Sample Matrix: WATER  
 Concentration: LOW  
 Sample Volume: 5.0mL  
 Percent Moisture: NA  
 Date Extracted: NA  
 Date Analyzed: 4/12/90  
 Instrument ID: VOA #1

Customer Sample No: TRIP BLANK  
 Sample Description: TRIP BLANK  
 Date Collected: 4/02/90  
 Time Collected: NA  
 Date Received: 4/12/90  
 Data Release Authorized:

C.A.S. Number	Compound	ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-56-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
133-02-7	Xylene (total)	5	U

\* See footnote page for data qualifiers (Q)

PA4233

2C  
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: Pacific Northwest Environmental Laboratory

	LAB SAMPLE NO.	S1 (NBZ)#	S2 (FBP)#	S3 (TPH)#	S4 (PHL)#	S5 (2FP)#	S6 (TBP)#	OTHER	TOT OUT
01	2372-MB	59	66	87	67	56	68		0
02	2372-16	93	95	95	66	58	90		0
03	2372-17	68	80	88	65	57	66		0
04	2372-17MS	58	67	87	49	43	60		0
05	2372-17MSD	67	72	75	58	48	75		0
06									
07									
08									
09									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

QC LIMITS

S1 (NBZ) = Nitrobenzene-d5 (35-114)  
 S2 (FBP) = 2-Fluorobiphenyl (43-116)  
 S3 (TPH) = Terphenyl-d14 (33-141)  
 S4 (PHL) = Phenol-d5 (10-94)  
 S5 (2FP) = 2-Fluorophenol (21-100)  
 S6 (TBP) = 2,4,6-Tribromophenol (10-123)

# Column to be used to flag recovery values  
 \* Values outside of contract required QC limits  
 NA Surrogates not analyzed for

## WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: Pacific Northwest Environmental Laboratory

Matrix Spike - Sample No.: 2372-17

Batch No.: BW-08

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC (LIMITS) REC.
Phenol	200	0	110	55	12- 89
2-Chlorophenol	200	0	88.9	44	27-123
1,4-Dichlorobenzene	100	0	47.9	48	36- 97
N-Nitroso-di-n-prop.(1)	100	0	46.2	46	41-116
1,2,4-Trichlorobenzene	100	0	56.6	57	39- 98
4-Chloro-3-methylphenol	200	0	80.5	40	23- 97
Acenaphthene	100	0	57.0	57	46-118
4-Nitrophenol	200	0	27.0	14	10- 80
2,4-Dinitrotoluene	100	0	38.4	38	24- 96
Pentachlorophenol	200	0	233	116*	9-103
Pyrene	100	0	71.3	71	26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD   REC.
Phenol	200	131.0	66	18	42   12- 89
2-Chlorophenol	200	109	54	20	40   27-123
1,4-Dichlorobenzene	100	58.9	59	21	28   36- 97
N-Nitroso-di-n-prop.(1)	100	58.1	58	23	38   41-116
1,2,4-Trichlorobenzene	100	66.8	67	16	28   39- 98
4-Chloro-3-methylphenol	200	122	61	42	42   23- 97
Acenaphthene	100	66.7	33	53*	31   46-118
4-Nitrophenol	200	39.9	20	35	50   10- 80
2,4-Dinitrotoluene	100	48.7	49	25	38   24- 96
Pentachlorophenol	200	349	174*	40	50   9-103
Pyrene	100	62.6	63	12	31   26-127

(1) N-Nitroso-di-n-propylamine

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

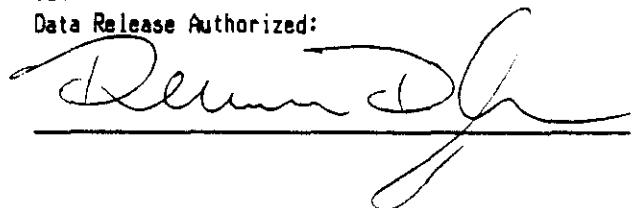
RPD: 1 out of 11 outside limits

Spike Recovery: 2 out of 22 outside limits

SEMI VOLATILE  
ORGANICS ANALYSIS DATA SHEET

Laboratory Name: Pacific Northwest Environmental Lab.  
Project Number: 63-900310-109  
Sample Matrix: Water  
Concentration: Low Dilution Factor: 1  
Sample wt/vol: 1000 mL  
Date Extracted: 4/17/90  
Date Analyzed: 4/25/90

Lab Sample: 2372-MB  
Customer Sample: Method Blank  
Sample Description: Method Blank  
Date Collected: NA  
Time Collected: NA  
Date Received: NA  
Data Release Authorized:

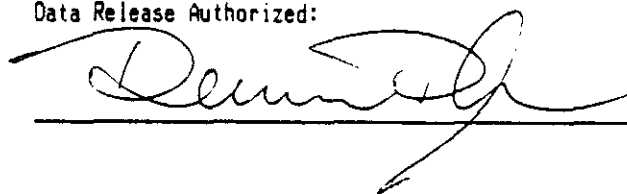


<u>C.A.S. Number</u>		<u>ug/L</u>
112-40-3	n-Dodecane	10 U
126-73-8	Tributyl Phosphate	10 U

