93-e43

DEPARTMENT OF ECOLOGY

September 21, 1993

TO: Megan White
Toxics Cleanup Program, SWRO

FROM: Pam Marti
Environmental Investigations & Laboratory Services

SUBJECT: Toftdahl Drum Long-term Monitoring Round VI

The attached memo summarizes the findings from the latest sampling at the Toftdahl Drum site, Round VI conducted on April 6, 1993. Low concentrations of copper and zinc were detected in the domestic wells. These concentrations were all well below state and federal drinking water standards and state ground water quality standards. Observed concentrations are consistent with previous sampling results; cooper and zinc are the only analytes that are regularly detected in the private wells. These occurrences are probably related to well construction and plumbing materials. Volatile organics were also tested for during this round, none were detected. With the exception of acetone, no volatile organics have been detected since 1987. Acetone was detected in April 1991 (Sample Round IV) at concentrations near the detection limit. Acetone is a common laboratory contaminant. I recommend that monitoring for volatile organics be discontinued. I am sending letters to the homeowners describing their results. I will be conducting Sample Round VII in April 1994. If you have any questions or comments, please call me at 586-8138.

PM:krc
Attachment

cc: Lynn Singleton
Bill Yake
Kathy Reed, TCP Library
Bob Kievit, EPA

TOFTDAHL DRUM SITE
GROUND WATER MONITORING ROUND VI
APRIL 6, 1993

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by
Pamela B. Marti
September 21, 1993

Washington State Department of Ecology
Environmental Investigations and Laboratory Services Program
Toxics, Compliance and Ground Water Investigations Section
Olympia, Washington 98504-7710

Water Body No. WA-28-1020-GW
(Segment No. 13-28-GW)

SUMMARY

Ground water samples were collected from four domestic water supply wells located near the former Toftdahl Drum Site on April 6, 1993. This sampling was part of the routine ground water monitoring conducted at the site since 1987. Low concentrations of copper and zinc were detected in the domestic wells. These concentrations were all well below state and federal drinking water standards and state ground water quality standards. Observed concentrations are consistent with previous sampling results; copper and zinc are the only analytes that are regularly detected in the private wells. These occurrences are probably related to well construction and plumbing materials.

OBJECTIVES

The Toxics, Compliance and Ground Water Investigation Section was requested by the Toxics Cleanup Program (TCP) to monitor ground water at the Toftdahl Drum Site as required by the federally mandated Record of Decision (ROD). Monitoring objectives are as follows:

1. Provide routine ground water monitoring data for selected metals (chromium, copper, lead, and zinc) annually for ten years, ending in April 2001; and

2. Determine future sampling needs at the completion of each sampling event.

SITE BACKGROUND

In the early 1970's, drums containing unknown quantities and types of waste were cleaned for resale on the Toftdahl property. The drums allegedly contained industrial wastes from a plywood manufacturing facility. It is estimated that between 100 and 200 drums were cleaned on the site. Approximately 50 drums contained residual wastes and could not be sold. These drums were buried on-site (see Figure 1). In 1985, the buried drums and wastes were removed. A Remedial Investigation conducted after drum removal concluded that no significant soil or ground water contamination existed. Low concentrations of PAH's, PCB's, VOC's, and BNA's were detected sporadically in nearby domestic water-supply wells during the initial phases of the site investigation. These contaminants have not been detected since the first routine sample round in 1987. Ground water monitoring was conducted for all priority pollutants semi-annually for five years, ending in April 1991. Ground water monitoring will continue for ten years for selected contaminants ending in 2001. In 1989, the site was delisted from the National Priorities List.

Geology of the area was defined in the Final Remedial Investigation (1986) as consisting of a complex sequence of discontinuous sediments, sedimentary rocks and volcanic layers. Extensive weathering and/or hydrothermal alteration of the original rock units and deposits makes stratigraphic correlation uncertain. Generally, ground water occurs in coarser stratified sand, gravel and clayey gravel zones at various depths. Based on on-site well logs two aquifer systems, designated the shallow and deep aquifers, have been identified beneath the site. Both systems consist of several discontinuous water-bearing zones separated by layers of clay and silt. The shallow system ranges in depth from about 7 to 30 feet and the deep system ranges in depth from 69 to 98 feet. Water levels in some deep borings are within 50 feet of the ground surface indicating at least partially confining conditions. The four private wells sampled during the compliance monitoring are all drilled to the deep zone and range in depth from 72 to 110 feet. Ground water in the deep system is generally thought to flow to the south. The Boone well is considered to be upgradient of the site and the Bedoff, Homala and Kyle wells downgradient. Figure 2 shows the locations of the domestic wells sampled and the approximate ground water flow direction.

METHODS

Ground Water Sampling

Prior to sample collection, domestic wells were purged by allowing taps to run until pH, temperature, and specific conductance measurements stabilized. Samples were then collected from the tap nearest the well. Wells were sampled from upgradient to downgradient. All wells were sampled for volatile organics, and selected total metals (chromium, copper, lead and zinc). Volatile organic samples were preserved with two drops of 1:1 hydrochloric acid, and metal samples were preserved with 1 mL of nitric acid to a $pH < 2$. Chemical analyses, analytical methods, and detection limits are shown in Table 1.

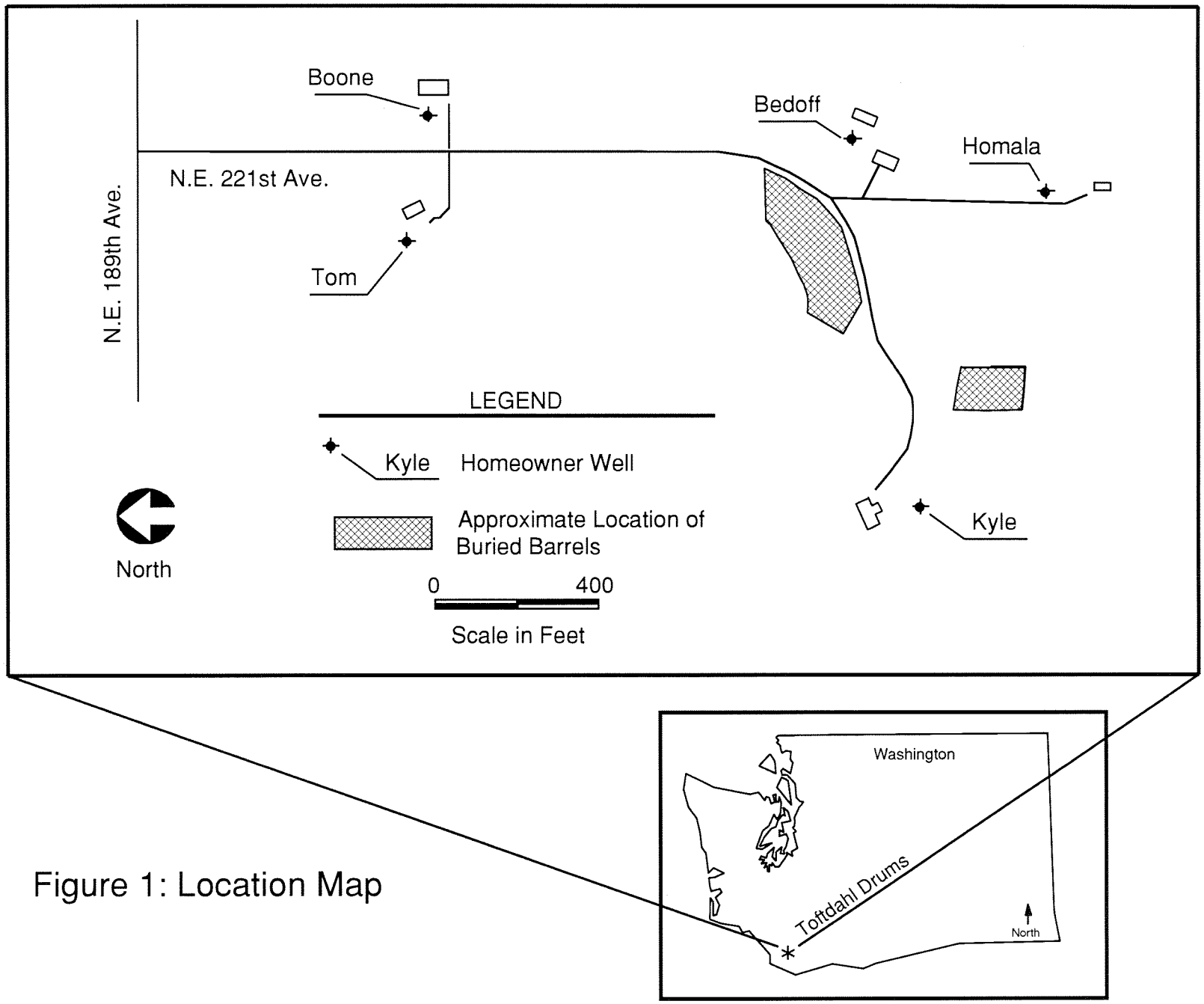

Figure 1: Location Map

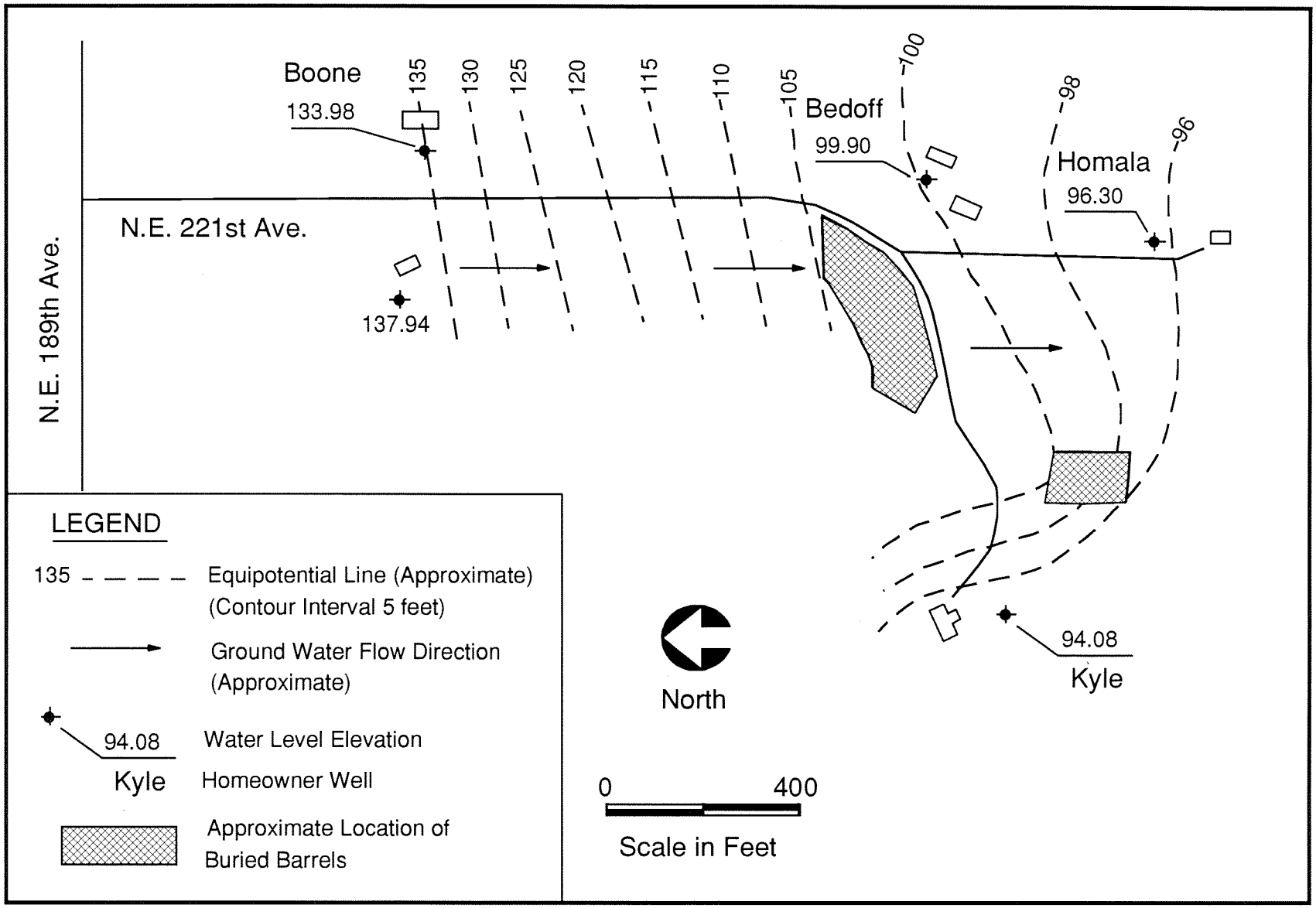

Figure 2: Potentiometric Surface Map for May 2, 1986 (Deep Aquifer)

Table 1: Parameters, Analytical Methods and Detection Limits

Analytical Parameters	Method	Detection Limit
Field Parameters:		
pH	Beckman pH Meter	0.1 Std Units
Specific Conductance	Beckman RC-15C Conductivity Bridge	10 umhos/cm
Temperature	Precision Thermometer	0.1°C
Volatile Organics	#624	1.0 μg/L
Metals (Total Recoverable):		
Chromium	#200.7	5.0 μg/L
Copper	#200.7	2.0 μg/L
Lead	#239.2	1.0 μg/L
Zinc	#200.7	2.0 μg/L

U.S. EPA, 1983. Methods for the Chemical Analysis of Water and Wastes. Environmental Monitoring and Support Laboratory, March 1983.

Quality Assurance Samples

In addition to laboratory calibration standards and method blanks, field quality assurance samples consisted of a blind duplicate and a transport blank. A blind duplicate sample, labeled "Smith," was collected from the Kyle well. Duplicate samples are two sets of samples collected from a well at the same time and submitted to the laboratory with different identification.

Bill Kammin and Karin Feddersen of Manchester Laboratory evaluated laboratory quality assurance results which are included in Appendix A. The quality of the results are good for both the volatile organics and metals analyses with the following exceptions. Methylene chloride and trichlorofluoromethane were detected in the volatile organics transport blank. Neither chemical was detected in any of the samples. Zinc was detected in the method blank. Sample results with less than ten times the concentration detected in the blank are flagged with a "B." All spike recoveries were within acceptable limits of 75-125%. Relative percent difference (%RPD) for a spike and spike duplicate were within ±20%. The relative percent difference of the blind duplicate samples (Kyle and Smith) were within ±5%.

ANALYTICAL RESULTS

Table 2 is a summary of field and laboratory results for sample Round VI conducted on April 6, 1993. No volatile organics were detected in any of the samples (see Appendix A). Copper and zinc were detected at low concentrations in both the up- and downgradient wells. Analytical results are presented in Appendix A. Data were managed using the ENVIS database software package.

DISCUSSION AND CONCLUSIONS