SEMI VOLATILE  
ORGANICS ANALYSIS DATA SHEET

Laboratory Name: Pacific Northwest Environmental Lab.  
Project Number: 63-900310-109  
Sample Matrix: Water  
Concentration: Low Dilution Factor: 1  
Sample wt/vol: 1000 mL  
Date Extracted: 4/17/90  
Date Analyzed: 4/25/90

Lab Sample: 2372-16  
Customer Sample: 15B  
Sample Description: Test Well #15  
Date Collected: 4/11/90  
Time Collected: 12:10  
Date Received: 4/12/90  
Data Release Authorized:



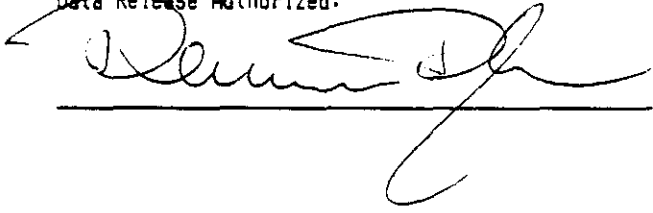
A handwritten signature in black ink, appearing to read 'Dunn', is written over a horizontal line.

<u>C.A.S. Number</u>		<u>ug/L</u>
112-40-3	n-Dodecane	10 U
126-73-8	Tributyl Phosphate	10 U

SEMI VOLATILE  
ORGANICS ANALYSIS DATA SHEET

Laboratory Name: Pacific Northwest Environmental Lab.  
Project Number: 63-900310-109  
Sample Matrix: Water  
Concentration: Low Dilution Factor: 1  
Sample wt/vol: 1000 mL  
Date Extracted: 4/17/90  
Date Analyzed: 4/25/90

Lab Sample: 2372-17  
Customer Sample: 98  
Sample Description: Test Well #9  
Date Collected: 4/11/90  
Time Collected: 12:35  
Date Received: 4/12/90  
Data Release Authorized:



A handwritten signature in black ink, appearing to read 'D. L. Smith', is written over a horizontal line. The signature is stylized and cursive.

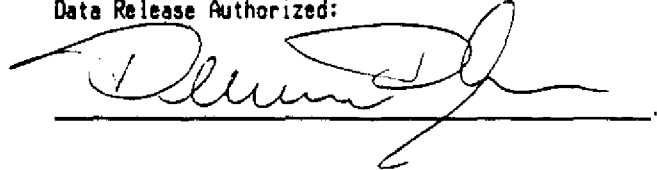
<u>C.A.S.</u> <u>Number</u>		<u>ug/L</u>
112-40-3	n-Dodecane	10 U
126-73-8	Tributyl Phosphate	15



SEMI VOLATILE  
ORGANICS ANALYSIS DATA SHEET

Laboratory Name: Pacific Northwest Environmental Lab.  
Project Number: 63-900310-109  
Sample Matrix: Water  
Concentration: Low Dilution Factor: 1  
Sample wt/vol: 500 mL  
Date Extracted: 4/17/90  
Date Analyzed: 4/25/90

Lab Sample: 2372-17MS  
Customer Sample: 98  
Sample Description: Test Well #9  
Date Collected: 4/11/90  
Time Collected: 12:35  
Date Received: 4/12/90  
Data Release Authorized:



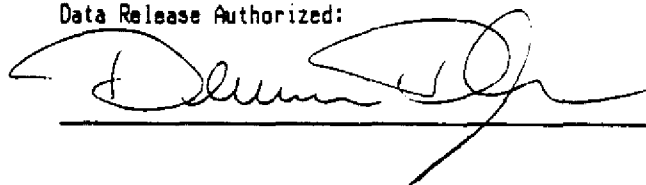
A handwritten signature in black ink, appearing to read 'D. L. ...', is written over a horizontal line.

<u>C.A.S. Number</u>		<u>ug/L</u>
112-40-3	n-Dodecane	10 U
126-73-8	Tributyl Phosphate	15

SEMI VOLATILE  
ORGANICS ANALYSIS DATA SHEET

Laboratory Name: Pacific Northwest Environmental Lab.  
Project Number: 63-900310-109  
Sample Matrix: Water  
Concentration: Low Dilution Factor: 1  
Sample wt/vol: 500 mL  
Date Extracted: 4/17/90  
Date Analyzed: 4/25/90

Lab Sample: 2372-17MSD  
Customer Sample: 98  
Sample Description: Test Well #9  
Date Collected: 4/11/90  
Time Collected: 12:35  
Date Received: 4/12/90  
Data Release Authorized:



<u>C.A.S. Number</u>		<u>ug/L</u>
112-40-3	n-Dodecane	10 U
126-73-8	Tributyl Phosphate	16