All detected concentrations for this round of sampling were well below the maximum contaminant levels (MCLs) established for state and federal drinking water supplies as shown in Table 3. Table 3 also summarizes results for all routine sample rounds to date.

Results from routine monitoring for 1988 to the present supports the Remedial Investigation (RI) findings that the degree of contamination at the site is probably small and does not appear to be a threat to public health or the environment via the ground water. Copper and zinc are the only analytes that are consistently detected in the wells, and concentrations are consistently higher in the upgradient Boone well than in the downgradient wells. These occurrences are probably related to well construction and plumbing materials.

RECOMMENDATIONS

1. Based on past analytical results and the Record of Decision (ROD), routine monitoring should continue annually for 10 years, until 2001. Due to the presence of acetone in Sample Round IV, volatile organics have been analyzed for the last two years. No volatile organics have been detected, therefore monitoring for volatile organics should be discontinued. Selected metals; chromium, copper, lead and zinc; should be tested for the next eight years.

2. Three downgradient wells (Bedoff, Homala, and Kyle) and one upgradient well (Boone) should continue to be sampled.

3. At the completion of the ten year monitoring period (2001), if no contaminants are observed other than copper, zinc and lead long-term, monitoring should be discontinued.

Table 2: Summary of Field Parameters and Detected Analytes from April 6, 1993

Location	pH (s.u.)	Temperature (°C)	Specific Conductance (umhos/cm)	Purge Volume (gallons/min)	Copper (ug/L)	Zinc (ug/L)
Boone	6.68	11.0	190	148	41.5	91.8 B
Bedoff	6.53	10.7	118	120	32.4	4.0 J
Kyle	6.40	10.5	73	90	61.6	37.4 B
Smith (duplicate)	--	--	--	--	64.5	38.4 B
Homala	6.40	11.1	78	127	4.0 P	56.2 B
Transport	--	--	--	--	3.0 U	4.0 U
Maximum Contaminant Level (MCL)	--	--	--	--	1000 **	5000 **

Note: Samples were collected and analyzed for volatile organics. None were detected.

U: The compound was not detected at or above the associated numerical value.
P: Analyte detected above the instrument detection limit but below the minimum quantitation limit.
B: Analyte was also found in the analytical method blank indicating the sample may have been contaminated.
--: Not Analyzed
**: Secondary Maximum Contaminant Levels (MCL) are based on factors other than health effects.