**PNELI**

**CHAIN-OF-CUSTODY / REQUEST FOR ANALYSIS**

Control No. \_\_\_\_\_

Laboratory Contact Susan Winter

Send Lab Report To Steve Lockhaven

Client Name Advanced Nuclear Fuels

Client Number \_\_\_\_\_

Advanced Nuclear Fuels

Bill To Advanced Nuclear Fuels

2101 Horn Rapids Rd. Richland, WA. 99352

2101 Horn Rapids Rd.

Date Report Required \_\_\_\_\_

Richland, WA. 99352

Client Contact Steve Lockhaven

PO No. R-24530

Client Contact Phone (509) 375-8228

Carrier No. \_\_\_\_\_

2372

**Analysis and Container**

VOA-601

Sample Number	Sample Location and Description	Date Collected	Time Collected	Sample Matrix	Number of Containers	Analysis and Container					Comments	
1A	Test well # 1	21-11-90	12:46	water	2	✓						Sample ok
1B	" # 1	"	12:57	water	2	✓						small air bubble in 1 of 2
2A	" # 2	"	13:08	water	2	✓						Sample ok
2B	" # 2	"	13:21	water	2	✓						↓
9A	" # 9	"	12:29	water	2	✓						
13A	" # 13	"	13:42	water	2	✓						↓
14A	" # 14	"	11:55	water	2	✓						small air bubble in 2 of 2
15A	" # 15	"	12:05	water	2	✓						Sample ok
16A	" # 16	"	12:18	water	2	✓						↓

Special Instructions \_\_\_\_\_ Possible Sample Hazards: None

Was Preservative Used? No  Yes  What Kind? \_\_\_\_\_ What Analysis? \_\_\_\_\_

1. Relinquished By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

2. Relinquished By Airborne Date 04/12/90 Time 1000 Received By Phil Barkley Date 04/12/90 Time 1000

3. Relinquished By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

4. Relinquished By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

**PNELI**

**CHAIN-OF-CUSTODY / REQUEST FOR ANALYSIS**

Control No.

Client Name Advanced Nuclear Fuels

Laboratory Contact Susan Winter

Client Number \_\_\_\_\_

Send Lab Report To Steve Lockhaven

Bill To Advanced Nuclear Fuels

Advanced Nuclear Fuels

3101 Horn Rapids Rd.

3101 Horn Rapids Rd. Richland, WA. 99352

Richland, WA. 99352

Date Report Required \_\_\_\_\_

Client Contact Steve Lockhaven

PO No. A-24530

Client Contact Phone (509) 375-8228

Carrier No. \_\_\_\_\_

PNEL 2372

Analysis and Container

Sample Number	Sample Location and Description	Date Collected	Time Collected	Sample Matrix	Number of Containers	Analysis and Container				Comments	
9B	Test Well #9	4-11-90	12:35	water	2	✓					broken vial lid in 1 of 2
13B	Test well #13	"	13:52	water	2	✓					small air bubble in 1 of 2
14B	test well #14	"	11:55	water	2	✓					↓
15B	test well #15	"	12:15	water	2	✓					Sample ok
16B	test well #16	"	12:23	water	2	✓					↓
Trip Blank	Trip BLANK (PNEL)	01-02-90		water	2	✓					1/4" air bubble in 1 Small air bubble in 1

Special Instructions \_\_\_\_\_ Possible Sample Hazards: None

Was Preservative Used? No  Yes  What Kind? \_\_\_\_\_ What Analysis? \_\_\_\_\_

1. Relinquished By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

2. Relinquished By Airborne Date 2/12/90 Time 1200 Received By Phil D. ... Date 01/12/90 Time 1000

3. Relinquished By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

4. Relinquished By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

**PNELI**

**CHAIN-OF-CUSTODY / REQUEST FOR ANALYSIS**

Control No. \_\_\_\_\_

Client Name Advanced Nuclear Fuels (ANF)

Laboratory Contact Susan Winter

Client Number \_\_\_\_\_

Send Lab Report To Steve Lockhaven

Bill To Advanced Nuclear Fuels

Advanced Nuclear Fuels

2101 Horn Rapids Road

2101 Horn Rapids Rd. Richland, WA 99352

Richland, WA 99352

Date Report Required \_\_\_\_\_

PO No. A-24530

Client Contact Steve Lockhaven

Carrier No. \_\_\_\_\_

Client Contact Phone (509) 375-8228

PNEL 2372

**Analysis and Container**

Sample Number	Sample Location and Description	Date Collected	Time Collected	Sample Matrix	Number of Containers	Analysis and Container						Comments	
						Trip	Preservative	Seal	Label	Storage	Other		
15B	Test well #15	4-11-90	12:10	water	1	✓							1 Sample
15B	Test well #15	4-11-90	12:10	water	1	✓							
9B	Test well #9	4-11-90	12:35	water	1	✓							1 Sample
9B	Test well #9	4-11-90	12:35	water	1	✓							
	Trip Blank (PNEL)	3-30-90	4:30 pm	water	2								1 small air bubble 1 large air bubble

Special Instructions \_\_\_\_\_ Possible Sample Hazards: NONE

Was Preservative Used? No  Yes  What Kind? \_\_\_\_\_ What Analysis? \_\_\_\_\_

1. Relinquished By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

2. Relinquished By Airborne Date 04/12/90 Time 1000 Received By Phil Dackland / PMS Date 04/12/90 Time 1000

3. Relinquished By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

4. Relinquished By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_