Table 3: Summary of Sampling Results from September 1988 to April 1993

	Boone	Bedoff	Kyle	Smith	Homala	MCL's
September 12, 1988						
Copper	76	121	42	--	--	1000**
Zinc	389	6	52	--	--	5000**
October 17, 1989						
Copper	50	50	30	--	ND	1000**
Zinc	290	ND	20	--	20	5000**
Mercury	0.06 U	0.06 U	0.1 B	--	0.16 B	2.0*
April 11, 1990						
Copper	77.6	37.6	46.1	46.1	3.3 J	1000**
Zinc	160	5.0 U	31 B	22 JB	80.3	5000**
Mercury	0.05 J	0.08 J	0.04 J	0.02 U	0.04 J	2.0*
October 23, 1990						
Copper	83.9	45.9	25.8	28.4	2.0 U	1000**
Zinc	480	6.2 JB	12 JB	15 JB	34.0	5000**
Chromium	6 J	5.0 U	5.0 U	5.0 U	5.0 U	50*
Lead	1.1 J	1.0 U	1.0 U	1.0 U	1.5 J	50*
April 23, 1991						
Copper	120	58.4	64.1	61.9	2.0 U	1000**
Zinc	178	5.5 J	19 J	22	64.3	5000**
Lead	1.2 J	20 U	2.4 J	NAR	NAR	50*
April 14, 1992						
Copper	50.5	48.8	45.1	45.0	7.4 P	1000**
Zinc	112	4.0 U	26	25	55.4	5000**
Lead	1.0 U	2.7	1.0 U	1.0 U	1.0 U	50*
April 6, 1993						
Copper	41.5	32.4	61.6	64.5	4.0 P	1000**
Zinc	91.8 B	4.0 J	37.4 B	38.4 B	56.2 B	5000**
Lead	20 U	20 U	20 U	20 U	20 U	50*

--: Not analyzed J: Estimated Value ND: Not Detected

U: The compound was not detected at or above the listed numerical value.

B: Analyte was also found in an analytical blank.

P: Analyte detected above the instrument detection limit but below the minimum quantitation limit.

*: Primary Maximum Contaminant Levels (MCLs) are based on chronic and acute health effects.

**: Secondary Maximum Contaminant Levels (MCLs) are based on factors other than health effects such as taste, odor or color.

APPENDIX A

Analytical Results
Toftdahl Drums
April 6, 1993

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

MANCHESTER ENVIRONMENTAL LABORATORY

7411 Beach Drive East • Port Orchard, Washington 98366-8204 • (206) 895-4737 • SCAN 744-4737

May 5, 1993

TO: Pam Marti

FROM: Bill Kammin, Environmental_Lab_Director

SUBJECT: Metals Quality Assurance memo for the Toftdahl Drum Site Project

SAMPLE INFORMATION

The samples from the Toftdahl Drum Site project were received by the Manchester Laboratory on 4/7/93 in good condition.

HOLDING TIMES

All analyses were performed within the USEPA Contract Laboratory Program (CLP) holding times for metals analysis (28 days for mercury, 180 days for all other metals).

INSTRUMENT CALIBRATION

Instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. Continuing calibration standards and blanks were analyzed at a frequency of 10% during the run and again at the end of the analytical run. All initial and continuing calibration verification standards were within the relevant USEPA (CLP) control limits. AA calibration gave a correlation coefficient (r) of 0.995 or greater, also meeting CLP calibration requirements.

PROCEDURAL BLANKS

The procedural blanks associated with these samples showed no analytically significant levels of analytes, with the following exception: zinc. Zinc results are qualified as B or J, depending on the level of zinc found in the sample.

SPIKED SAMPLE ANALYSES

Spike and duplicate spike sample analyses were performed on this data set. All spike recoveries were within the CLP acceptance limits of +/- 25%.

PRECISION DATA

The results of the spike and duplicate spike samples were used to evaluate precision on this sample set. The Relative Percent Difference (RPD) for all analytes was within the 20% CLP acceptance window for duplicate analysis.

LABORATORY CONTROL SAMPLE (LCS) ANALYSES

LCS analyses were within the windows established for each parameter.

SUMMARY

The data generated by the analysis of these samples can be used noting the data qualifications discussed in this memo.

Please call Bill Kammin at SCAN 206-871-8801 to further discuss this project.

WRK:wrk

*** Lab Analysis Report ***

==> Transaction #: 05031251 Laboratory: (WE) Ecology, Manchester Lab

Work Group: (38) Metals - ICP Scan

Instrument: (ICP) ICP, Jarrell-Ash AtomComp 1100 (DOE)

Method: (EP1-200.7) Inductively Coupled Plasma Atomic Emissions Analysis

Chemist: (MMM) McIntosh, Myrna LAB Hours Worked:

Project: DOE-699Y TOFTDAHL DRUM SITE Prg Ele#: D3P01

Prj Off: Marti, Pam DOE Analysis Due: 930407 Revised Due:

*** Sample Records in Transaction ***

Seq#	Sample #	QA	Date/Time	Description	Alternate Keys		
01	93158020	LBK1	930406	BOONE			
02	93158020		930406	BOONE			
03	93158021		930406	BEDOFF			
04	93158022		930406	HOMALA			
05	93158023		930406	KYLE			
06	93158025		930406	TRANSPOR			
07	93158024		930406	SMITH			
08	93158024	LMX1	930406	SMITH			
09	93158024	LMX2	930406	SMITH			

Record Type: TRNIN3 Date Verified: 5-4-93 By: Susan Davis
Transaction Status: New Transaction...First Printing...Unverified.
Processed: 3-MAY-93 13:13:28 Status: N Batch: (In CUR DB)

*** Lab Analysis Report ***

Transaction #: 05031251 Seq #: 01 (38) Metals - ICP Scan
Proj Code : DOE-699Y TOFTDAHL DRUM SITE PE # : D3P01

Blank ID : EWPB 15.83
Sample No.: 93 158020 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (00) %Slds:
QA Code: (LBK1) Lab Blank Sample #1 Peaks Total:
Date Extracted: Date Analyzed: 930426 # Days to Ext/Anal: 0/ 20

Line	Par #	Parameter Description	Units	Value
1	01034	Chromium Cr-Total	ug/l	5.0U
2	01042	Copper Cu-Total	ug/l	3.0U
3	01051	Lead Pb-Total	ug/l	20U
4	01092	Zinc Zn-Total	ug/l	20P

*** Lab Analysis Report ***

Transaction #: 05031251 Seq #: 02 (38) Metals - ICP Scan
Proj Code : DOE-699Y TOFTDAHL DRUM SITE PE # : D3P01

Sample No.: 93 158020 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930426 # Days to Ext/Anal: 0/ 20

Line	Par #	Parameter Description	Units	Value
1	01034	Chromium Cr-Total	ug/l	5.0U
2	01042	Copper Cu-Total	ug/l	41.5
3	01051	Lead Pb-Total	ug/l	20U
4	01092	Zinc Zn-Total	ug/l	91.8B

*** Lab Analysis Report ***

Transaction #: 05031251 Seq #: 03 (38) Metals - ICP Scan
Proj Code : DOE-699Y TOFTDAHL DRUM SITE PE # : D3P01

Sample No.: 93 158021 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930426 # Days to Ext/Anal: 0/ 20

Line	Par #	Parameter Description	Units	Value
1	01034	Chromium Cr-Total	ug/l	5.0U
2	01042	Copper Cu-Total	ug/l	32.4
3	01051	Lead Pb-Total	ug/l	20U
4	01092	Zinc Zn-Total	ug/l	4.0J

*** Lab Analysis Report ***

Transaction #: 05031251 Seq #: 04 (38) Metals - ICP Scan
Proj Code : DOE-699Y TOFTDAHL DRUM SITE PE # : D3P01

Sample No.: 93 158022 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930426 # Days to Ext/Anal: 0/ 20

Line	Par #	Parameter Description	Units	Value
1	01034	Chromium Cr-Total	ug/l	5.0U
2	01042	Copper Cu-Total	ug/l	4.0P
3	01051	Lead Pb-Total	ug/l	20U
4	01092	Zinc Zn-Total	ug/l	56.2B

*** Lab Analysis Report ***

Transaction #: 05031251 Seq #: 05 (38) Metals - ICP Scan
Proj Code : DOE-699Y TOFTDAHL DRUM SITE PE # : D3P01

Sample No.: 93 158023 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930426 # Days to Ext/Anal: 0/ 20

Line	Par #	Parameter Description	Units	Value
1	01034	Chromium Cr-Total	ug/l	5.0U
2	01042	Copper Cu-Total	ug/l	61.6
3	01051	Lead Pb-Total	ug/l	20U
4	01092	Zinc Zn-Total	ug/l	37.4B

*** Lab Analysis Report ***

Transaction #: 05031251 Seq #: 06 (38) Metals - ICP Scan
Proj Code : DOE-699Y TOFTDAHL DRUM SITE PE # : D3P01

Sample No.: 93 158025 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930426 # Days to Ext/Anal: 0/ 20

Line	Par #	Parameter Description	Units	Value
1	01034	Chromium Cr-Total	ug/l	5.0U
2	01042	Copper Cu-Total	ug/l	3.0U
3	01051	Lead Pb-Total	ug/l	20U
4	01092	Zinc Zn-Total	ug/l	4.0U

*** Lab Analysis Report ***

Transaction #: 05031251 Seq #: 07 (38) Metals - ICP Scan
Proj Code : DOE-699Y TOFTDAHL DRUM SITE PE # : D3P01

Sample No.: 93 158024 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930426 # Days to Ext/Anal: 0/ 20

Line	Par #	Parameter Description	Units	Value
1	01034	Chromium Cr-Total	ug/l	5.0U
2	01042	Copper Cu-Total	ug/l	64.5
3	01051	Lead Pb-Total	ug/l	20U
4	01092	Zinc Zn-Total	ug/l	38.4B

*** Lab Analysis Report ***

Transaction #: 05031251 Seq #: 08 (38) Metals - ICP Scan
Proj Code : DOE-699Y TOFTDAHL DRUM SITE PE # : D3P01

Sample No.: 93 158024 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (94) % Recov %Slds:
QA Code: (LMX1) Lab Mtrx Spike #1 (% Rec Peaks Total:
Date Extracted: Date Analyzed: 930426 # Days to Ext/Anal: 0/ 20

Line	Par #	Parameter Description	Units	Value
1	01034	Chromium Cr-Total ug/l	% Recov	97
2	01042	Copper Cu-Total ug/l	% Recov	106
3	01051	Lead Pb-Total ug/l	% Recov	98
4	01092	Zinc Zn-Total ug/l	% Recov	100

*** Lab Analysis Report ***

Transaction #: 05031251 Seq #: 09 (38) Metals - ICP Scan
Proj Code : DOE-699Y TOFTDAHL DRUM SITE PE # : D3P01

Sample No.: 93 158024 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (94) % Recov %Slds:
QA Code: (LMX2) Lab Mtrx Spike #2 (% Rec Peaks Total:
Date Extracted: Date Analyzed: 930426 # Days to Ext/Anal: 0/ 20

Line	Par #	Parameter Description	Units	Value
1	01034	Chromium Cr-Total ug/l	% Recov	100
2	01042	Copper Cu-Total ug/l	% Recov	108
3	01051	Lead Pb-Total ug/l	% Recov	99
4	01092	Zinc Zn-Total ug/l	% Recov	101

State of Washington Department of Ecology
Manchester Environmental Laboratory
7411 Beach Dr. East Port Orchard WA. 98366

Data Review
May 6, 1993

Project: **Toftdahl Drum Site**

Samples: 158020, 158021, 158022, 158023, 158024, 158025

Laboratory: Analytical Resources, Inc. D477

By: Karin Feddersen KF

Case Summary

These samples were received at the Manchester Environmental Laboratory on April 7, 1993, and transported to Analytical Resources, Inc. on April 8, 1993 for VOA analysis.

These analyses were reviewed for qualitative and quantitative accuracy, validity, and usefulness.

There is no need to assimilate the "dilution factor" or "sample wt/vol" into the final values reported; these calculations have already been figured into the reported values.

DATA QUALIFIER DEFINITIONS

U - The analyte was not detected at or above the reported result.

UJ - The analyte was not detected at or above the reported estimated result.

J - The associated numerical result is an estimated quantity.

Volatiles

Holding Times:

These samples were analyzed within the SW-846 recommended holding time.

Method Blank:

No target analytes were detected in either method blank.

GC/MS Tuning and Calibration:

Calibration against Bromofluorobenzene (BFB) is acceptable for the initial calibration, continuing calibration and all associated sample analyses.

Initial Calibration:

The initial calibration met the minimum response criteria of greater than 0.05 for the average relative responses. The % Relative Standard Deviations were within the maximum of 30% with one exception which did not affect the results.

Continuing Calibration:

The average relative response factors for all target analytes were above the minimums, and the percent deviations between the initial and continuing calibration standards were within the maximum of 25% with several exceptions which did not affect the results.

Matrix Spikes (MS/MSD):

Matrix spike recovery and precision data are reasonable, acceptable, and within advisory QC limits with one exception. The %RPD for Tolune is 14, slightly above the QC limit of 13. Since no Toluene was detected in the samples, this is not indicative of a larger QC problem. No qualification of data was warranted.

Surrogates:

All surrogate recoveries for these samples, the matrix spikes, and the associated method blanks are reasonable, acceptable, and within QC limits.

Sample results:

This data is acceptable for use without the need for additional qualification.

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Sample: 158020

Lab ID: D477-A
Matrix: Waters

QC Report No: D477 - WDOE
Project: Toft Dahl Drums

Data Release Authorized: _____ VTSR: 04/08/93
Report: 04/16/93 MAC: GaT

Instrument: FINN 3
Date Analyzed: 04/12/93

Amount Purged: 5.0 mL
Conc/Dilution: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	Methylene Chloride	2.0 U
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	1.0 U
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	Trans-1,2-Dichloroethene	1.0 U
156-59-2	Cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	1.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U

CAS Number		µg/L
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	1.0 U
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	1.0 U
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	1.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	1.0 U
108-90-7	Chlorobenzene	1.0 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
1330-20-7	Total Xylenes	2.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U

Surrogate Recoveries

d8-Toluene	95.9%
Bromofluorobenzene	98.4%
d4-1,2-Dichloroethane	99.7%

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Matrix: Waters **Sample No: 158020**

Lab ID: D477-A
Instrument: FINN 3
Date Analyzed: 04/12/93

Client: WDOE
QC Report No: D477-WDOE
Project No: Toft Dahl Drums

VTSR: 04/08/93

Data Release Authorized: _____
Report preparted: 04/16/93 MAC:GaT

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	No UNKNOWN pks >10% IS peak height	VOA	-	-
2					
3					
4					
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ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Sample: 158021

Lab ID: D477-B
Matrix: Waters

QC Report No: D477 - WDOE
Project: Toft Dahl Drums

Data Release Authorized: _____ VTSR: 04/08/93
Report: 04/28/93 MAC:GaT

Instrument: FINN 3
Date Analyzed: 04/12/93

Amount Purged: 5.0 ml
Conc/Dilution: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	Methylene Chloride	2.0 U
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	1.0 U
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	Trans-1,2-Dichloroethene	1.0 U
156-59-2	Cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	1.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U

CAS Number		µg/L
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	1.0 U
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	1.0 U
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	1.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	1.0 U
108-90-7	Chlorobenzene	1.0 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
1330-20-7	Total Xylenes	2.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U

Surrogate Recoveries

d8-Toluene	96.6%
Bromofluorobenzene	96.3%
d4-1,2-Dichloroethane	98.3%

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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Matrix: Waters **Sample No: 158021**

Lab ID: D477-B
Instrument: FINN 3
Date Analyzed: 04/12/93

Client: WDOE
QC Report No: D477-WDOE
Project No: Toft Dahl Drums

VTSR: 04/08/93

Data Release Authorized: _____
Report prepared: 04/16/93 MAC:GaT

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	No UNKNOWN pks >10% IS peak height	VOA	-	-
2					
3					
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ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Sample: 158022

Lab ID: D477-C
Matrix: Waters

QC Report No: D477 - WDOE
Project: Toft Dahl Drums

Data Release Authorized: VTSR: 04/08/93
Report: 04/16/93 MAC:GaT

Instrument: FINN 3
Date Analyzed: 04/12/93

Amount Purged: 5.0 ml
Conc/Dilution: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	Methylene Chloride	2.0 U
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	1.0 U
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	Trans-1,2-Dichloroethene	1.0 U
156-59-2	Cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	1.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U

CAS Number		µg/L
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	1.0 U
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	1.0 U
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	1.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	1.0 U
108-90-7	Chlorobenzene	1.0 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
1330-20-7	Total Xylenes	2.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U

Surrogate Recoveries

d8-Toluene	92.0%
Bromofluorobenzene	99.4%
d4-1,2-Dichloroethane	102%

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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Matrix: Waters **Sample No: 158022**

Lab ID: D477-C
Instrument: FINN 3
Date Analyzed: 04/12/93

Client: WDOE
QC Report No: D477-WDOE
Project No: Toft Dahl Drums

VTSR: 04/08/93

Data Release Authorized: _____
Report preparted: 04/16/93 MAC:GaT

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	No UNKNOWN pks >10% IS peak height	VOA	-	-
2					
3					
4					
5					
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ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Sample: 158023

Lab ID: D477-D
Matrix: Waters

QC Report No: D477 - WDOE
Project: Toft Dahl Drums

Data Release Authorized: _____ VTSR: 04/08/93
Report: 04/16/93 MAC:GaT

Instrument: FINN 3
Date Analyzed: 04/12/93

Amount Purged: 5.0 ml
Conc/Dilution: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	Methylene Chloride	2.0 U
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	1.0 U
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	Trans-1,2-Dichloroethene	1.0 U
156-59-2	Cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	1.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U

CAS Number		µg/L
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	1.0 U
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	1.0 U
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	1.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	1.0 U
108-90-7	Chlorobenzene	1.0 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
1330-20-7	Total Xylenes	2.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U

Surrogate Recoveries

d8-Toluene	94.7%
Bromofluorobenzene	99.4%
d4-1,2-Dichloroethane	98.0%

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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Matrix: Waters **Sample No: 158023**

Lab ID: D477-D
Instrument: FINN 3
Date Analyzed: 04/12/93

Client: WDOE
QC Report No: D477-WDOE
Project No: Toft Dahl Drums

VTSR: 04/08/93

Data Release Authorized:
Report prepared: 04/16/93 MAC:GaT

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	No UNKNOWN pks >10% IS peak height	VOA	-	-
2					
3					
4					
5					
6					
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ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Sample: 158024

Lab ID: D477-E
Matrix: Waters

QC Report No: D477 - WDOE
Project: Toft Dahl Drums

Data Release Authorized: VTSR: 04/08/93
Report: 04/16/93 MAC:GaT

Instrument: FINN 3
Date Analyzed: 04/12/93

Amount Purged: 5.0 ml
Conc/Dilution: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	Methylene Chloride	2.0 U
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	1.0 U
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	Trans-1,2-Dichloroethene	1.0 U
156-59-2	Cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	1.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U

CAS Number		µg/L
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	1.0 U
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	1.0 U
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	1.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	1.0 U
108-90-7	Chlorobenzene	1.0 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
1330-20-7	Total Xylenes	2.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U

Surrogate Recoveries

d8-Toluene	95.6%
Bromofluorobenzene	95.9%
d4-1,2-Dichloroethane	101%

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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Matrix: Waters **Sample No: 158024**

Lab ID: D477-E
Instrument: FINN 3
Date Analyzed: 04/12/93

Client: WDOE
QC Report No: D477-WDOE
Project No: Toft Dahl Drums

VTSR: 04/08/93

Data Release Authorized: Mark Hartt
Report preparted: 04/16/93 MAC:GaT

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	No UNKNOWN pks >10% IS peak height	VOA	-	-
2					
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ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Sample: 158025

Lab ID: D477-F
Matrix: Waters

QC Report No: D477 - WDOE
Project: Toft Dahl Drums

Data Release Authorized: _____ VTSR: 04/08/93
Report: 04/28/93 MAC:GaT

Instrument: FINN 3
Date Analyzed: 04/12/93

Amount Purged: 5.0 ml
Conc/Dilution: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	**Methylene Chloride**	**1.5 J**
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	1.0 U
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	Trans-1,2-Dichloroethene	1.0 U
156-59-2	Cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	1.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U

CAS Number		µg/L
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	1.0 U
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	1.0 U
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	1.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	1.0 U
108-90-7	Chlorobenzene	1.0 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
1330-20-7	Total Xylenes	2.0 U
75-69-4	**Trichlorofluoromethane**	**4.1**
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U

Surrogate Recoveries

d8-Toluene	94.8%
Bromofluorobenzene	94.9%
d4-1,2-Dichloroethane	98.5%

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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Matrix: Waters **Sample No: 158025**

Lab ID: D477-F
Instrument: FINN 3
Date Analyzed: 04/12/93

Client: WDOE
QC Report No: D477-WDOE
Project No: Toft Dahl Drums

VTSR: 04/08/93

Data Release Authorized: _____
Report preparted: 04/16/93 MAC:GaT

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	No UNKNOWN pks >10% IS peak height	VOA	-	-
2					
3					
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ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Sample: 158020
MATRIX SPIKE

Lab ID: D477-AMS
Matrix: Waters

QC Report No: D477 - WDOE
Project: Toft Dahl Drums

Data Release Authorized: VTSR: 04/08/93
Report: 04/16/93 MAC: GaT

Instrument: FINN 3
Date Analyzed: 04/15/93

Amount Purged: 5.0 mL
Conc/Dilution: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	Methylene Chloride	2.0 U
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	-
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	Trans-1,2-Dichloroethene	1.0 U
156-59-2	Cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	1.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U

CAS Number		µg/L
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	-
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	-
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	1.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	-
108-90-7	Chlorobenzene	-
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
1330-20-7	Total Xylenes	2.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U

Surrogate Recoveries

d8-Toluene	104%
Bromofluorobenzene	104%
d4-1,2-Dichloroethane	105%

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ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Sample: 158020
MATRIX SPIKE DUPLICATE

Lab ID: D477-AMSD
Matrix: Waters

QC Report No: D477 - WDOE
Project: Toft Dahl Drums

Data Release Authorized: VTSR: 04/08/93
Report: 04/16/93 MAC: GaT

Instrument: FINN 3
Date Analyzed: 04/15/93

Amount Purged: 5.0 mL
Conc/Dilution: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	Methylene Chloride	2.0 U
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	-
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	Trans-1,2-Dichloroethene	1.0 U
156-59-2	Cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	1.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U

CAS Number		µg/L
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	-
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	-
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	1.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	-
108-90-7	Chlorobenzene	-
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
1330-20-7	Total Xylenes	2.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U

Surrogate Recoveries

d8-Toluene	101%
Bromofluorobenzene	102%
d4-1,2-Dichloroethane	102%

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ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Sample: Method Blank

Lab ID: MB0412
Matrix: Waters

QC Report No: D477 - WDOE
Project: Toft Dahl Drums

Data Release Authorized: _____ VTSR: NA
Report: 04/16/93 MAC: GaT

Instrument: FINN 3
Date Analyzed: 04/12/93

Amount Purged: 5.0 mL
Conc/Dilution: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	Methylene Chloride	2.0 U
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	1.0 U
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	Trans-1,2-Dichloroethene	1.0 U
156-59-2	Cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	1.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U

CAS Number		µg/L
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	1.0 U
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	1.0 U
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	1.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	1.0 U
108-90-7	Chlorobenzene	1.0 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
1330-20-7	Total Xylenes	2.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U

Surrogate Recoveries

d8-Toluene	97.8%
Bromofluorobenzene	98.1%
d4-1,2-Dichloroethane	91.0%

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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Matrix: Waters **Sample No: Method Blank**

Lab ID: MB0412
Instrument: FINN 3
Date Analyzed: 04/12/93

Client: WDOE
QC Report No: D477-WDOE
Project No: Toft Dahl Drums

VTSR: NA

Data Release Authorized: _____
Report prepared: 04/16/93 MAC:GaT

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	No UNKNOWN pks >10% IS peak height	VOA	-	-
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
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ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS

Sample: Method Blank#2

Lab ID: MB0415
Matrix: Waters

QC Report No: D477 - WDOE
Project: Toft Dahl Drums

Data Release Authorized: _____ VTSR: NA
Report: 04/16/93 MAC: GaT

Instrument: FINN 3
Date Analyzed: 04/15/93

Amount Purged: 5.0 mL
Conc/Dilution: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.0 U
74-83-9	Bromomethane	2.0 U
75-01-4	Vinyl Chloride	2.0 U
75-00-3	Chloroethane	2.0 U
75-09-2	Methylene Chloride	2.0 U
67-64-1	Acetone	5.0 U
75-15-0	Carbon Disulfide	1.0 U
75-35-4	1,1-Dichloroethene	1.0 U
75-34-3	1,1-Dichloroethane	1.0 U
156-60-5	Trans-1,2-Dichloroethene	1.0 U
156-59-2	Cis-1,2-Dichloroethene	1.0 U
67-66-3	Chloroform	1.0 U
107-06-2	1,2-Dichloroethane	1.0 U
78-93-3	2-Butanone	5.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	1.0 U
108-05-4	Vinyl Acetate	1.0 U
75-27-4	Bromodichloromethane	1.0 U
78-87-5	1,2-Dichloropropane	1.0 U

CAS Number		µg/L
10061-01-5	cis-1,3-Dichloropropene	1.0 U
79-01-6	Trichloroethene	1.0 U
124-48-1	Dibromochloromethane	1.0 U
79-00-5	1,1,2-Trichloroethane	1.0 U
71-43-2	Benzene	1.0 U
10061-02-6	trans-1,3-Dichloropropene	1.0 U
110-75-8	2-Chloroethylvinylether	1.0 U
75-25-2	Bromoform	1.0 U
108-10-1	4-Methyl-2-Pentanone	5.0 U
591-78-6	2-Hexanone	5.0 U
127-18-4	Tetrachloroethene	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U
108-88-3	Toluene	1.0 U
108-90-7	Chlorobenzene	1.0 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	1.0 U
1330-20-7	Total Xylenes	2.0 U
75-69-4	Trichlorofluoromethane	2.0 U
76-13-1	1,1,2-Trichlorotrifluoroethane	2.0 U

Surrogate Recoveries

d8-Toluene	103%
Bromofluorobenzene	104%
d4-1,2-Dichloroethane	92.2%

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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Matrix: Waters

Sample No: Method Blank #2

Lab ID: MB0415
Instrument: FINN 3
Date Analyzed: 04/15/93

Client: WDOE
QC Report No: D477-WDOE
Project No: Toft Dahl Drums

VTSR: NA

Data Release Authorized: _____
Report preparted: 04/16/93 MAC:GaT

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	No UNKNOWN pks >10% IS peak height	VOA	-	-
2					
3					
4					
5					
6					
7					
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9					
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WATER VOLATILE SURROGATE RECOVERY

ARI Job No: D477

Client: WDOE
Project: Toft Dahl Drums

Client Sample ID	S1 (TOL)	S2 (BFB)	S3 (DCE)	Other	TOT OUT
Method Blank 04/12	97.8	98.1	91.0		0
158020	95.9	98.4	99.7		0
158021	96.6	96.3	98.3		0
158022	92.0	99.4	102		0
158023	94.7	99.4	98.0		0
158024	95.6	95.9	101		0
158025	94.8	94.9	98.5		0
Method Blank 04/15	103	104	92.2		0
158020 MS	104	104	105		0
158020 MSD	101	102	102		0

	QC LIMITS
S1 (TOL)=Toluene-d8	(88-118)
S2 (BFB=Bromofluorobenzene	(86-115)
S3 (DCE)=1,2-Dichloroethane-d4	(76-114)

Asterisked values outside QC Limits

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WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

ARI Job No: D477-A

Client: WDOE
Project: Toft Dahl Drums

Sample No: 158020

COMPOUND	SPIKE ADDED (µg/L)	SAMPLE CONC (µg/L)	MS CONC (µg/L)	MS % REC	QC LIMITS REC
1,1-Dichloroethene	50.0	0.0	56.7	113	61-145
Trichloroethene	50.0	0.0	53.4	107	71-120
Benzene	50.0	0.0	53.4	107	76-127
Toluene	50.0	0.0	57.9	116	76-125
Chlorobenzene	50.0	0.0	58.1	116	75-130

COMPOUND	SPIKE ADDED (µg/L)	MSD CONC (µg/L)	MSD % REC	% RPD	Q C LIMITS RPD	Q C LIMITS REC
1,1-Dichloroethene	50.0	53.6	107	5.5	14	61-145
Trichloroethene	50.0	50.9	102	4.8	14	71-120
Benzene	50.0	53.1	106	0.9	11	76-127
Toluene	50.0	50.4	101	*14	13	76-125
Chlorobenzene	50.0	51.5	103	12	13	75-130

RPD: 1 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

Asterisked values outside QC Limits

Comments: *QC Limits taken from CLP OLM01.6 (June 1991)*

Report prepared: 04/16/93 MAC:GAT

MH 4-27-93

FORM III VOA

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VOLATILE METHOD BLANK SUMMARY

ARI Job No: D477
Lab Sample ID: F30412MB
Date Analyzed: 04/12/93

Client: WDOE
Project: Toft Dahl Drums

Instrument ID: FINN 3

Time Analyzed: 11:19

Report Prepared: MAC: GaT

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS,MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Time Analyzed
158020	D477-A	F3D477A	17:30
158021	D477-B	F3D477B	18:00
158022	D477-C	F3D477C	18:31
158023	D477-D	F3D477D	19:02
158024	D477-E	F3D477E	19:33
158025	D477-F	F3D477F	20:03

Comments:

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VOLATILE METHOD BLANK SUMMARY

ARI Job No: D477
Lab Sample ID: F30415MB
Date Analyzed: 04/15/93

Client: WDOE
Project: Toft Dahl Drums

Instrument ID: FINN 3

Time Analyzed: 09:50

Report Prepared: MAC: GaT

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS,MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Time Analyzed
158020 MS	D477-AMS	F3D477AMS	12:22
158020 MSD	D477-AMSD	F3D477AMSD	12:53

Comments: